Net Gain

Final Recommendations
Submission to Natural England & JNCC

31 August 2011

Version 1.2

Net Gain
The North Sea Marine Conservation Zones Project
The Deep Business Centre
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Document version control tables

Build status

Version	Date	Author	Reason / comments	Amended sections
1.0	31st August 2011		Original release - submission to Natural England & JNCC	
1.1	6th September 2011	S Barnard and M Vaughan	Minor corrections & edits	All sections
1.2	2nd July 2012	J Redhead	Minor corrections including spelling, grammatical errors, and edits to improve readability. Amendments previously issued in the addendum have been incorporated. No changes have been made to boundaries or recommendations.	All sections

Amendments in this release

Section title	Amendment summary
All sections including Annexes	Minor corrections and edits.
Section 4, Table 4.1	Incorporation of addendum material into report. Correction of site size for NG13 to 198.75km^2 and NG13a to 0.44km^2. These values were previously transposed.
Section 4, Table 4.3	Inclusion of the geological feature Inner Silver Pit glacial tunnel valley in NG 6.
Section 6, Table 6.1	Incorporation of addendum material into report. Correction of conservation objectives for subtidal coarse sediment, subtidal sand, subtidal mixed sediments broad-scale habitats, and subtidal sands and gravels FOCI to maintain. Inclusion og geological features and recommended conservation objectives.
Section 7, NG 1c	Incorporation of addendum material into report. Correction of area covered by smelt from 36.70km^2 to 12.24km^2.
Section 7, NG5	Incorporation of addendum material into report: 1. Correction of conservation objectives for subtidal coarse sediment, subtidal sand, subtidal mixed sediments to maintain; 2. Inclusion of omitted conservation objective Table 7.33a for subtidal sands and gravels FOCI.
Section 7, NG6	Inclusion of omitted conservation objective Table 7.42a for the geological feature (Inner Silver Pit glacial tunnel valley), revision of Table 7.37 to include feature.
Section 7, NG1b, NG1c, NG2, NG4, NG5, NG8, NG9,	The ecological descriptions have been updated to reflect RSPB feedback received on the Impact Assessment in March 2012.

NG10, NG13, NG14	
Section 7, NG2, NG13, NG13a, RA2a and 2b, RA5, RA9	Addition of existing designations within or adjacent to the recommended site which had previously been omitted from the 'Sites to which this site is related' section.
Annex 2	Incorporation of addendum material into report. All records for NG5 that relate to subtidal sediment features ***and*** to pressures caused by beach replenishment activity have had the 'exposure' field revised to 'not exposed' and the 'Vulnerability Assessment and Conservation Objective' field set to 'Low vulnerability – CO set to maintain'.

Distribution

Copy	Version	Issue date	Issued to
Electronic	1.0	31st August 2011	Natural England; JNCC
Electronic	1.1	6th September 2011	Natural England; JNCC; Defra; Net Gain Regional Project Board; RSG (StAP) Chair
		8th September 2011	Net Gain Website
Electronic	1.2	2nd July 2012	Natural England; JNCC; Defra; Net Gain Regional Project Board

Cover Note

The Net Gain stakeholder engagement process involves a wide range of organisations and individuals interested in or concerned about Marine Conservation Zones (MCZs) in the English North Sea. This Final Recommendation Report represents the work undertaken to date by the Net Gain Regional Stakeholder Group (RSG), which is comprised of four Regional Hubs and a Stakeholder Advisory Panel. It is the collective responsibility of the Regional Stakeholder Group to make MCZ recommendations to Government by 31st August 2011.

We are making this report publicly available to ensure openness and transparency about our work, discussions and developments. We are not, however inviting comments on the report as this is not a public consultation but a participatory planning approach. We are aware that Defra has undertaken to run a public consultation later on in the process, after we have submitted our recommendations.

The report contains within it the agreements, comments and caveats regarding the sites currently under consideration. Merely by having participated in the process, no stakeholder is thereby bound to agree with every statement in the report.

As laid out in the RSG terms of reference, it is the role of the Stakeholder Advisory Panel Chair, Trevor Jameson, to provide final sign off of any submissions to the SAP, JNCC and Natural England.

A note from the Chair of the Stakeholder Advisory Panel, Trevor Jameson:

In my capacity as Chair of the Stakeholder Advisory Panel, I have reflected most carefully on the Netgain project as a whole before signing this final submission.

Throughout, I have observed an inclusive and transparent approach, the knowledge, engagement and commitment of stakeholders being complemented by the tools and framework developed by the project team to facilitate and focus stakeholder discussion and decision making. The manner in which the project team has guided and managed the project has, in my opinion, been exemplary and a model of best practice for future projects of this nature. We are fortunate, indeed, that the controlling bodies have provided the framework for such important conservation issues to be debated and for proposals to be put forward for recommended MCZs.

Given the diverse range of stakeholder interests and the time commitments imposed on the project, it is nothing short of remarkable that such a positive outcome has been achieved. Again, thanks to the professional approach of both stakeholders and the project team.

It has been a privilege for me to be part of the project and with the support of Net Gain stakeholders gained at the Large Group Meeting held on the 19th and 20th July, I have no hesitation in signing this final submission on behalf of the Regional Stakeholder Group.

Chair of the Net Gain Stakeholder Advisory Panel

A note from the Chair of the Regional Project Board, Colin Brown:

When I was first asked to Chair the management Board of Netgain my initial reaction was that everyone else must have already turned it down! It seemed such a complex and potentially divisive proposition that it was difficult to see any way through the labyrinth of passionately held but apparently mutually exclusive agendas which we would face.

The process which was envisaged was also novel and required a leap of faith that would challenge the assumption that for every winner, there must be a loser. Whilst as ever, the timescales and budgets were challenging.

Had I of course known then the calibre of people I would be working with I would not have been at all concerned. I would therefore like to thank the staff at JNCC and Natural England for their support and professionalism, the fellow members of the Board for their wisdom and patience, and most of all Joanna Redhead and her amazing team who have worked longer and harder than anyone could have reasonably asked to bring this project in so successfully.

My hope for the future is that this document will not be the last word on the subject but the first step in a process.

If "The Deep", Hulls Millennium project could have played even a tiny part in establishing a sustainable future for the North Sea and for those communities who depend on it then this will rank as our greatest ever achievement.

Chair of the Net Gain Regional Project Board and Chief Executive of The Deep.

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Supplementary materials

Further materials referred to in this report are available for download from Net Gain's website at www.netgainmcz.org.

Section 1 Executive summary

This report lays out Net Gain's final recommendations for a suite of Marine Conservation Zones (MCZs) within the English North Sea, submitted to the Statutory Nature Conservation Bodies (SNCBs) on the 31st August 2011.

The recommendations have been developed by a Regional Stakeholder Group (RSG) comprised of four Regional Hubs and a Stakeholder Advisory Panel (StAP), and represent the outcome of in excess of 6,000 hours of dedicated stakeholder planning. In developing the recommendations, RSG members have liaised with their wider sectors and feedback has also been sought from Named Consultative Stakeholders at the time of each formal iteration submitted to the Science Advisory Panel.

In total, the RSG have recommended 18 MCZs and 13 Reference Areas covering an area of almost 13,000km^2. Figure 1.1 illustrates the network configuration including sites proposed by Net Gain alongside existing marine protected areas (MPAs). Should all the recommended sites reach designation it would increase the total coverage of MPAs to approximately 30% of the Net Gain project area.

Ecological network guidance design principles of representativity, replication, adequacy, viability and connectivity were met for 19 of the 23 broad-scale habitats found within the Net Gain project area. Each design principle was met for low energy infralittoral rock and subtidal mud with the exception of adequacy, with both habitats falling short of the minimum target extent (by 0.81 km^2 and 83km^2 respectively). Similarly, for subtidal macrophyte-dominated sediment each design principle was met apart from replication, with one more replicate required to attain the target. None of the ecological criteria were met for deep sea mud; within Net Gain there is only 4.69km^2 of available deep sea mud habitat, which following advice from the Science Advisory Panel (SAP), was excluded from stakeholder discussions.

Ecological network guidance design principles of representativity, replication, viability and connectivity were met for 10 of the 14 habitat features of conservation importance (FOCI) within the Net Gain project area. Due to a lack of confidence in the data available for four of the habitat FOCI, replication was not met for sea-pen and burrowing megafauna, and both representativity and replication were not met for horse mussel beds, mud habitat in deep water and tide swept channels. In addition to concern over the quality of data for these FOCI, the Regional MCZ Projects were also advised by the SNCBs that there are no true tide swept channels within our boundaries, effectively preventing discussions on their inclusion.

Of the 12 species FOCI present in the Net Gain project area, representativity was met for the tentacled lagoon worm, ocean quahog, lagoon sand shrimp and starlet sea anemone, with replication only being met for the latter two species. Reasons for failing to meet the criteria include single records for a number of species, poor accuracy of data or a lack of available evidence.

The majority of Net Gain's recommended sites are proposed with a good level of support from the RSG (either a 3 or 4 on a 4 point scale, where 1 was strongly against and 4 was strongly support). Conservation objectives have been drafted for all features at each site, and discussions have been held on potential management measures required to achieve the objectives. There are a limited number of sites for which discussions were not finalised given the time available, which do not form part of the formal recommendations, but are included in Annex 7 for information.

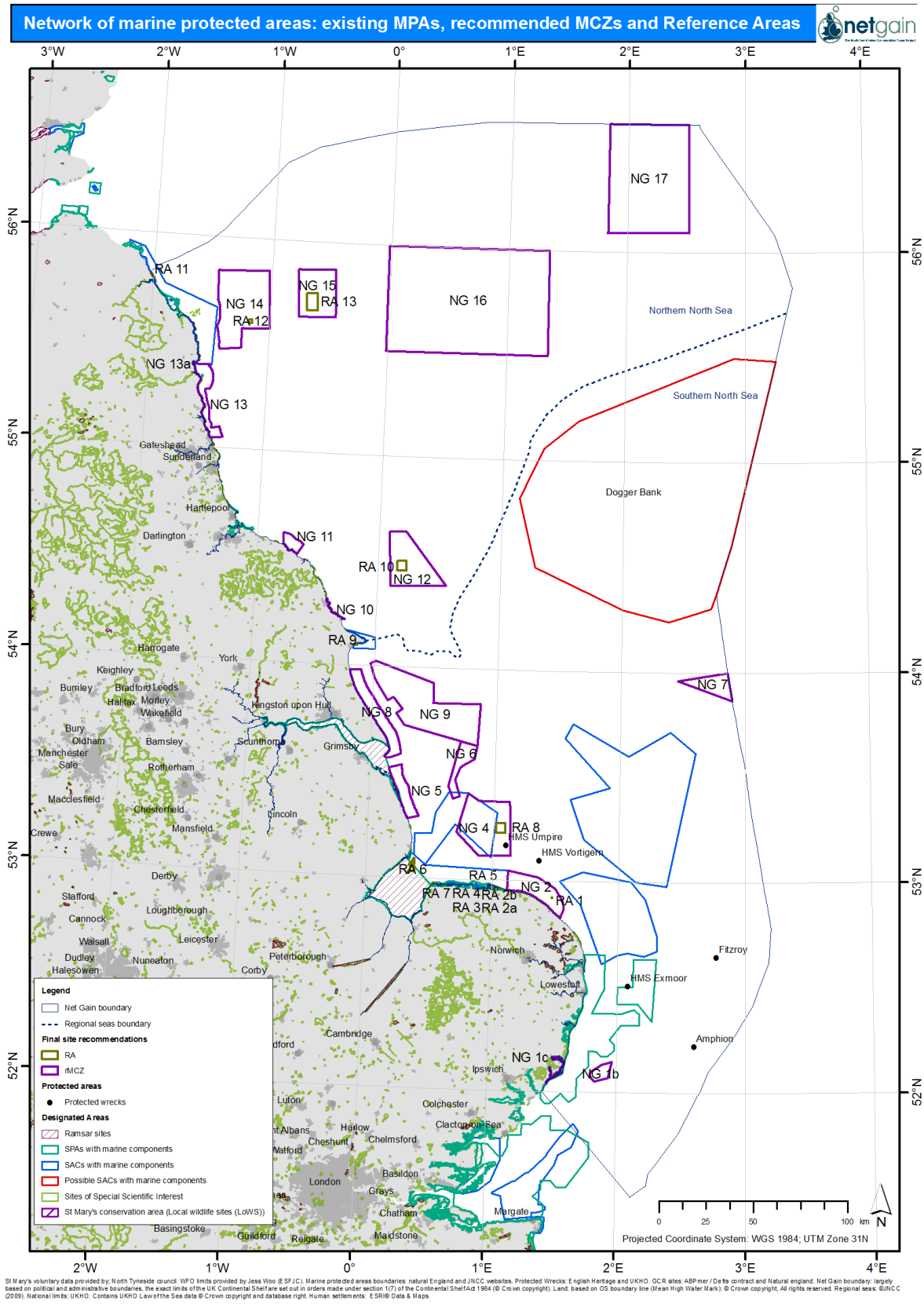


Figure 1.1 Network configuration including existing MPAs and recommended MCZs and RAs.

Section 2 Introduction to the Net Gain Regional MCZ Project area

2.1 Geographic extent of the Net Gain Project

The Net Gain MCZ Project area spans two regional seas; the southern portion of the Northern North Sea (Scottish border to Flamborough Head) and the northern portion of the Southern North Sea (Flamborough Head to Bawdsey, see Figure 2.1). Water depths across this area range from less than 50m in the south to 200m in the north. Most of the region is well mixed by tides and wind throughout the year, and sea surface temperatures vary seasonally, from 4ºC in winter to 19ºC in summer (Defra 2010[1]).

2.2 Ecology and geomorphology

The area covered by the Net Gain Project includes 22 of the 23 broad-scale habitats listed within the Ecological Network Guidance (ENG); missing only examples of subtidal macrophyte-dominated sediment. In addition, the Net Gain Project has 14 habitat features of conservation importance (FOCI) and records for 12 low or limited mobility species FOCI. Of the three highly mobile species FOCI listed in the ENG, smelt and European eel are known to utilise estuaries or inshore coastal waters within Net Gain for key life stages. Protection is afforded to some ENG features by existing designations, including Special Areas for Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Ramsar sites (Natural England, 2011[2]). Under European legislation, these existing Marine Protected Areas (MPAs) conserve additional Annex I and II habitats and species which will therefore generally not require further protection through MCZs.

The coastline in the north is predominantly rocky, interspersed with intertidal sediments in bays and inlets. In the south, the coastline is varied with large expanses of intertidal sands, muds and soft cliffs. The offshore benthic environment comprises large expanses of sands, muds and coarser sediments. Both the Northern and Southern North Sea areas support a diversity of marine species, including marine mammals, birds and commercially important species including some of the most valuable Demersal and Nephrops fisheries in the UK (Defra, 2010). Herring, mackerel and other shellfish fisheries are also commercially important. Fish stock assessments indicate that stocks are not at full reproductive capacity or are not being harvested sustainably. Demersal fish communities appear to be improving in terms of abundance, biomass and species richness, but smaller and opportunistic fish are dominant (Defra, 2010). Fishing activity, particularly bottom (benthic) trawling, is considered to be a major pressure on the marine benthic environment.

2.3 Anthropogenic perspectives

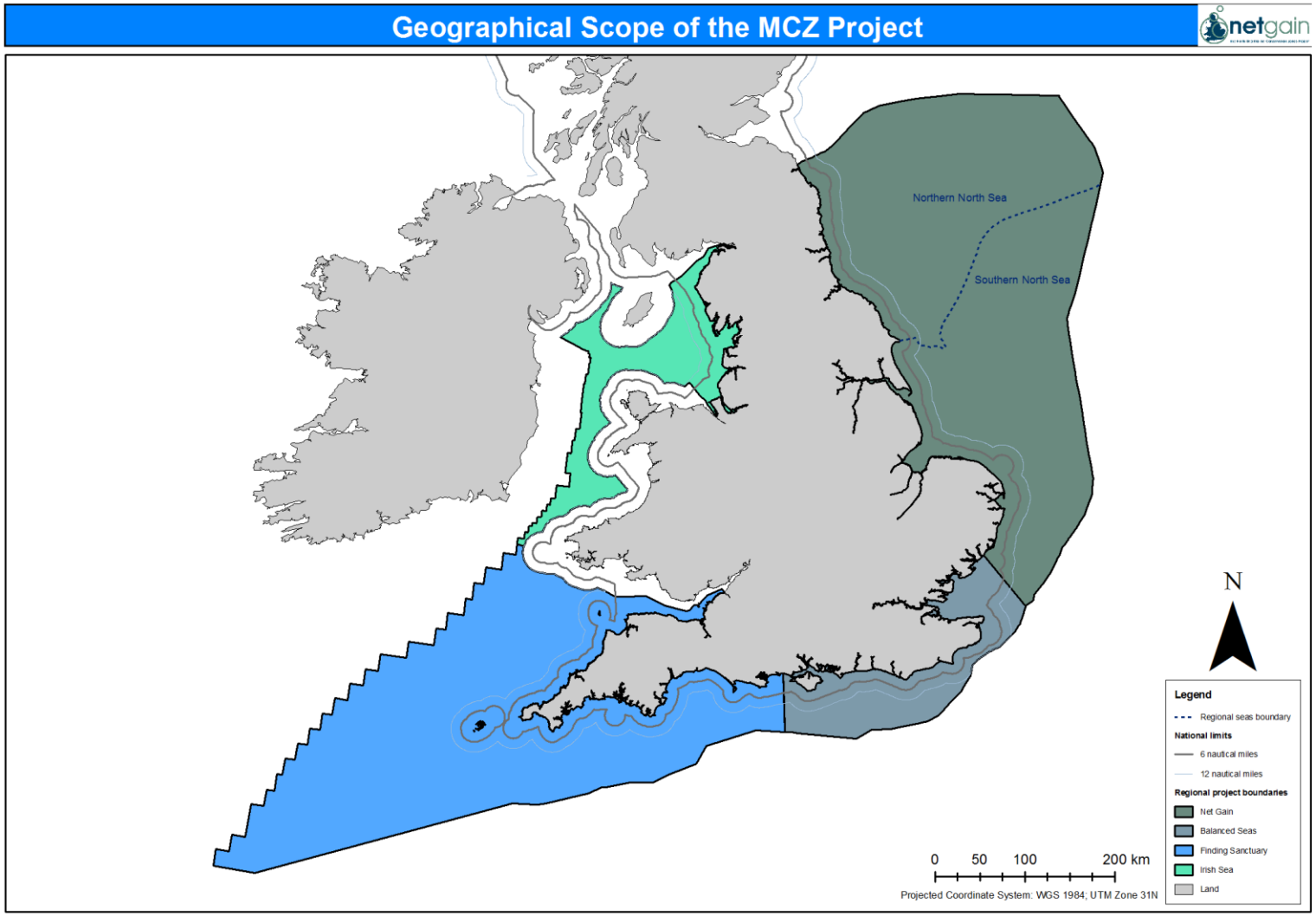
The Net Gain region is extremely important to the oil and gas sectors, the aggregate extraction sector, the renewable energy sector and to shipping (Defra, 2010). Most industries are well regulated but are still considered to be a source of pressure to the marine environment due to the effects of infrastructure, pollution, disturbance, and extractive and depositional activities. The marine environment in the Net Gain area is also important for recreation, supporting local communities and tourism (Defra, 2010).

A recent assessment of the safety and biological diversity of our seas (Defra, 2010) indicated that intertidal habitats are deteriorating in both the Northern and Southern North Sea areas. Sea level rise is of particular concern in the Southern North Sea region; associated with an increased risk of coastal erosion, flooding and loss of intertidal habitats. Rising sea temperature has been linked to

[1] Defra (21010) *Defra Charting Progress 2 – the State of the UK Seas*, http://chartingprogress.defra.gov.uk/

[2] Natural England (2011) *Marine Protected Areas*, http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/default.aspx

changes in plankton production and the plankton community, which may be affecting the marine food web (Defra, 2010). The deterioration of intertidal habitats was also linked to human activities, including land claim, beach litter, shellfish harvesting and the presence of coastal structures. On the contrary, subtidal habitats are generally stable or improving in condition. Subtidal rocky habitats are generally only subject to local pressures such as construction of coastal infrastructure and bottom trawling, whereas subtidal sediments are subject to widespread pressures from aggregate extraction, benthic fishing, pollution and renewable energy infrastructure. The status of estuarine fish was assessed to be improving in the Northern North Sea, but deteriorating in the Southern North Sea, linked to improved water quality and reduced eel recruitment, respectively. Cetacean, grey seal and seabird populations are either stable or increasing in the North Sea. Conversely, harbour seals are decreasing in response to various pressures such as disease, competition, predation, unregulated shooting and declines in prey species. Cleanliness and safety indicators have shown little deterioration in the Net Gain area.



MCZ project boundaries: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: ©JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right.

Figure 2.1 Location of Net Gain and adjacent Regional Seas

Section 3 Engagement with stakeholders: process and delivery

3.1 The Regional Stakeholder Group

The national Project Delivery Guidance provided by the SNCBs to the Regional MCZ Projects called for MCZ recommendations to be made by a representative Regional Stakeholder Group (RSG). In the initial stages of the project it was determined that a single RSG would not be logistically feasible due to the size of the Net Gain project area and length of coast covered. For this reason, the Regional Stakeholder Group (RSG) was established in such a way so as to facilitate stakeholder engagement from the large numbers of individuals and organisations across the project area, allowing for greater representation from each sector, and taking account of regional variations within sectors along the coast.

The Net Gain Regional Stakeholder Group was comprised of a Stakeholder Advisory Panel (StAP) and four Regional Hubs, which operated under a common set of Terms of Reference (a copy of which is provided as Annex 8). While it was the collective responsibility of the Regional Stakeholder Group to make MCZ recommendations to Government, the StAP and Regional Hubs had different roles in the recommendation process.

The four Regional Hubs were where the main focus of the planning work and deliberation over sites took place, representing the real 'hands on' part of the work. Members worked together in facilitated sessions to develop recommendations on MCZs. Regional Hub members made recommendations on the size, location, boundaries and, ultimately, conservation objectives for proposed sites.

The Regional Hubs were complemented by the Stakeholder Advisory Panel (StAP) whose function was to maintain an overview of the work being undertaken in the Regional Hubs, to check for consistency and balance and to bring all the recommendations from the Regional Hubs together before passing them to Defra's independent Science Advisory Panel (SAP) for review and feedback.

In common with the other three Regional MCZ Projects, additional input to the work of the Net Gain RSG was provided by members of the Named Consultative Stakeholders (NCS) group. NCS status allowed regional, national or international stakeholders who may not be able to resource attendance at Regional Hub or StAP meetings to play a less intensive role in the development of MCZ recommendations. At key stages NCS members were asked for views on the MCZ recommendations being developed by the RSG, their comments being recorded and fed into the planning process. However, stakeholders in the NCS category did not play a direct role in the development of MCZ recommendations.

3.2 Establishing the Regional Stakeholder Group

The first step in establishing the RSG involved undertaking a stakeholder analysis; this work was led by independent facilitators, drawing on the expertise of the project team. The outcome was the development of a stakeholder database including organisations and individuals who were felt to have an interest in the project, who could be invited to our initial events.

Roadshows

To raise awareness of the MCZ Project, Net Gain initiated its stakeholder engagement programme by holding a series of 'Roadshow' meetings during January 2010. The roadshows were publicised through local and regional press and trade publications, contacts on the stakeholder database were invited, existing networks were utilised and the liaison officers raised awareness of the events through visits to local stakeholder establishments.

Roadshows were held at six venues across the Net Gain Project area:

- The Dove Marine Laboratory, Cullercoats;
- Whitby Yacht Club, Whitby;
- Scarborough Spa, Scarborough;
- Kings Lynn Town Hall, King's Lynn;
- Orbis Energy Centre, Lowestoft; and
- Humber Seafood Institute, Grimsby.

Two separate meetings were held at each roadshow venue, one in the late afternoon and one in the early evening, to increase opportunities to attend. In each meeting Net Gain gave two presentations. The first of these outlined the project, covering:

- the background to the project (what Net Gain was, why it had been established and the timescales for achieving its objectives);
- what an MCZ is (including how they will operate and what are they intended to achieve); and
- an introduction to the local Net Gain Liaison Officer and how they could be contacted.

The second presentation outlined how and when stakeholders could get involved in the process.

Question and answer sessions were held after each presentation. The key questions (as identified by stakeholders at the time) were answered immediately, with all other questions noted and carried forward. Subsequently all questions were collated and, together with definitive answers, were used to produce a comprehensive 'Frequently Asked Questions' (FAQ) document. This document – which covered nearly 600 questions across 16 broad themes was subsequently made available to stakeholders via the Net Gain website.

All attendees at the roadshow meetings were invited to pass their contact details to Net Gain, and to indicate whether they would be interested in joining the Regional Stakeholder Group. Attendees were also asked to provide contact details for other stakeholders who they felt should be involved, and to make nominations for RSG members. In total, contact details were supplied by 253 roadshow attendees, of which 123 expressed an interest in becoming part of the Regional Stakeholder Group.

Inaugural Large Group Meeting

Following the roadshows an inaugural Large Group Meeting (LGM) was held at the KC Stadium in Hull on the 11th February 2010. Invites were extended to the entire stakeholder database, including those contacts provided to us at the roadshows. This meeting brought together a total of 104 stakeholders, 57 of whom had previously attended one or more of the roadshow events.

The principal aim of the Large Group Meeting was, at the outset of the engagement process, to provide key stakeholders with an opportunity to contribute to shaping the approach being taken. That in turn led to a number of aims, namely to:

- develop a better understanding of MCZs, the role of the Net Gain Project and the approach Net Gain was intending to follow;
- develop a broadly agreed 'first stab' list of possible principles for successful MCZs;
- begin developing the Terms of Reference for the RSG; and
- suggest the sectoral makeup of the Regional Hubs and Stakeholder Advisory Panel and discuss who should be invited to contribute.

The meeting was also important to begin to develop social capital. Stakeholders could begin to get to know each other and to share common concerns, and there would be the opportunity to challenge preconceptions and to understand different perspectives.

3.3 Populating the Regional Stakeholder Group

The roadshows and Large Group Meeting resulted in the identification of a number of potential RSG members through expressions of interest and third-party suggestions. Additional nominations and expressions of interest were also received directly, to either the project team based in Hull or to the Liaison Officers out-posted throughout the Net Gain Project area.

Press articles and communications to stakeholder database contacts, for example the February 2010 Net Gain newsletter (Net News), also highlighted that the RSG membership was still to be decided and provided contact details to allow prospective members to get in touch with the project team.

Whilst the Project aimed to invite as many stakeholders as possible onto the RSG it was necessary to keep membership at a level where it was felt that productive meetings could be held. Membership of the Regional Hubs and StAP was based on a number of criteria.

The number of nominations and the individuals' knowledge of their own and other sectors was clearly important. For Hub members it was important that local interests could be represented, with members having detailed experience of their local and regional environment, and other sea users with an interest in the project. A key requirement on the part of the members was to be able to commit to attend regular meetings, and to keep their wider sectors up to date with the project, establishing effective two way communication so that the views of their sector could be adequately represented. A key aspect on member selection was their ability to deliver on this requirement, to ensure that feedback from as wide a stakeholder group as possible could be incorporated into the project delivery.

StAP membership was more limited than for the Regional Hubs (reflecting the nature of the StAP meeting structure and the role of the group). Consequently, there was need for as little sectoral duplication as possible amongst the membership, and members were required to be as representative as possible in terms of both sector and geography. The objective was to appoint membership to the StAP such that the group would be made up of a limited number of umbrella organisations, associations or key industry stakeholders who were well placed to comment on the outputs of the Regional Hubs and to advise on sectoral issues across the whole of the Net Gain Project area.

Following initial drafting of RSG membership lists, at the request of the National Project Board there was dialogue between the Regional MCZ Project Managers to standardise, so far as appropriate, the sectors represented on the RSG of each Regional MCZ Project. Once the RSG was established, further applications to join were considered on a case by case basis and discussed with existing members.

Regional Hubs

The Regional Hubs were focused in the following areas, although the boundaries were not rigid:

- North East (NE): Scottish Border to Hartlepool
- Yorkshire & Humber (YH): Hartlepool to Grimsby
- Lincolnshire and The Wash (LW): Grimsby to Wells
- East of England (EE): Wells to Suffolk/Essex border

The intention was to have around 40 members on each Regional Hub, representing the range of stakeholder sectors with an interest in the Net Gain Project. Final membership levels varied across the Regional Hubs (the NE Regional Hub has 40 definitive members; with 43 in YH; 30 in LW; and a further 33 in EE) with attendance at each Regional Hub fluctuating across successive meetings. Attendance by Regional Hub members at each meeting is detailed in Annex 3.

Stakeholder Advisory Panel

The StAP comprised 23 members representing a number of umbrella organisations, associations or key national stakeholders who were well placed to comment on their sectors throughout the Net Gain project area as a whole. In order to maintain transparency within the RSG, members from each of the Regional Hubs were also nominated to join the StAP.

The role of the StAP was to provide comment and input on the recommendations being developed, and to feedback to subsequent Regional Hub rounds. This was of particular importance when discussing issues which could only be assessed on the project area scale such as Ecological Network Guidance criteria and cumulative impacts to stakeholders. By following this process, although not involved in the detailed discussions around sites, the StAP were able to influence decisions.

The StAP meetings were not facilitated, instead they were run by an independent Chair, Mr Trevor Jameson, appointed by the Net Gain Regional Project Board. It was the role of the Chair, on behalf of the RSG to sign off the final recommendations.

Working together

The Regional Hubs, StAP, and NCS members, were involved in an iterative process to develop MCZ recommendations following from the initial stakeholder engagement meetings (the roadshows and the LGM). The components of the RSG worked together to produce the MCZ recommendations for the three Iteration reports plus the Draft Final and the Final Recommendation Reports. Overall, the process of stakeholder engagement can be summarised as shown in Figure 3.1.

From an early stage the Project recognised the importance and value of engaging with stakeholders beyond the project boundaries and undertook specific activity to promote this aspect of the Project's work (see Section 3.5, below).

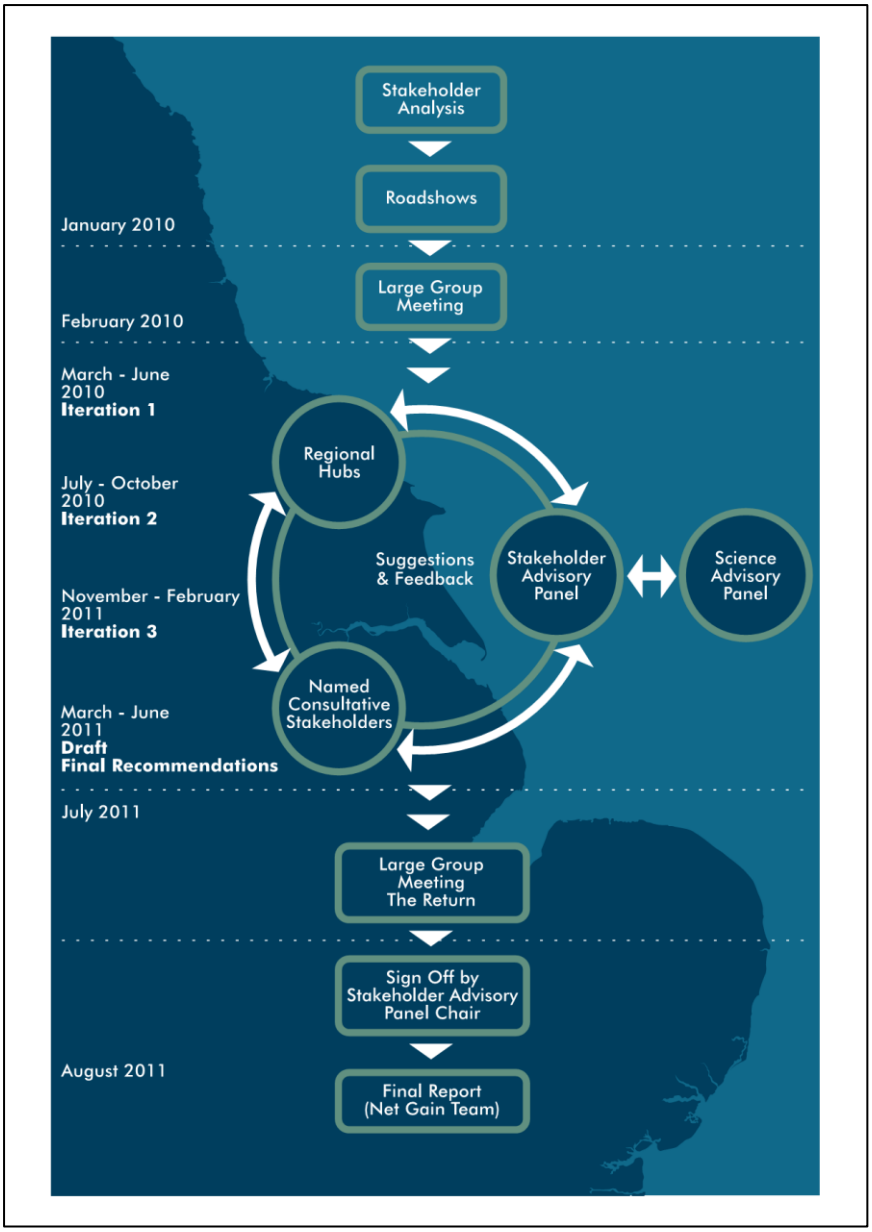


Figure 3.1 Schematic of Net Gain Regional Stakeholder Group engagement

3.4 Overview of stakeholder engagement through the liaison team

Overview of recreational sea angling engagement

Through the course of the Project engagement with recreational sea angling stakeholders was undertaken both by Net Gain's Senior Liaison Officer and five regionally-based Liaison Officers. Together they identified and contacted angling club representatives by email and telephone who were based throughout the project area to set up meetings with their club members with the aim of providing recreational fishing interests with a sound understanding of how the Net Gain Project was structured and how they could become more closely involved (for example, by providing data to the Project).

Meetings were set up throughout 2010 to present to recreational sea anglers with interests in the Net Gain area, and to explain to them what information they could contribute to the Project. After providing an overview of the Net Gain project at these meetings a detailed mapping session of recreational angling activity in the area was carried out. Subsequently the maps were digitised and

the data included in the Regional Profile for use in Regional Hub meetings where areas of interest for possible MCZ identification were being discussed. A total of 12 interviews at club level took place representing 883 club members.

In addition to the meetings held at angling clubs, the Liaison Officers visited various areas along the coast throughout the Net Gain project area where it was known that recreational sea angling and other recreational fishing activities took place. This was to enable the Liaison Officers to reach a wider circle of recreational anglers and recreational fishermen who were not necessarily members of local clubs and to explain to them what Net Gain was set up to achieve and how they could get involved in providing data. The Liaison Officers carried out a total of 254 individual interviews with stakeholders who were not members of angling clubs; 218 of these interviews were with recreational sea anglers and 36 were with stakeholders who held a licence issued by the regional Inshore Fisheries and Conservation Authorities (IFCAS) to carry out commercial fishing methods (netting/potting) on a recreational basis with catch limitations/restrictions.

Net Gain also exhibited at the North East Angling show in November 2010 and April 2011, reaching hundreds of recreational sea anglers at each event.

Overview of commercial fishing engagement

Through the course of the project Net Gain committed significant resource to engagement with local fishing communities. Not only was it recognised that the information collected from commercial fishermen (through the Fishermap work) would be of central importance to the planned Impact Assessment work, but also direct communication with the fishing sector at the grass roots level would ensure that the Project's final outputs would be better understood by stakeholders and would go some way to helping increase stakeholder support for MCZs.

A dedicated team of Liaison Officers visited each port or fishing harbour across the Net Gain Project area and arranged to interview the skippers of fishing vessels. In total 489 vessels across 58 ports or harbours were identified. The extent of the interview programme is summarised below in Table 3.1.

Table 3.1 Summary of commercial fishery engagement within Net Gain

Fishing method	Total number of vessels within Net Gain	Total number of vessels interviewed	Proportion of vessels interviewed
Mobile	129	69	53 %
Static	333	250	75 %
Dual	27	27	100 %
Overall total	**489**	**349**	**72 %**

The data collected through the Fishermap interview process was used to develop GIS data layers showing the intensity of fishing activity (by home port and gear type) across the Net Gain Project area. These data layers could then be used in Regional Hub meetings to help identify where areas being discussed as possible candidates for MCZs may be spatially coincident with commercial fishing activity. The fact that information was collated from over 70% of the fishing fleet suggests that the derived GIS data should be reasonably representative of the overall fleet's activity.

The interview exercise also served to develop links between the Project and those commercial fishermen who were not directly involved on the RSG. During the iterative rounds of report production it was possible to obtain direct feedback from elements of the commercial fishing sector that may otherwise have been poorly represented in the overall Net Gain engagement process.

Overview of international commercial fishing engagement

Through the course of the project, engagement with international fisheries stakeholders was undertaken both by Net Gain's Senior Liaison Officer and by JNCC's Fisheries Liaison Officers. Together they identified and contacted relevant industry representatives from neighbouring European countries to initiate meetings with the wider industry in each country. This was done with the aim of providing non-UK commercial fishing interests with a sound understanding of how the Net Gain Project was structured and how they could become more closely involved (for example, by providing data to the Project).

Both Dutch and Danish fishing representatives were initially contacted by Net Gain in January/February 2010 when potential dates for meetings were discussed. It was later agreed that engagement with all non-UK fishing communities with access to the waters within Net Gain's boundary would be led by the JNCC.

Attendance at a North Sea Regional Advisory Council (RAC) meeting in London in March 2010 provided an opportunity to introduce the Net Gain Project to the RAC members from Denmark, Germany, the Netherlands, Belgium and France. With the exception of Germany, the countries present were interested in being kept up to date with the work of Net Gain and were interested in setting up meetings with the Project. As a result, Belgian, Danish and Dutch fishing representatives were accepted as Named Consultative stakeholders to Net Gain. Following exploration of options for NCS status with national French fisheries representatives, Net Gain was advised that the regional fisheries organisation, CRPMEM Nord - Pas de Calais / Picardie would be the main point of contact for our project, and wished to attend Hub meetings. In addition, representatives from the Dutch and Danish fleets also attended a number of Regional Hub meetings.

Once appointed, the JNCC Fisheries Liaison Officers worked with Net Gain's Senior Liaison Officer to develop a strategy to engage with those non-UK commercial fishers who had shown an interest in providing data to the Project. Net Gain's Senior Liaison Officer and JNCC's Fisheries Liaison Officers held meetings in the Netherlands and Denmark in September 2010 to present to representatives of those commercial fishermen with interests in the Net Gain area, and to explain to them what information they could usefully contribute to the Project.

Fishermen from the Netherlands decided they would feed into the project by appointing a lead (Jurie Romkes) from the North Sea Producers Organisation to gather their information on fishing areas within UK waters. This information was forwarded to JNCC where it was mapped and sent to the four Regional MCZ Projects. In addition to the information received from the Dutch representative via JNCC, Net Gain's Senior Liaison Officer arranged an additional meeting in February 2011 with Pim Visser, the Dutch fishermen's spokesperson (VisNed, the over-arching representative body for Dutch Demersal Fisheries Producer Organisations). This meeting was also attended by Adrie Vonk (an experienced beam-trawl skipper), Conny Loonstra (Policy Officer with VisNed) and Anne-Marie Kats (Spatial Planner with the Pelagic RAC). After providing an overview of the Net Gain project a detailed mapping session of Dutch fishing activity, as it related to the Net Gain area, was carried out. Subsequently this processed information was used in Regional Hub meetings where areas of interest for possible MCZ identification were being discussed.

The Net Gain Senior Liaison Officer also met with a representative of interests in the Danish sand eel fishery (Ole Mortson) who was able to map out the Danish sand eel fishery as it relates to UK waters. In addition, along with visits to various ports along the west coast of Denmark, a number of discussions were held with local fishermen and with Hendrik Lund, the nominated Danish fishing representative. Information was collected on fishing methods and types of vessels used in UK waters which, as for the information from the Netherlands, was made available for use in Net Gain' s Regional Hub meetings. Fisheries data was passed through to Net Gain during October 2011, and was forwarded (via the JNCC Fisheries Liaison Officers) to the other three Regional MCZ Projects and to the Scottish MPA project.

The collation of fishing data from France, Belgium, Germany and Norway was undertaken by the JNCC Fisheries Liaison Officers. The only information relating to Belgian and German fisheries that was received by Net Gain was the Vessel Monitoring System (VMS) dataset obtained by JNCC through DEFRA; no separate mapping exercise was carried out for activities of the commercial fishing fleet from either country.

In December 2010 Net Gain was contacted by national French fishing representatives, who felt unable to complete the data-gathering work which had been requested by JNCC and expressed concern over the subsequent lack of input to the Project by the French fishing fleet. Net Gain contacted Anthony Viera (CRPMEM Nord - Pas de Calais / Picardie) in January 2011 to discuss known French fishing areas within the Net Gain region, and how this information could be accessed. Subsequently in January 2011, Anthony Viera attended the NE Regional Hub and second Large Group Meeting.

The Anglo-Scottish fishing representative on Net Gain's North East Regional Hub was contacted by Net Gain in October 2010 to discuss the possible input to the Net Gain project by Scottish vessel skippers and owners and to outline proposals for Net Gain and JNCC to visit Scottish ports. Subsequent liaison meetings were set up by JNCC in the ports of Eyemouth, Pitanweem and Anstruther (these being the main ports identified as having vessels which fished waters within the Net Gain Project area). The JNCC Fisheries Liaison Officers, together with the Net Gain Senior Liaison Officer, visited these ports to explain the background to the Net Gain Project and to suggest how they could provide information to the Project on the (English) fishing grounds they made use of. Further drop in meetings were arranged by JNCC in these ports in an attempt to gather specific information on the fishing grounds historically worked by the local under-15 metre vessels. However, these meetings were very poorly attended by fishermen and only very limited data were obtained.

Overview of wildlife enthusiasts engagement

Through the course of the Project engagement with wildlife enthusiasts was undertaken by the five regionally-based Liaison Officers.

Due to the wide geographic spread of people throughout the country, the large amount of people who take part in this group of activities, and the limited timescale of the project, it was deemed not to be possible to interview these stakeholders on an individual basis.

The team of Liaison Officers identified and contacted all the known RSPB coastal bird sanctuaries and Wildlife Trust coastal sanctuaries within the Net Gain Project area to arrange meetings with their site managers. These meetings were intended to provide site managers and staff with a sound understanding of how the Net Gain Project was structured and how they, and visitors to their sites, could become more closely involved (for example, by providing data to the Project).

Following these meetings the Net Gain Liaison Officers and site managers agreed that, in order to enable wildlife enthusiasts to have the best input possible into the Project, information leaflets and Liaison Officers' business cards/contact details would be available in the sites' information offices. The leaflets displayed in the site information offices explained the Project and outlined how enthusiasts interested in getting involved could contribute information to the Project (e.g. information on particular areas of activity within the Net Gain area). These leaflets highlighted the web-based GIS tool that had been developed to capture data on peoples' activities throughout the Project area.

In addition to using the web-based GIS platform to capture data submitted by wildlife enthusiasts who visited the Net Gain coastal sites from across the country, 42 separate interviews were carried out by Liaison Officers. One interview was held with staff from a site with approximately 60,000

visitors annually; four interviews were held with club representatives (representing a total of 355 individual members); and 37 further interviews were held with smaller groups or individuals, representing 84 people in total.

3.5 Overview of international MPA project engagement

Two meetings have been held with the Scottish MPA project, in March 2010 and May 2011. These meetings were attended by the project managers of the Net Gain and Irish Sea Conservation Zones Regional MCZ Projects, and representatives from Marine Scotland, the JNCC, Scottish Natural Heritage and Historic Scotland. At each meeting, progress was presented to the Scottish MPA project followed by wider discussions on coordination of work. However, due to differences in adopted approached and timescales, prospects of join up have been limited; the opportunity to provide feedback has however been presented to the Scottish MPA project following the 2nd, 3rd and Draft Final Recommendations through our Named Consultative Stakeholder process.

3.6 Working with the RSG

The schematic shown as Figure 3.1 indicates the iterative nature of meetings held with the different elements of the Project's RSG. Through the period March 2010 to June 2011 a total of six full rounds of Regional Hub meetings were held (24 meetings in all) each round being tied in with meetings of the StAP.

The first, second and fifth Regional Hub rounds consisted of one-day meetings, whilst the third, fourth and sixth rounds consisted of either one-and-a-half or two-day meetings. In total, it is estimated that Net Gain has drawn upon 5,500 hours of stakeholder effort through its Regional Hub meetings alone.

StAP meetings were held after each round of Regional Hubs, to review the outputs and provide guidance and oversight. Through the course of the Project, StAP meetings provided an additional 500 hours of stakeholder effort to the Project.

Dates and stakeholder attendance at each RSG meeting are provided as Annex 3.

Images of stakeholder meetings are presented below as Figure 3.2 and Figure 3.3.

3.7 Development and implementation of methodologies and tools

Net Gain made use of several important methodologies and developed several bespoke tools to facilitate stakeholder engagement with the Project and to both assist and promote the efficient development of a network of MCZ sites which satisfied the requirements of the ENG. These methodologies and tools were important as they not only added value to the process but also contributed significantly to the efficient operation of the RSG meetings. Given their important role in the process followed by Net Gain each of these methodologies and tools are described below.

Figure 3.2 Stakeholders working in a meeting of the Yorkshire & Humber Regional Hub

Figure 3.3 Stakeholders at the second Large Group Meeting (July 2011)

Regional Profiles

The Regional Profiles were developed for the initial round of Regional Hub meetings and were constantly reviewed and updated through the ensuing rounds of meeting. Regional Profiles were available at varying scales to meet the needs of the individual Regional Hubs, as well as for the whole of the Net Gain Project area.

Layers of data from the Project's GIS were reproduced in hard copy format, on both A2 paper and A2 clear acetate sheets. This enabled stakeholders to take a hands-on approach and view several layers

of information at the same time to assess suitable planning areas. For example, it was possible to overlay a paper copy of the underlying broad Scale Habitat of the Regional Hub area with acetates showing existing windfarm developments and commercial fishing activity.

In addition, 'blank' acetates showing only the Regional Hub coastline were provided on which stakeholders could record possible locations of MCZs during their discussions.

Four separate copies of the Regional Profiles for each Regional Hub were produced, so as to allow up to four groups to work simultaneously in any given meeting.

Marxan

The Marxan resource allocation optimisation software was used ahead of the second and third rounds of Regional Hub meetings. Although in both instances their use by members was optional, outputs were presented to members to help initiate discussions on possible MCZ site locations.

Marxan outputs were first presented to the Regional Hubs in the June 2010 meetings. At this time, the project team did not have the full set of ecological data layers to input into the software, only the UK SeaMap 2010 v2 broad scale habitat data and the maximum adequacy targets from the ENG were available. In order to limit the outputs, activity data layers were also used. Fishing intensity, as inferred by Vessel Monitoring System (VMS), logbook and EU vessel register data, provided from 2007 (compiled and provided by Cefas under contract MB0106), was used as an activity (or 'cost') dataset. Marxan was operated so as to optimise its outputs by avoiding areas of such activity. When running the Marxan software current MPAs were positively selected ('conserved'), whilst Round 1 and Round 2 offshore renewable sites were de-selected ('excluded'). In these initial runs a uniform $5km^2$ (hexagonal) grid of planning units was applied to the whole of the Net Gain project area.

A revised Marxan output was presented to the stakeholders in the October 2010 Regional Hubs, after more ecological data had been received by the project. The Marxan outputs were based on the broad scale habitat data, habitats and species FOCI, and accounted for existing MPAs. No attempt was made in this second application of Marxan to account for any socio-economic data.

Adequacy Targets

In order to assist discussions, stakeholders were presented with the adequacy targets for broad scale habitats as outlined in the ENG. Stakeholders were encouraged to address the upper range of the adequacy targets from the ENG, such that they would potentially have more 'room for manoeuvre' during subsequent rounds of meetings should members wish to amend or move boundaries.

Subsequent to the June 2010 meetings, the overall adequacy targets were presented as a proportion specific to each Regional Hub, based on the extent of each habitat within that Hub. This approach focused stakeholder discussions on those habitats represented in their area and also assisted in meeting replication criteria by dividing up the adequacy target across the four Regional Hubs.

As the Project developed, the adequacy targets given to stakeholders were reviewed to incorporate the Gap Analysis work being delivered by the SNCBs. Whilst targets in the second round of meetings were based solely on habitat occurrence within the Project area, the targets being used at the end of the process (e.g. the fifth and sixth rounds of meetings) were able to account for protection given to features within existing or proposed MPAs. This was of particular importance with regard to the need for, and extent of, sites in the vicinity of large MPAs (for example, the Dogger Bank pSAC and the Haisborough, Hammond & Winterton SAC). In turn this meant that the evolving targets (which were generally decreasing as more features could be adequately accounted for within existing or proposed MPAs) had an impact on the development of the overall network.

Draft Compatibility Matrix

Preliminary work done by the Finding Sanctuary Regional MCZ Project provided a high-level indication of what activities would be likely to be compatible with the different broad scale habitat features.

This was presented as a simple colour-coded matrix of a series of key activities against the range of broad scale habitats. Cells in the matrix were coloured green (activity compatible), amber (activity compatible if managed appropriately) or red (activity not compatible).

In later meetings this was replaced with sensitivity and pressure matrices provided by the SNCBs.

Consensus Form

This form evolved from an early 'checklist' of features and adequacy targets produced to help focus discussions in the supplementary Yorkshire & Humber Regional Hub meeting in July 2010 (see Figure 3.4). The Consensus Form was developed for use as a recording tool for the October 2010 Regional Hub meetings (see Figure 3.5). It was recognised that the checklist approach used in the July Yorkshire & Humber Regional Hub meeting had been useful, but the Consensus Form allowed all pertinent discussion points associated with a potential MCZ site to be recorded in a standardised format allowing site-by-site comparisons to be made during plenary work. The Consensus Form also provided adequacy targets specific to each Regional Hub against each broad scale habitat type (as the example shown in Figure 3.5 is 'generic' it does not have these targets shown, being replaced instead with the text 'ABC squares').

The targets were given in terms of the number of 5km x 5km squares that needed to be identified within MCZs to meet the maximum ENG adequacy targets. The Regional Profiles included a small acetate scale with a 5km x 5km grid of squares to assist in visualising how the adequacy targets given in the Consensus Form related to the hard copy charts within the Regional Profile.

In addition, the Consensus Form also provided the group responsible for developing the MCZ proposal with an opportunity to record:

- the consensus view of whether the group supported the site or whether they were against the site, with consensus being recorded on a scale of 1 (strongly against) to 4 (strongly support);
- an indication of the likely level of contention that might be associated with the designation of the site (recorded as L, M or H); and
- a view on the confidence of the underlying data used to develop the site proposals (again, recorded as L, M or H).

The Consensus Form also allowed stakeholders to record additional information on the nature of the site, including other ENG considerations such as information relating to Areas of Additional Ecological Importance (AAEI), additional (non-ENG) features, and activities that may require management.

Finally, under the general title of 'taking the site forward', there was space to record any considerations of what conservation objectives might be applied to the site and any other information (such as assumptions regarding potential management measures or data quality).

A completion/guidance note was also produced to complement the Consensus Form (Figure 3.6). This note was intended to provide Regional Hub members with enough information to allow them to complete the forms with minimal input by Net Gain.

Use of Additional Areas of Ecological Importance data and 'league tables'

AAEI data were presented to RSG members at the earliest opportunity during the planning process. Data were incorporated into the Net Gain GIS and were presented as layers within the Regional Profiles. Throughout the interactive planning sessions stakeholders were encouraged to make use of the AAEI layers to help maximise the ecological benefit of potential sites.

During the October 2010 Regional Hub meetings AAEI within sites under discussion were deliberately captured using the Consensus Forms and used alongside BSH and FOCI data to help prioritise possible sites ahead of plenary discussions. The number of broad scale habitats within a site, the total number of FOCI, and the number of additional considerations supporting site selection (effectively the value of the site in terms of AAEI) were taken together with the level of consensus for the site as recorded by each working group. All these data were normalised (by expressing each value as a percentage of the maximum for that particular measure) and then the results were averaged across sites to provide a single metric with which to rank the full suite of suggested sites. This ranking provided a simple 'league table' of sites which could be used, if required, to help prioritise sites for discussion.

Live GIS

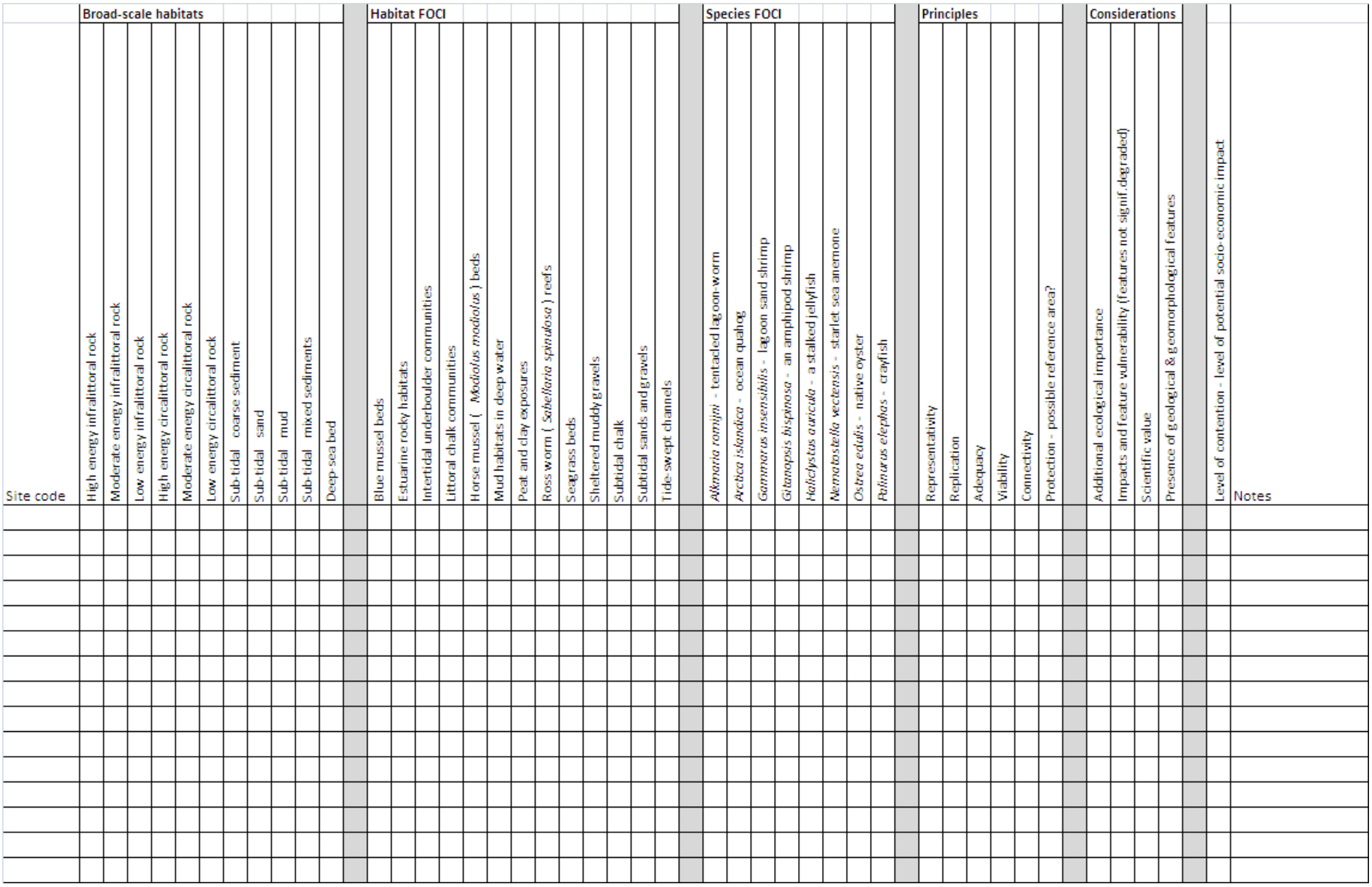
A GIS dedicated laptop was used in meetings to provide full GIS capability to support debate and discussions within the Regional Hubs. This laptop was coupled with an LCD projector and was used to provide fully scalable visual outputs of data held in the Net Gain GIS.

The use of GIS enabled several 'layers' of data to be shown simultaneously (e.g. BSH, offshore windfarm developments, bird foraging areas and specific types of commercial fishing activity). Whilst this was also possible with the hard copy versions provided in the Regional Profiles, the GIS was quicker, clearer and scalable – making it an invaluable tool especially in support of plenary discussions.

FisherMap and StakMap outputs

FisherMap interviews (which collected local data direct from those engaged in the commercial fishing sector) plus interviews from other recreational sea users (e.g. recreational anglers, yachtsmen, charter boat operators) were undertaken by the Net Gain Liaison Officers during the period March to October 2010. Data from these interviews were compiled in the StakMap database which, once completed, was used to produce new GIS data layers showing the intensity of commercial fishing and recreational sea use across the Net Gain Project area.

These data layers were made available within the Regional Profiles ahead of the January 2011 Regional Hub meetings. The commercial fishing data in particular was important as the alternative commercial fishing activity data (based on VMS data) potentially gave an incomplete and biased picture of activity as it only applied to vessels of 15m and over.



	Broad-scale habitats													Habitat FOCI												Species FOCI								Principles							Considerations						
Site code	High energy infralittoral rock	Moderate energy infralittoral rock	Low energy infralittoral rock	High energy circalittoral rock	Moderate energy circalittoral rock	Low energy circalittoral rock	Sub-tidal coarse sediment	Sub-tidal sand	Sub-tidal mud	Sub-tidal mixed sediments	Deep-sea bed			Blue mussel beds	Estuarine rocky habitats	Intertidal underboulder communities	Littoral chalk communities	Horse mussel (*Modiolus modiolus*) beds	Mud habitats in deep water	Peat and clay exposures	Ross worm (*Sabellaria spinulosa*) reefs	Seagrass beds	Sheltered muddy gravels	Subtidal chalk	Subtidal sands and gravels	Tide-swept channels		*Alkmaria romijni* - tentacled lagoon-worm	*Arctica islandica* - ocean quahog	*Gammarus insensibilis* - lagoon sand shrimp	*Gitanopsis bispinosa* - an amphipod shrimp	*Halicystus auricula* - a stalked jellyfish	*Nematostella vectensis* - starlet sea anemone	*Ostrea edulis* - native oyster	*Palinurus elephas* - crayfish		Representativity	Replication	Adequacy	Viability	Connectivity	Protection - possible reference area?		Additional ecological importance	Impacts and feature vulnerability (features not signif.degraded)	Scientific value	Presence of geological & geomorphological features		Level of contention - level of potential socio-economic impact	Notes

Figure 3.4 Site details / consensus pro forma used in the supplementary 2nd round Yorkshire & Humber Regional Hub meeting

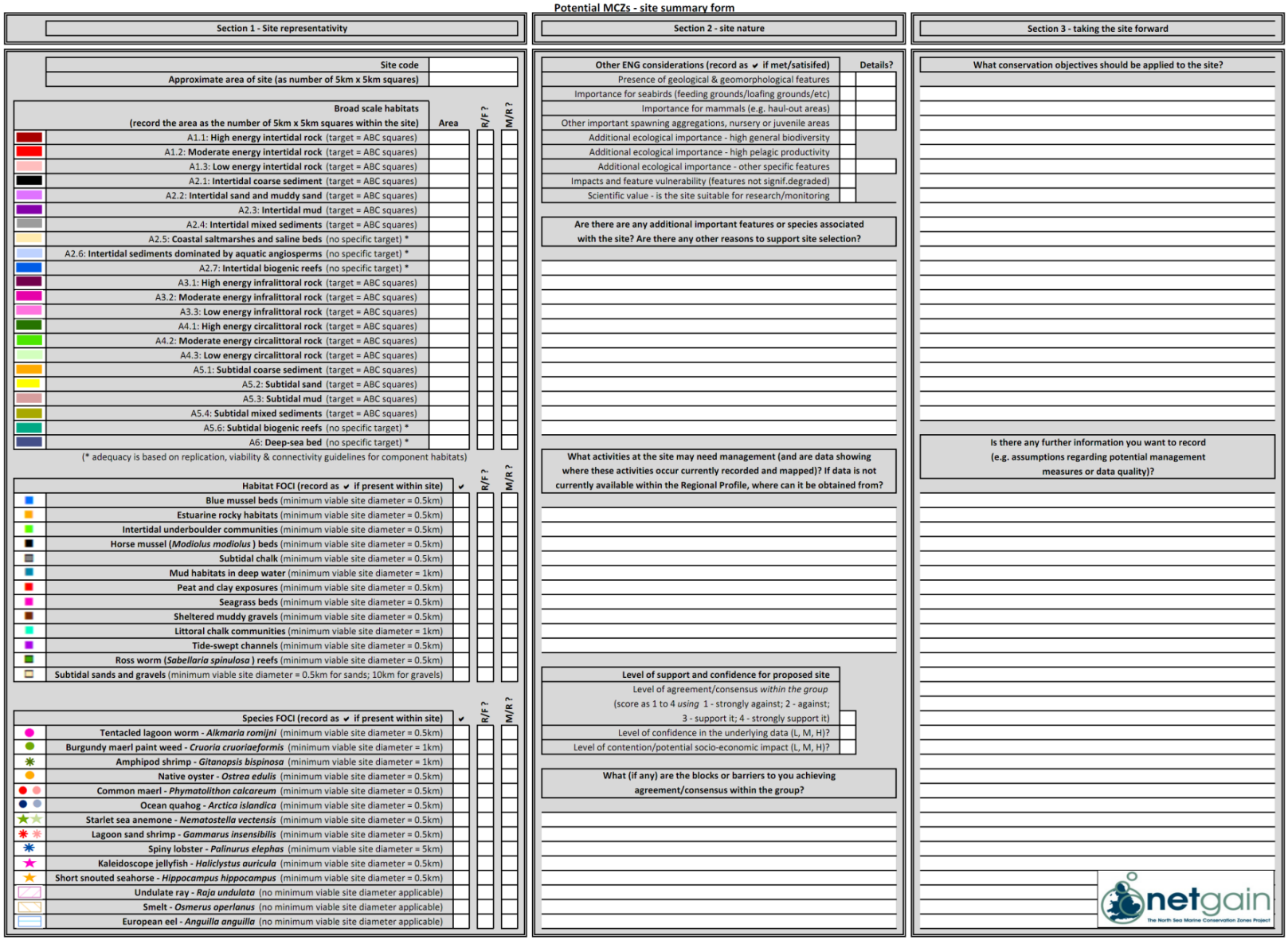


Figure 3.5 Example of Consensus Form as used in the 3rd round of Regional Hub meetings

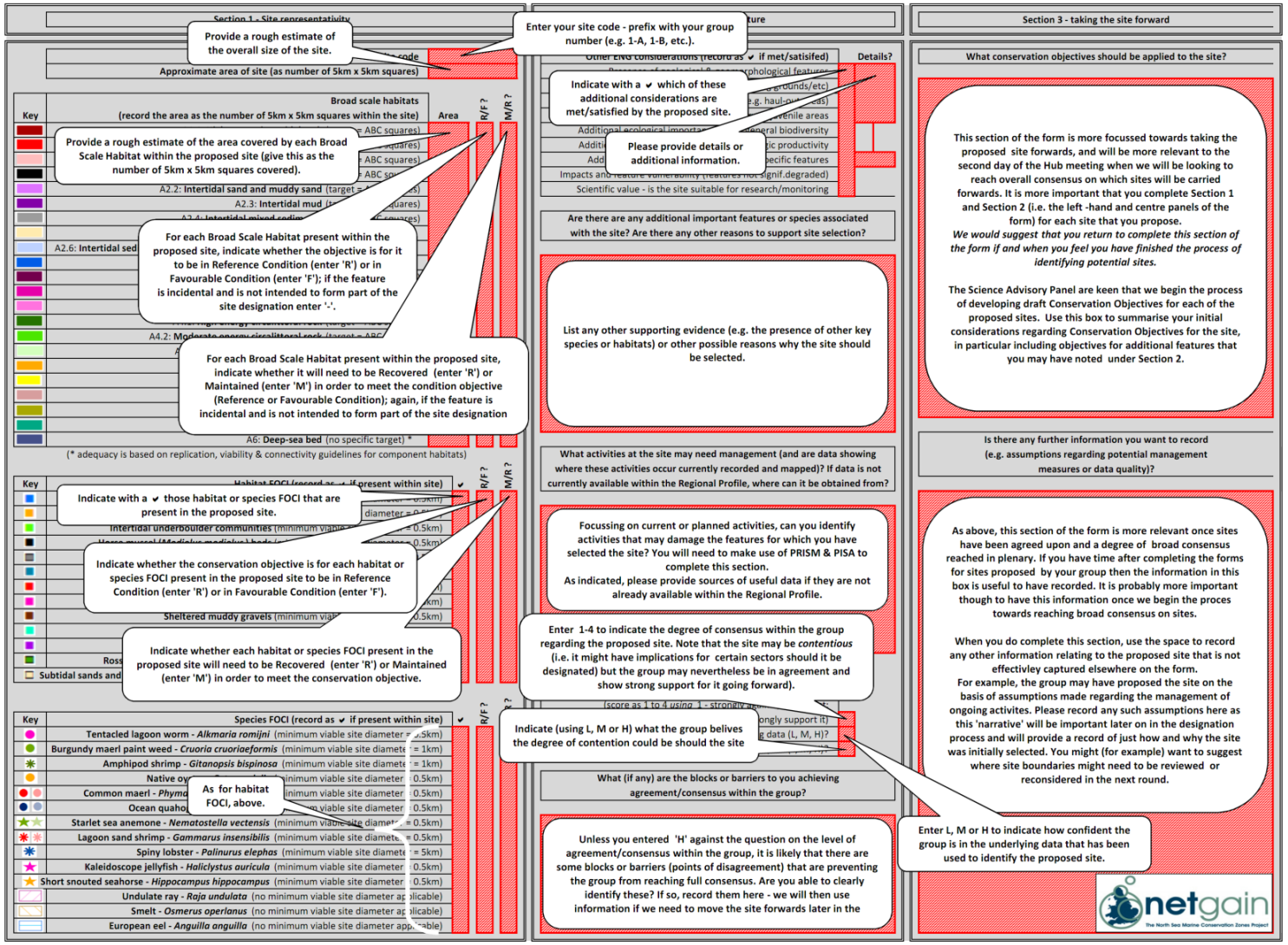


Figure 3.6 Notes used to accompany the Consensus Form

Interactive PDFs

Interactive PDFs were available from the time of the January 2011 Regional Hubs onwards. The Interactive PDFs allowed most of the data layers presented within the Regional Profiles to be viewed without the GIS software. Given the use of the Regional Profiles and the availability of live GIS within the Regional Hub meetings Interactive PDFs were not used extensively within the meetings. However, they were made available to stakeholders outside of the meetings and played an important role in allowing discussions on site location to be continued outside of the formal Regional Hub meeting environment.

PRISM & PISA Access database tools

Delivery of the 'Sensitivity Matrix' (the pressures-MCZ/MPA features matrix) by ABPMer and MarLIN and the associated activities-pressures matrix that was produced by the SNCBs was welcomed by Net Gain as it brought some clarity to discussions over potential management implications. However, it was immediately apparent that the sheer quantity of data was challenging for use in a stakeholder workshop environment. For each of the 108 ENG features the sensitivity matrix work considered 40 pressures (producing 4,320 assessments of sensitivity). Each of the 40 pressures was also assessed against 41 separate activities – giving a total of 177,120 potential feature/pressure/activity combinations to consider.

For stakeholders to be able to make use of this immense dataset, and to extract useable information, a pair of associated Access database reporting tools – PRISM and PISA – were developed by Net Gain.

PRISM - **PR**oducing **I**nformation from **S**ensitivity **M**atrices – was developed to filter the full database in order to identify, in relation to any of the BSH or FOCI features, the subset of activities that may potentially need to be managed post-designation. The software allowed the user to select any BSH or FOCI feature and to undertake an assessment based on any given combination of feature sensitivity to pressures (see Figure 3.7).

The PRISM tool also allowed the user to select any of the activities that it identifies and to display which are the relevant pressures that arise from the selected activity together with their pressure benchmark information (see Figure 3.8).

In a similar manner, PISA - **P**otential **I**mpacts from **S**elected **A**ctivities - was developed to filter the full database in order to identify, in relation to any activity, the subset of BSH or FOCI features that may potentially be affected. The software allowed the user to select any activity and to undertake an assessment based on any given combination of feature sensitivity to pressures (see Figure 3.9).

The PISA tool also allowed the user to select any of the features that it identifies as being potentially affected by an activity and to display which are the relevant pressures that arise from the selected activity together with pressure benchmark information on an activity by activity basis (Figure 3.10).

Development of both of these tools allowed ease of use of the full range of sensitivity and pressure information provided to us, and limited the number of assumptions on management implications being made by stakeholders in their discussions.

STARFISH Access database tool

STARFISH - **S**implified **T**ables for **A**ssessing the need for **R**egulation, using **F**iltered **I**mpacts on **S**pecies and **H**abitats – was developed for use in developing debates around vulnerability assessment (to inform Conservation Objectives) and the possible need for management measures. It is recognised that the outputs from this tool do not automatically indicate a need for regulation, but do suggest

the potential need for some form of management; STARFISH is nevertheless a better acronym than STAMFISH.

The schematic presented as Figure 3.11 provides an illustration of how STARFISH works. Of the range of pressures that potentially affect features within the marine environment, only a subset is relevant to those features known to be actually present at the site (the yellow portion of the figure). Similarly, only a limited number of activities occur at any given site, and again these give rise to a subset of pressures (the blue portion of the figure). Knowing what features are present within a suggested dMCZ, together with what activities occur there, allows the subset of pressures that need to be considered for potential managed (the green portion of the figure) to be identified.

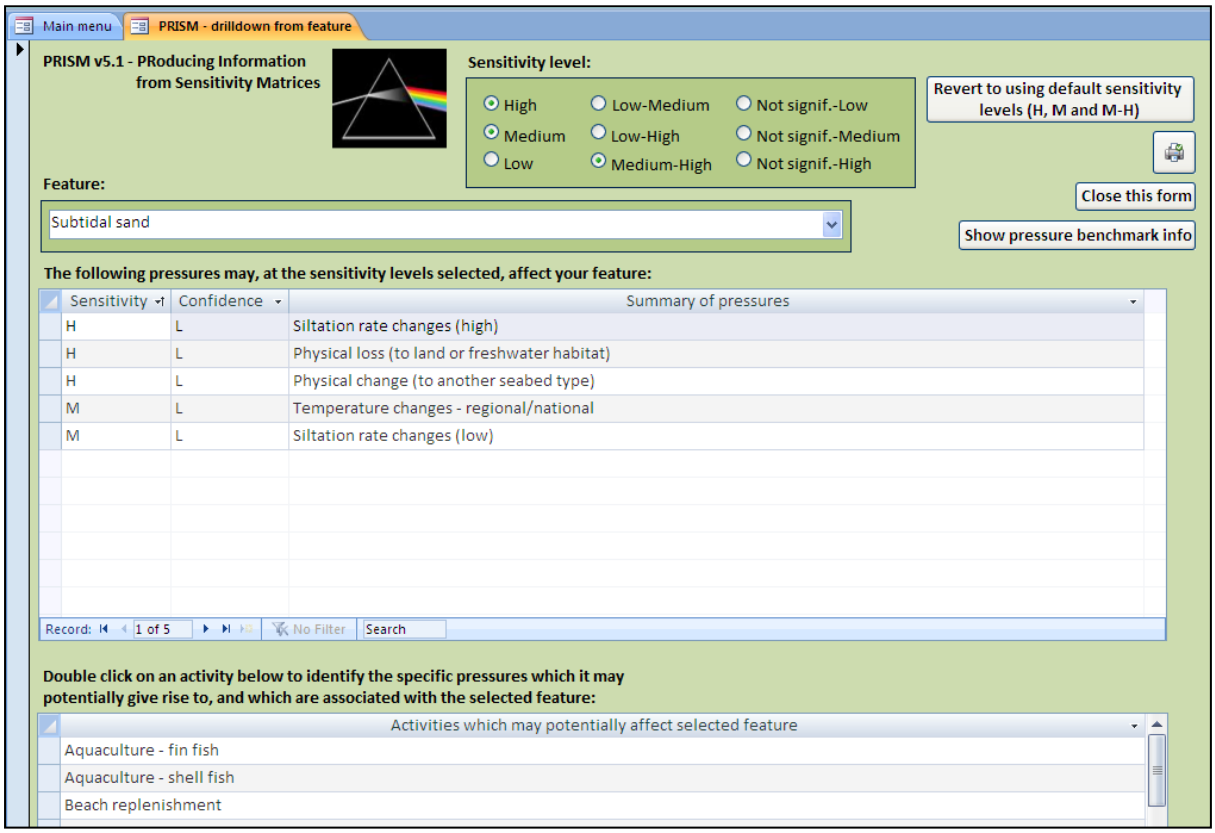


Figure 3.7 Screenshot of the main screen of the PRISM database tool

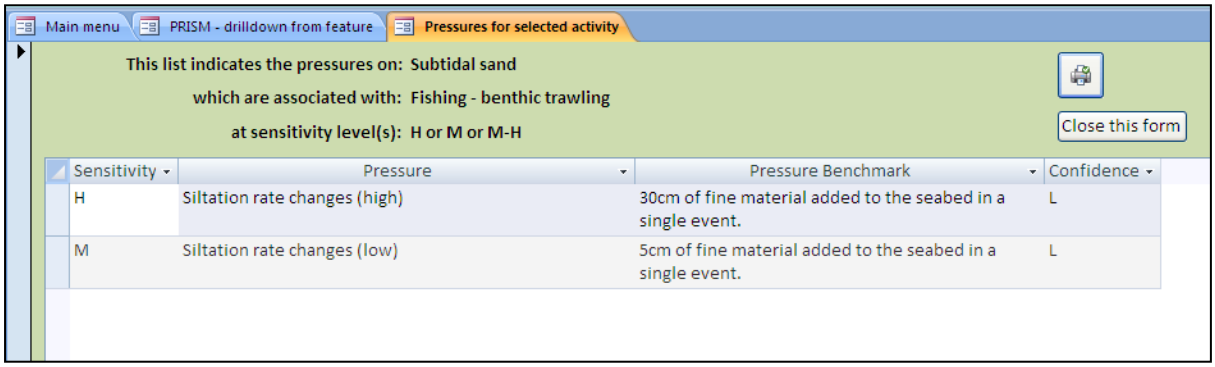


Figure 3.8 Screenshot of detailed output from the PRISM database tool

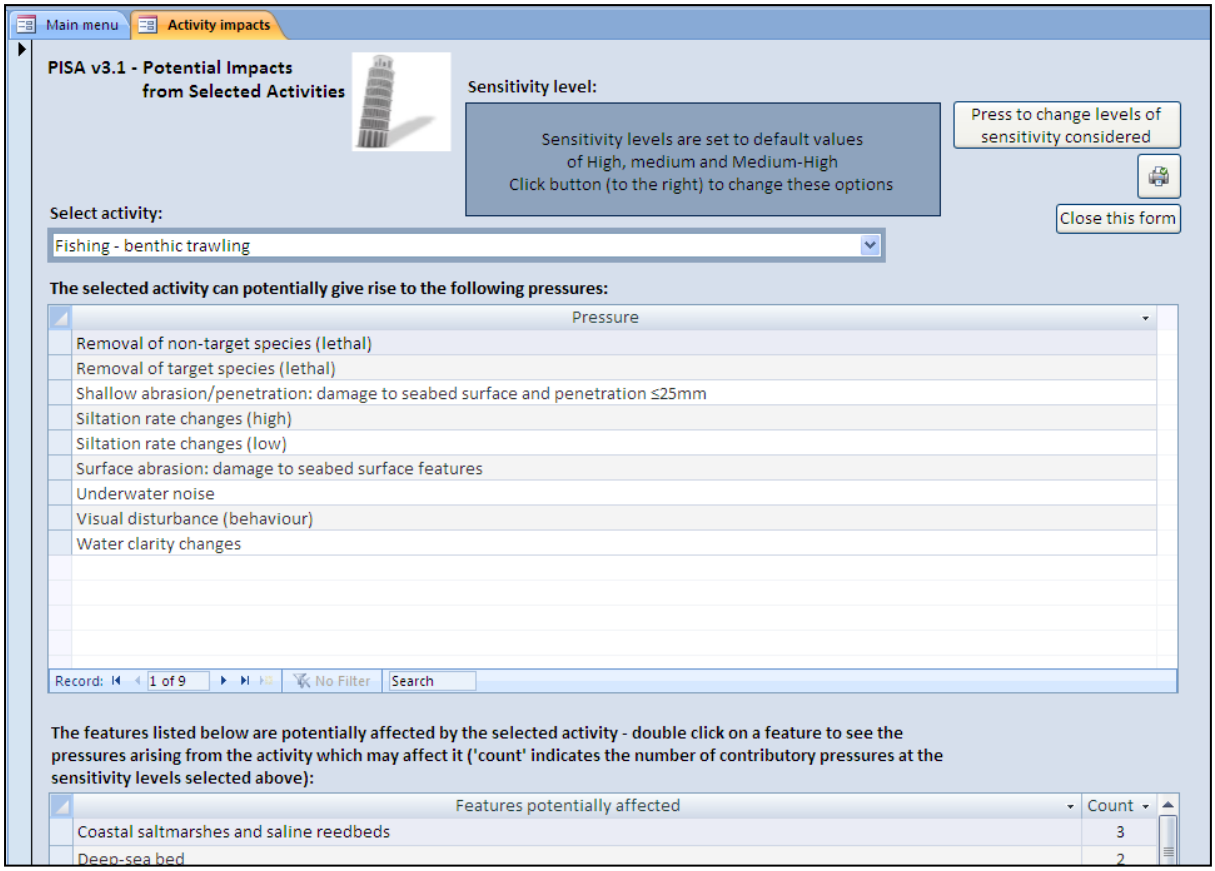


Figure 3.9 Screenshot of the main screen of the PISA database tool

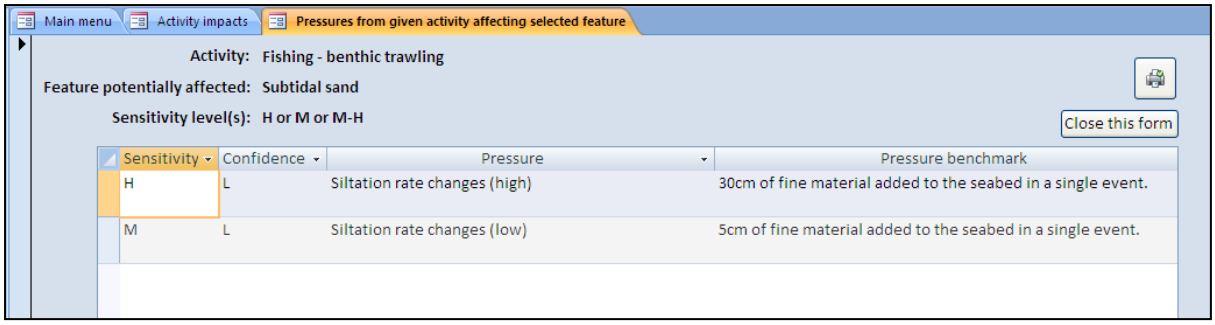


Figure 3.10 Screenshot of detailed output from the PISA database tool

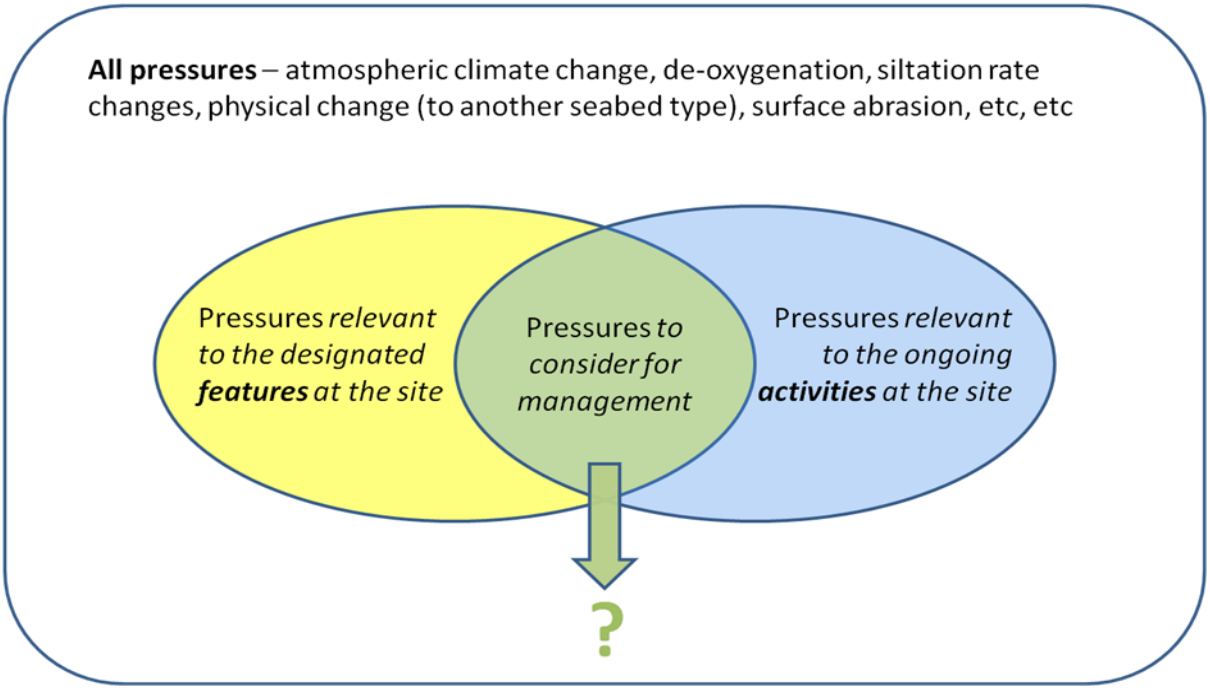


Figure 3.11 Subsets of pressure data for consideration regarding potential management

The main input screen for STARFISH (Figure 3.12) allows the user to select the MCZ being considered. Together with the sensitivity-pressures and pressures-activities data the database also holds information on what features and what activities occur at each of Net Gain's rMCZ sites. This information is used (as described above) to identify those pressures that should be considered for management on a site-specific basis. A number of possible outputs can be selected – see, for example, Figure 3.13. It is also possible to output in matrix format for inclusion in reports (see, for example, Figure 3.14).

STARFISH provided an easy way for Net Gain to identify those activity/pressure combinations that needed to be considered in the Vulnerability Assessment work and helped stakeholders to better understand the process that was subsequently being followed both in the development of Conservation Objectives and also in the discussions around management measures.

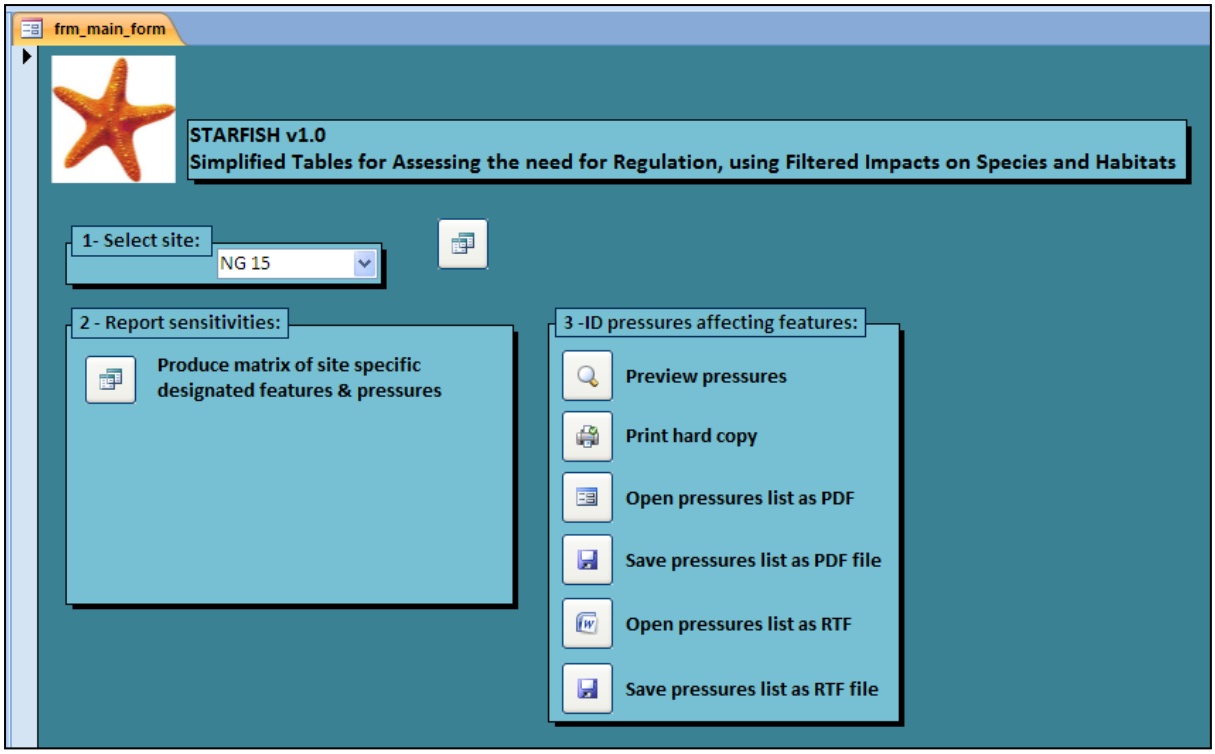


Figure 3.12 Screenshot of the main screen of the STARFISH database tool

Pressures from activities at site NG 15 which may potentially affect site features

Activity	Pressure	Pressure Benchmark	Pressure of activity?
Aquaculture - fin fish	De-oxygenation	Compliance with WFD criteria for good status	ABOVE / BELOW benchmark
Aquaculture - fin fish		Compliance with WFD criteria for good status	ABOVE / BELOW benchmark
Aquaculture - fin fish		Compliance with WFD criteria for good status	ABOVE / BELOW benchmark
Aquaculture - fin fish		Compliance with WFD criteria for good status	ABOVE / BELOW benchmark
Aquaculture - fin fish	Genetic modification & translocation of indigenous species	Translocation outside of geographic area; introduction of hatchery-reared juveniles outside of geographic area from which adult stock derives	ABOVE / BELOW benchmark
Aquaculture - fin fish		Translocation outside of geographic area; introduction of hatchery-reared juveniles outside of geographic area from which adult stock derives	ABOVE / BELOW benchmark
Aquaculture - fin fish		Translocation outside of geographic area; introduction of hatchery-reared juveniles outside of geographic area from which adult stock derives	ABOVE / BELOW benchmark
Aquaculture - fin fish	introduction of light	None proposed	ABOVE / BELOW benchmark
Aquaculture - fin fish		None proposed	ABOVE / BELOW

Figure 3.13 Example of direct output from the STARFISH database tool

Pressure	Designated feature							
	A4_2: Moderate energycirallittoral rock	A5_1: Subtidal coarse sediment	A5_2: Subtidal sand	A5_3: Subtidal mud	A5_4: Subtidal mixed sediments	Ocean quahog - *Arctica islandica*	Ross worm (*Sabellaria spinulosa*) reefs	Subtidal sands and gravels
Atmospheric climate change	NE	NE	NE	NE	NE	NE	NE	NE
Barrier to species movement (behaviour, reproduction)	NE	NE	NE	NE	NE	NS	NE	NE
Death or injury by collision	NE	NE	NE	NE	NE	NS	NE	NE
De-oxygenation	NS	NS	NS	NS	NS	NS	NS	NS
Emergence regime changes (sea level) - regional/national	NE	NE	NE	NE	NE	NE	L	NE
Introduction of light	NA	NA	NA	NA	NA	NA	NA	NA
Introduction or spread of non-indigenous species & translocations (competition)	L-M	NS-M	NS-M	NS-M	L-M	NS	NS	NS-M
Litter	NA	NA	NA	NA	NA	NA	NA	NA

Figure 3.14 Example of formatted output from STARFISH

Vulnerability Assessment tables

To support the development of draft Conservation Objectives and to indicate where management measures might be required an extensive Vulnerability Assessment exercise needed to be undertaken. The detail on this process is provided below (Section 6.1). STARFISH outputs were used to focus work on those feature/pressure/activity combinations pertinent to each site.

The Vulnerability Assessment (VA) tables outlined in the SNCBs guidance on Conservation Objectives were used as a template, and a separate VA table was produced for each feature identified for designation at each site. STARFISH outputs were then used to populate the cells of the table (each pressure/activity combination being assigned to a feature exposure level and a feature sensitivity level. The initial assignment (the 'first-cut') was undertaken by Net Gain with support from the SNCBs, MMO, and IFCAs and the resultant VA tables were then each ground-truthed by stakeholders in the final (sixth) round of Regional Hub meetings.

Site summary booklets (LGM)

Following the final round of Regional Hub meetings in May 2011, RSG members were invited to attend the second Large Group Meeting (LGM). To assist discussions at this workshop, booklets covering Net Gain's network of recommended MCZs and Reference Areas were produced. For each site, the booklets provided:

- a map of the recommended site;
- a list of the ENG features at the site (indicating which features the site was recommended to be designated for, together with Conservation Objectives were appropriate);
- a list of those activities known to occur at the site (and which had been taken into account during the earlier VA work); and
- a précis of additional ecological data on the site.

These summary booklets helped focus debate and provide a standard reference point for decision-making within the LGM.

Feature's exposure to pressure	Feature's sensitivity to pressure			
	High	Moderate	Low	Not sensitive
Exposed	Moderate to high vulnerability	Moderate to high vulnerability	Low vulnerability	Low vulnerability
Low exposure*	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability
Not exposed	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability
Exposure unknown	Unknown vulnerability	Unknown vulnerability	Unknown vulnerability	Unknown vulnerability

* - additional category added to allow for pragmatic judgement

Figure 3.15 Modified VA table

Data: quality assurance and quality control

Quality assurance and quality control processes were followed for data received by the project and for the collation of information derived from the Fishermap interviews. This ensured that data being used and presented by the team was accurate, precise and (as far as possible) could be confirmed by the provider.

- Following the receipt of data and, more specifically, shapefiles:
  Net Gain's GIS team developed a map of the Net Gain region (or part thereof) using the supplied data. This map was returned to the data provider for review, with remedial action (if required) being taken by the GIS team following their response.
- Following the collation of the data from Fishermap questionnaires:
  individual maps of overall fishing activity were created for each area by port and by gear type. These were used by Net Gain's Liaison Officers as the basis for a series of validation meetings that were held with the Fishermap interviewees. At these meetings, confirmation was sought from fishermen that the maps (which, for any given port and gear type, where the amalgamation of several individual responses) were a sound representation of their overall activity. Again, where feedback or comments were made regarding any anomalies or mistakes, amendments to the mapped outputs were made by the GIS team.

3.8 Progress at Regional Hub meetings

Detailed outputs from each Regional Hub meeting were reported on in the weeks following each meeting, with reports being circulated to RSG members and copies being made available for download from the Net Gain website. These reports (see Annex 5) provide a definitive record of the work undertaken at each Regional Hub meeting; a summary of progress made through the six rounds of Regional Hub meetings is provided below.

Round 1 Regional Hub meetings - March 2010

The first round of Regional Meetings introduced members to the Ecological Network Guidance (which at that stage was still under development). This effectively began to set the scene for what work lay ahead for the group.

This round of meetings also concentrated on developing and agreeing a way of working which provided a basis for subsequent work. Outputs were used to help develop the Terms of Reference for both the Regional Hubs and the StAP.

An interactive 'hands-on' session was also included within the meeting which allowed Net Gain to introduce the Regional Profiles to members. It also allowed Regional Hub members to feedback to Net Gain on how the Regional Profiles could be improved (for example, in terms of their ease of use).

The first round of Regional Hub meetings was followed by the first meeting of the StAP (April 2010), which introduced the recommendation process and Ecological Network Guidance, and provided opportunity to review the Terms of Reference and discuss challenges in the work expected.

Round 2 Regional Hub meetings - June 2010

The second round of Regional Hub meetings was preceded with an optional evening session to allow for new members, or members who had been unable to attend the first meeting, to get quickly up to speed on the Ecological Network Guidance and to familiarise themselves with the Regional Profiles for the Hub area.

Practical MCZ identification work at this round of Regional Hub meetings presented members with the option of using outputs from the Marxan optimisation software. For this purpose, Marxan had been deployed using broad scale habitat data, plus data on existing MPAs, existing windfarm developments and Vessel Monitoring System (VMS) monitoring data (2006-7, all gear types). Members were able to choose whether or not to make use of Marxan to help initiate their discussions on potential site size and location. In addition, the developing Gap Analysis was presented to the group (although no firm outputs were available as existing protection levels for features within MPAs had not been accounted for at this stage).

Work in this round of meetings focused on attempting to satisfy adequacy targets for broad scale habitats. The proportional targets were based on each broad scale habitat's abundance within the Regional Hub area and on the Ecological Network Guidance adequacy targets.

Site selection to meet these targets was based on the use of outputs from the Marxan optimisation software and the data presented in the Regional Profiles. The Regional Profiles were used in conjunction with large (A2 size) clear acetates, pre-printed with the Regional Hub's coastline. Potential sites were drawn onto the clear acetates with permanent markers; following the meetings the boundaries of each site recorded on the acetates were digitised and transferred to Net Gain's GIS.

In addition, the meeting involved some group debate around the development of possible measures both for socio-economic impacts of MCZs and for the conservation benefits that should accrue. This was intended to help develop the associated Impact Assessment work.

Although these meetings were very successful, and a number of possible sites were identified, no overall consensus on potential sites was reached between the Regional Hub members present at the meetings. This was largely because of the limited time that was available for members to become familiar with the materials and approaches, and to physically undertake the planning work with the maps. However, members also felt that they did not have full access to the key requisite data sets and/or did not have full confidence in the accuracy of the data that was presented. In particular, Regional Hub members were concerned at the absence of broad scale habitat data from the intertidal zone; the lack of Fishermap data and the consequent reliance on VMS data; the lack of full information from the Gap Analysis; and the absence of detailed information on features' sensitivity to various pressures and on the activities that may give rise to such pressures.

In addition, many Regional Hub members expressed a lack of confidence in some of the key data available to them at this time. Whilst this was especially true of the broad scale habitat data, it was also the case for the VMS data that was presented. Notwithstanding the fact that the VMS data is only applicable to vessels greater than 15m in length (and consequently, by effectively missing out on the majority of the inshore fleet, both under represents and biases the apparent distribution of fishing activity across the Net Gain project area) it was felt that, as the data was collected in 2007, it may not be an accurate representation of the distribution of activity as fishing patterns may well have altered in recent years in response to economic pressures such as rising fuel costs. For these reasons the outputs from the mapping work and planning could not be taken as being representative of potential MCZs but rather only as broad Areas of Interest (BAIs).

The second round of Regional Hub meetings was followed by the second meeting of the StAP (June 2010), in which progress was reviewed and advice was sought from members on the sources of data for socioeconomics and possible indicators to include in the Impact Assessment. This was followed by the submission of the 1st Iteration Report to the SAP (June 2010). Although a decision was taken to base the 1st Iteration Report on the network of existing MPAs within the Net Gain area, the BAIs identified by the Regional Hubs were presented to the SAP as a supplementary report together with an assessment of the contributions they would make in satisfying the requirements of the ENG.

Another meeting of the StAP was held (August 2010) subsequent to the submission of the 1st Iteration Report to receive feedback from the SAP and dicuss implications for Regional Hub planning.

Additional second round meeting – July 2010

Following feedback received from the Yorkshire/Humber hub members after the first of the June 2010 Regional Hub meetings the structure of the subsequent Regional Hub meetings was significantly modified. Given the change in format, it was felt that, in order to maximise the opportunity for members to participate and to help that the group was not in any way disenfranchised, it was appropriate to re-convene and hold a follow up meeting for the Yorkshire & Humber Regional Hub.

As a result, following submission of the 1st Iteration Report, a supplementary meeting was held for the Yorkshire & Humber Regional Hub in July 2010. The format for this meeting was developed by the Net Gain team and incorporated feedback offered by participants during the June Regional Hub meeting and the subsequent StAP meeting.

This meeting represented something of a watershed in the engagement approach taken by Net Gain in that it was the first Regional Hub meeting that was prepared and presented by Net Gain without

the support of independent external facilitators. Subsequently, general feedback was that the meeting had been well planned and delivered and that the attendees had felt that they had been led through the process rather than being 'over facilitated'.

This meeting also introduced an initial version of a proforma to record site details and to help focus discussions to support possible consensus-building. This initial version was developed and expanded, resulting in the comprehensive Consensus Form used during the October 2010 Regional Hub Meetings.

Round 3 Regional Hub meetings - October 2010

The purpose of this round of Regional Hubs was to enable members to develop a long list of Broad Areas of Interest which, through subsequent plenary debate, could be refined to a number of draft MCZs by the close of the meeting. It was intended that these draft MCZs would be submitted in the 2nd Iteration Report to the Science Advisory Panel (SAP) later the same month. Initial thoughts on Conservation Objectives and management implications for these draft MCZs were also to be considered.

The Regional Hubs were advised that, based on feedback received following the previous round of Regional Hub meetings, a number of changes had been made to the format of this round of meetings:

- Extending the meeting from one day to one and a half days. The Regional Hubs were advised this was a compromise between some members wanting one full day and others wanting two. The first day would focus on bringing the Regional Hub up to date with progress and developing a long list of Broad Areas of Interest to meet the ENG requirements, while the second day would focus on reaching consensus on a number of draft MCZs.
- Fewer, but larger tables were used in the meeting to allow for a better mix of sectors on each.
- The Net Gain team delivered the meeting without the use of facilitators, although at this stage the facilitators still worked with the project 'behind the scenes'.

These meetings also introduced the Regional Hub members to several new or refined tools:

- Marxan – a new Marxan analysis was produced and presented by Net Gain based solely on broad scale habitat and habitats and species FOCI (i.e. including only ecological features and excluding socio-economic data);
- A revised Gap Analysis - produced by JNCC/Natural England (suggesting that certain adequacy targets had already been met within existing MPAs);
- PRISM/PISA – a MS Access database developed to provide easy interpretation of the Features/Pressures (sensitivity) and Pressures/Activity matrices; and
- Consensus Forms – to capture the table discussions and to help focus attention on the requirements of the ENG.

All outputs from the first day's work were digitised and loaded to the Net Gain GIS overnight. In addition, all of the information on the Consensus Forms was transcribed; these data being used on the second day to provide a means of structuring and focusing plenary discussions.

The number of broad scale habitats within a site, the total number of FOCI, and the number of additional considerations supporting site selection (effectively the value of the site in terms of AAEI) were taken together with the level of consensus for the site as recorded by the group. All these data were normalised (by expressing each value as a percentage of the maximum for that particular

measure) and then the results were averaged across sites to provide a single metric with which to rank the full suite of suggested sites. This ranking provided a simple 'league table' of sites which could be used, if required, to help prioritise sites for discussion. An example of this is presented below (Table 3.2).

Table 3.2 Example of 'league table' approach for prioritising sites

Site	BSH %	FOCI %	Addtl %	Cons %	Avg %
1A	100	100	33	75	77
2B	75	63	78	75	73
2A	75	13	100	100	72
1E	75	100	11	75	65
3D	25	75	56	75	58
1C	50	38	22	100	52
2F	25	13	67	100	51
2D	25	13	89	75	50
3A	50	75	0	75	50
3C	50	50	22	75	49
2J	25	38	44	75	45
2G	25	25	56	75	45
3B	25	25	56	75	45
1B	50	38	11	75	43
1F	50	38	11	75	43
2E	25	13	56	75	42
2C	25	13	22	100	40
3E	25	0	56	75	39
1D	25	38	0	75	34
2H	25	13	0	75	28

The third round of Regional Hub meetings was followed by the production and submission of the 2nd Iteration Report to the SAP (October 2010) and by the fourth StAP meeting (November 2010), at which the SAP Chair presented initial feedback to the StAP on the 2nd iteration, wider feedback was reviewed, and the Impact Assessment requirements were discussed.

Round 4 Regional Hub meetings - January 2011

The fourth round of Regional Hubs was originally planned for November/December 2010. Unfortunately it was necessary to postpone these meetings at short notice due to adverse weather conditions. The meetings were rescheduled as soon as practicable and were held in January 2011.

This round of meetings was used to further develop the network of sites presented to the SAP in the 2nd Iteration Report. In addition, the feedback to the 2nd Iteration Report from the SAP and from stakeholders was presented. Natural England gave the Regional Hub members an introduction to the SNCBs guidance on Conservation Objectives and Reference Areas.

Once again, Consensus Forms were used to help direct discussions. On this occasion though a slightly modified form was used, as it was possible to pre-populate them with the areas of each broad scale habitat, the presence of FOCI, and other information indicative of additional ecological importance for each of the draft MCZs.

Both PRISM and PISA were available to help inform discussions.

In addition, delegates at this round of meetings produced and voted on potential names for the draft MCZs that had been identified.

This round of Regional Hub meetings was followed by the fifth meeting of the StAP (February 2011) in which progress was reviewed and advice was sought on specific site issues and ENG targets. The 3rd Iteration Report was submitted to the SAP in February 2011.

Round 5 Regional Hub meetings - March 2011

The MMO was invited to attend and present at this round of Regional Hubs, providing useful background information both on the marine planning process and on the processes and options for MMO management measures for MCZs. These two presentations were followed up with question and answer sessions, which were used to feed into a FAQ document that was subsequently produced by the MMO.

In addition, the Regional Hub members engaged in plenary discussions over potential Reference Areas for inclusion in the network, and over possible amendments to MCZ boundaries. The latter topic was discussed in light of the prevailing position in terms of adequacy targets. Where targets were significantly oversubscribed, and site boundaries could be moved to reduce the site size and increase stakeholder support (whilst not having significant detrimental impacts on the ecological value of the site), potential changes were logged. It was intended that these decisions could be reviewed at the start of the next round of Regional Hub meetings.

This fifth round of Regional Hub meetings was followed by the sixth meeting of the StAP (April 2011). Here, the SAP feedback on the 3rd iteration was presented, and areas of search were identified for reference areas for a number of features to assist the Regional Hubs in their planning. The MMO also gave a presentation on management measures.

Round 6 Regional Hub meetings - April/May 2011

The final round of Regional Hub meetings was used initially to confirm changes to site boundaries. In addition plenary discussions were held to confirm the list of features that each of the Regional Hub's sites should be designated for, and to ground-truth the list of activities believed to occur within each site. However, the bulk of the work in this round of meetings focussed on ground-truthing the Vulnerability Assessment first-cut work that had been undertaken by the project team with support from the SNCBs, MMO and IFCAs. Extensive use was made of the completed (draft) Vulnerability Assessment tables for each site/feature combination as produced by the STARFISH software, whilst PRISM and PISA were used to help identify the impacts of other potential activities that had been flagged earlier in the meeting (enabling the Regional Hub to complete additional VA work where necessary).

The Vulnerability Assessment work enabled the Regional Hub to arrive at a series of Conservation Objectives for each site/feature combination, all of which could be agreed by the assembled stakeholders.

Whilst the meetings were held over two days each day dealt with a distinct set of MCZs, focusing on either inshore or offshore sites.

This sixth and final round of Regional Hub meetings was followed by the seventh meeting of the StAP in May 2011. The StAP were presented with maps of the dMCZs, features and conservation objectives and had the opportunity to provide comment for inclusion in the Draft Final Recommendations. The cover note for this report was also drafted.

Following the seventh StAP meeting, the Draft Final Recommendations Report was submitted to the SAP in May 2011. Subsequently, the eighth meeting of the StAP was held in July 2011, mainly to receive the SAP feedback. The StAP were updated on work undertaken by the SNCBs to quality

assure the conservation objectives, and on progress made by the team with public authorities in relation to options for potential management measures. The StAP also had the opportunity to input into the format of the second Large Group Meeting.

Additional Regional Hub meeting – June 2011

Following the submission of the Draft Final Recommendations Report an additional Regional Hub meeting was convened specifically to discuss the development of proposals for a number of Reference Areas off and around the North Norfolk coast.

Delegates for this one day meeting included members of both the Lincolnshire & the Wash and the East of England Regional Hub.

Reference Areas for a number of ENG features were discussed, including:

- Blue mussel beds;
- Sub-tidal chalk;
- Sabellaria/biogenic reefs;
- Starlet sea anemone;
- Peat and clay exposures;
- Saline reed bed;
- Coastal salt marsh; and
- Sea grass beds.

The outputs from this meeting were shared with the wider RSG at the second Large Group Meeting.

Large Group Meeting II – July 2011

A second Large Group Meeting (LGM) was held in July 2011 subsequent to the production and submission of the Draft Final Recommendations report.

This two day meeting was organised for members of both the Regional Hubs and the Stakeholder Advisory Panel and provided an opportunity for the Net Gain Project to further develop stakeholders' understanding of the recommended network of MCZ sites. Stakeholders were presented with the final outputs from the Project (in terms of recommended MCZs and reference areas, together with their associated Conservation Objectives) and Net Gain captured final views on consensus and developed proposals for potential management measures (which would be used to inform the Impact Assessment work that is being undertaken by Net Gain in parallel with the development of the rMCZ network).

The second LGM also presented an opportunity to develop a view of how stakeholders regarded the overall process followed by the Net Gain MCZ Project.

3.9 Stakeholder support

Net Gain has enjoyed strong support from across the RSG throughout the Project. As noted above, the degree to which our RSG members view the Project as making progress was reviewed in our second LGM.

The original parameters and aims for the Net Gain Project, as outlined within the 'Regional Stakeholder Group Terms of Reference' and the 'Principles for Successful Marine Conservation Zones' both of which were developed and agreed by the RSG at the outset of the engagement process, can be summarised as:

"Setting up and running a process whereby:

1. A representative group of regional stakeholders (the RSG) are tasked with drawing up proposals for a regional MCZ network, following a set of ecological design guidelines (the Ecological Network Guidance).

2. There is a structured, coherent and transparent process that allows the RSG to:
    - build up a knowledge base and an understanding of the issues;
    - explore potential solutions to these issues;
    - have a central role in planning the MCZ network;
    - have a process of negotiation and resolution of conflict between differing needs and interests.
3. There is good decision making to identify the optimum location for MCZs and the decisions [on the recommendations put forward] are taken by stakeholders.
4. The process and final recommendations emerging from it are understood by a wide range of stakeholders, especially those who will, or are likely to be impacted by the advent of an MCZ network. This includes stakeholders who have national, regional and local interests.
5. The best available data is used."

Delegates at the second LGM were asked to provide their views on how far each element of this process was met –indicating their response by placing their position along a continuum between 'not met' and 'fully met'. By applying a scale of 0 to 10 to this continuum, responses were converted to scores. The full feedback from this exercise is provided as Annex 9 but a brief summary follows (a value of 0 indicates where expectations over part of the process were not met; a value of 10 indicates that expectations were fully met).

In terms of the degree to which the RSG constitutes a representative group of regional stakeholders responsible for drawing up proposals for a regional MCZ network (and following the Ecological Network Guidance) the delegates at our second LGM returned an average score of 7.1.

In terms of there being a structured, coherent and transparent process the delegates at our second LGM returned an average score of 6.8.

In terms of there being good decision-making to identify the location for MCZs, with decisions taken by stakeholders, the delegates at our second LGM returned an average score of 6.9.

In terms of the process and the final recommendations being understood by a wide range of stakeholders the delegates at our second LGM returned an average score of 7.0.

Finally, in terms of whether the delegates at our second LGM felt that the best available data had been used, delegates returned an average score of 5.7.

In addition, delegates were asked how they rated the support given to them as stakeholders by the Net Gain Project Team, and they rated the value and contribution made by meeting design and support. In terms of support, delegates returned an average score of 8.0; the value and contribution made by meeting design and support (work done by Net Gain without independent facilitators), delegates returned an average score of 7.8.

Section 4 Overview of final recommendations

4.1 Summary of existing Marine Protected Areas in the Project area

This work is being undertaken by the SNCBs and will be delivered separately.

Natural England and JNCC will provide this information to Government in their submission of advice on 16 January 2012.

4.2 Summary of rMCZs

It is Government's intention that the network of existing MPAs will be augmented by a number of MCZs. The Net Gain Regional MCZ Project has identified a number of rMCZs to contribute to this aim, a summary of which is provided below (see Table 4.1 to Table 4.3, below).

In total, Net Gain's Regional Stakeholder Group has developed recommendations for 18 rMCZs, which are proposed for a range of habitats and species within estuaries, coastal zones, and inshore and offshore waters. The largest rMCZ is NG16, Swallow Sand, covering an area of 4746km^2 in the northeast of the project area. The smallest rMCZ is NG13a at 0.44km^2, covering the Aln Estuary on the Northumberland coast. The total extent of all 18 rMCZs is 12,594 km^2.

In addition, the RSG has recommended 13 rRAs, all of which fall within a wider rMCZ or existing marine protected area (or both); in being spatially coincident the RSG felt that edge effects would be minimised on these highly protected sites. The total extent of rRAs is 121km^2; as many rRAs were identified to protect FOCI, they cover smaller overall areas individually than the rMCZs.

Should all Net Gain's recommended sites reach designation it would increase the total coverage of MPAs in the southern and mid North Sea to approximately 30%.

The majority of Net Gains' recommended sites are proposed with a good level of support from the RSG. There are a limited number of sites for which discussions were not finalised given the time available which are not included in our final recommendations. With the exception of three options for additional or alternative Reference Areas (which are detailed separately in Annex 7), the network recommended by Net Gain does not contain configuration 'options'. The process adopted by Net Gain has avoided the inclusion of alternative options within the developing network by evolving the final network from a much larger and less focussed precursor position (see, for example, Annex 4). In this way, stakeholders have been able to focus and fine tune the network to produce a refined set of sites that, together, contribute to meeting the targets of the ENG. Redundancy (and hence the inclusion of 'options') within the network has therefore been avoided.

In addition, any issues of co-location have been considered:

- in the design of the network – where site locations have, in addition to ensuring ecological and conservation aims were met, also considered human activity during stakeholder discussions; and
- in the Vulnerability Assessment work – where potential implications of spatial overlap between proposed sites and areas of human activity were fully considered, and consequently embedded within the production of Conservation Objectives.

Table 4.1 Summary table of rMCZs and features recommended for designation

Site name	Site size	Features recommended for designation
NG 1b, Orford Inshore	71.95km²	A5.4: Subtidal mixed sediments
NG 1c, Alde Ore Estuary	12.24km²	Estuarine rocky habitats Sheltered muddy gravels Smelt
NG 2, Cromer Shoal Chalk Beds	315.64km²	A3.1: High energy infralittoral rock A3.2: Moderate energy infralittoral rock A4.2: Moderate energy circalittoral rock Subtidal chalk
NG 4, Wash Approach	724.52km²	A5.2: Subtidal sand A5.4: Subtidal mixed sediments Subtidal sands and gravels
NG 5, Lincs Belt	175.50km²	A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments Peat and clay exposures Subtidal sands and gravels
NG 6, Silver Pit	168.09km²	A5.2: Subtidal sand A5.4: Subtidal mixed sediments Ross worm (*Sabellaria spinulosa*) reefs Subtidal sands and gravels
NG 7, Markham's Triangle	200.13km²	A5.1: Subtidal coarse sediment A5.2: Subtidal sand
NG 8, Holderness Inshore	307.14km²	A2.4: Intertidal mixed sediments A5.1: Subtidal coarse sediment A5.2: Subtidal sand Peat and clay exposures Subtidal chalk Subtidal sands and gravels Ross worm (*Sabellaria spinulosa*) reefs
NG 9, Holderness Offshore	1,176.10km²	A5.1: Subtidal coarse sediment A5.4: Subtidal mixed sediments
NG 10, Castle Ground	3.70km²	A1.1: High energy intertidal rock A1.2: Moderate energy intertidal rock A1.3: Low energy intertidal rock A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud Intertidal underboulder communities

Continued over ...

Site name	Site size	Features recommended for designation
NG 11, Runswick Bay	67.92km²	A3.1: High energy infralittoral rock A3.2: Moderate energy infralittoral rock A4.1: High energy circalittoral rock A4.2: Moderate energy circalittoral rock A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments Ocean quahog (*Arctica islandica*)
NG 12, Compass Rose	551.56km²	A4.2: Moderate energy circalittoral rock
NG 13, Coquet to St Mary's	198.75km²	A1.2: Moderate energy intertidal rock A1.3: Low energy intertidal rock A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.4: Intertidal mixed sediments A3.1: High energy infralittoral rock A3.2: Moderate energy infralittoral rock A4.2: Moderate energy circalittoral rock A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.3: Subtidal mud A5.4: Subtidal mixed sediments Intertidal underboulder communities
NG 13a, Aln Estuary	0.44km²	A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A3.1: High energy infralittoral rock Estuarine rocky habitats Sheltered muddy gravels Subtidal sands and gravels
NG 14, Farnes East	944.92km²	A4.2: Moderate energy circalittoral rock A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.3: Subtidal mud A5.4: Subtidal mixed sediments Peat and clay exposures
NG 15, Rock Unique	492.07km²	A4.3: Low energy circalittoral rock A5.1: Subtidal coarse sediment A5.2: Subtidal sand Subtidal sands and gravels
NG 16, Swallow Sand	4,746.12km²	A5.1: Subtidal coarse sediment A5.2: Subtidal sand Subtidal sands and gravels
NG 17, Fulmar	2, 437.12km²	A5.1: Subtidal coarse sediment A5.2: Subtidal sand Subtidal sands and gravels Ocean quahog (*Arctica islandica*)

Table 4.2 Summary table of rRAs and features recommended for designation

Site name	Site size	Features recommended for designation
RA 1, North Norfolk Blue Mussel Beds	0.25km²	A3.2: Moderate energy infralittoral rock Blue mussel beds Subtidal chalk Subtidal sands and gravels
RA 2a and 2b, Seahorse Lagoon and Arnold's Marsh	0.05km² 0.09km²	Starlet sea anemone (*Nematostella vectensis*)
RA 3, Glaven Reedbed	0.04km²	A2.5: Coastal saltmarsh and saline reedbeds
RA 4, Blakeney Marsh	1.00km²	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds Littoral chalk communities
RA 5, Blakeney Seagrass	0.03km²	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud Seagrass beds
RA 6, Dogs Head Sandbanks	12.31km²	A2.3: Intertidal mud A5.2: Subtidal sand A5.3: Subtidal mud A5.4: Subtidal mixed sediments A5.6: Subtidal biogenic reefs Ross worm (*Sabellaria spinulosa*) reefs Subtidal sands and gravels Subtidal chalk
RA 7, Seahenge Peat and Clay	0.26km²	A2.2: Intertidal sand and muddy sand A5.2: Subtidal sand Peat and clay exposure Subtidal sands and gravels
RA 8, Wash Approach RA	25.01km²	A5.4: Subtidal mixed sediments Subtidal sands and gravels
RA 9, Flamborough Head No Take Zone	0.94km²	A1.2: Moderate energy intertidal rock A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A3.1: High energy infralittoral rock A3.2: Moderate energy infralittoral rock Littoral rock communities Subtidal sands gravels
RA 10, Compass Rose RA	25.00km²	A4.2: Moderate energy circalittoral rock A5.2: Subtidal sand Subtidal sands and gravels
RA 11, Berwick Coast	0.46km²	A1.1: High energy intertidal rock A1.2: Moderate energy intertidal rock A1.3: Low energy intertidal rock A5.1: Subtidal coarse sediment Intertidal underboulder communities Subtidal sands and gravels

Continued over ...

Site name	Site size	Features recommended for designation
RA 12, Farnes Clay	3.43km²	A4.2: Moderate energy circalittoral rock A5.2: Subtidal sand Peat and clay exposures Subtidal sands and gravels
RA 13, Rock Unique RA	52.49km²	A4.3: Low energy circalittoral rock A5.1: Subtidal coarse sediment A5.2: Subtidal sand Subtidal sands and gravels

Table 4.3 Summary table of geological features included in sites

Site name	Geological Feature	Area of overlap	Present / Recommended
NG 1c, Alde Ore Estuary	Orfordness (subtidal)	12.23km²	Recommended
NG 2, Cromer Shoal Chalk Beds	North Norfolk Coast (subtidal)	14.89km²	Recommended
NG 6, Silver Pit	North Sea Glacial Tunnel Valleys (Inner Silver Pit)	150km²[3]	Recommended
NG 8, Holderness Inshore	Spurn Head (subtidal)	16.11km²	Recommended
NG 16, Swallow Sand	North Sea Glacial Tunnel Valleys (Swallow Hole)	18.44km²	Recommended
RA 4, Blakeney Marsh	North Norfolk Coast (subtidal)	0.96km²	Recommended
RA 5, Blakeney Seagrass	North Norfolk Coast (subtidal)	0.03km²	Recommended
RA 6, Dogs Head Sandbanks	Gibraltar Point (subtidal)	1.30km²	Recommended
RA 7, Seahenge Peat and Clay	North Norfolk Coast (subtidal)	0.26km²	Recommended

Further details on each of the sites in the network are provided within:

- **Section 5**: which shows how the proposed network of rMCZs contributes to meeting the requirements of the ENG;
- **Section 6:** Which outlines the process adopted for developing Conservation Objectives for features within the rMCZs, and which provides a summary overview of these Conservation Objectives; and
- **Section 7**: which provides a complete and detailed account of each rMCZ and rRA in the proposed network (including full Conservation Objectives) in the form of a series of Site Assessment Documents.

[3] [3] The full extent of the feature within the site boundaries is unknown. The extent shown in table 7.37 has been estimated from bathymetry data.

Section 5 Recommended network in relation to the Ecological Network Guidance requirements

5.1 Introduction

In addition to existing MPAs, Net Gain's final marine conservation zone (MCZ) recommendations include a total of 18 MCZs and 13 reference areas that hold a good level of support from the Regional Stakeholder Group (RSG). The Net Gain region covers a total area of 112,270 km², of which 25,064 km² is protected by MPAs (22.3%). The rMCZ network covers 12,715km², 12,594km² from rMCZs and 121km² from rRAs. Details of the discussions and caveats associated with each site along with the conservation objectives for each feature are provided in Section 6. The development of the network and associated maps for each iteration are provided in Section 4.

This section presents analysis of the ENG network design principles of representativity, replication, adequacy, viability and connectivity (Met with an "*" indicates that the target is met as far as possible within the Net Gain region).

Table 5.1 Summary table of Net Gain ENG design principles

Feature	Representativity	Replication	Adequacy
Broad-scale habitats			
A1.1: High energy intertidal rock	Met	Met	Met
A1.2: Moderate energy intertidal rock	Met	Met	Met
A1.3: Low energy intertidal rock	Met	Met	Met
A2.1: Intertidal coarse sediment	Met	Met	Met
A2.2: Intertidal sand and muddy sand	Met	Met	Met
A2.3: Intertidal mud	Met	Met	Met
A2.4: Intertidal mixed sediments	Met	Met	Met
A2.5: Coastal saltmarshes and saline reedbeds	Met	Met	No adequacy target
A2.6: Intertidal sediments dominated by aquatic angiosperms	Met	Met	No adequacy target
A2.7: Intertidal biogenic reefs	Met	Met	No adequacy target
A3.1: High energy infralittoral rock	Met	Met	Met
A3.2: Moderate energy infralittoral rock	Met	Met	Met
A3.3: Low energy infralittoral rock	Met	Met	Not met
A4.1: High energy circalittoral rock	Met	Met	Met
A4.2: Moderate energy circalittoral rock	Met	Met	Met
A4.3: Low energy circalittoral rock	Met	Met*	Met
A5.1: Subtidal coarse sediment	Met	Met	Met
A5.2: Subtidal sand	Met	Met	Met
A5.3: Subtidal mud	Met	Met	Not met
A5.4: Subtidal mixed sediments	Met	Met	Met
A5.5: Subtidal macrophyte-dominated sediment	Met	Not met	Spatial data missing

Feature	Representativity	Replication	Adequacy
A5.6: Subtidal biogenic reefs	Met	Met	No adequacy target
A6: Deep-sea bed	Not met	Not met	No adequacy target
Habitat FOCI			
Blue mussel beds (including intertidal beds on mixed and sandy sediments)	Met	Met	n/a
Estuarine rocky habitats	Met	Met	n/a
Horse mussel (*Modiolus modiolus*) beds	Not met	Not met	n/a
Intertidal underboulder communities	Met	Met	n/a
Littoral chalk communities	Met	Met	n/a
Mud habitats in deep water	Not met	Not met	n/a
Peat and clay exposures	Met	Met	n/a
Ross worm (*Sabellaria spinulosa*) reefs	Met	Met	n/a
Seagrass beds	Met	Met	n/a
Sea-pen and burrowing megafauna communities	Met	Not met	n/a
Sheltered muddy gravels	Met	Met	n/a
Subtidal chalk	Met	Met	n/a
Subtidal sands and gravels	Met	Met	n/a
Tide-swept channels	Not met	Not met	n/a
Species FOCI			
Tentacled lagoon worm (*Alkmaria romijni*)	Met	Not met	n/a
Ocean quahog (*Arctica islandica*)	Met	Not met[4]	n/a
Burgundy maerl paint weed (red seaweed) (*Cruoria cruoiaeformis*)	Not met	Not met	n/a
Lagoon sand shrimp (*Gammarus insensibillis*)	Met	Met	n/a
Amphipod shimp (*Gitanopsis bispinosa*)	Not met	Not met	n/a
Stalked jellyfish (*Haliclystus auricular*)	Not met	Not met	n/a
Short snouted seahorse (*Hippocampus hippocampus*)	Not met	Not met	n/a
Starlet sea anemone (*Nematostella vectensis*)	Met	Met	n/a
Native oyster (*Ostrea edulis*)	Not met	Not met	n/a
Spiny lobster (*Palinurus elephas*)	Not met	Not met	n/a
Common maerl (*Phymatolithon calcareum*)	Not met	Not met	n/a

[4] Discussions held during the July, 2011 LGM suggested that this feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site within NG 6 and this would bring the total replication for Ocean quahog to 3 and meet the ENG target. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.

Feature	Representativity	Replication	Adequacy
Lagoon sea slug (*Tenellis adspersa*)	Not met	Not met	n/a
Mobile species FOCI			
Smelt (*Osmerus eperlanus*)	Met	Not met	n/a
European eel (*Anguilla anguilla*)	Not met[5]	Not met	n/a
Undulate ray (*Raji undulate*)	Not met	Not met	n/a

5.2 Representativity

In order to protect the range of marine biodiversity found in the North Sea, the network of ENG features is required to be represented. This is achieved by grouping species and habitats into broad-scale habitats and features of conservation interest (FOCI). Representativity requires there to be an example of each feature to be present and protected within MPAs, rMCZs and rRAs within each of the Regional MCZ Project areas.

Representativity was met for all broad-scale habitats with the exception of A6: Deep-sea bed, where there is only a very small amount (4.69km²) present within the Net Gain region and the team received recommendation from the SAP to ignore this as a habitat to be conserved.

Representativity was met for all habitat FOCI with the exception of horse mussel beds, mud habitats in deep water and tide swept channels. Representativity for horse mussel beds has not been met because records available are associated with wrecks and it is thought unlikely that the mussels will be forming beds in these locations. In addition to this there is a further lack of data to indicate the presence of horse mussel beds. Representativity for mud habitats in deep water has not been met because of the lack of confidence shown by the RSG regarding the validity of the data. Representativity of tide-swept channels has not been met because all Regional MCZ Projects have been advised that there are no locations within their boundaries that qualify as “Tide-swept channels”.

Representativity for species FOCI was met for the tentacled lagoon worm, ocean quahog, lagoon sand shrimp and starlet sea anemone. General reasons for the other species not meeting representativity include, only a single occurrence available in the data (SAP advice to not recommend species for designation based on a single record), data available associated with man-made structures (SAP advise to avoid designating for such occurrences), data available provides records on land and no data available (e.g. Lagoon sea slug).

Only one mobile species, Smelt (*Osmerus eperlanus*), was recommended as a feature in one site meeting the representativity ENG target for this species. The reason for the other mobile species not meeting ENG targets was due to the lack of confidence in the data layers held by the Net Gain Project, which suggest that mobile species cover a large area within the region. Additional, more accurate information was supplied by the Environment Agency for the distribution of smelt.

[5] Discussions held during the July, 2011 LGM suggested that this feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site within NG 1c and this would meet the ENG requirements for representativity for European eel. For the purposes of Net Gain’s final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.

Table 5.2 Summary table of representativity for broad-scale habitat

Feature	MPA contribution	rMCZ and rRA contribution	ENG requirement met?
Broad-scale habitat			
A1.1: High energy intertidal rock	Met	Met	**Met**
A1.2: Moderate energy intertidal rock	Met	Met	**Met**
A1.3: Low energy intertidal rock	Met	Met	**Met**
A2.1: Intertidal coarse sediment	Met	Met	**Met**
A2.2: Intertidal sand and muddy sand	Met	Met	**Met**
A2.3: Intertidal mud	Met	Met	**Met**
A2.4: Intertidal mixed sediments	Met	Met	**Met**
A2.5: Coastal saltmarshes and saline reedbeds	Met	Met	**Met**
A2.6: Intertidal sediments dominated by aquatic angiosperms	Met	Not met	**Met**
A2.7: Intertidal biogenic reefs	Met	Met	**Met**
A3.1: High energy infralittoral rock	Met	Met	**Met**
A3.2: Moderate energy infralittoral rock	Not met	Met	**Met**
A3.3: Low energy infralittoral rock	Met	Not met	**Met**
A4.1: High energy circalittoral rock	Met	Met	**Met**
A4.2: Moderate energy circalittoral rock	Not met	Met	**Met**
A4.3: Low energy circalittoral rock	Not met	Met	**Met**
A5.1: Subtidal coarse sediment	Met	Met	**Met**
A5.2: Subtidal sand	Met	Met	**Met**
A5.3: Subtidal mud	Met	Met	**Met**
A5.4: Subtidal mixed sediments	Met	Met	**Met**
A5.5: Subtidal macrophyte-dominated sediment	Met	Met	**Met**
A5.6: Subtidal biogenic reefs	Met	Met	**Met**
A6: Deep-sea bed	Not met	Not met	**Not met**

Table 5.3 Summary table of representativity for habitat FOCI

Feature	MPA contribution	rMCZ and rRA contribution	ENG requirement met?
Habitat FOCI			
Blue mussel beds (including intertidal beds on mixed and sandy sediments)	Met	Met	**Met**
Estuarine rocky habitats	Met	Met	**Met**
Horse mussel (*Modiolus modiolus*) beds	Not met	Not met	**Not met**
Intertidal underboulder communities	Met	Met	**Met**
Littoral chalk communities	Met	Met	**Met**
Mud habitats in deep water	Not met	Not met	**Not met**
Peat and clay exposures	Not met	Met	**Met**
Ross worm (*Sabellaria spinulosa*) reefs	Met	Met	**Met**
Seagrass beds	Met	Met	**Met**
Sea-pen and burrowing megafauna communities	Met	Not met	**Met**
Sheltered muddy gravels			
Subtidal chalk	Met	Met	**Met**
Subtidal sands and gravels	Met	Met	**Met**
Tide-swept channels	Not met	Not met	**Not met**

Table 5.4 Summary table of representativity for species FOCI

Feature	MPA contribution	rMCZ and rRA contribution	ENG requirement met?
Species FOCI			
Tentacled lagoon worm (*Alkmaria romijni*)	Met	Not met	**Met**
Ocean quahog (*Arctica islandica*)	Not met	Met	**Met**
Burgundy maerl paint weed (red seaweed) (*Cruoria cruoiaeformis*)	Not met	Not met	**Not met**
Lagoon sand shrimp (*Gammarus insensibillis*)	Met	Not met	**Met**
Amphipod shrimp (*Gitanopsis bispinosa*)	Not met	Not met	**Not met**
Stalked jellyfish (*Haliclystus auricula*)	Not met	Not met	**Not met**
Short snouted seahorse (*Hippocampus hippocampus*)	Not met	Not met	**Not met**
Starlet sea anemone (*Nematostella vectensis*)	Met	Met	**Met**
Native oyster (*Ostrea edulis*)	Not met	Not met	**Not met**
Spiny lobster (*Palinurus elephas*)	Not met	Not met	**Not met**
Common maerl (*Phymatolithon calcareum*)	Not met	Not met	**Not met**
Lagoon sea slug (*Tenellis adspersa*)	Not met	Not met	**Not met**

Table 5.5 Summary table of representativity for mobile species FOCI

Feature	MPA contribution	rMCZ and rRA contribution	ENG requirement met?
Species FOCI			
Smelt (*Osmerus eperlanus*)	No data	Met	**Met**
European eel (*Anguilla Anguilla*)	No data	Not met	**Not met**
Undulate ray (*Raja undulate*)	No data	Not met	**Not met**

5.3 Replication

Replication refers to the protection of the same feature in multiple sites (two sites required for broad-scale habitats and three-five sites required for FOCI) within the network while taking biogeographic variation into account. Replication is important to the network to help decrease the risk of damaging events and long-term change, safeguard against unexpected disasters or collapse of species populations and to ensure natural variation of the features to be captured.

The analysis of counting replicates that were spatially separated required consideration of the replication of each feature in corresponding areas, for example SACs and SSSI that overlap or reference areas that are present within a rMCZ. In each of these cases only one replicate was recorded. For the purposes of the tables "nearly met" refers to the feature only requiring one more replication to meet the ENG target.

Replication for broad-scale habitats has been met for all features with the exception of A5.5: Subtidal macrophyte-dominated sediment which is nearly met and A6: Deep-sea bed. For subtidal macrophyte-dominated sediment the reasons for not meeting replication are due to the lack of the available spatial data for this feature. For deep-sea bed, the reasons are as for representativity where there is only a single discrete patch (4.69km²) present within the Net Gain region and the team has received recommendation from the SAP to ignore this as a habitat to be conserved.

Replications for habitat FOCI have been met for ten habitat FOCI and not met for four (horse mussel (*Modiolus modiolus*) beds, mud habitats in deep water, sea-pen and burrowing megafauna communities and tide-swept channels. Again the reasons for these not being met are similar to those for representativity. Horse mussel beds have not been met because records available are associated with wrecks and it is thought unlikely that the mussels will be forming beds in these locations. In addition to this there is a further lack of data that indicates the presence of horse mussel beds. Replication for mud habitats in deep water and sea-pen and burrowing megafauna communities have not been met because of the lack of confidence shown by the RSG regarding the validity of the data. For tide-swept channels replications have not been met because all Regional MCZ Projects have been advised that there are no locations within the boundaries that qualify as "Tide-swept channels".

Replications for species FOCI have been met for lagoon sand shrimp and starlet sea anemone. Ocean quahog nearly meets the requirements for the ENG targets with one more replicate required. General reasons for not meeting the replication targets are the same as for representativity, which are: only a single occurrence available in the data (SAP advice to not recommend species for designation based on a single record), data available associated with man-made structures (SAP advise to avoid designating for such occurrences), data available provides records on land and no data available (e.g. Lagoon sea slug).

Table 5.6 Summary table for replication of broad-scale habitats

Feature	MPA contribution	rMCZ and rRA contribution	Total number of replicates	ENG requirement met?
Broad-scale habitat				
A1.1: High energy intertidal rock	5	2	**7**	**Met**
A1.2: Moderate energy intertidal rock	4	4	**8**	**Met**[6]
A1.3: Low energy intertidal rock	4	3	**7**	**Met**[6]
A2.1: Intertidal coarse sediment	3	3	**6**	**Met**[6]
A2.2: Intertidal sand and muddy sand	9	6	**15**	**Met**[6]
A2.3: Intertidal mud	11	6	**17**	**Met**[6]
A2.4: Intertidal mixed sediments	3	2	**5**	**Met**[6]
A2.5: Coastal saltmarshes and saline reedbeds	16	3	**19**	**Met**
A2.6: Intertidal sediments dominated by aquatic angiosperms	6	0	**6**	**Met**
A2.7: Intertidal biogenic reefs	2	0	**2**	**Met**[6]
A3.1: High energy infralittoral rock	1	5	**6**	**Met**
A3.2: Moderate energy infralittoral rock	0	4	**4**	**Met**
A3.3: Low energy infralittoral rock	3[7]	0	**3**	**Met**
A4.1: High energy circalittoral rock	1	1	**2**	**Met**
A4.2: Moderate energy circalittoral rock	0	5	**5**	**Met**[6]
A4.3: Low energy circalittoral rock	0	1	**1**	**Met**[8]
A5.1: Subtidal coarse sediment	5	11	**16**	**Met**[6]
A5.2: Subtidal sand	6	13	**19**	**Met**[6]
A5.3: Subtidal mud	4	3	**7**	**Met**
A5.4: Subtidal mixed sediments	3	9	**12**	**Met**[6]
A5.5: Subtidal macrophyte-dominated sediment	1	0	**1**	**Nearly met**
A5.6: Subtidal biogenic reefs	5	1	**6**	**Met**
A6: Deep-sea bed	0	0	**0**	**Not met**

[6] Discussions held during the July, 2011 LGM suggested that this feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment. If included, these additions would increase replicates as follows: A1.2, total of 9 replications (agreement for feature inclusion in NG 11); A1.3, total of 8 replications (agreement for feature inclusion in NG 1c); A2.1, total of 7 replications (agreement for feature inclusion in NG 1c); A2.2, total of 18 replications (agreement for feature inclusions in NG 5, 8 and 11); A2.3, total of 19 replications (agreement for feature inclusions in NG 1c and 11); A2.4, total of 7 replications (agreement for feature inclusions in NG 1c and 11); A2.7, total of 3 replications (agreement for feature inclusion in NG 1c); A4.2, total of 6 replications (agreement for feature inclusion in NG 7); A5.1, total of 19 replications (agreement for feature inclusion in NG 2, 4 and 12); A5.2, total of 24 replications (agreement for feature inclusion in NG 1b, 1c, 2, 12 and 13); A5.4, total of 14 replications (agreement for feature inclusion in NG 1c and 2).

[7] A3.3: Low energy infralittoral rock is present in the GAP table in three SSSI sites, Cresswell Ponds, Humber Estuary and The Lagoons, however spatial broad-scale habitat data is not available within these MPAs and has therefore been included towards MPA replications.

[8] A4.3: Low energy circalittoral rock is only present in one location within the Net Gain region, and therefore ENG targets have been met as far as is possible.

Only one mobile species, Smelt (*Osmerus eperlanus*) was ercommended as a feature in one site (NG 1c). The reason for the other sites and mobile species not being put forward for recommendation was due to the lack of confidence in the data layers held by the Net Gain team, which suggest that mobile species cover a large area within the region. Subsequently there were no further replications for mobile species and the ENG targets for replication were not met for mobile species.

Table 5.7 Summary table for replication of habitat FOCI

Feature	MPA contribution	rMCZ and rRA contribution	Total number of replicates	ENG requirement met?
Habitat FOCI				
Blue mussel beds (including intertidal beds on mixed and sandy sediments)	2	1	3	Met[9]
Estuarine rocky habitats	3	2	6	Met
Horse mussel (*Modiolus modiolus*) beds	0	0	0	Not met
Intertidal underboulder communities	2	3	5	Met
Littoral chalk communities	1	2	3	Met
Mud habitats in deep water	0	0	0	Not met
Peat and clay exposures	0	4	4	Met[9]
Ross worm (*Sabellaria spinulosa*) reefs	4	3	7	Met
Seagrass beds	4	1	5	Met
Sea-pen and burrowing megafauna communities	1	0	1	Not met
Sheltered muddy gravels	2	2	4	Met
Subtidal chalk	1	3	4	Met
Subtidal sands and gravels	6	12	18	Met[9]
Tide-swept channels	0	0	0	Not met

[9] Discussions held during the July, 2011 LGM suggested that this feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment. If included, these additions would increase replicates as follows: blue mussel beds, total of 5 replications (agreement for feature inclusion in NG 1c and 2); peat and clay exposures, total of 5 replications (agreement for feature inclusion in NG 2); subtidal sands and gravels, total of 24 replications (agreement for feature inclusion in NG 1b, 2, 7, 11, 12 and 14).

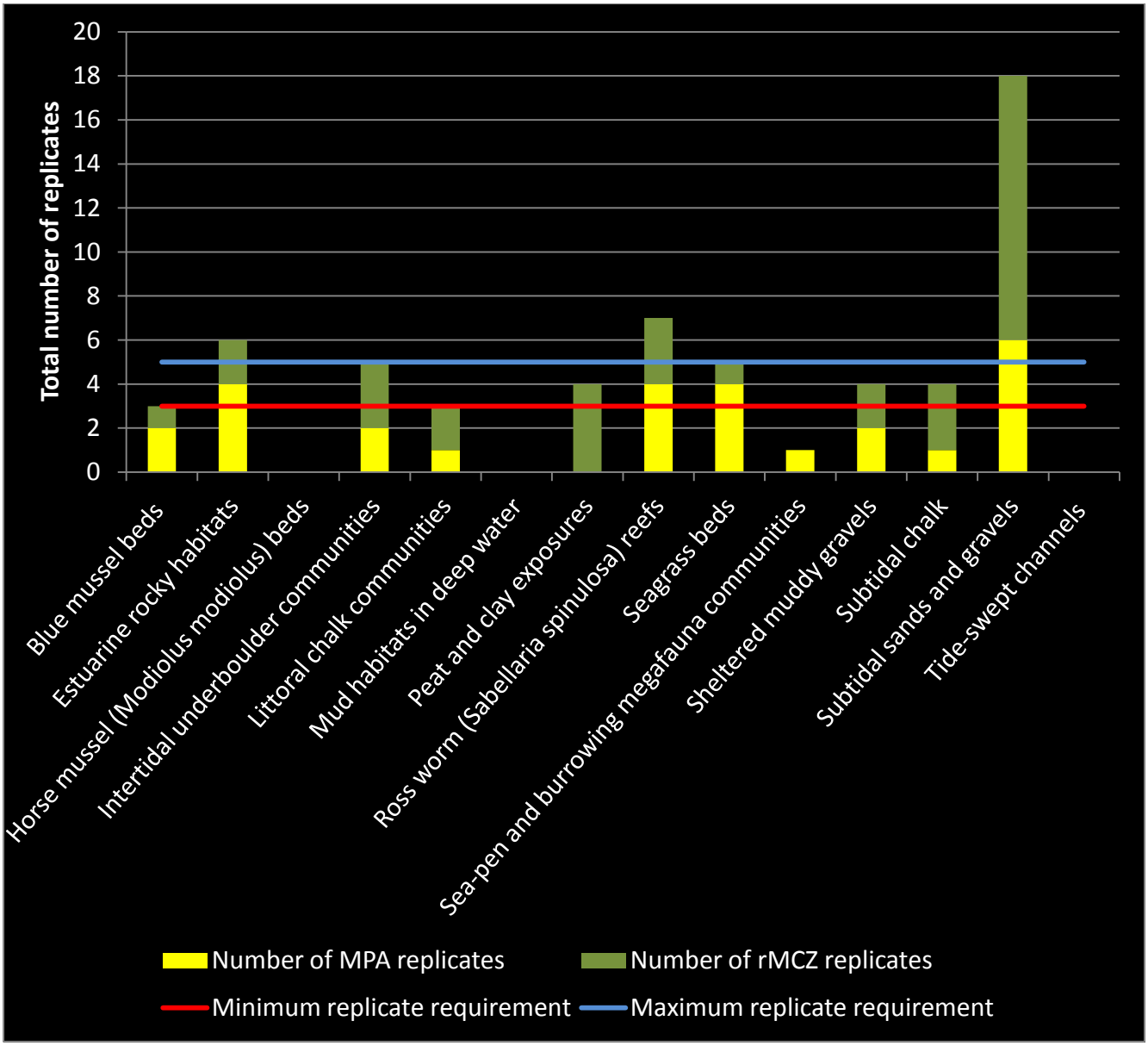


Figure 5.1 **Summary graph of habitat FOCI replication targets**

Table 5.8 Summary table for replication of species FOCI

Feature	MPA contribution	rMCZ and rRA contribution	Total number of replicates	ENG requirement met?
Species FOCI				
Tentacled lagoon worm (*Alkmaria romijni*)	1	0	1	**Not met**[10]
Ocean quahog (*Arctica islandica*)	0	2	2	**Nearly met**[10]
Burgundy maerl paint weed (red seaweed) (*Cruoria cruoiaeformis*)	0	0	0	**Not met**
Lagoon sand shrimp (*Gammarus insensibillis*)	3	0	3	**Met**
Amphipod shrimp (*Gitanopsis bispinosa*)	0	0	0	**Not met**
Stalked jellyfish (*Haliclystus auricula*)	0	0	0	**Not met**
Short snouted seahorse (*Hippocampus hippocampus*)	0	0	0	**Not met**
Starlet sea anemone (*Nematostella vectensis*)	3	1	4	**Met**
Native oyster (*Ostrea edulis*)	0	0	0	**Not met**
Spiny lobster (*Palinurus elephas*)	0	0	0	**Not met**
Common maerl (*Phymatolithon calcareum*)	0	0	0	**Not met**
Lagoon sea slug (*Tenellis adspersa*)	0	0	0	**Not met**

[10] Discussions held during the July, 2011 LGM suggested that this feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. If included, these additions would increase replicates as follows: tentacled lagoon worm, total of 2 (agreement for feature inclusion in NG 1c); Ocean quahog, total of 3, meaning that replication targets would be met (agreement for feature inclusion in NG 6). For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.

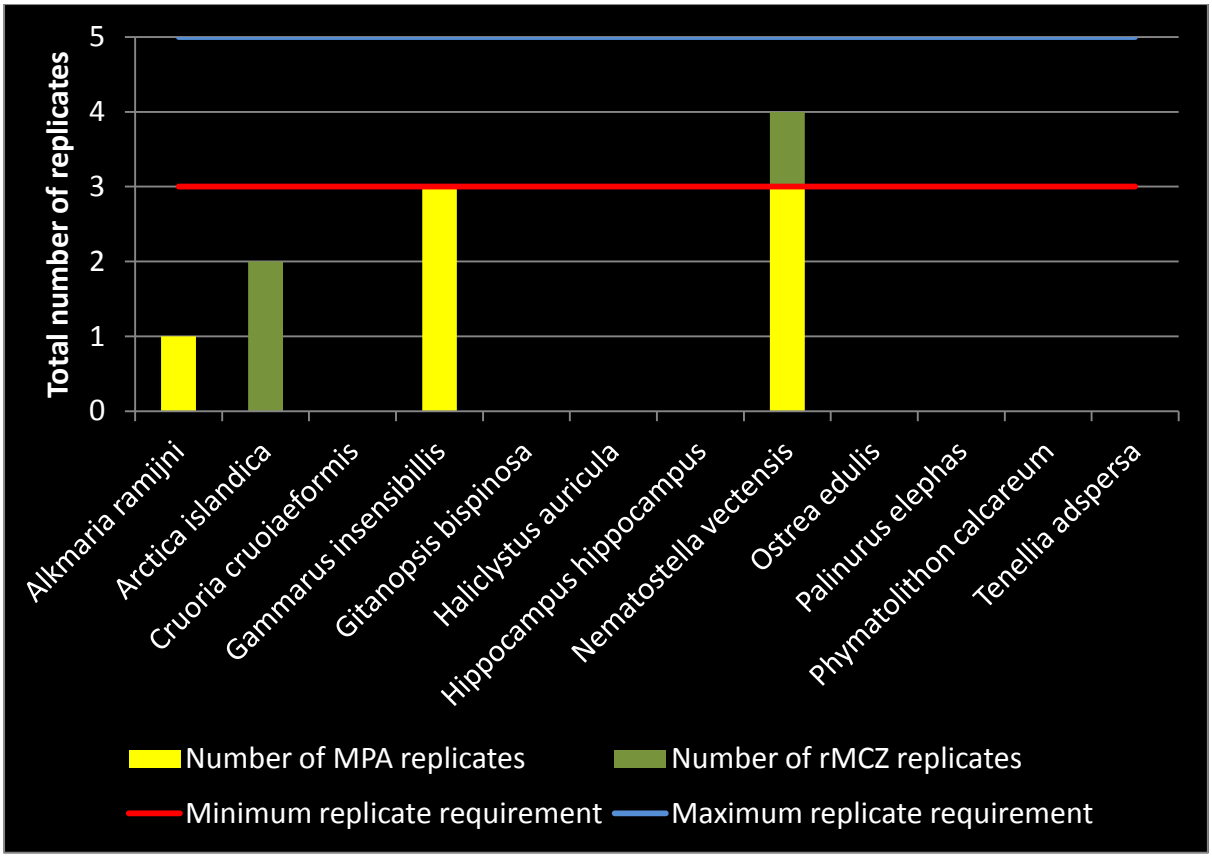


Figure 5.2 **Summary graph of species FOCI replication targets**

Table 5.9 **Summary table for replication of mobile species FOCI**

Feature	MPA contribution	rMCZ and rRA contribution	Total number of replicates	ENG requirement met?
Mobile species FOCI				
Smelt (*Osmerus eperlanus*)	No data	1	1	**Not met**
European eel (*Anguilla anguilla*)	No data	0	0	**Not met**[11]
Undulate ray (*Raja undulate*)	No data	0	0	**Not met**

[11] Discussions held during the July, 2011 LGM suggested that this feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site, bringing the total to 1 (agreement for feature in NG 1c). For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.

5.4 Adequacy

Adequacy targets set for the ENG refer to the overall size of the MPA network and the proportion of each feature protected within the network. Broad-scale habitats have percentage targets to meet. There are no adequacy targets for FOCI as the proportions to which protection is required will be met by the application of the guidelines under the principles of replication, viability and connectivity.

For the network to be adequate it needs to be of sufficient size and large enough to deliver the network's ecological objectives and enable the feature's long-term protection and recovery.

17 broad-scale habitats were assigned adequacy targets which Net Gain met with the exception of A5.3: Subtidal mud (short by 83.22km²) and A3.3: Low energy infralittoral rock. For ten of these features the maximum target was met.

The reason subtidal mud adequacy targets were not met was due to the receipt of more accurate new data layers, and a revised gap analysis following the final sign off of site boundaries by the RSG. A site adjacent to NG14 (NG 14S) which contained an area of subtidal mud was dropped from the network prior to the production of the Draft Final Recommendations Report and receipt of the new data (for further details see Annex 4). At the time, and based on the available data for broad-scale habitats, it was suggested that the adequacy target for subtidal mud would still be met. The receipt of the new data increased the total amount of subtidal mud in the Net Gain Project area by 119.25km² to 1,287.97km^2, which meant that the minimum target was effectively higher than it had previously been (minimum target now 193.20km²).

A3.3: Low energy infralittoral rock was not considered for inclusion within a site because there is only 5.04km² present within the Net Gain region in two separate areas, neither of which met the viable patch size for broad-scale habitat (minimum diameter requirement of 5km).

Table 5.10 Summary table for adequacy of broad-scale habitats

Feature	Extent within Net Gain (km²)	Recommended target	Extent within MPAs (km²)	MPA % of total extent protected	Extent within rMCZs and rRAs (km²)	rMCZ and rRA % of total extent protected (from the remaining target after MPA protection)	Adequacy total (km² and %)	ENG target assessment (km²)
A1.1: High energy intertidal rock	1.46	21-38%	0.24	16.67%	0.21	14.3%	0.45 30.94%	**Met** Min met surplus of 0.14
A1.2: Moderate energy intertidal rock	8.38	21-38%	4.08	48.68%	1.38	16.5%	5.46 65.15%	**Met** Max met surplus of 3.7
A1.3: Low energy intertidal rock	2.12	22-39%	1.42	67.17%	0.37	17.2%	1.79 84.42%	**Met** Max met surplus of 0.96
A2.1: Intertidal coarse sediment	4.27	25-42%	1.76	41.26%	0.21	4.8%	1.97 46.07%	**Met** Max met surplus of 0.17
A2.2: Intertidal sand and muddy sand	177.15	25-42%	167.69	94.66%	2.14	1.2%	169.84 95.87%	**Met** Max met surplus of 95.43
A2.3: Intertidal mud	241.76	25-42%	237.33	98.17%	4.31	1.8%	241.63 99.95%	**Met** Max met surplus of 140.1
A2.4: Intertidal mixed sediments	7.18	25-42%	2.84	39.48%	1.81	25.2%	4.65 64.67%	**Met** Max met surplus of 1.63
A2.5: Coastal saltmarshes and saline reedbeds	20.28	No adequacy target	20.27	99.95%	1.15	5.7%	21.42 105.61%	No adequacy target
A2.6: Intertidal sediments dominated by aquatic angiosperms	6.26	No adequacy target	6.26	100%	0	0%	6.26 100%	No adequacy target
A2.7: Intertidal biogenic reefs	2.51	No adequacy target	0.85	33.86%	0.001	0.1%	0.85 33.92%	No adequacy target
A3.1: High energy infralittoral rock	333.21	15-31%	4.83	1.45%	84.44	26.2%	92.27 27.69%	**Met** Min met surplus of 42.29
A3.2: Moderate energy infralittoral rock	442.95	17-32%	0	0%	203.42	45.9%	203.42 45.92%	**Met** Max met surplus of 61.68
A3.3: Low energy infralittoral rock	5.04	16-32%	0	0%	0	0%	0 0%	**Not met** 0.81 required

Feature	Extent within Net Gain (km²)	Recommended target	Extent within MPAs (km²)	MPA % of total extent protected	Extent within rMCZs and rRAs (km²)	rMCZ and rRA % of total extent protected (from the remaining target after MPA protection)	Adequacy total (km² and %)	ENG target assessment (km²)
A4.1: High energy circalittoral rock	13.47	11-25%	9.81	72.81%	0.05	0.3%	9.85 73.15%	**Met** Max met surplus of 6.49
A4.2: Moderate energy circalittoral rock	5,057.54	13-28%	0	0%	864.98	17.1%	864.98 17.10%	**Met** Min met surplus of 207.47
A4.3: Low energy circalittoral rock	20.34	16-32%	0	0%	20.34	100%	20.34 100%	**Met** Max met surplus of 13.83
A5.1: Subtidal coarse sediment	12,141.05	17-32%	3,219.99	26.52%	1,879.70	15.5%	5,099.68 42%	**Met** Max met surplus of 1,214.55
A5.2: Subtidal sand	85,893.22	15-30%	14,155	16.48%	7,956.48	9.3%	22,111.48 25.74%	**Met** Min met, surplus of 9,227.49
A5.3: Subtidal mud	1,287.97	15-30%	95.97	7.45%	14.01	1.1%	109.98 8.54%	**Not met** 83.22 required
A5.4: Subtidal mixed sediments	6,161.21	16-32%	127.79	2.07%	1,371.93	22.3%	1,499.72 24.34%	**Met** Min met surplus 513.92
A5.5: Subtidal macrophyte-dominated sediment	Spatial data missing	No adequacy target	Spatial data missing	Spatial data missing	Spatial data missing	Spatial data missing	Spatial data missing	Spatial data missing
A5.6: Subtidal biogenic reefs	218.77	No adequacy target	84.64	38.69%	0.1	0.0004%	84.74 38.73%	No adequacy target
A6: Deep-sea bed	4.69	No adequacy target	0	0%	0	0%	0 0%	No adequacy target

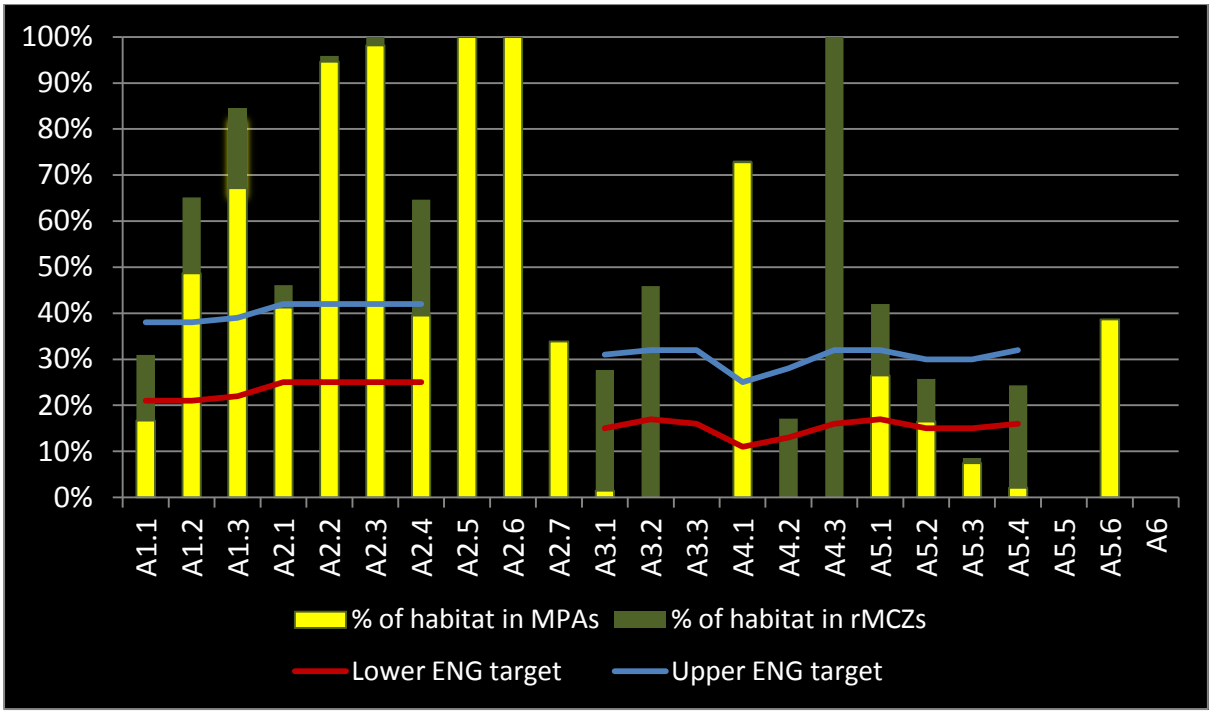


Figure 5.3 **Summary graph of broad-scale habitat adequacy targets**

Viability

In order to provide protection and to maintain the integrity of features, allow them to be self-sustaining throughout natural cycles of variation and to encompass an area of habitat large enough to support populations of species that live attached to the feature, the ENG suggests that MCZs for broad-scale habitats should have a minimum diameter of 5km whilst FOCI patches should have a minimum diameter between 0.5km-1km. Pragmatically however it is necessary to make allowance for sites which are more rectilinear than circular (e.g. intertidal habitats). As the suggestion of a 5km minimum diameter equates to an area of c.20km^2 this report considers viability to be met if sites meet this area criterion.

Viability was met for all of Net Gain's recommended sites with the exception of those indicated with a "*". These sites are restricted in some way, such as the boundaries of the estuary (NG 1c and 13a), are sites put forward to protect intertidal features (NG 10, rRA 6 and 11) or in the cases of reference areas are restricted to the limits of a patch of habitat FOCI (rRA 3 and 5) or the presence of species FOCI (rRA 2a and 2b).

Table 5.11 Summary table of viability of rMCZs and rRAs

Site name	Site size	Viability met
Recommended Marine Conservation Zone		
NG 1b, Orford Inshore	71.95 km²	Met
NG 1c, Alde Ore Estuary	12.21 km²	Met*
NG 2, Cromer Shoal Chalk Beds	315.64 km²	Met
NG 4, Wash Approach	724.52 km²	Met
NG 5, Lincs Belt	175.5 km²	Met
NG 6, Silver Pit	168.09 km²	Met
NG 7, Markham's Triangle	200.13 km²	Met
NG 8, Holderness Inshore	307.14 km²	Met
NG 9, Holderness Offshore	1,176.10 km²	Met
NG 10, Castle Ground	3.7 km²	Met*
NG 11, Runswick Bay	67.92 km²	Met
NG 12, Compass Rose	551.56 km²	Met
NG 13, Coquet to St Mary's	198.75 km²	Met
NG 13a, Aln Estuary	0.44 km²	Met*
NG 14, Farnes East	944.92 km²	Met
NG 15, Rock Unique	492.07 km²	Met
NG 16, Swallow Sand	4,746.12 km²	Met
NG 17, Fulmar	2,437.12 km²	Met
Recommended Reference Areas		
rRA 1, North Norfolk Blue Mussel Beds	0.25 km²	Met
rRA 2a and 2b, Seahorse Lagoon and Arnold's Marsh	0.05 km² 0.09 km²	Met*
rRA 3, Glaven Reedbed	0.04 km²	Met*
rRA 4, Blakeney Marsh	1 km²	Met
rRA 5, Blakeney Seagrass	0.03 km²	Met*
rRA 6, Dogs Head Sandbanks	12.31 km²	Met*
rRA 7, Seahenge Peat and Clay	0.26 km²	Met
rRA 8, Wash Approach rRA	25.01 km²	Met

Site name	Site size	Viability met
rRA 9, Flamborough Head No Take Zone	0.94 km²	Met
rRA 10, Compass Rose rRA	25 km²	Met
rRA 11, Berwick Coast	0.46 km²	Met*
rRA 12, Farnes Clay	3.43 km²	Met
rRA 13, Rock Unique rRA	52.49 km²	Met

5.5 Connectivity

The network design principle of connectivity of sites and features refers to the extent at which populations in different locations of a species range are linked by the movement of eggs, larvae, juveniles or adults. Connectivity between habitats is one of the key principles of ecological coherence and allows species that utilise habitats to maintain connection for dispersal, settlement, movement and other linkages such as nutrient transfer.

Connectivity of the network of MPAs, rMCZs and rRAs was assessed by placing buffers around each of the EUNIS level 2 broad-scale habitat types found within an MPA/rMCZ/rRA to present connectivity. We have presented one map for each EUNIS level 2 habitat below. The EUNIS level 2 habitats present within the Net Gain region include:

- A1: littoral rock and other hard substrata
- A2: littoral sediments
- A3: infralittoral rock and other hard substrata
- A4: circalittoral rock and other hard substrata
- A5: sublittoral sediments

Net Gain have not included a connectivity buffer map for the EUNIS level 2 habitat "Deep-sea", as this habitat is only found in one location in the northern reaches of the Net Gain region and therefore the possibility of connectivity is not viable.

When running the connectivity analysis, Net Gain has considered all MPAs, rMCZs and rRAs within the Net Gain region, adjacent sites from Balanced Seas and within the Scottish MPA Project. Outside the territorial limits the only MPA known adjacent to the Net Gain region boundaries is the Cleaverbank North Sea Natura 2000 site (approximately 1,235km²). The site is being put forward to protect 'Open-sea reefs', harbour porpoise, grey seal and harbour seal (Noordzee Natura 2000, 2011[12]). This has not been included in the analysis of connectivity as the data for broad-scale habitat is unavailable for the site, however it is known that considerable quantities of gravel are present and these may contribute to connectivity (Noordzee Natura 2000, 2011[12]).

The guidelines in the ENG state that '*In the absence of species-specific information on connectivity, MPAs of similar habitat should be separated, where possible, by no more than 40-80km (between individual MPA* boundaries)'. Connectivity was run for the five EUNIS level 2 habitats present within the Net Gain region, one of these A5 met connectivity at no more than 40km separation between MPAs, one A2 met connectivity requirements at no more than 80km separation between MPAs, and the other three (A1, A3 and A5) did not meet connectivity for all sites at 40-80km however, these were met for the majority of the region with only one gap between the connectivity around The Wash area.

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http://www.noordzeenatura2000.nl/index.php?option=com_content&view=article&id=60&Itemid=92&lang=en

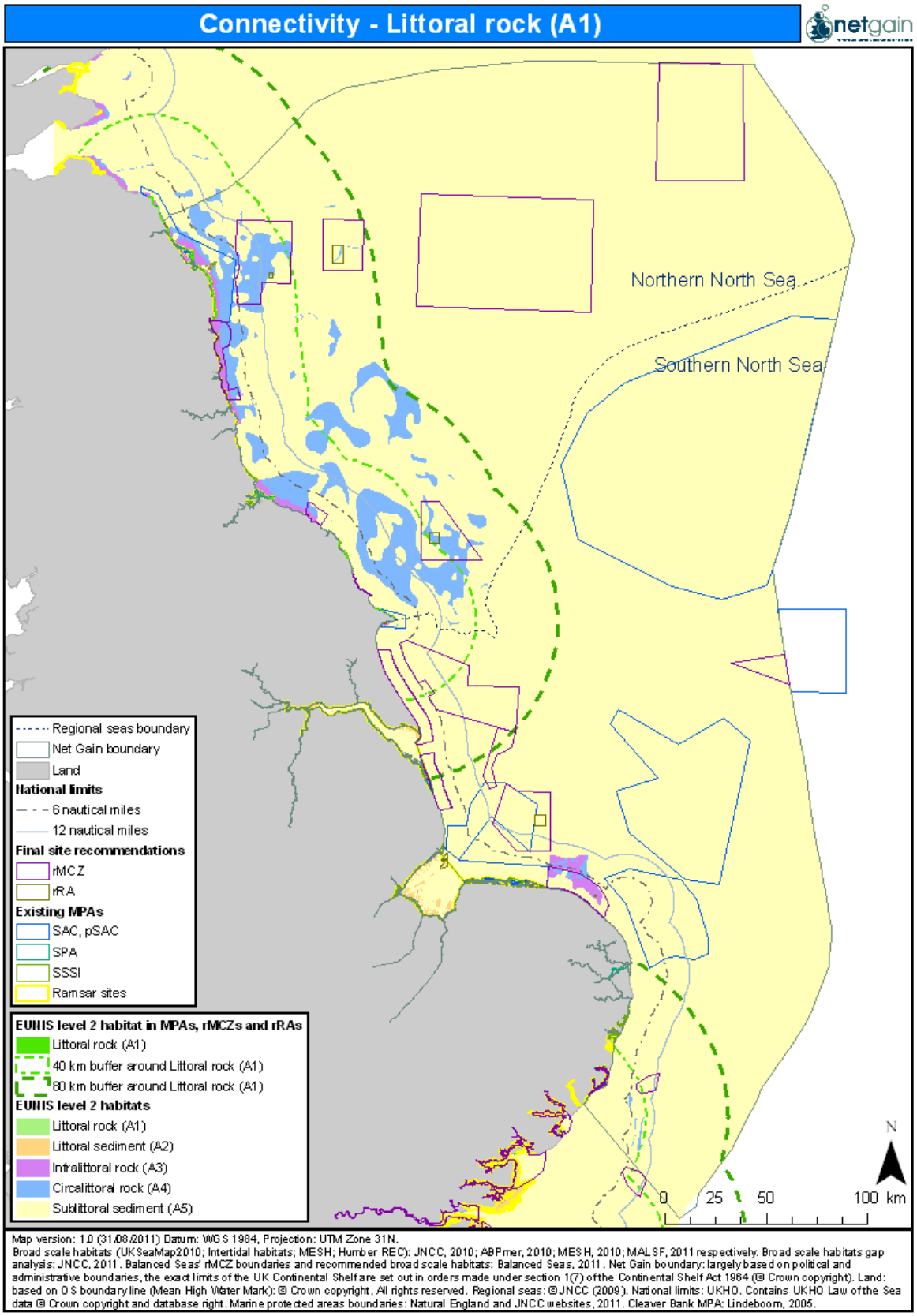

Figure 5.4 **Connectivity of designated MPAs, rMCZs and rRAs within which EUNIS level A1 (littoral rock and other hard substrata) are protected**

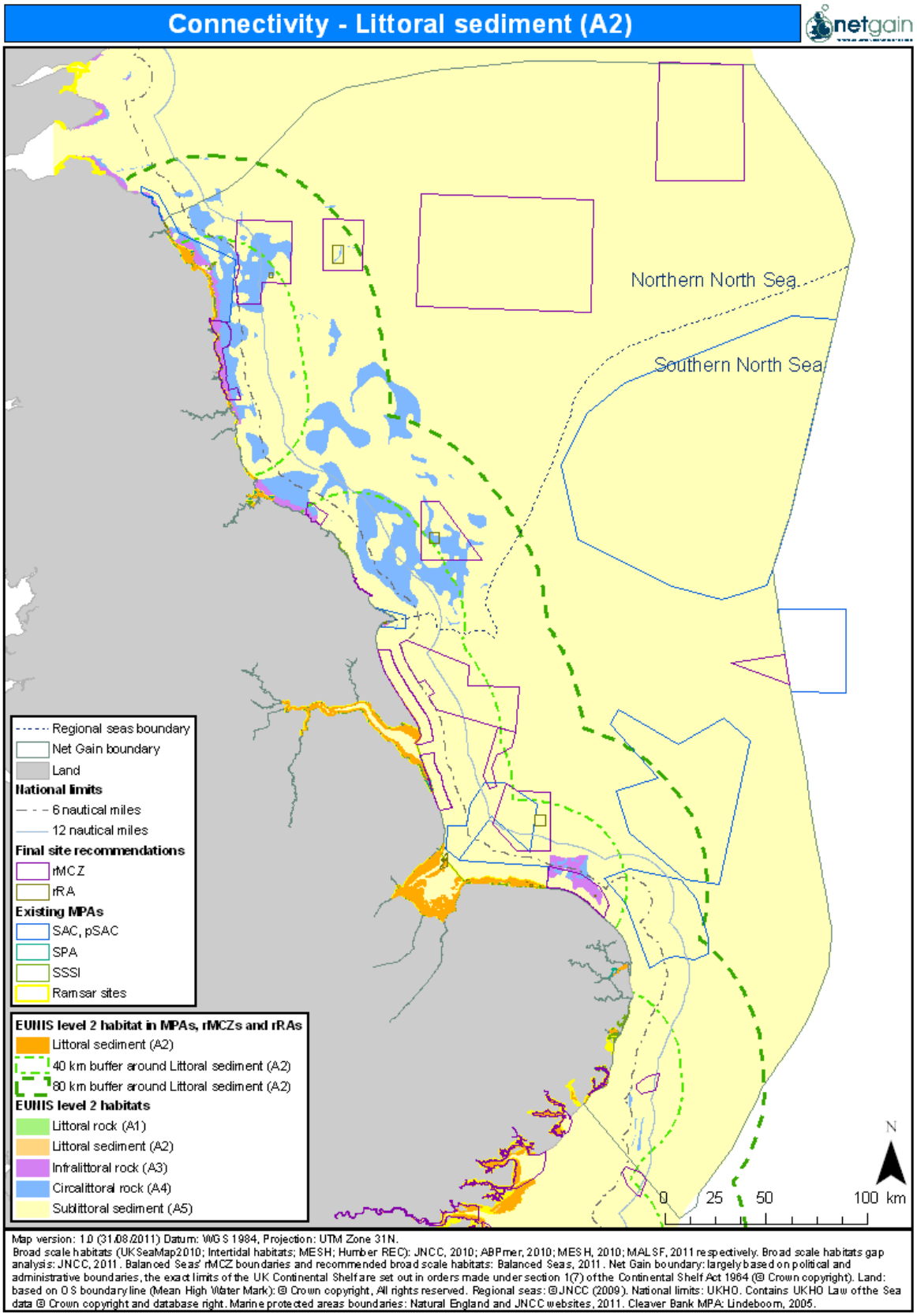

Figure 5.5 **Connectivity of designated MPAs, rMCZs and rRAs within which EUNIS level A2 (littoral sediments) are protected**

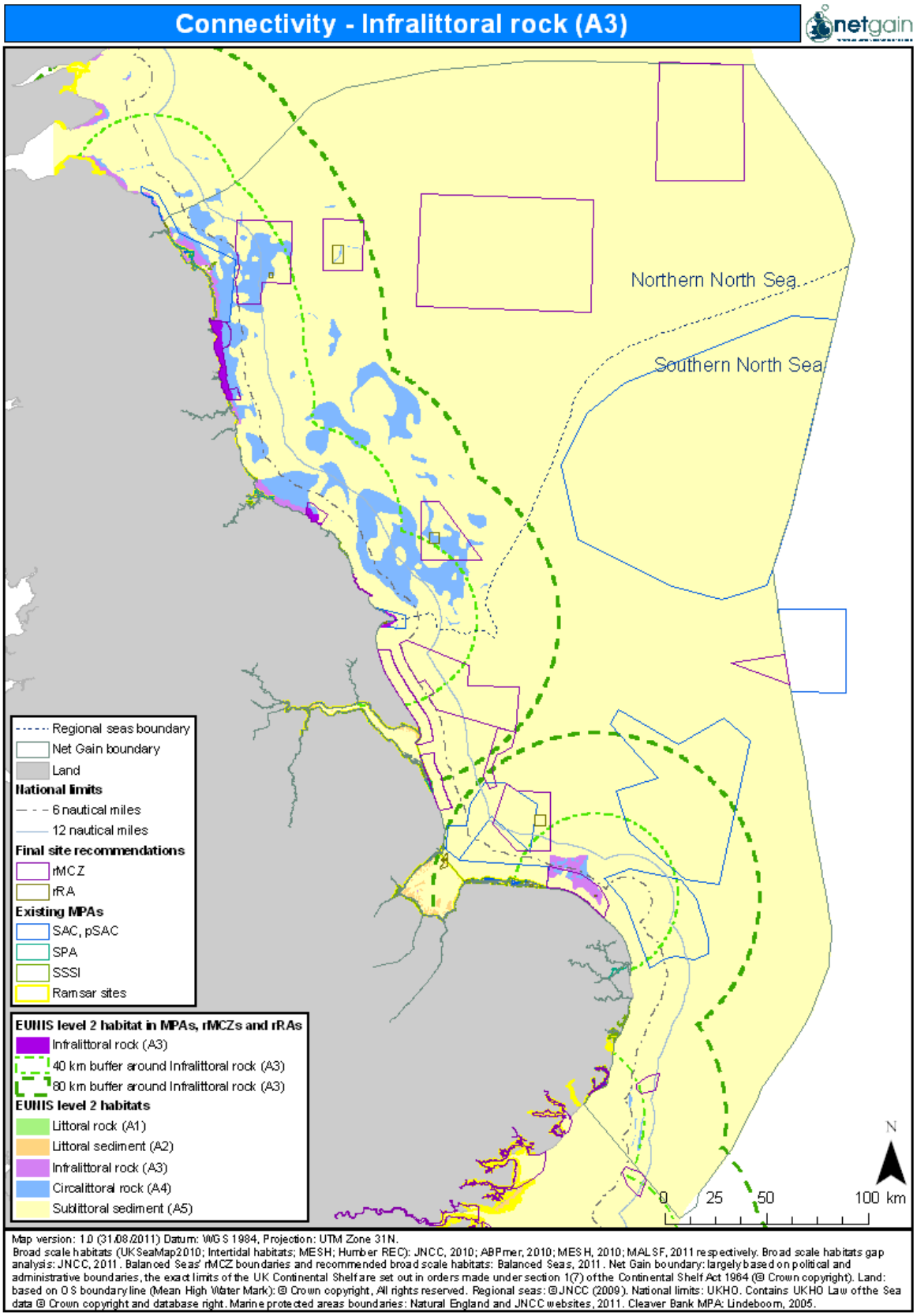

Figure 5.6 **Connectivity of designated MPAs, rMCZs and rRAs within which EUNIS level A3 (infralittoral rock and other hard substrata) are protected**

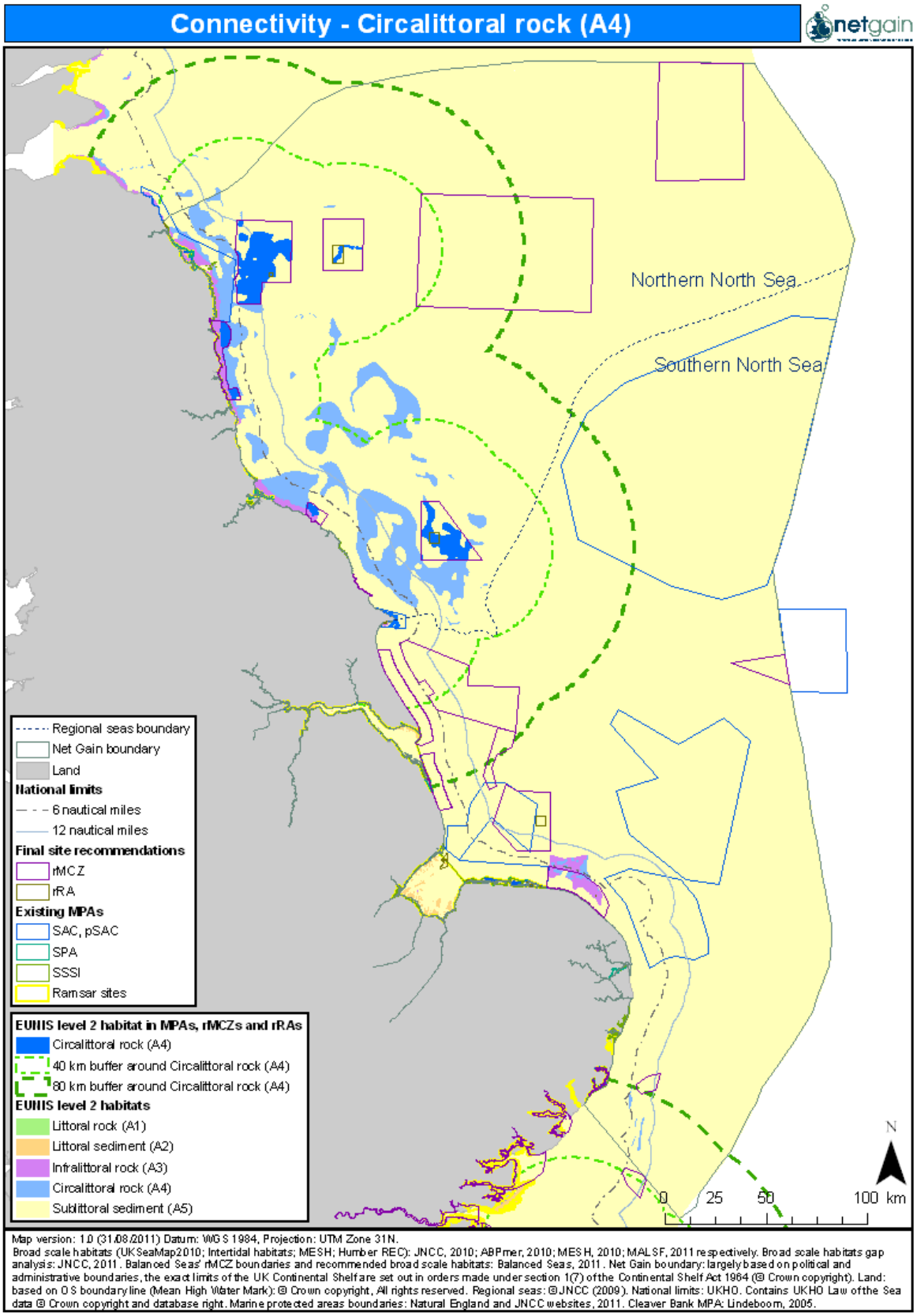

Figure 5.7 **Connectivity of designated MPAs, rMCZs and rRAs within which EUNIS level A4 (circalittoral rock and other hard substrata) are protected**

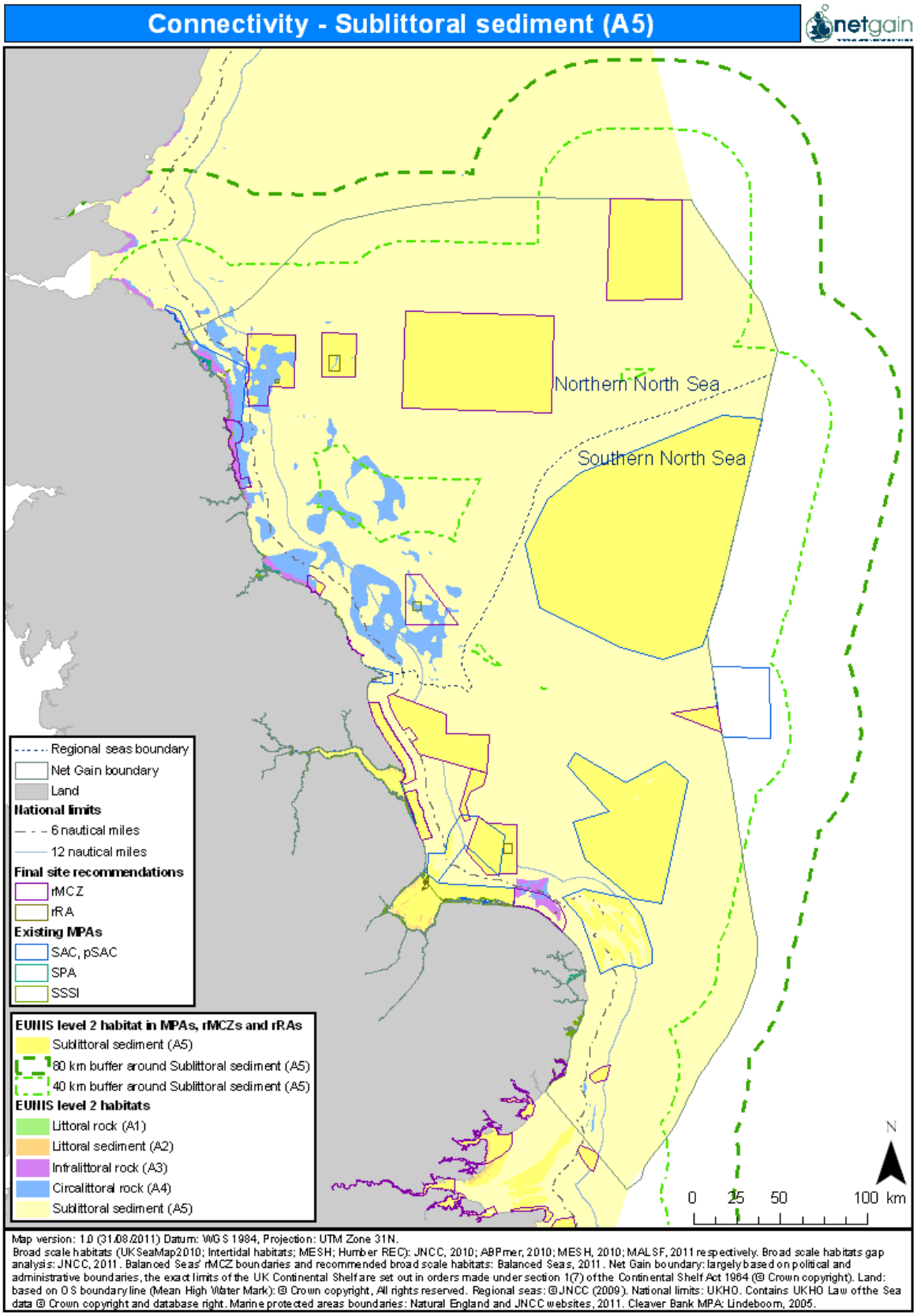

Figure 5.8 **Connectivity of designated MPAs, rMCZs and rRAs within which EUNIS level A5 (sublittoral sediments) are protected**

5.6 Reference area protection

Within the Net Gain region there are 13 recommended reference area sites, which cover a total of 121.36km², of these five are included within other rMCZ site recommendations.

Following the conservation objective guidance provided to the Regional MCZ Projects the default conservation objective for reference areas will be "recover". In light of this advice, the conservation objectives for all features within our rRAs are set to "recover".

Table 5.12 Summary of the area of broad-scale habitat and FOCI habitat recommended for protection in each reference area

Reference area name	Features proposed for designation	Total extent of feature	Total area of site
rRA 1, North Norfolk Blue Mussel Beds	A3.2: Moderate energy infralittoral rock	0.25 km²	0.25 km²
	Blue mussel beds	0.25 km²	
	Subtidal chalk	0.003 km²	
	Subtidal sands and gravels	0.25 km²	
rRA 2a and 2b, Seahorse Lagoon and Arnold's Marsh	Starlet sea anemone (*Nematostella vectensis*)	Local knowledge (Natural England surveys)	0.05 km² 0.09 km²
rRA 3, Glaven Reedbed	A2.5: Coastal saltmarsh and saline reedbeds	0.04 km²	0.04 km²
rRA 4, Blakeney Marsh	A2.2: Intertidal sand and muddy sand	0.04 km²	1 km²
	A2.3: Intertidal mud	0.03 km²	
	A2.5: Coastal saltmarsh and saline reedbeds	0.90 km²	
	Littoral chalk communities	6.83 km (line data)	
	North Norfolk Coast (subtidal) geological feature	096 km²	
rRA 5, Blakeney Seagrass	A2.2: Intertidal sand and muddy sand	0.0003 km²	0.03 km²
	A2.3: Intertidal mud	0.03 km²	
	Seagrass beds	0.02 km²	
	North Norfolk Coast (subtidal) geological feature	0.03 km²	
rRA 6, Dogs Head Sandbanks	A2.3: Intertidal mud	4.07 km²	12.31 km²
	A5.2: Subtidal sand	7.27 km²	
	A5.3: Subtidal mud	0.63 km²	
	A5.4: Subtidal mixed sediments	0.28 km²	
	A5.6: Subtidal biogenic reefs	0.06 km²	
	Ross worm (*Sabellaria spinulosa*) reefs	0.06 km²	
	Subtidal chalk (modelled)	8.05 km²	
	Subtidal sands and gravels Subtidal sands and gravels (modelled)	7.66 km² 10.98 km²	
	Gibraltar point (subtidal) geological feature	1.3 km²	
rRA 7, Seahenge Peat and Clay	A2.2: Intertidal sand and muddy sand	0.25 km²	0.26 km²
	A5.2: Subtidal sand	0.002 km²	
	Peat and clay exposures	0.09 km² 1 point	

Reference area name	Features proposed for designation	Total extent of feature	Total area of site
	Subtidal sands and gravels	0.15 km²	
	North Norfolk Coast (subtidal) geological feature	0.26 km²	
rRA 8, Wash Approach rRA	A5.4: Subtidal mixed sediments	25 km²	25.01 km²
	Subtidal sands and gravels	25 km²	
rRA 9, Flamborough Head No Take Zone	A1.2: Moderate energy intertidal rock	0.00004 km²	0.94 km²
	A2.1: Intertidal coarse sediment	0.00004 km²	
	A2.2: Intertidal sand and muddy sand	0.00001 km²	
	A3.1: High energy infralittoral rock	0.15 km²	
	A3.2: Moderate infralittoral rock	0.79 km²	
	Littoral rock communities	0.53 km (line data)	
	Subtidal sands gravels	0.4 km²	
rRA 10, Compass Rose rRA	A4.2: Moderate energy circalittoral rock	21.8 km²	25 km²
	A5.2: Subtidal sand	3.2 km²	
	Subtidal sands and gravels (modelled)	25 km²	
rRA 11, Berwick Coast	A1.1: High energy intertidal rock	0.13 km²	0.46 km²
	A1.2: Moderate energy intertidal rock	0.15 km²	
	A1.3: Low energy intertidal rock	0.004 km²	
	A5.1: Subtidal coarse sediment	0.18 km²	
	Intertidal underboulder communities	3 point data	
	Subtidal sands and gravels	0.004 km²	
rRA 12, Farnes Clay	A4.2: Moderate energy circalittoral rock	3.28 km²	3.43 km²
	A5.2: Subtidal sand	0.15 km²	
	Peat and clay exposures	2.75 km²	
	Subtidal sands and gravels (modelled)	3.43 km²	
rRA 13, Rock Unique rRA	A4.3: Low energy circalittoral rock	13.88 km²	52.49 km²
	A5.1: Subtidal coarse sediment	1.99 km²	
	A5.2: Subtidal sand	36.63 km²	
	Subtidal sands and gravels (modelled)	48.07 km²	

Table 5.13 Summary of the total area of broad-scale habitat and FOCI habitat recommended for protection in reference areas across the project region

Feature	Area covered within reference areas
Broad-scale habitats	
A1.1: High energy intertidal rock	0.13 km²
A1.2: Moderate energy intertidal rock	0.15 km²
A1.3: Low energy intertidal rock	0.004 km²
A2.1: Intertidal coarse sediment	0.0004 km²
A2.2: Intertidal sand and muddy sand	0.29 km²
A2.3: Intertidal mud	4.13 km²
A2.4: Intertidal mixed sediments	0 km²
A2.5: Coastal saltmarshes and saline reedbeds	0.9 km²
A2.6: Intertidal sediments dominated by aquatic angiosperms	0 km²
A2.7: Intertidal biogenic reefs	0 km²
A3.1: High energy infralittoral rock	0.15 km²
A3.2: Moderate energy infralittoral rock	1.04 km²
A3.3: Low energy infralittoral rock	0 km²
A4.1: High energy circalittoral rock	0 km²
A4.2: Moderate energy circalittoral rock	25.08 km²
A4.3: Low energy circalittoral rock	13.88 km²
A5.1: Subtidal coarse sediment	2.17 km²
A5.2: Subtidal sand	47.25 km²
A5.3: Subtidal mud	0.63 km²
A5.4: Subtidal mixed sediments	25.28 km²
A5.5: Subtidal macrophyte-dominated sediment	0 km²
A5.6: Subtidal biogenic reefs	0.06 km²
A6: Deep-sea bed	0 km²
Habitat FOCI	
Blue mussel beds (including intertidal beds on mixed and sandy sediments)	0.25 km²
Estuarine rocky habitats	0 km²
Horse mussel (*Modiolus modiolus*) beds	0 km²
Intertidal underboulder communities	3 point records
Littoral chalk communities	5.5 km (line data)
Mud habitats in deep water	0 km²
Peat and clay exposures	2.84 km²
Ross worm (*Sabellaria spinulosa*) reefs	0.06 km²
Seagrass beds	0.02 km²
Sea-pen and burrowing megafauna communities	0 km²
Sheltered muddy gravels	0 km²
Subtidal chalk	8.05 km²
Subtidal sands and gravels	109.97 km²
Tide-swept channels	0 km²

5.7 Best available evidence

The Net Gain team have used the information for broad-scale habitat, habitat FOCI and species FOCI that has been provided to the Regional MCZ Project teams from the SNCBs. In some cases Net Gain has received data that is believed by the regional stakeholders to be more accurate and this has superceded the data provided by the SNCBs.

One case of this was the receipt of the Humber Regional Environmental Characterisation data layer which provided survey data to a EUNIS level 4 and 5 in NG 4, 5, 6, 8, 9 and rRA 8.

Additional data was received by Net Gain for NG 2 and rRA 1, including survey records for blue mussel beds from Eastern IFCA and additional blue mussel data from Seasearch East Anglia, survey records for broad-scale habitat A5.2: subtidal sand from North Sea Wildlife Trust and Seasearch, survey records for subtidal chalk, peat and clay exposures and subtidal sands and gravels from Seasearch and North Sea Wildlife Trusts.

Within NG 4 and NG 9 additional survey records were provided for Ross worm (*Sabellaria spinulosa*) reefs from CEFAS[13].

Details for the presence of saline reedbeds (A2.5: Coastal saltmarshes and saline reedbeds) in rRA 3 have been provided by local knowledge from The North Norfolk Wildlife Trusts.

Within rRA 7, detailed survey records have been collected by Net Gain Liaison Officers with the support of John Dinwiddy, as well as surveys from English Heritage[14].

In NG 5, The Lincolnshire Wildlife Trust provided Net Gain with data indicating the location of peat and clay exposures along the coast. This was an important feature identified by the RSG to be recommended for protection within the site and Net Gain currently held no information to suggest its presence.

Additional records of subtidal sands and gravels, blue mussel beds and subtidal chalk have been used in NG 10 to support the presence of these features; the data was received from surveys records provided by North Sea Wildlife Trusts.

The presence of Ocean quahog (*Arctica islandica*) in NG 11was identified through the provision of survey records from Allen, 2008[15].

Within NG 13a, data provided to the Net Gain team did not indicate the presence of saltmarsh, however local knowledge informed that these are present and the Environment Agency provided a data layer to support this. In addition to this, coordinates for a field that has been flooded as part of the managed realignment strategy have also been provided by the Environment Agency.

Occurrences of Ross worm (*Sabellaria spinulosa*) reefs have been noted for inclusion in NG 13, from surveys records provided in a report by Holt, 1994[16].

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[13] CEFAS. 1989-2005. Ross worm (*Sabellaria spinulosa*) occurrences from grab and beam trawl surveys.

[14] ENGLISH HERITAGE. 2011. Holme Beach monitoring project 2003-2008. NAU Archaeology Report 1444.

[15] ALLEN, J.H. 2008. Ecological Assessment of Yorkshire Coast prohibited Trawling Areas. Report to North Eastern Sea Fisheries Committee. Institute of Estuarine and Coastal Studies (IECS), University of Hull. Occurrences of *Arctica Islandica* provided by the NESFC in 2010.

[16] HOLT, R.H.F. 1994. Marine biological survey of Eyemouth (Berwickshire) to Alnmouth (Northumberland). Joint Nature Conservation Committee Report, No. 157. (Marine Nature Conservation Review Report, No. MNCR/SR/24.). Coordinates for *Sabellaria spinulosa* occurrences and reefs.

The location of subtidal mud in NG 14 (and the previous NG 14S) was provided through personal communications with Ritchie, 2011, and was subsequently included as a feature of the site put forward for recommendation. Within the same site, the location of red clay exposures was identified by Lawrence, 2011 (pers. comm.), and this data was used to support the recommendation of a reference area (rRA 12).

Section 6 Conservation Objectives

6.1 The development of Conservation Objectives

Introduction

Central to the development of a Conservation Objective statement is an assessment of whether a particular feature has 'maintain at favourable condition' or 'recover to favourable condition' as its objective. To undertake this assessment fully the current condition of each feature needs to be reviewed. Ideally, this would make use of existing data on the ecological quality of each site and the current status of the designated features. However, for the rMCZs within Net Gain (as for the other three Regional MCZ Projects), appropriate survey and monitoring data are not readily available. In light of this the SNCBs produced guidance on a process for producing Conservation Objectives which makes use of proxy condition assessments.

In short, where features are known to be exposed to pressures to which they are moderately or highly sensitive they are assumed to be degraded (i.e. in an unfavourable condition). Consequently, in such circumstances, the Conservation Objective is set to 'recover to favourable condition'. Conversely, where features are exposed only to pressures to which they are relatively insensitive (i.e. 'low sensitivity' or 'not sensitive'), then the features are assumed to be in a favourable state and hence the Conservation Objective is set to 'maintain at favourable condition'.

This proxy assessment of feature condition or 'Vulnerability Assessment' (VA) relies on a full assessment of the features' vulnerability to all of the pressures that may occur at the site and represents the first stage of the production of draft Conservation Objectives. As outlined in Section 3, the process followed in producing Conservation Objectives was iterative.

In line with the SNCB's guidance on producing Conservation Objectives, all features within Reference Areas were given the default objective of 'restore to favourable condition'. This default objective applies to all ENG features within the proposed Reference Areas and not just those for which the site was initially selected.

Data selection

To begin the process, data on features, pressures, sensitivities and activities were produced by Net Gain using the STARFISH tool. After formatting, this data was presented to the SNCBs, MMO and IFCAs to assist in the first cut vulnerability assessment.

First cut VA

The project team carried out an initial VA, with support from the SNCBs, MMO and IFCAs. As far as possible, this 'first-cut' VA took into account the spatial relationship of features and activities (i.e. the potential 'footprint' of activities and, hence, pressures). The outputs from this 'first cut' VA were, for each feature at each site, used to populate a VA table (as shown in Figure 6.1), this being based on the draft vulnerability table provided in the guidance from JNCC and Natural England.

For each feature at each site, the pressures identified in the STARFISH outputs were each assigned to a cell within the VA table according to the sensitivity of the feature and the level of exposure of the feature to the pressure. The assessment of a feature's level of exposure was made with reference to the spatial footprint, duration, frequency and intensity of each causative activity, together with any associated existing mitigation or management measures.

The position of pressures within the completed VA table provides an indication of the feature's vulnerability to each of the pressures considered; i.e. 'Moderate to high vulnerability' to pressures assigned to the red-shaded cells, and 'Low vulnerability' to pressures in the green-shaded cells.

To help accommodate a pragmatic approach in assessing feature vulnerability (as suggested in the guidance from JNCC and Natural England) an additional exposure category ('Low exposure') was used for instances where features were believed to be exposed to a particular activity/pressure combination but where exposure was at a low level relative to the pressure benchmark provided.

Feature's exposure to pressure	Feature's sensitivity to pressure			
	High	Moderate	Low	Not sensitive
Exposed	Moderate to high vulnerability	Moderate to high vulnerability	Low vulnerability	Low vulnerability
Low exposure*	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability
Not exposed	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability
Exposure unknown	Unknown vulnerability	Unknown vulnerability	Unknown vulnerability	Unknown vulnerability

* - additional category added to allow for pragmatic judgement

Figure 6.1 Modified VA table used to determine MCZ feature draft Conservation Objectives

Note that, for clarity and for the purpose of producing outputs for ground-truthing at the Regional Hub meetings, pressures to which the feature was not sensitive were omitted from the VA table outputs.

In instances where activity/pressure combinations were assigned to the 'Exposed' row and to either the 'High sensitivity' or 'Moderate sensitivity' columns (i.e. the cells shaded red in Figure 6.1) the feature was deemed to have high or moderate vulnerability, and feature condition is likely to be unfavourable. For any feature therefore, should one or more activity/pressure combinations be assigned to these 'Moderate to high vulnerability' cells, the Conservation Objective for the feature would be set to 'recover to favourable condition'.

Regional Hub ground-truthing

The 'first cut' VA was then reviewed and ground-truthed by the RSG in a series of Regional Hub meetings. This exercise performed two valuable functions:

- firstly, by providing an opportunity for stakeholders to review the VAs they also better appreciated and understood the process of developing Conservation Objectives; and
- secondly, it was possible to bring local knowledge and site-specific information to the table and to use this both in clarifying likely exposure to pressures where it had not been possible

to do so in the first cut, and in re-assigning exposure where there was supporting evidence and consensus.

It was highlighted by Hub members that this was the first instance in the Regional MCZ Project planning process of work directly affecting the development of the Project's outputs being completed outside of the RSG meetings. The team made it clear that the stakeholder-led approach was not being overturned by the external input at this stage. The work done by the SNCBs and public authorities in the 'first-cut' vulnerability assessment effectively presented the stakeholders with a short-cut in getting from a wealth of data (the outputs from STARFISH) to a more focussed set of VA tables each of which could be discussed and debated in turn. To put it into context, the raw data that was assessed ahead of the meetings covered more than 20,000 combinations of sites, features, pressures and activities whilst the number of VAs that were discussed in the Regional Hubs numbered, at most, a couple of dozen.

An example of a compiled VA table as used in the Regional Hub meetings is given below as Figure 6.2.

The ground-truthing work at the Regional Hub meetings was carried out alongside an exercise to confirm, for each site, the list of features to be designated in the rMCZ and to check the list of activities that were believed to occur there.

Where additional features were proposed for designation, or additional activities identified, these were incorporated by the Net Gain team. The PRISM and PISA database tools were used in plenary to identify where 'additional' features might be moderately or highly vulnerable to pressures from 'existing' activities, or where currently proposed features might be moderately or highly vulnerable to additional pressures from 'new' activities. Where this was not possible within the Regional Hub meetings, the debate and comment around anticipated pressure level associated with activities (i.e. discussions on activity footprints, intensity, duration, frequency, etc. and existing mitigation and management) that had already been recorded was used by Net Gain after the meeting to complete the VA for new features and/or activities.

Instances where activity intensity was felt to be higher or lower than originally assessed in the 'first cut' VA were discussed in plenary. Where the application of best available evidence and local knowledge resulted in a consensus to shift a pressure from, for example, the 'exposed' category' to either the 'low exposure' or 'not exposed' category this change was made, together with any associated comments in support of the decision.

Also, where the exposure to a pressure was 'unknown', a decision was taken (again using best available evidence and local knowledge) to assign the pressure to either the 'exposed' or the 'low exposure' category.

Where, for any of the features discussed, there were pressures caused by activities at the site to which a feature was concluded to be moderately or highly vulnerable these were flagged to the Regional Hub members as causing the Conservation Objective for the feature to be set to 'recover to favourable condition'. In all other cases the Conservation Objective was set to 'maintain at favourable condition'. The possible implications of this as far as potential management was concerned were also touched upon in plenary discussion, although it was pointed out to stakeholders that decisions on management measures would ultimately fall outside the scope of the Regional MCZ Project.

SNCB's Quality Assurance exercise

Subsequent to the Regional Hubs ground-truthing work, completed and revised VAs were passed back to the SNCBs for a final Quality Assurance exercise. This allowed the SNCBs to provide an overview on the outputs from, and ensure consistency across, all four Regional MCZ Projects.

Initial assessment of feature vulnerability to pressures imposed by activities at the site
Site: NG 17
Feature: A5.2 Subtidal sand

	Sensitivity		
	High	**Medium**	**Low**
Exposed (above)			
Uncertain			
Low exposure	• **Extraction - oil & gas** - Physical change (to another seabed type) • **Infrastructure - offshore (oil & gas platforms)** - Physical change (to another seabed type) • **Infrastructure - cables & pipelines (Installation)** - Physical change (to another seabed type) • **Infrastructure - cables & pipelines (Operation)** - Physical change (to another seabed type)	• **Fishing - benthic trawling** - Removal of non-target species (lethal) • **Fishing - benthic trawling** - Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • **Fishing - benthic trawling** - Surface abrasion: damage to seabed surface features • **Fishing - set netting** - Surface abrasion: damage to seabed surface features • **Infrastructure - offshore (oil & gas platforms)** - Structural abrasion/penetration: Structural damage to seabed >25mm • **Infrastructure - cables & pipelines (Installation)** - Structural abrasion/penetration: Structural damage to seabed >25mm • **Infrastructure - cables & pipelines (Operation)** - Structural abrasion/penetration: Structural damage to seabed >25mm • **Shipping** - Introduction or spread of non-indigenous species & translocations (competition)	
Not exposed	• **Fishing - benthic trawling** - Siltation rate changes (high)	• **Fishing - benthic trawling** - Siltation rate changes (low) • **Shipping** - Temperature changes - regional/national	• **Fishing - pelagic trawling** - Removal of non-target species (lethal) • **Fishing - set netting** - Removal of non-target species (lethal) • **Infrastructure - cables & pipelines (Installation)** - Physical removal (extraction of substratum) • **Shipping** - Water flow (tidal & ocean current) changes - regional/national • **Shipping** - Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm • **Shipping** - Surface abrasion: damage to seabed surface features

Figure 6.2 Example of compiled VA table as used for VA ground-truthing in Regional Hub meetings

Following the QA exercise, suggestions for changes to conservation objectives were provided to Net Gain by the JNCC for a number of offshore sites as follows:

- NG6 – Although the draft conservation objective for all features had been set to recover, with the exception of Ross worm (*Sabellaria spinulosa*) reefs, the JNCC suggested that as *Sabellaria* is more sensitive to pressures than the underlying broad scale habitat on which it is located it too should have a conservation objective of recover.
  Whilst JNCC's comments are duly noted, the position that was developed through discussion with the RSG (Ross worm [Sabellaria spinulosa] reefs conservation objective set to maintain) has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub meetings has therefore been maintained.
- NG16 – The JNCC suggested that due to localised high intensity fishing activity focused around the Swallow Hole feature within this rMCZ that the conservation objective for the site features should be set to recover rather than maintain.
  Whilst JNCC's comments are duly noted, the position that was developed through discussion with the RSG has been preserved. Advice from Natural England[17] recommends that, as regards the condition of Swallow Hole, the site should be set to 'maintain'. The agreed position developed at the Regional Hub meetings has therefore been maintained.
- NG17 – The JNCC suggested that due to the extensive infrastructure present within the rMCZ the conservation objective should be set to recover rather than to maintain.
  Whilst JNCC's comments are duly noted, the position that was developed through discussion with the RSG has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub meetings has therefore been maintained.

Natural England is further developing the advice they had produced regarding the impacts of commercial fishing activities on features. Until this work is finalised, it is not possible to undertake a cumulative assessment of impacts within the inshore rMCZs. Accordingly the QA exercise on inshore sites has been delayed, and all recommendations in the final report are therefore based solely on work undertaken in the first cut vulnerability assessment workshops and RSG meetings.

6.2 Vulnerability Assessment outputs

The complete dataset supporting the VA is available as an Excel spreadsheet. In addition, a hard copy of the VA outputs is provided as 0.

The VAs agreed following the Regional Hub meetings were not contingent on a range of assumptions at either the site or the network level. By encouraging the RSG to make full use of the sensitivity matrix work – and by supplying stakeholders with the necessary tools to make sense of these data (the PRISM and PISA database tools) – the Net Gain Project was able to ensure that stakeholders had, from an early stage, a good understanding of the potential implications of feature designation.

[17] Swallow Hole is a glacial tunnel valley but comprises a somewhat smaller feature than Inner Silver Pit. All of the sensitivities identified for the Inner SilverPit (e.g. aggregate extraction and, to a lesser extent, platform construction) apply to this feature. However, as a consequence of the smaller size of the Swallow Hole feature, sensitivities related to the placement or construction of platforms as well as infrastructure could be considered to be heightened.

Given the levels of activity associated with the area it was suggested by Natural England that, for the most part, the Swallow Hole site would be in good condition. **Natural England advice would be for the Conservation Objective to aim to maintain the Swallow Hole feature in its current state.**

As a consequence, the VA work that was undertaken did not result in any significant 'surprises' for stakeholders. Any general caveats that might otherwise be associated with the VA outputs were therefore avoided and it was possible for the Regional Hubs to put forward draft Conservation Objectives for sites and features with both a clear understanding of the process followed and an acceptance of the implications of their designation.

Where best available evidence or local knowledge was used during the ground-truthing exercise at the Regional Hubs, the basis for any decisions made was recorded and subsequently transcribed to the VA spreadsheet. For example, information may have been discussed regarding fishing gear modifications; once taken into account this may have resulted in an agreement to shift a pressure from the 'exposed' category to the 'low exposure' or 'not exposed' category.

6.3 Conservation Objective outputs

A summary of the Conservation Objectives for all recommended features across the Net Gain network is provided below.

Full Conservation Objectives (i.e. the full Conservation Objective statements) are provided on a site-by-site basis within the Site Assessment Documents presented below in Section 7.

Table 6.1 Summary table of sites and conservation objectives. Note: Recommended reference areas are not included in this table. A summary of the features recommended for protection in each rRA is provided in Table 5.12; the conservation objective for all features in rRAs is 'recover to reference condition' and therefore they are not repeated here.

Site name	Feature	Conservation objective
NG 1b, Orford Inshore	A5.4: Subtidal mixed sediments	Recover
NG 1c, Alde Ore Estuary	Estuarine rocky habitat	Maintain
	Sheltered muddy gravels	Maintain
	Smelt (*Osmerus eperlanus*)	Maintain
	Orfordness (subtidal)	Maintain
NG 2, Cromer Shoal Chalk Beds	A3.1: High energy infralittoral rock	Maintain
	A3.2: Moderate energy infralittoral rock	Maintain
	A4.2: Moderate energy circalittoral rock	Maintain
	Subtidal chalk	Maintain
	North Norfolk Coast (subtidal)	Maintain
NG 4, Wash Approach	A5.2: Subtidal sand	Maintain
	A5.4: Subtidal mixed sediments	Maintain
	Subtidal sands and gravels	Maintain
NG 5, Lincs Belt	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain
	A5.4: Subtidal mixed sediments	Maintain
	Peat and clay exposures	Maintain
	Subtidal sands and gravels	Maintain
NG 6, Silver Pit	A5.2: Subtidal sand	Recover
	A5.4: Subtidal mixed sediments	Recover
	Ross worm (*Sabellaria spinulosa*) reefs	Maintain
	Subtidal sands and gravels	Recover
	North Sea Glacial Tunnel Valley (Inner Silver Pit)	Maintain
NG 7, Markham's Triangle	A5.1: Subtidal coarse sediment	Recover
	A5.2: Subtidal sand	Recover
NG 8, Holderness Inshore	A2.4: Intertidal mixed sediments	Maintain

Site name	Feature	Conservation objective
	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain
	Peat and clay exposures	Maintain
	Subtidal chalk	Maintain
	Subtidal sands and gravels	Maintain
	Ross worm (*Sabellaria spinulosa*) reefs	Maintain
	Spurn Head (subtidal)	Maintain
NG 9, Holderness Offshore	A5.1: Subtidal coarse sediment	Recover
	A5.4: Subtidal mixed sediments	Recover
NG 10, Castle Ground	A1.1: High energy intertidal rock	Maintain
	A1.2: Moderate energy intertidal rock	Maintain
	A1.3: Low energy intertidal rock	Maintain
	A2.1: Intertidal coarse sediment	Maintain
	A2.2: Intertidal sand and muddy sand	Maintain
	A2.3: Intertidal mud	Maintain
	Intertidal underboulder communities	Maintain
NG 11, Runswick Bay	A3.1: High energy infralittoral rock	Maintain
	A3.2: Moderate energy infralittoral rock	Maintain
	A4.1: High energy circalittoral rock	Maintain
	A4.2: Moderate energy circalittoral rock	Maintain
	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain
	A5.4: Subtidal mixed sediments	Maintain
	Ocean quahog (*Arctica islandica*)	Maintain
NG 12, Compass Rose	A4.2: Moderate energy circalittoral rock	Recover
NG 13, Coquet to St Mary's	A1.2: Moderate energy intertidal rock	Maintain
	A1.3: Low energy intertidal rock	Maintain
	A2.1: Intertidal coarse sediment	Maintain
	A2.2: Intertidal sand and muddy sand	Maintain
	A2.3: Intertidal mud	Maintain
	A2.4: Intertidal mixed sediments	Maintain
	A3.1: High energy infralittoral rock	Maintain
	A3.2: Moderate energy infralittoral rock	Maintain
	A4.2: Moderate energy circalittoral rock	Maintain
	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain
	A5.3: Subtidal mud	Maintain
	A5.4: Subtidal mixed sediments	Maintain
	Intertidal underboulder communities	Maintain
NG 13a, Aln Estuary	A2.3: Intertidal mud	Maintain
	A2.5: Coastal saltmarshes and saline reedbeds	Maintain
	A3.1: High energy infralittoral rock	Maintain
	Estuarine rocky habitats	Maintain
	Sheltered muddy gravels	Maintain
	Subtidal sands and gravels	Maintain
NG 14, Farnes East	A4.2: Moderate energy circalittoral rock	Maintain
	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain

Site name	Feature	Conservation objective
	A5.3: Subtidal mud	Recover
	A5.4: Subtidal mixed sediments	Maintain
	Peat and clay exposures	Maintain
NG 15, Rock Unique	A4.3: Low energy circalittoral rock	Maintain
	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain
	Subtidal sands and gravels	Maintain
NG 16, Swallow Sand	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain
	Subtidal sands and gravels	Maintain
	North Sea Glacial Tunnel Valley (Swallow Hole)	Maintain
NG 17, Fulmar	A5.1: Subtidal coarse sediment	Maintain
	A5.2: Subtidal sand	Maintain
	Subtidal sands and gravels	Maintain
	Ocean quahog (*Arctica islandica*)	Maintain

Section 7 Site Assessment Documents

This section provides the complete set of Site Assessment Documents (SADs). There is a separate SAD provided for each rMCZ and rRA in the recommended network.

7.1 Marine Conservation Zone: NG 1b, Orford Inshore

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. The ecological description has been updated to reflect RSPB feedback on the IA. No changes have been made to recommendations or boundaries.

Site name

NG1b, Orford Inshore

Site centre location

52° 05’ 36’’N, 1° 52’ 55’’ E
52.093669°, 1.882227°
Lambert Azimuthal Equal Area projection, ETRS89 datum.

Site surface area

71.95km² / 7,194.60ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

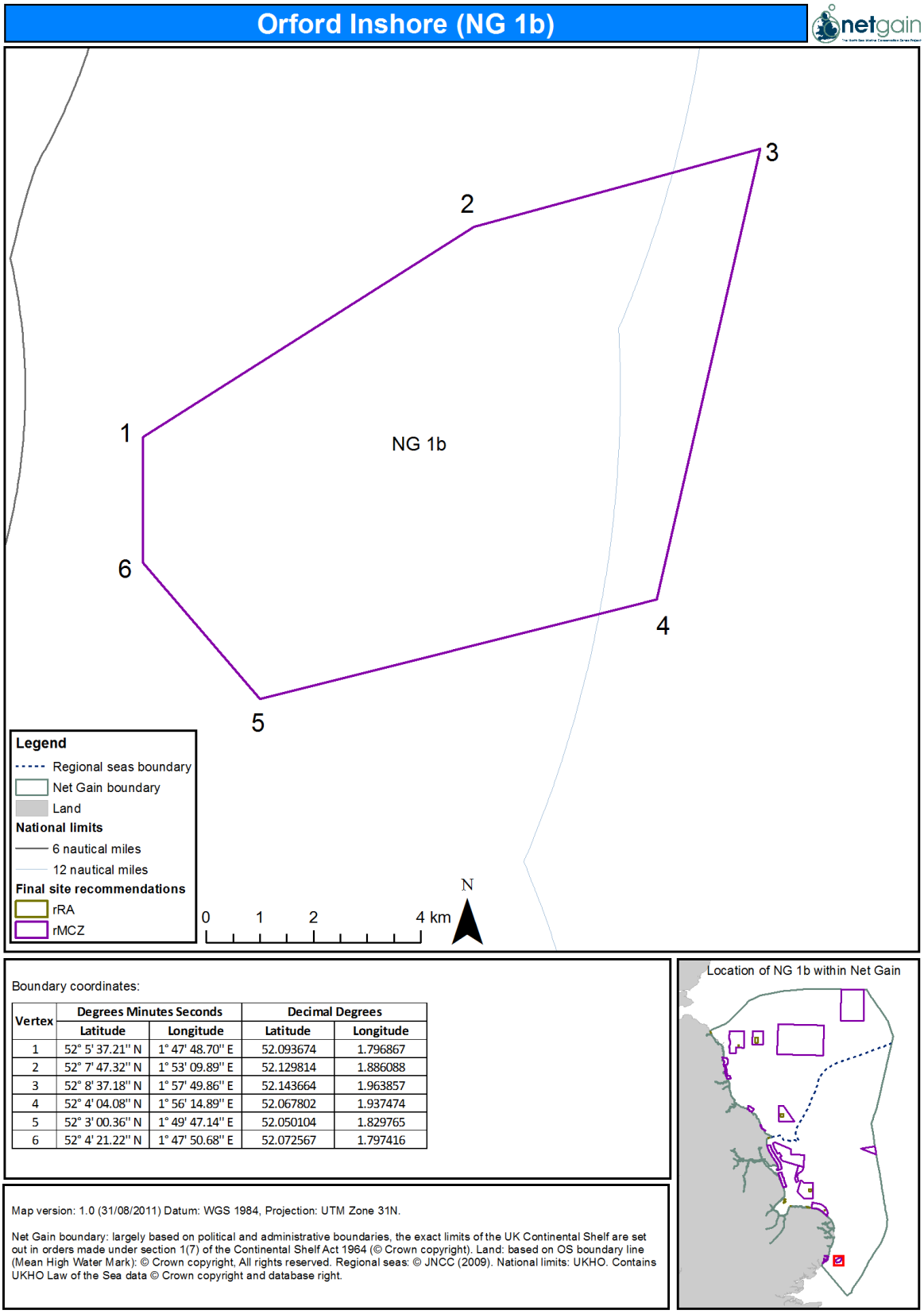
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.1 Features proposed for designation within NG 1b, Orford Inshore

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.4: Subtidal mixed sediments	71.65 km²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.2 Features within NG 1b, Orford Inshore not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.2: Subtidal sand	There is only a very small portion of this BSH (0.25km²) present in the north eastern corner; therefore it was decided to leave it off the recommendation list because there are better examples of the BSH in other sites.
Habitat of conservation importance	Subtidal sands and gravels (modelled)	Site was identified for subtidal mixed sediments other habitat features were not considered.
Species of conservation importance	n/a	n/a



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 5' 37.21" N	1° 47' 48.70" E	52.093674	1.796867
2	52° 7' 47.32" N	1° 53' 09.89" E	52.129814	1.886088
3	52° 8' 37.18" N	1° 57' 49.86" E	52.143664	1.963857
4	52° 4' 04.08" N	1° 56' 14.89" E	52.067802	1.937474
5	52° 3' 00.36" N	1° 49' 47.14" E	52.050104	1.829765
6	52° 4' 21.22" N	1° 47' 50.68" E	52.072567	1.797416

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.1 Location and extent of site NG1b (Orford Inshore)

Site summary

The site consists of the recommended feature subtidal mixed sediments covering nearly the entire site in waters that are between 20-30m deep (Figure 7.5). It lies approximately 14.36km off the East of England, offshore from the Alde Ore Estuary, with most of the site within the 6-12nm limits and a small portion beyond the 12nm limit. The site is of high importance as a nursery and spawning ground for fish species, and has a low diversity of seabirds but may be important for foraging species.

Detailed site description

NG1b is being recommended for the presence of subtidal mixed sediments. Other habitats included in the area are subtidal sands and gravels. This is the only proposed MCZ off the Suffolk coastline and is therefore also important for maintaining connectivity between other MCZs in the network. There are currently no other MPAs that overlap with the site and the closest MPA is approximately 3km to the West (the Outer Thames Estuary SPA).

NG1b is located in the Southern North Sea, offshore and adjacent to the Suffolk coast in the east of England. The habitat type in the area has been mapped using both biological and physical data (McBreen, 2010; Langmead et al., 2010). The area is subject to moderate energy at the seabed level due to the combined effect of currents and waves (McBreen, 2010) and as such is a relatively stable, depositional environment.

The area is of moderate ecological importance and plankton surveys show it to be of high importance as a nursery and spawning ground for fish. Surveys have found Dover sole, sprat, lemon sole, and sandeels to spawn within this area (Figure 7.6; Figure 7.7). Skate, ray, crustaceans and dogfish are also present in this area.

NG1b may be used by foraging seabird species such as the black- legged kittiwake and sandwich tern. Inshore and along the coast from NG1b there are several bird aggregations and RSPB reserves including Minsmere and North Warren which support these species. The Outer Thames Estuary SPA for the red throated diver is also close to the site. Other species such as kittiwake and sandwich tern, as well herring gull and lesser black-backed gull, are found in colonies along the Suffolk and Essex coast (RSPB, pers. comm. 2011).

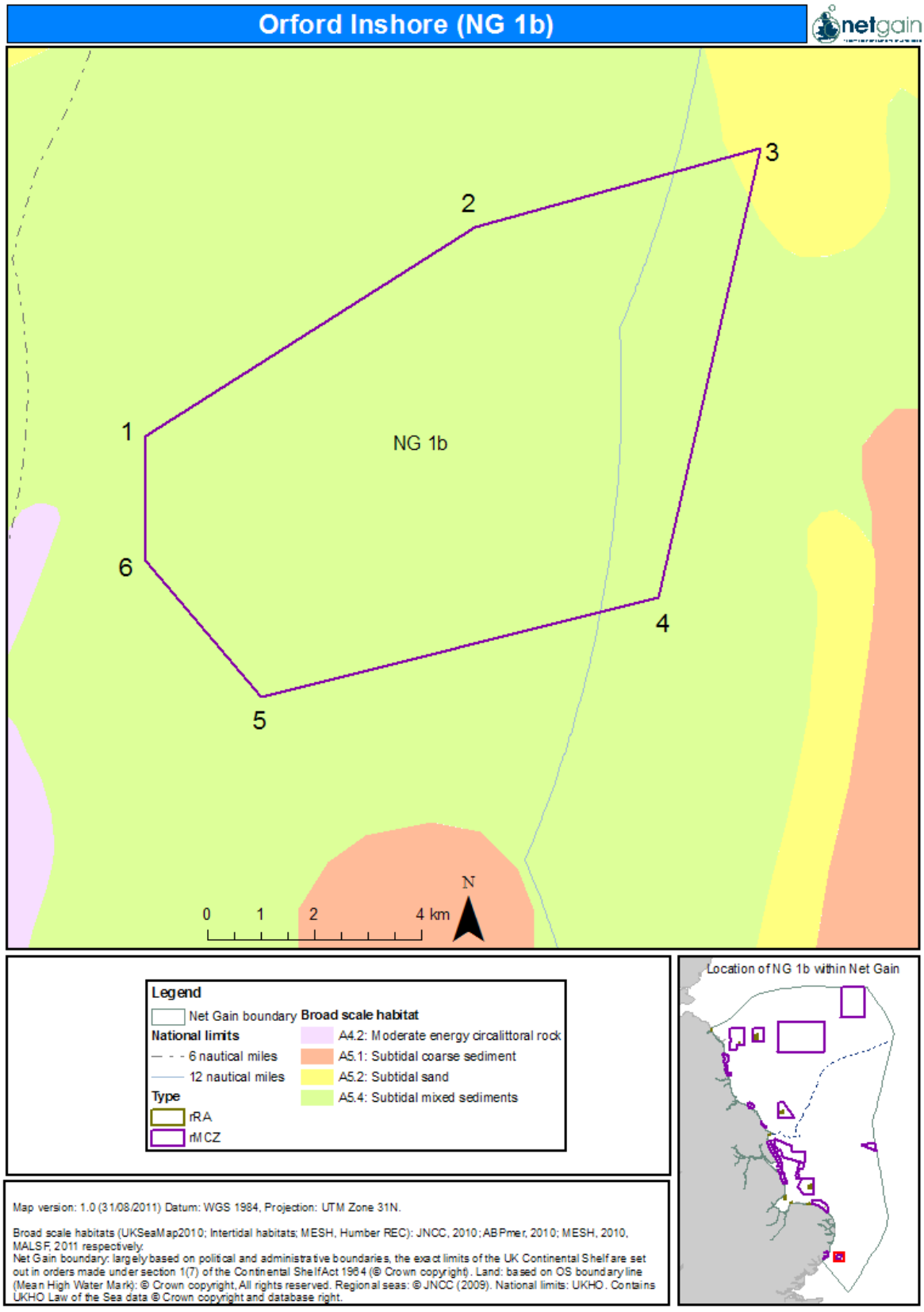


Figure 7.2 Broad-scale habitat present within NG 1b

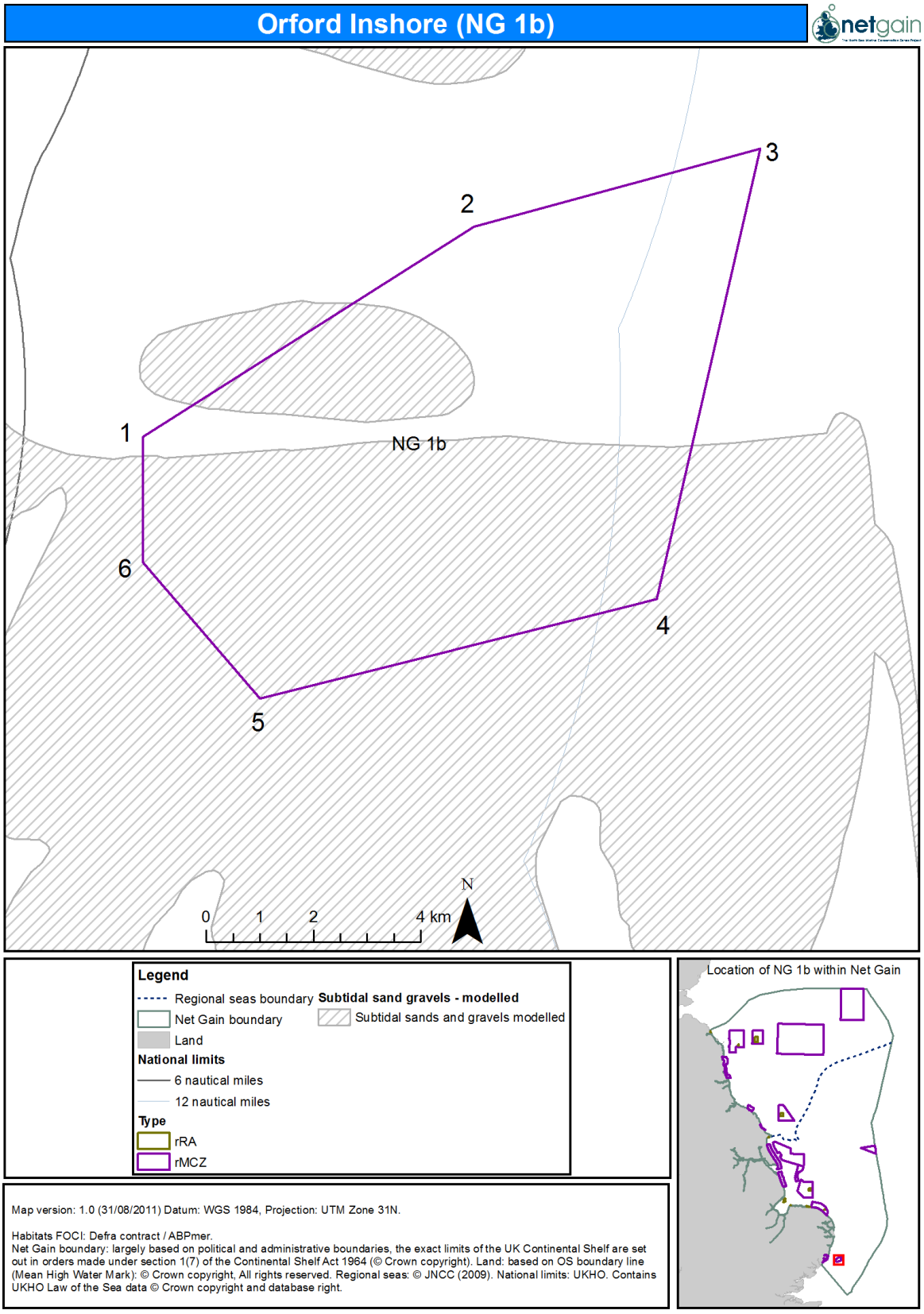


Figure 7.3 FOCI habitat present within NG 1b

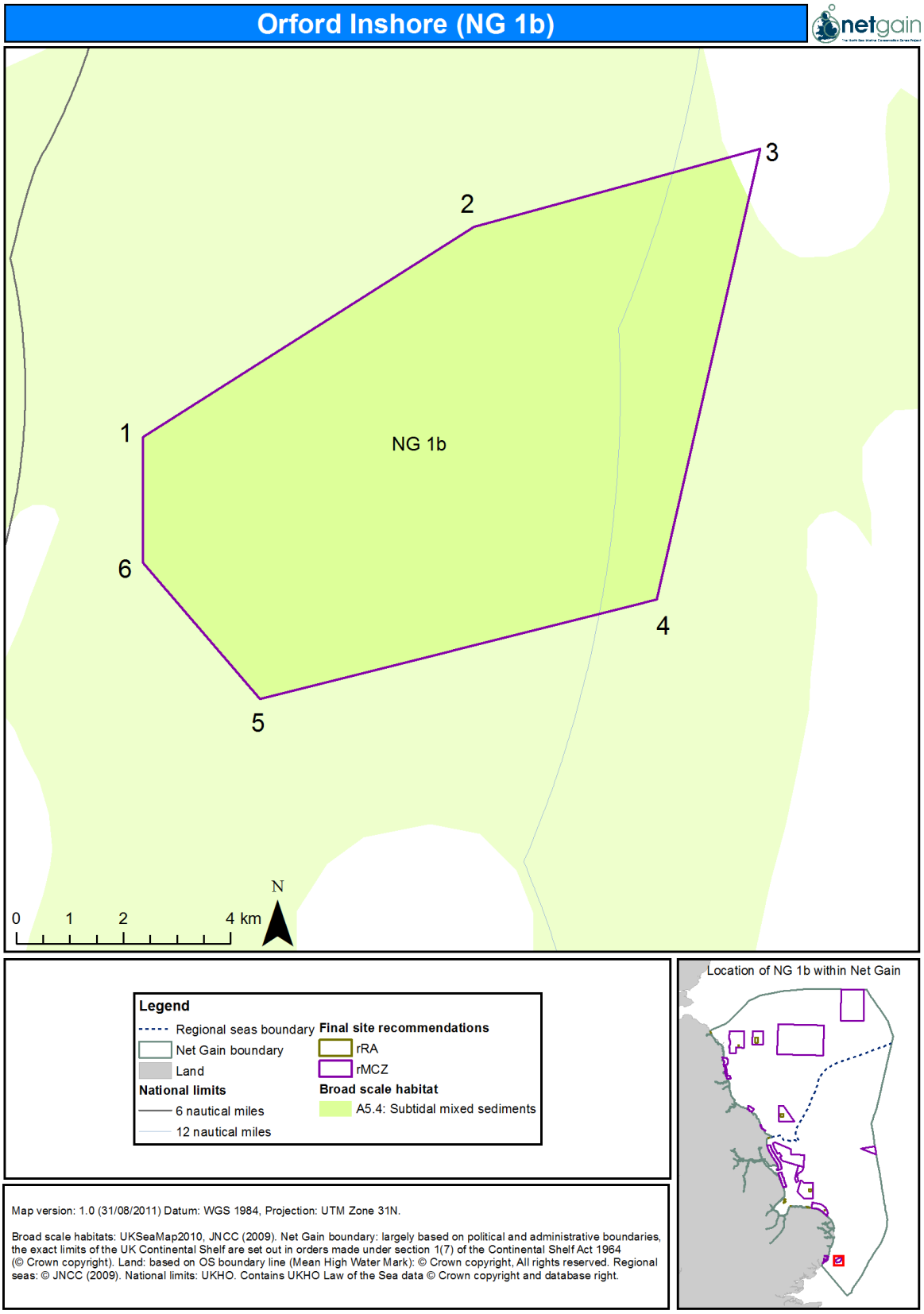


Figure 7.4 Features put forward for recommendation in NG 1b

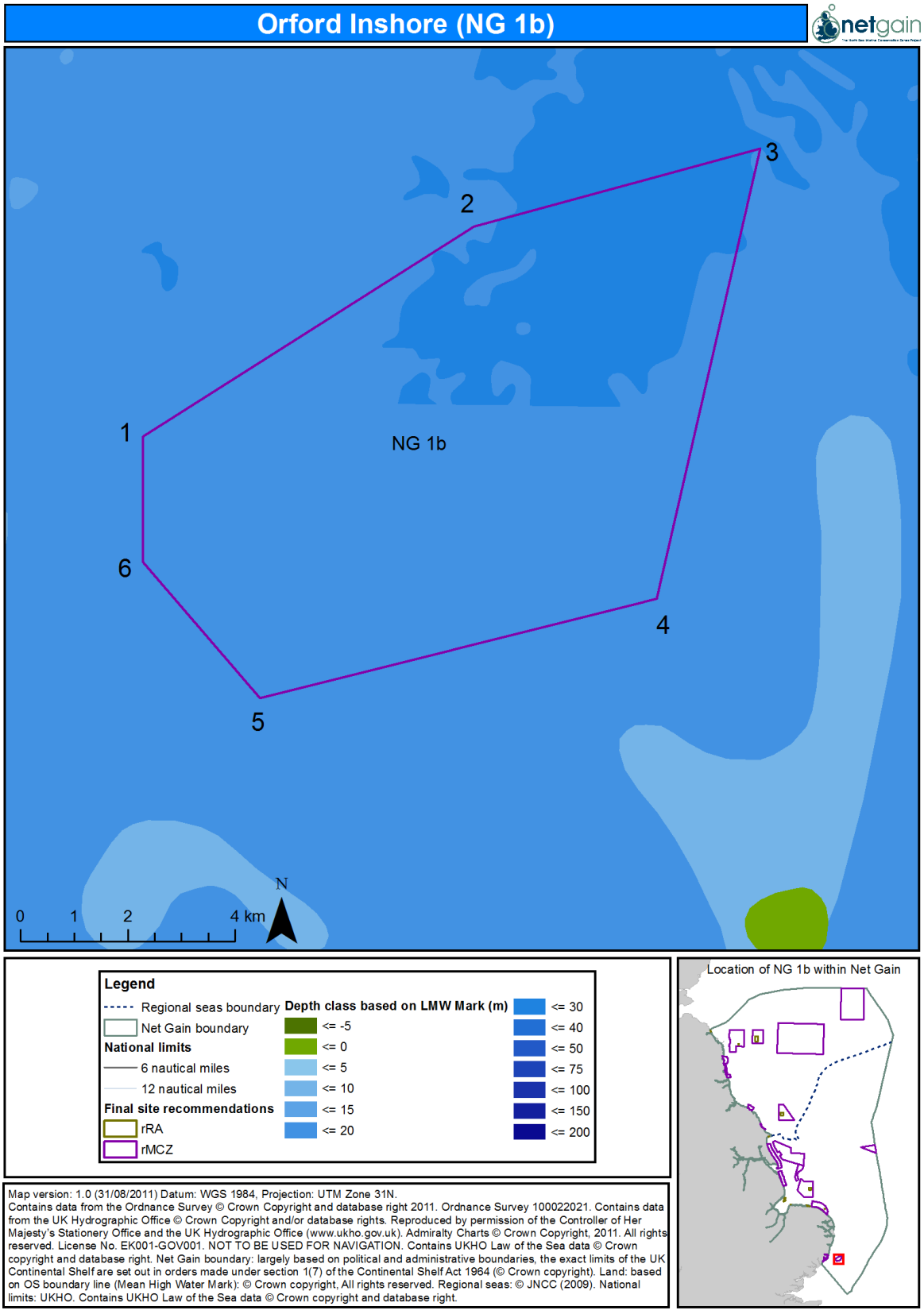


Figure 7.5 Bathymetry of NG 1b

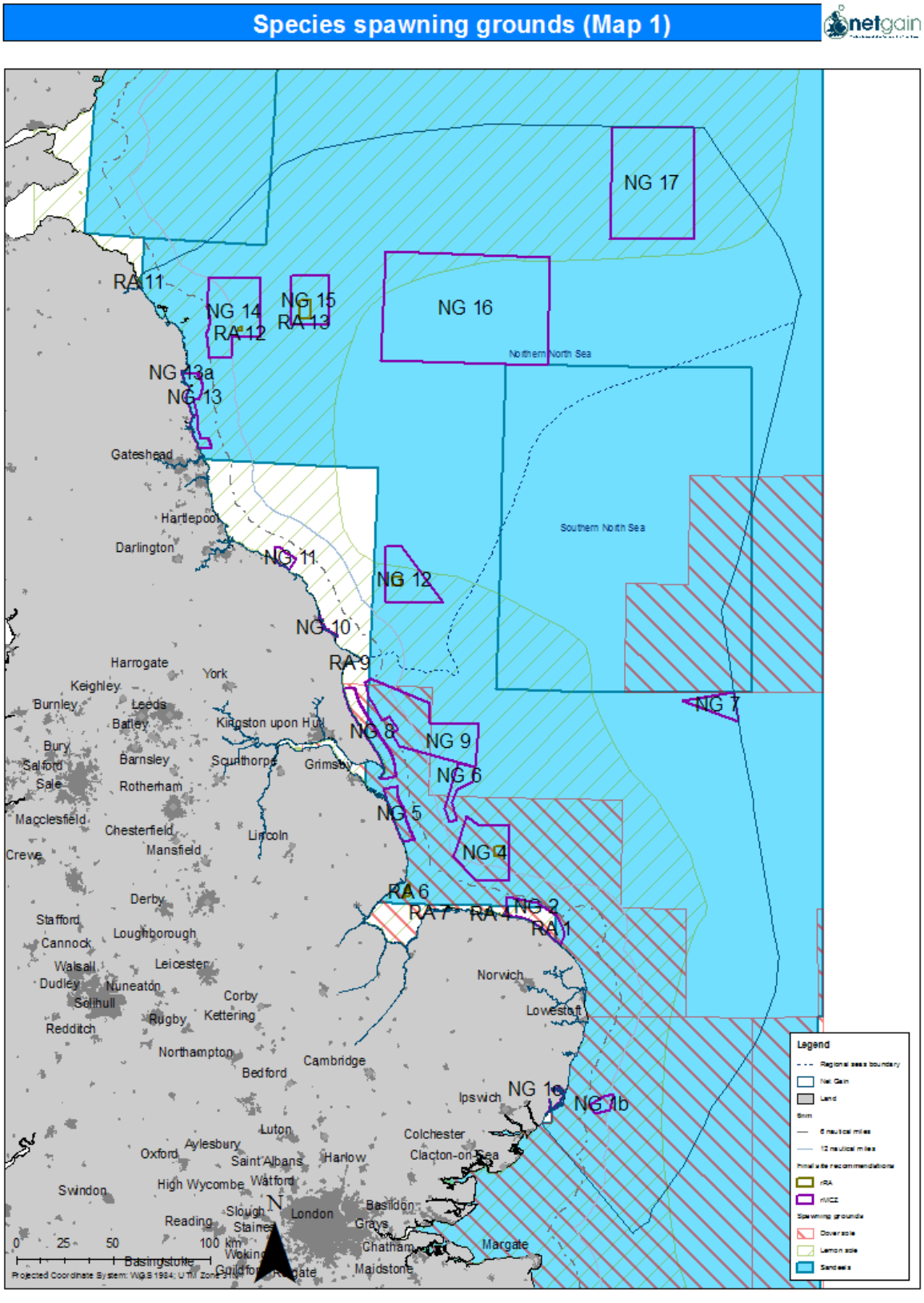
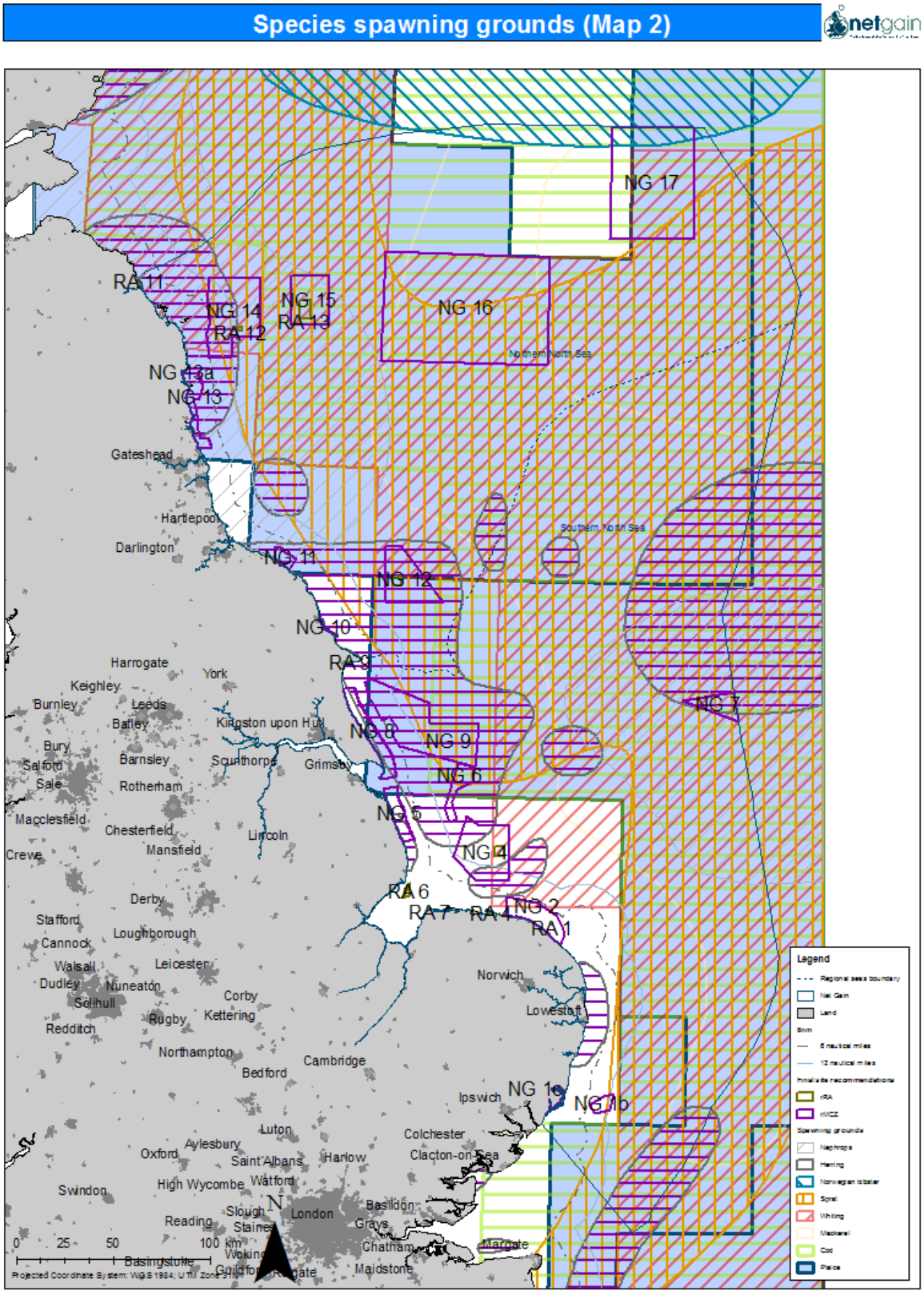


Figure 7.6 Spawning grounds (map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.7 Spawning grounds (map 2)

Site boundary

This site was developed from dMCZ site NG2.01 (which originated from the third round of meetings ahead of the second iteration report). Following two differing and separate trains of thought as to how best to maintain the ecological contribution proposed by the original site whilst seeking to reduce potential impacts that designation may have on commercial and recreational users, site NG 1b was drafted as an offshore extension of the original site NG2.01 and was identified as a good example of the broad-scale habitat subtidal mixed sediments.

Discussions during the Regional Hubs about the boundaries and activities that are occurring within close proximity of the site led to the decision to align the eastern boundary with the proposed Galloper wind farm export cable corridor, and the southern boundary was moved northward from its original 3rd iteration recommended position to provide a buffer for The Crown Estate aggregate application.

Conservation objectives

Table 7.3 Conservation objectives for site NG 1b, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal mixed sediments to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — L

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

There are no current MPAs that overlap with NG 1b, with the closest MPA approximately 3km away (Outer Thames Estuary SPA). The closest rMCZ is NG 1c, Alde Ore Estuary which is recommended for the Habitat FOCI estuarine rocky habitats and sheltered muddy gravels, along with the mobile species, smelt (*Osmerus eperlanus*). The Balanced Seas Regional MCZ Project boundary lies approximately 25km south of NG 1b, and to the south east lies Balanced Seas rMCZ 30 Kentish Knock East which has been recommended for subtidal coarse sediment and subtidal sand.

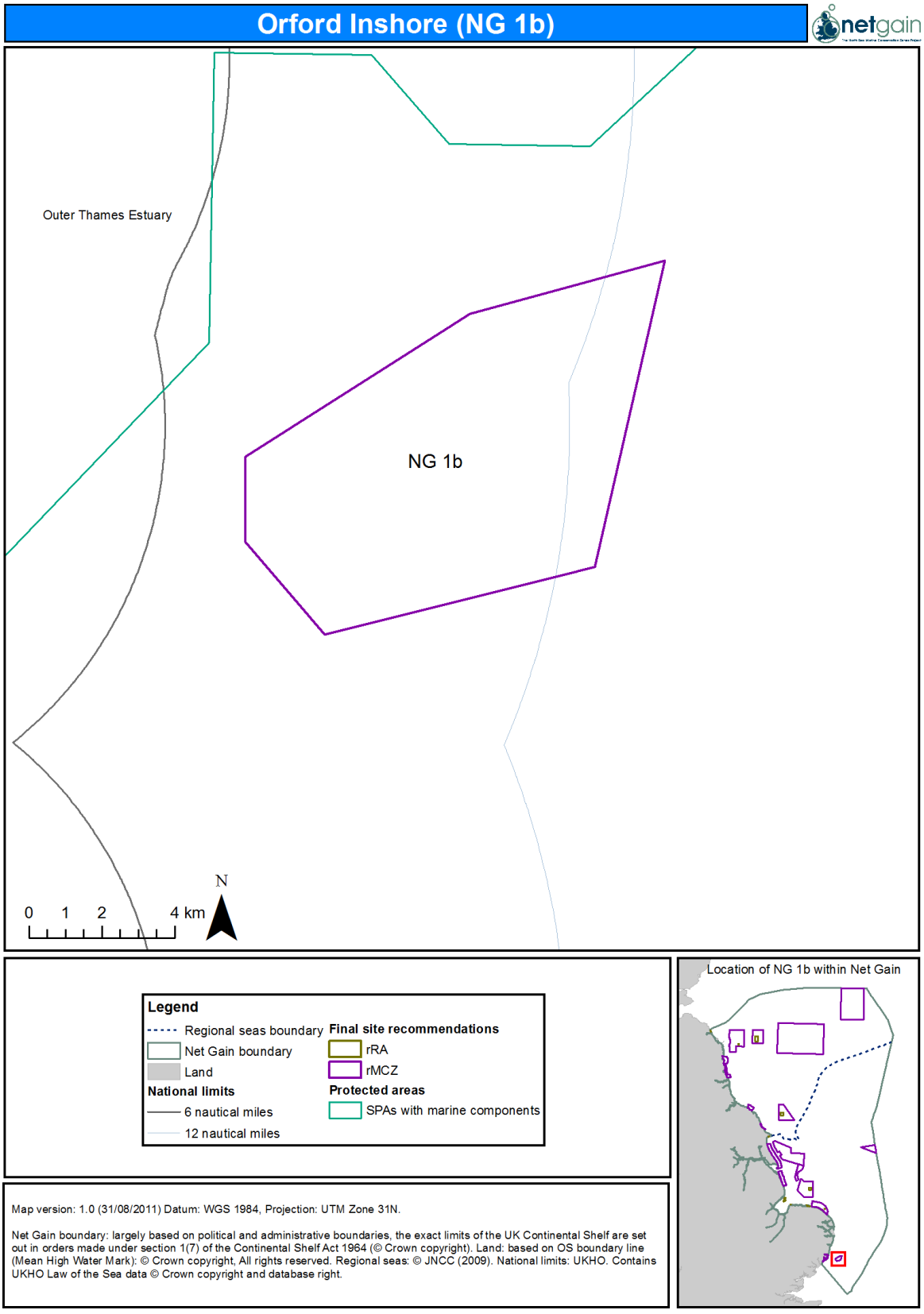


Figure 7.8 MPAs/rMCZs within or adjacent to NG 1b

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site had a good level of support from three separate groups of RSG members at the second LGM who scored their support for the site as 3, 3, and 4. It was suggested that recent developments may lead to co-location of cable routes in the area which would help increase support for the site. The MCS strongly supports the site but recorded an element of disappointment owing to the limited scale of the site following earlier compromises made during its development at the Regional Hubs. Another stakeholder commented that it was the 'least worst option', whilst another noted that it was not the absolute best place for it for all the stakeholders; it would be second choice for some. One group noted that their consensus assessment of support was given without representation from the commercial fishing sector (note: in Regional Hub meetings the commercial fishing sector had supported this site over the alternative NG1 site originally proposed). Final support will depend on management options, buffer zones, etc, and additional costs associated with the site as assessed through the EIA. It was also commented that there were generally good levels of support for the site.

In terms of confidence in underlying data this was low to moderate, with two scores of 'L' and one of 'M' being recorded. One of the 'L' scores was subject to geological surveys confirming what was actually at the site, whilst the 'L' score related to Habitat FOCI being modelled data (rather than physical survey data).

The potential level of contention was judged to be moderate (two scores of 'M'); contention is sector dependant (for example the site was expected to be contentious to both the international fisheries and offshore renewable energy sectors) it was the 'unknowns', for example of possible additional EIA burdens in the future, that were flagged as influencing these scores.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- French commercial fishing sector:- Strongly against
- Marine Aggregates:- Against (but would move to support if buffer distances between rMCZ boundary and aggregate interests are confirmed as being sufficient to mitigate for indirect pressures)
- RSPB:- Not against the site, but would prefer to see the 'original' site NG1 reinstated in its place
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation –concern however over recent NE/JNCC guidance on size of buffers required to avoid additional mitigation requirements on licensed aggregate sites
- The Wildlife Trusts:- Site not particularly supported – would prefer instead to see 'original' site NG1 reinstated

Table 7.4 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010.
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010.
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009.

References

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

LANGMEAD, O., E. JACKSON., C. GRIFFITHS., P. WILKES., M. NEILLY., D. LEAR., I. LUCKRAFT., A.FOGGO., H. TYLER- WALTERS. 2010. *UK marine benthic diversity layer*. Report to the Department of Environment, Food and Rural Affairs from the Marine Life Information Network (MarLIN) Plymouth: Marine Biological Association of the UK, subcontracted by ABPmer, Southampton. Defra Contract No. MB0102 Task 2F, Report No. 20

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

RSPB, 2010. *RSPB species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby 2010

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer.*

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.2 Marine Conservation Zone: NG 1c, Alde Ore Estuary

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries. Correction of area covered by smelt from 36.70km^2 to 12.24km^2 in Table 7.5. The ecological description has been updated to reflect Natural England and RSPB feedback on the IA.

Site name

NG1c, Alde Ore Estuary

Site centre location

52° 06’ 59’’N, 1° 32’ 09’’ E
52.11663°, 1.536085°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

12.24km² / 1,224.13ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

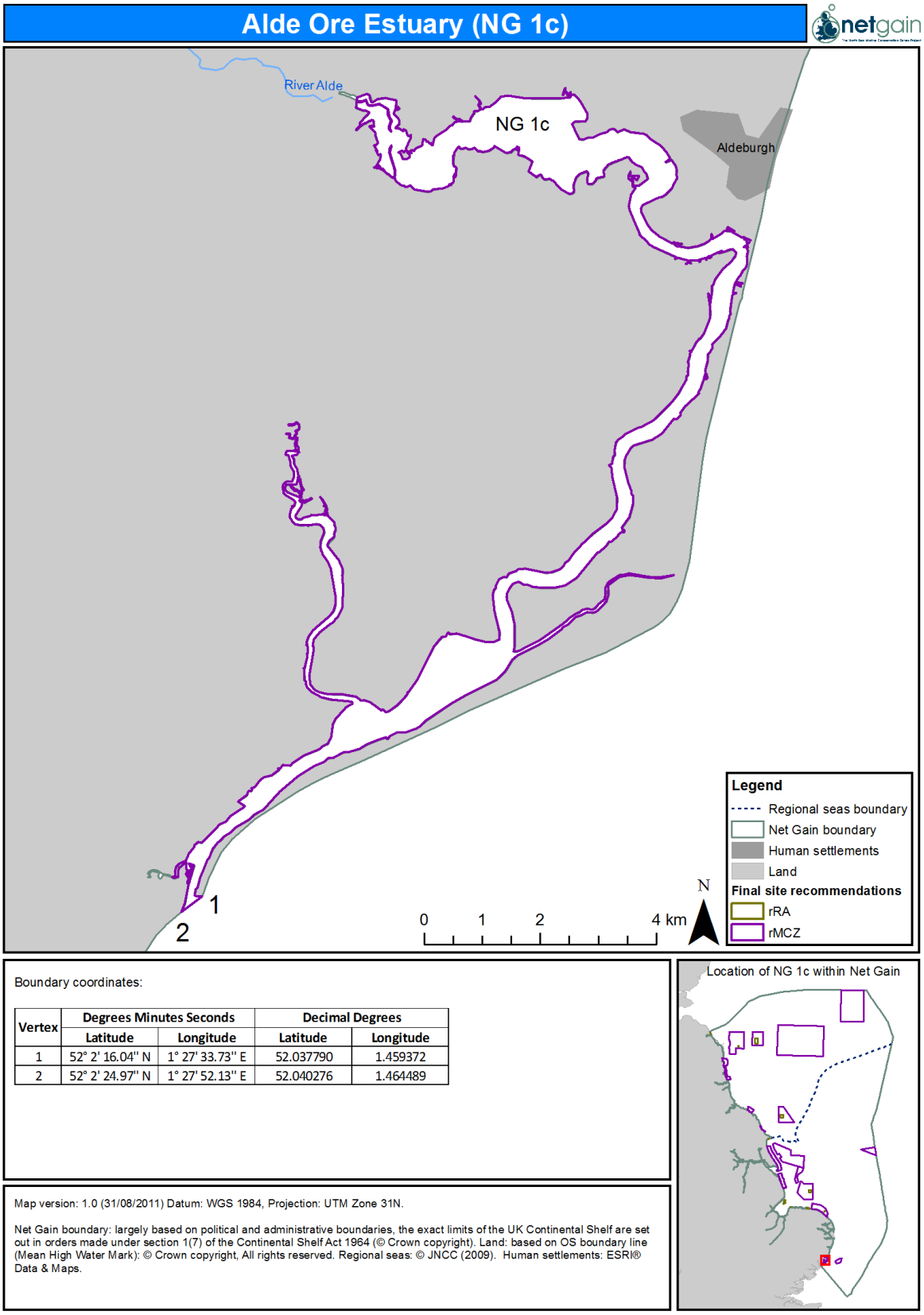
Table 7.5 Features proposed for designation within NG1c, Alde Ore Estuary

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	n/a	n/a
Habitat of conservation importance	Estuarine rocky habitats	4 points
Habitat of conservation importance	Sheltered muddy gravels	1 point
Species of conservation importance	Smelt (*Osmerus eperlanus*)	12.24km²
Geological feature	Orfordness (subtidal)	12.23km²
Other feature	n/a	n/a

Table 7.6 Features within NG1c, Alde Ore Estuary not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A1.3: Low energy intertidal rock	Very small portion of habitat present (0.02km²)[18]
Broad-scale habitat	A2.1: Intertidal coarse sediment	Very small portion of habitat present (0.02km²)[18]
Broad-scale habitat	A2.3: Intertidal mud	Very small portion of habitat present (0.01km²)[18]
Broad-scale habitat	A2.4: Intertidal mixed sediments	Very small portion of habitat present (0.0001km²)[18]
Broad-scale habitat	A2.7: Intertidal biogenic reefs	Very small portion of habitat present (0.001km²)[18]
Broad-scale habitat	A5.2: Subtidal sand	Small portion of habitat present (1.87km²)[18]
Broad-scale habitat	A5.4: Subtidal mixed sediments	Very small portion of habitat present (0.38km²)[18]
Habitat of conservation importance	Blue mussel beds	Only single point and 0.02km² present, not perceived to be a good example of this feature[18]
Species of conservation importance	European eel (*Anguilla anguilla*)	Not a significant ecological component of the site
Species of conservation importance	Tentacled lagoon-worm (*Alkmaria romijni*)	Only a single record present from 1992[18]

[18] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 2' 16.04'' N	1° 27' 33.73'' E	52.037790	1.459372
2	52° 2' 24.97'' N	1° 27' 52.13'' E	52.040276	1.464489

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). Human settlements: ESRI® Data & Maps.

Figure 7.9 Location and extent of site NG1c (Alde Ore Estuary)

Site summary

NG 1c is the Alde Ore Estuary located in close proximity to Aldeburgh on the Suffolk coast in the East of England, and includes the Orfordness (subtidal) geological feature (Brooks, et al. 2009; May, 2007). The depth range for the site is from 5m exposed at mean low water mark to 5m deep (Figure 7.13) with the eastwards running Alde River relatively wide and shallow whilst the southwest flowing Ore River is narrower and deeper with strong currents (JNCC, 2011b). The seabed of the site is composed of estuarine rocky habitats and sheltered muddy gravels put forward for recommendation, as well as small areas of other intertidal rock, mud and sediment habitats, and biogenic reefs. Smelt (*Omerus eperlanus*) is present and recommended for designation within the site, and is known to utilise the estuary for spawning and as a nursery for juveniles (Ellis, et al. 2010) along with other marine fish species (Colclough and Scarr, 2010). The diversity of habitats within the site provide opportunities for seabirds to forage, roost and nest (JNCC, 2011a).

Detailed site description

NG1c is being recommended for the presence of estuarine rocky habitats and sheltered muddy gravels and for its ecological importance as a breeding and nursery estuary for smelt (Omerus eperlanus). The site is located inshore from the coast in the east of England. The eastwards running Alde River is relatively wide and shallow whilst the southwest flowing River Ore is narrower and deeper with strong currents (JNCC, 2011b). The Alde and Ore system is an example of a bar built estuary. Estuaries are ecologically important and protecting these productive, yet fragile ecosystems is vital.

Diverse and species rich intertidal sand and mudflat biotopes grade naturally along the length of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed. A study by JNCC in 1996 showed the following; areas of mixed substrata on the mid shore, such as east of Snape Maltings were covered by a blanket of the ephemeral algae *Ulva lactuca* and *Entermorpha* spp and where mixed substrata extended on the lower shore such as off Flybury Point, communities of anemones (*Sagartia* sp), peacock worms (*Sabella pavonina*), and the non-native slipper limpet (*Crepidula fornicate*) were found amongst red algae. Muddy substrata at the head of the Alde are supported by typical upper estuarine communities and are dominated by polychaetes and amphipods. The brackish water polychaete *Alkmaria romijni* was recorded at two sites within the system and this polychaete is listed as a Schedule 5 species under the Wildlife and Countryside Act, 1981 (Hill et al., 1996). Bivalve (*Macoma balthica*) communities were found to be widespread and sandmason worms (*Lanice conchilega*) have been found near the mouth of the Ore Estuary (Hill et al., 1996).

The site is of importance for smelt (*Omerus eperlanus*) which spawns in the area. Estuaries are important for juvenile fish providing feeding and refuge habitat. Research suggests that the current strategy of protecting marine fish at sea but leaving them vulnerable in their nursery grounds only meets with limited success, a case for establishing MCZs in estuaries (Colclough and Scarr, 2010). Over the last two centuries smelt has gone into decline and disappeared from many rivers (English Nature, 2003). There is a lack of understanding of the human impact on high mobility species such as smelt but they are thought to be under threat from overfishing, pollution and habitat loss, therefore important spawning grounds such as this need to be protected (Net Gain, 2011).

The estuary also supports sprat and herring nurseries throughout and nurseries for other marine species such as sole and dab are afforded in the lower reaches (Colclough and Scarr, 2010). Migratory species such as salmon, sea trout and eel are common in these estuaries. Commercially important species that may be present include lobsters and oysters (Hill et al., 1996). Blue mussel beds are also present in the area, although the area is not perceived to be a particularly good example of this feature. The ENG features of tentacled lagoon worm (*Alkmoria romiji*) and the European eel (*Anguila anguilla*) may also be present in the area but do not form a significant ecological component of the site.

The site falls within the boundaries of two currently designated Special Areas of Conservation (SACs); Alde, Ore and Butley Estuaries and Orfordness-Shingle Street, which have a range of littoral sediment and rock biotopes that are of high diversity and species richness for estuaries in east of England and the area is relatively natural, being largely undeveloped with limited industrial activity (JNCC, 2011b). It also falls within the Alde-Ore Estuary Site of Special Scientific Interest (SSSI), Ramsar site and Special Protection Area (SPA), which supports internationally important populations of regularly occurring migratory birds including redshank (*Tringa tetanus*) and lesser black- backed gulls (*Larus fuscus graellsii*) (JNCC, 2011b). The site supports a wetland and seabird assemblage of international importance by regularly supporting at least 20,000 waterfowl and 20,000 seabirds. The variety of habitats present include intertidal rock, mud, coarse sediment, mixed sediment, biogenic reef, subtidal sand, blue mussel beds and wetland habitats including grazing marsh and saltmarsh. The habitats have a high diversity and species richness of particular significance to the birds occurring at the site as these provide a range of opportunities for feeding, roosting, nesting and breeding. Seabirds such as little and sandwich terns, lesser black-backed, herring and black-headed gulls breed within the SPA and forage widely outside of its boundaries (RSPB, pers. comm. 2012).

The Orfordness geological feature is also a recommended feature. The shingle ridges that form Orfordness extend 15 km south from Aldeburgh on the Suffolk coast and divert the River Ore for a similar distance (May, 2007), although the full extent of the feature does not fall within the proposed boundaries. The site has been well documented and is generally thought of as one of the largest and most important shingle structures on the British Coast (May, 2007).

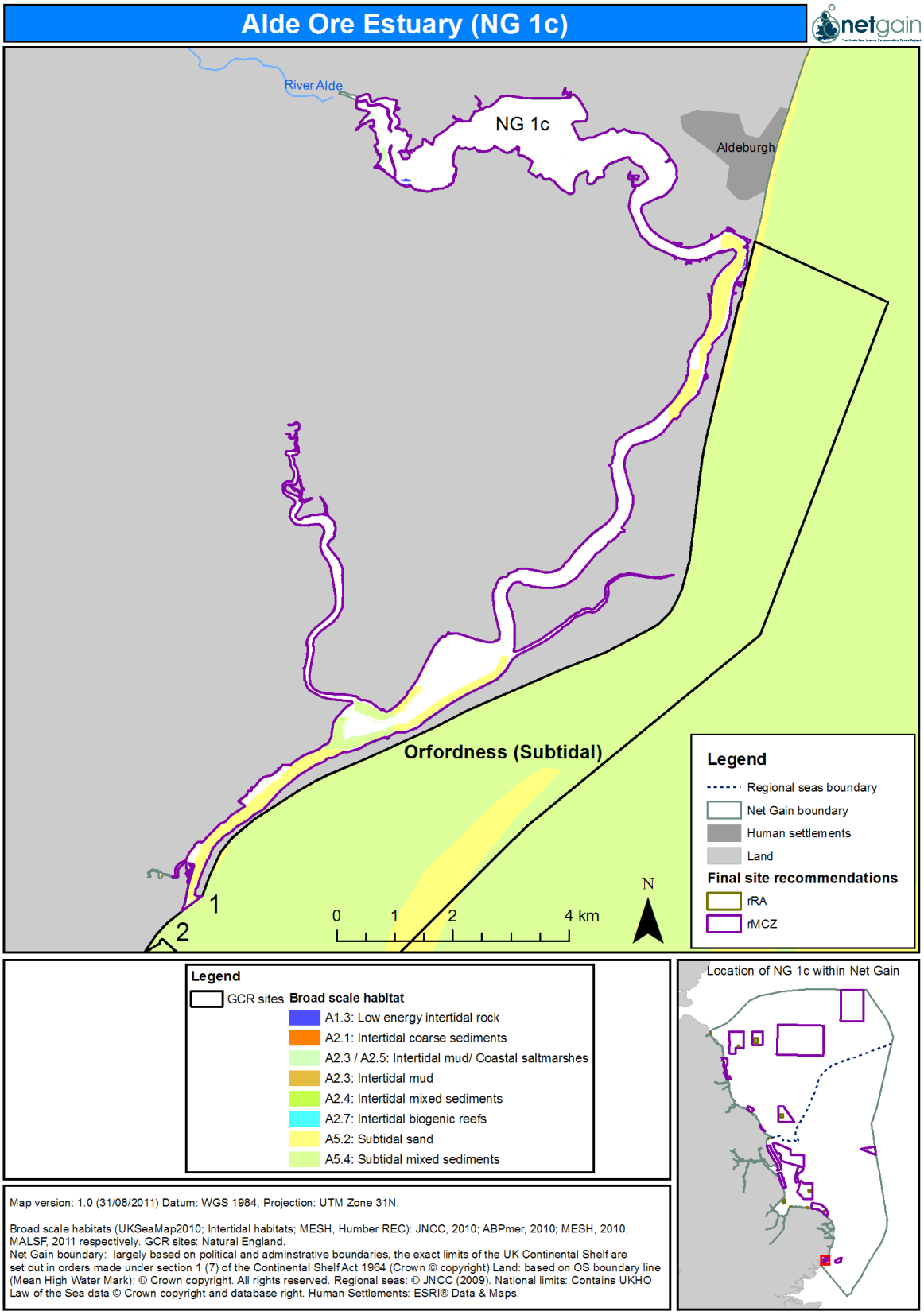


Figure 7.10 Broad-scale habitat present within NG 1c

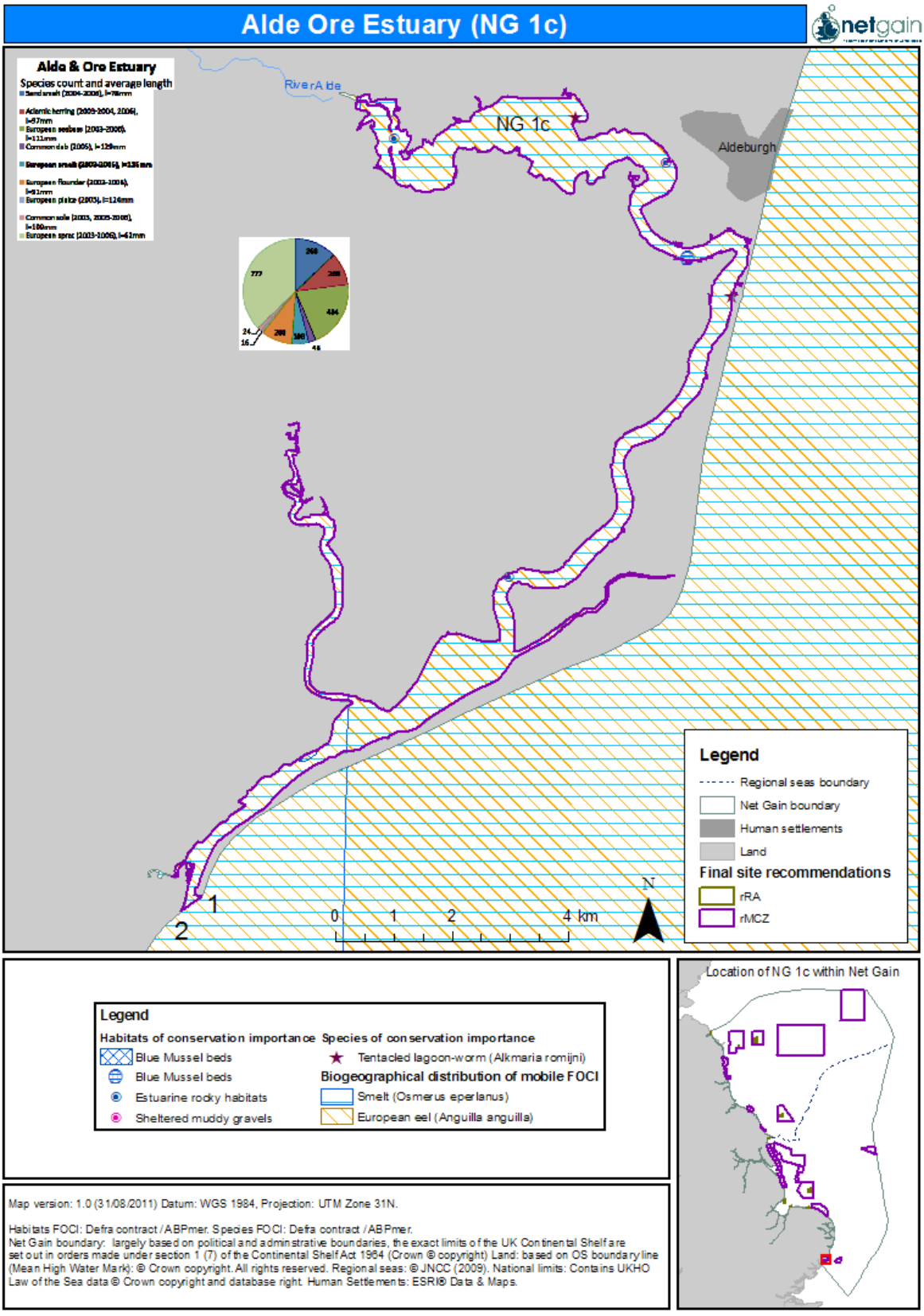


Figure 7.11 FOCI habitat and species present within NG 1c

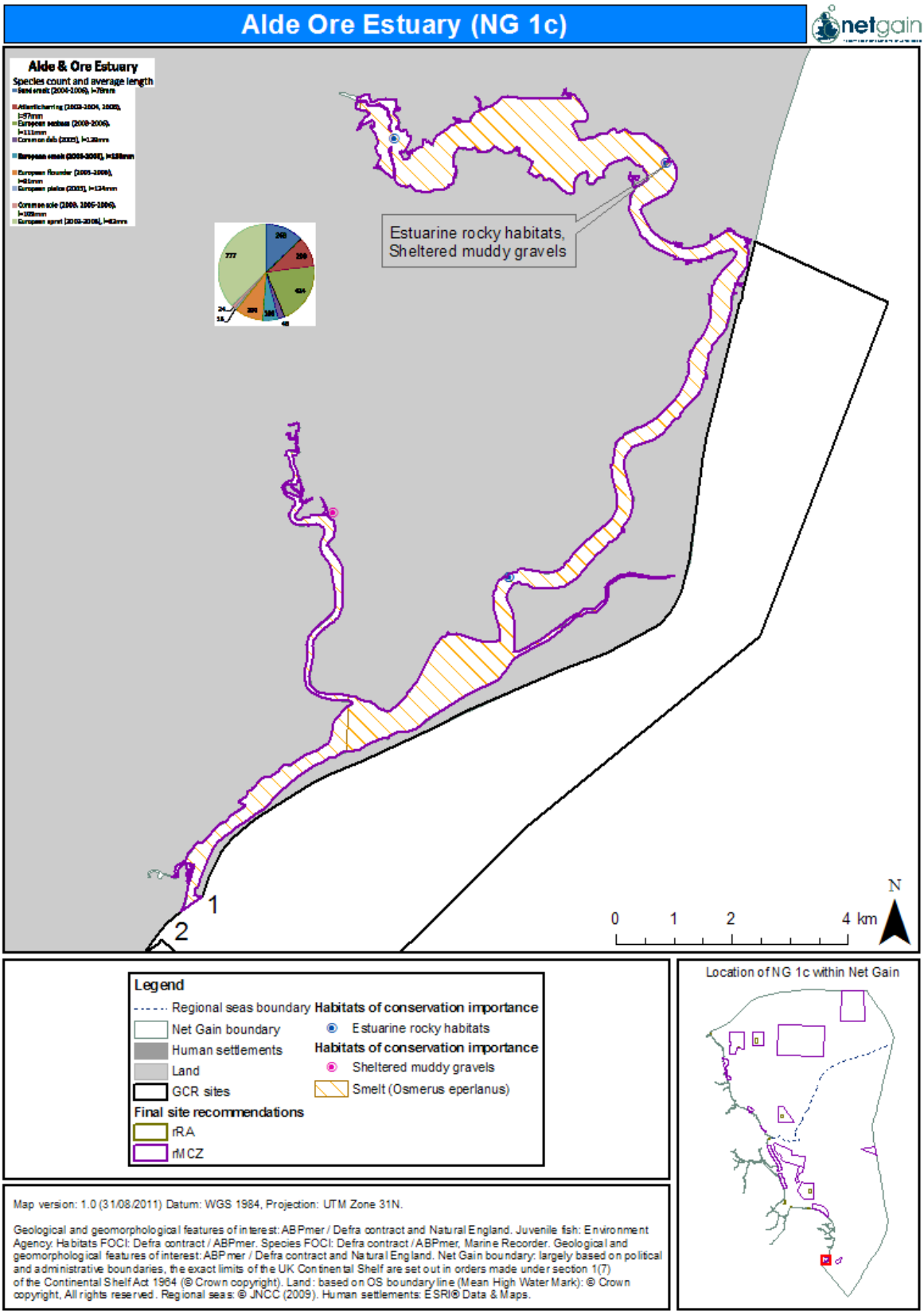


Figure 7.12 Features put forward for recommendation in NG 1c

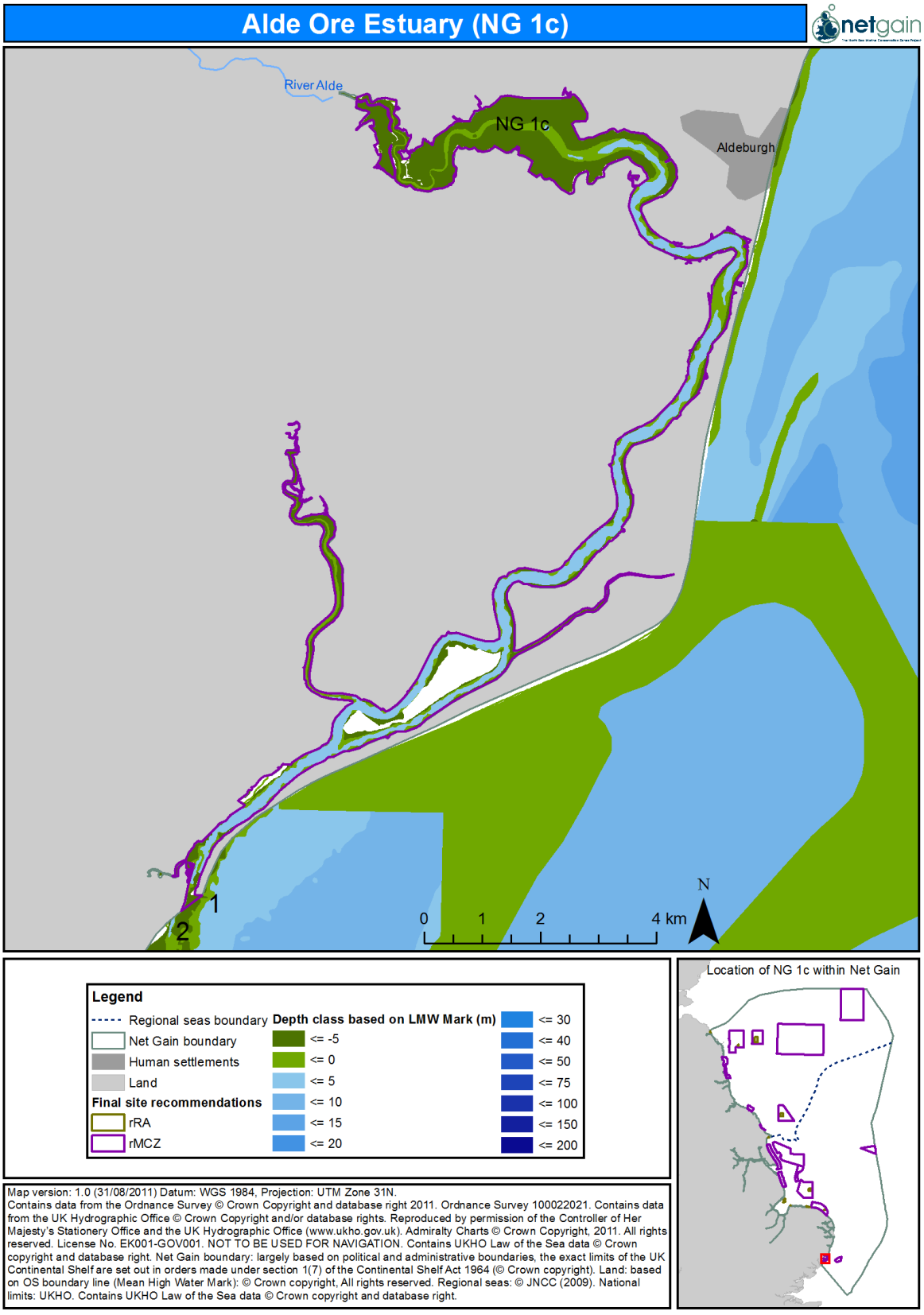


Figure 7.13 Bathymetry of NG 1c

Site boundary

The boundary of NG1c, Alde Ore Estuary site was derived from a much larger site NG2.01 that was subsequently split to be recommended for designation of specific features. It was suggested that it might be logical to consider estuarine MCZs separately to coastal MCZs due to the diversity of activities, authorities and environmental concerns. The site boundaries have been defined to include the entire estuary including the three rivers up to mean high water mark and to the seaward side of the spit.

Conservation objectives

Table 7.7 Conservation objectives for site NG 1c, Estuarine rocky habitat

<table>
<tr><td>Conservation Objective</td><td></td></tr>
<tr><td>1
Maintain/ recover</td><td>Estuarine rocky habitats are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Estuarine rocky habitats in favourable condition, such that the:</td></tr>
<tr><td>2
Attributes and parameters (indicated by *) of feature</td><td><u>Habitat</u>

the
• extent,
• diversity,
• community structure,
• natural environmental quality*, and
• natural environmental processes*

representative of Estuarine rocky habitats in the biogeographic region are maintained, such that the feature makes its contribution to the network.</td></tr>
<tr><td>Advice on operations</td><td></td></tr>
<tr><td>3
Pressures</td><td>Estuarine rocky habitats is sensitive to the pressures listed below:
<table>
<tr><th>Pressure</th><th>Sensitivity</th><th>Confidence</th></tr>
<tr><td>Emergence regime changes (sea level) - regional/national</td><td>H</td><td>L</td></tr>
<tr><td>Introduction or spread of non-indigenous species & translocations (competition)</td><td>H</td><td>L</td></tr>
<tr><td>Physical loss (to land or freshwater habitat)</td><td>H</td><td>L</td></tr>
</table></td></tr>
</table>

	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Introduction of microbial pathogens (disease)	M	L
	Physical change (to another seabed type)	M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Temperature changes - regional/national	M	L
	Removal of target species (lethal)	L	L
	Salinity changes - local	L	L
	Siltation rate changes (high)	L	L
	Temperature changes - local	L	M
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.8 Conservation objectives for site NG 1c, Sheltered muddy gravels

Conservation Objective	
1 Maintain/ recover	Sheltered muddy gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the sheltered muddy gravels in favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the sheltered muddy gravels in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Sheltered muddy gravels is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — L Siltation rate changes (high) — H — M

	Atmospheric climate change	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	M	L
	Physical change (to another seabed type)	M	L
	Removal of non-target species (lethal)	M	M
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	M
	Siltation rate changes (low)	M	M
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	M
	Surface abrasion: damage to seabed surface features	M	M
	Temperature changes - regional/national	M	L
	Water clarity changes	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.9 Conservation objectives for site NG 1c, Smelt (*Osmerus eperlanus*)

Conservation Objective	
1 Maintain/ recover	Smelt (*Osmerus eperlanus*) is on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the smelt (*Osmerus eperlanus*) in favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**Species** the • natural range, • habitat extent, • population structure, • population density, • size structure, • natural environmental quality*, and natural environmental processes* representative of the Smelt (*Osmerus eperlanus*) in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Smelt (*Osmerus eperlanus*) is sensitive to the pressures: Guidance for the pressures that the feature is sensitive to have not been provided to the Net Gain regional project.
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Table 7.10 Conservation objectives for site NG 1c, Orfordness (subtidal) geological feature

Conservation Objective	
1 Maintain/ recover	The Orfordness (subtidal) geological feature is a shingle ridge that provides evidence for oscillations in sea level, and provides a fantastic example for research to help clarify many of the processes that are relevant in spit development worldwide. Subject to natural change, maintain the Orfordness (subtidal) in favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**<u>Geological/ Geomorphological</u>** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the Orfordness (subtidal) in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Orfordness (subtidal) is sensitive to the pressures: Water flow (tidal and ocean current) changes-regional/national Emergence regime changes (sea level)-regional/national

	Wave exposure changes-regional/national Water flow (tidal current) changes-local Emergence regime changes-local Wave exposure changes-local Physical loss Siltation rate changes (flow) Siltation rate changes (high) Structural abrasion/penetration: structural damage to seabed >25mm Shallow abrasion/penetration: damage to seabed surface and penetration Surface abrasion: damage to seabed surface features Physical removal (extraction of substratum)
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

The site NG 1c, Alde Ore Estuary falls within the boundaries of two currently designated SACs, Alde, Ore and Butley Estuaries and a small portion of the Orfordness-Shingle Street. The site also falls within the Alde-Ore Estuary SPA, SSSI and Ramsar site.

The table below shows rMCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.11 MPAs within or adjacent to NG 1c

MPA Type	Site Name	Feature protected
SAC	Alde, Ore and Butley Estuaries	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.4: Intertidal mixed sediments A2.5: Coastal saltmarshes and saline reedbeds
SAC	Orfordness-Shingle Street	Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SPA	Alde-Ore Estuary	Not in GAP table Migratory bird species
SSSI	Alde-Ore Estuary	A2.1: Intertidal coarse sediment Saline lagoons Estuarine rocky habitats
Ramsar Site	Alde-Ore Estuary	Not in GAP table Wetland site for migrating bird species

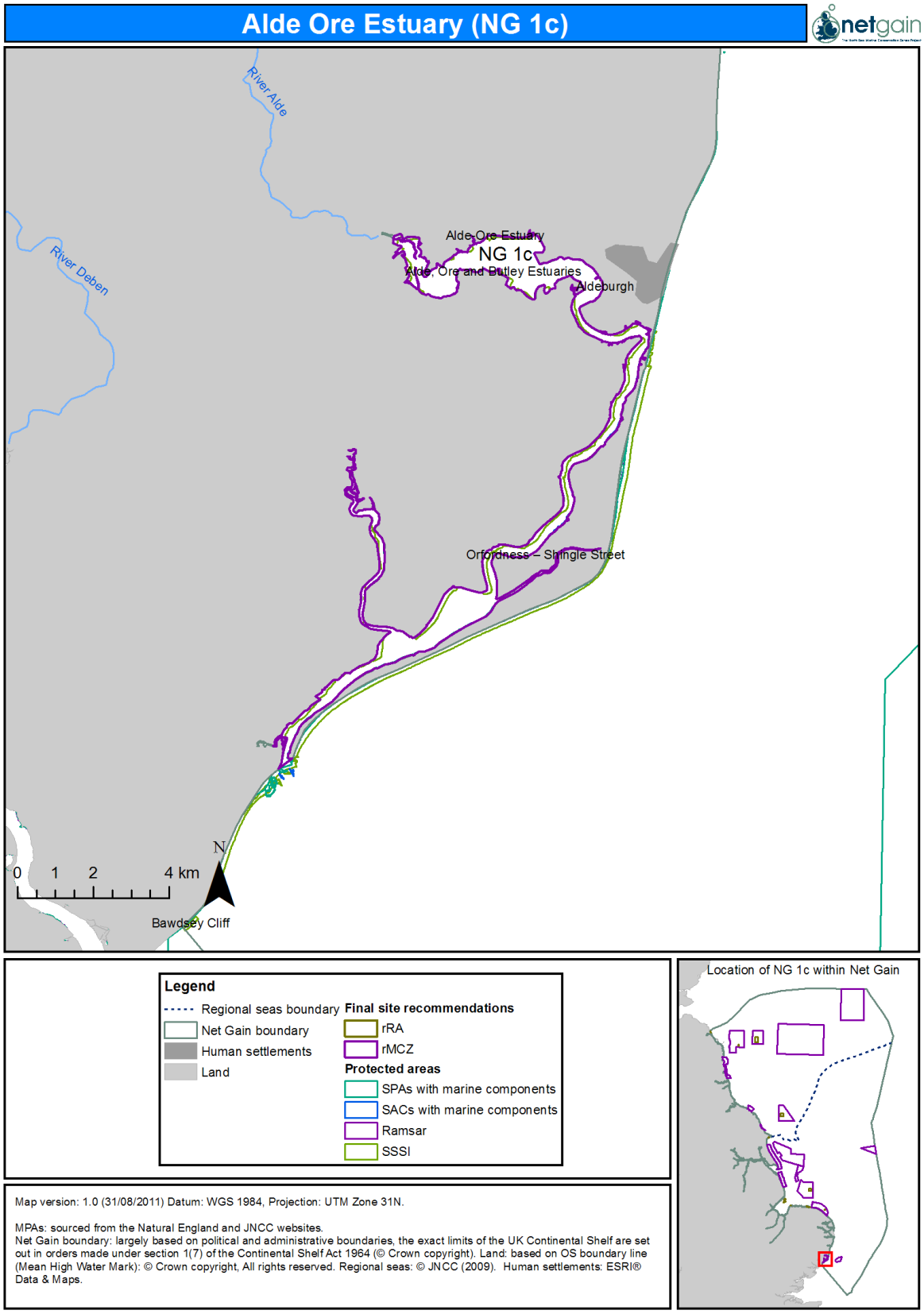


Figure 7.14 MPA and rMCZ/rRA sites neighbouring NG 1c

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The level of support was generally high, with scores of 4 and 3 being given (by groups containing representatives of the Wildlife Trust and inshore fishery concerns, respectively).

Confidence in the underlying data was moderate (scores from two groups were 'M') but one group commented that they would like more clarity of where the GCR site is as it cannot be clearly seen on the map.

Potential level of contention was recorded as low to moderate (one 'L', one 'M'), and it was noted that there may possibly be local opposition from those who have chosen not to participate or who have not yet been contacted during the process.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- RSPB:- Not against the site, but would prefer to see the 'original' site NG1 reinstated in its place
- The Crown Estate:- Accept
- The Wildlife Trusts:- Site not particularly supported – would prefer instead to see 'original' site NG1 reinstated

Table 7.12 Supporting documentation

Information	Type of information	Source
Blue mussel beds, Estuarine rocky habitat, Sheltered muddy gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Smelt, European eel	Combination of historical and recent records	Ellis, et al. 2010
Tentacled lagoon worm (*Alkmaria romijni*)	Combination of historical and recent records	Seeley, et al. 2010

References

ARAI, T., A. KOTAKE., T. McCARTHY. 2006. *Habitat use by the European eel Anguilla anguilla in Irish Waters*. Estuarine, Coastal and Shelf Science. 67; 569- 578.

BROOKS, A.J., ROBERTS, H., KENYON, N.H. 2009. *Accessing and developing the required biophysical and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 8: *Task 2A-Mapping of Geological and Geomorphological Features.* ABP Marine Environmental Research Ltd.

COLCLOUGH, S. & T. SCARR. 2010. *Marine Juvenile Fish in Estuaries – A Contribution to Net Gain*. Environment Agency.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

ELLIS, J.R., READDY, L., SOUTH, A. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 15: Task 2B - Distribution of highly mobile species. ABP Marine Environmental Research Ltd.

ENGLISH NATURE. 2003. *The status of Smelt Osmerus eperlanus in England*. English Nature Research Reports. Report 516.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 24: Task 2I. Intertidal habitats datalayer (Final). ABP Marine Environmental Research Ltd.

JNCC, 2011a. *Alde, Ore and Butley site details*. Available at: http://jncc.defra.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030076. Last accessed 10 August 2011.

JNCC. 2011b. *SPA description, Alde- Ore Estuary*. Published 2011. Available at: http://jncc.defra.gov.uk/page-2010. Last accessed 14 August 2011.

LANGMEAD, O., E. JACKSON., C. GRIFFITHS., P. WILKES., M. NEILLY., D. LEAR., I. LUCKRAFT., A.FOGGO., H. TYLER- WALTERS. 2010. *UK marine benthic diversity layer*. Report to the Department of Environment, Food and Rural Affairs from the Marine Life Information Network (MarLIN) Plymouth: Marine Biological Association of the UK, subcontracted by ABPmer, Southampton. Defra Contract No. MB0102 Task 2F, Report No. 20

May, 2007. *Orfordness (GCR ID: 1758*). Volume 28: Coastal Geomorphology of Great Britain, Chapter 6: Gravel and 'shingle' beaches-GCR site reports.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

NET GAIN. 2011. *March Hub Meeting Report*. Available: http://www.netgainmcz.org/latest_news.php Last accessed 12 August 2011.

SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P., ADAMS, L. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 14: Task 2B - Mapping of species with limited mobility (Benthic Species). ABP Marine Environmental Research Ltd.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.3 Marine Conservation Zone: NG 2, Cromer Shoal Chalk Beds

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. Addition of the North Norfolk Coast SAC, SPA, SSSI and Ramsar site to Table 7.20. The ecological description has been amended to reflect RSPB feedback on the IA. No changes have been made to recommendations or boundaries.

Site name

NG 2, Cromer Shoal Chalk Beds (contains rRA 1, North Norfolk Blue Mussel Beds)

Site centre location

52.955159°, 1.350854°
52° 57' 18''N, 1° 21' 03''E
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

315.64km² / 31,564.39ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

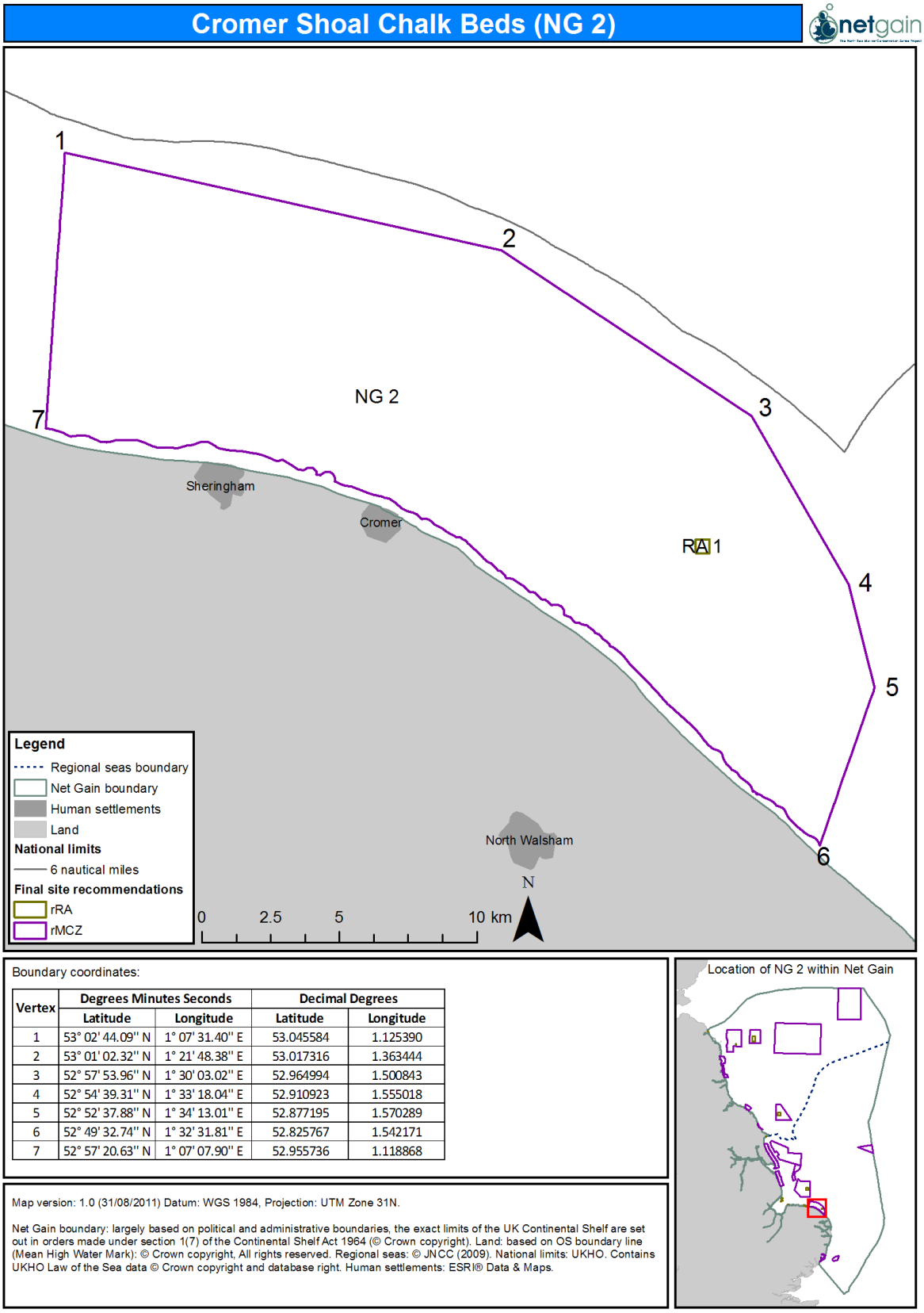
Table 7.13 Features proposed for designation within NG 2, Cromer Shoal Chalk Beds

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A3.1 High energy infralittoral rock	2.71km²
Broad-scale habitat	A3.2 Moderate energy infralittoral rock	145.71km²
Broad-scale habitat	A4.2 Moderate energy circalittoral rock	11.56km²
Habitat of conservation importance	Subtidal chalk Subtidal chalk (modelled)	22 point records 189.37km²
Species of conservation importance	n/a	n/a
Geological feature	North Norfolk coast (Subtidal)	14.89km²
Other feature	n/a	n/a

Table 7.14 Features within NG 2, Cromer Shoal Chalk Beds not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.1 Subtidal coarse sediment	Site not proposed for this BSH, as adequacy was met elsewhere[19]
Habitat of conservation importance	Blue mussel beds	A portion of the blue mussels beds present in NG 2 are proposed within the rRA 1[19]
Habitat of conservation importance	Peat and clay exposures	Site not proposed for this habitat, as adequacy was met elsewhere[19]
Habitat of conservation importance	Subtidal sands and gravels Subtidal sands and gravels (modelled)	Site not proposed for this habitat, as adequacy was met elsewhere[19]
Geological feature	Trimmingham (subtidal)	Site boundary positioned 200m offshore to avoid hindering coastal defence work, only an estimated **0.46km²** of the subtidal portion of the Trimmingham Cliff feature lies within the proposed site

[19] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 02' 44.09" N	1° 07' 31.40" E	53.045584	1.125390
2	53° 01' 02.32" N	1° 21' 48.38" E	53.017316	1.363444
3	52° 57' 53.96" N	1° 30' 03.02" E	52.964994	1.500843
4	52° 54' 39.31" N	1° 33' 18.04" E	52.910923	1.555018
5	52° 52' 37.88" N	1° 34' 13.01" E	52.877195	1.570289
6	52° 49' 32.74" N	1° 32' 31.81" E	52.825767	1.542171
7	52° 57' 20.63" N	1° 07' 07.90" E	52.955736	1.118868

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.15 Location and extent of site NG2 (Cromer Shoal Chalk Beds)

Site summary

NG 2 is located approximately 200m from the English Norfolk Coast, adjacent to Sheringham, Cromer, West Weybourne and Sea Palling (Redhead, 2011). The depth range of the sites is 0-20m (Figure 7.19) and the seabed is composed of a variety of rock, sediment, chalk, blue mussel beds and peat and clay exposures. It is an important site for benthic biodiversity (including 30 species of nudibranchs) (Spray, 2011 pers. comm.), and encompasses some of the best examples of subtidal chalk within the North Sea (approximately 2% of the coastline is chalk), forming part of the longest chalk reef in Europe with arch formations in chalk walls 550m from the beach. The site is likely to provide foraging opportunities for seabirds (RSPB, 2010), and has frequent sightings of small cetaceans and pinnipeds (whales, dolphins, porpoises and seals) (Clark, et al. 2010) and unusual sightings of species such as sunfish and basking shark (Spray, 2011 pers. comm.).

Detailed site description

NG 2 is located 200m seaward from low water mark running off the North Norfolk Coast adjacent to the coastal communities from West Weybourne to Sea Palling. The site is being recommended for designation for the presence of three broadscale habitats; A3.1: high energy infralittoral rock, A3.2: moderate energy infralittoral rock and A4.2: moderate energy circalittoral rock, and also one habitat of conservation importance, subtidal chalk. Subtidal chalk is a relatively scarce environmental resource and this subtidal chalk forms part of the longest chalk reef in Europe (possibly in the world) forming dramatic arches more than 2m high that are found at the seaward ends of the tide cut gullies (JNCC, 2011; Spray and Watson, 2010a).

The chalk within and surrounding this area hosts large communities of crustaceans, sponges, squirts and cnidarians (Spray and Watson, 2010b). Seasearch dives within this area have identified sponges (including *Stelligera rigida*), abundant numbers of green and brown algae species, a good range of sea anemones (including an unusually frequent number of Dahlia) as well as sandmasons, Colonial squirts (including *Molgula* squirts), dragonets, finger bryozoans, and squat lobsters (*Galathea squamifera*). Lesser sand eels and piddocks have also been seen in large numbers (Spray and Watson, 2010a).

Subtidal sands and gravels and peat and clay exposures are also present, but not proposed for designation as MCZ features. Survey data verifies the presence of these habitat features (Spray and Watson, 2010a; Tyler- Walters et al., 2009). Although not a feature of the ENG design principles, the diversity of flora and fauna should be noted. Species include burrowing piddock shells, sponges (some of which are rare), nudibranchs (up to 30 species), worms and crabs as well as blue mussel beds (recommended for protection in rRA 1). Whilst areas closer to shore (not included in the MCZ boundary) have appreciable seaweed populations it is likely that red seaweeds will be present in this area offshore (Brodie et al., 2007). A recent press release has shown that a purple sponge, never seen in UK waters has been discovered during dives off East Runton (Myall, 2011). The survey also uncovered 131 types of seaweed and an unidentified sea slug (The Wildlife Trusts' North Sea Project, 2011).

NG2 is located on the offshore edge of a wider area of subtidal sands and gravels which are present in the North Sea. The habitat types have been mapped and biological and physical data collected (McBreen, 2010, Langmead et al., 2010). The area within this site is mostly subject to moderate energy wave and tidal energy (McBreen, 2010) although there is a small area subject to high energy wave and tidal energy, and as such there is a relatively stable, depositional environment.

The western end of the site aligns with The Wash and North Norfolk Coast SAC. Further west of NG2 in the North Norfolk SAC there are high numbers of marine eelgrass (*Zostera* sp.), an important nursery ground for many species (West & Kirby, 2010). Research has shown the site to be an important spawning ground for Dover sole, lemon sole, whiting and sandeel (Figure 7.20; Figure 7.21).

Cromer blue mussel surveys show blue mussels to be present within the NG2 area. (Eastern Inshore Joint Fisheries and Conservation Authority, 2011). Blue mussels can form extensive beds, with living and dead mussels, sand and mud all bound together by the mussels' sticky 'beards' of byssus threads (Natural England, 2011). Grab samples and video footage from the Cromer blue mussel surveys yielded only mussel and a mixture of sand and gravel, so the area surveyed was classified as sublittoral mixed sediment (Eastern Inshore joint Fisheries and Conservation Authority, 2011). The mussels provide a hard surface and a greater range of marine life than would otherwise be found there can survive. Seaweeds, anemones, barnacles, sea snails and starfish and worms have been found living on blue mussel beds (Natural England, 2011).

The broader region has a great diversity of high-quality freshwater, intertidal and marine habitats which result in very large numbers of seabirds occurring throughout the year (JNCC, 2011). The site is likely to provide foraging opportunities for seabirds, particularly those associated with the habitats within it, such as seaducks and terns. It is also within range of important colonies of breeding terns along the Norfolk coast, such as Sandwich tern and little tern, although is not within what may be considered the core range for these species. Key prey items of these species include mid-sized schooling mid-water fish, small pelagic shoaling fish, marine invertebrates and sandeel (RSPB 2012, pers. comm.).

Populations of both common and grey seals are found to the west at Blakeney Point. They use Blakeney Point mostly as a 'haul- out' site for resting and sleeping and form part of the much larger breeding population in The Wash (National Trust, 2011). Sightings of harbour porpoises in this area are frequent (Clark et al., 2010). Basking sharks and sunfish have also been sighted within this area (Spray 2011, pers. comm.).

Figure 1. Squat Lobsters (*Galathea squamifera*) are found within NG2 (Spray and Watson, 2010a).

Figure 2. Sessile animals such as Sea Squirts (*Clavellina lepadiformis*) are also found (Spray and Watson, 2010a).

Figure 3. Arch formations within the chalk can be found within this area (Spray and Watson, 2010a)

Figure 4. Sessile animals such as sea mats or bryozoans (eg. *Bulhula* as shown above) can also be found (Spray and Watson, 2010a)

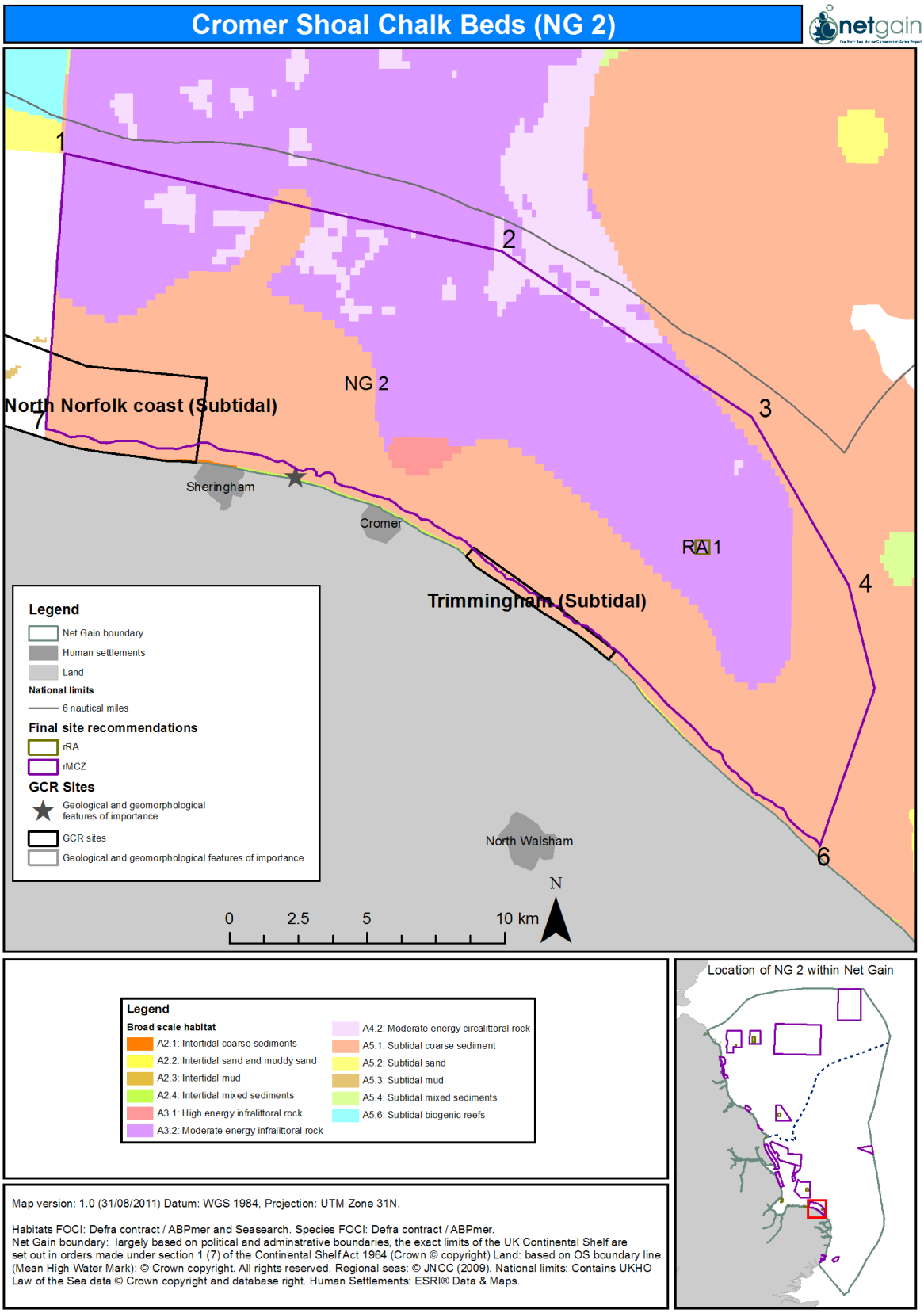


Figure 7.16 Broad-scale habitat and GCR sites present within NG 2

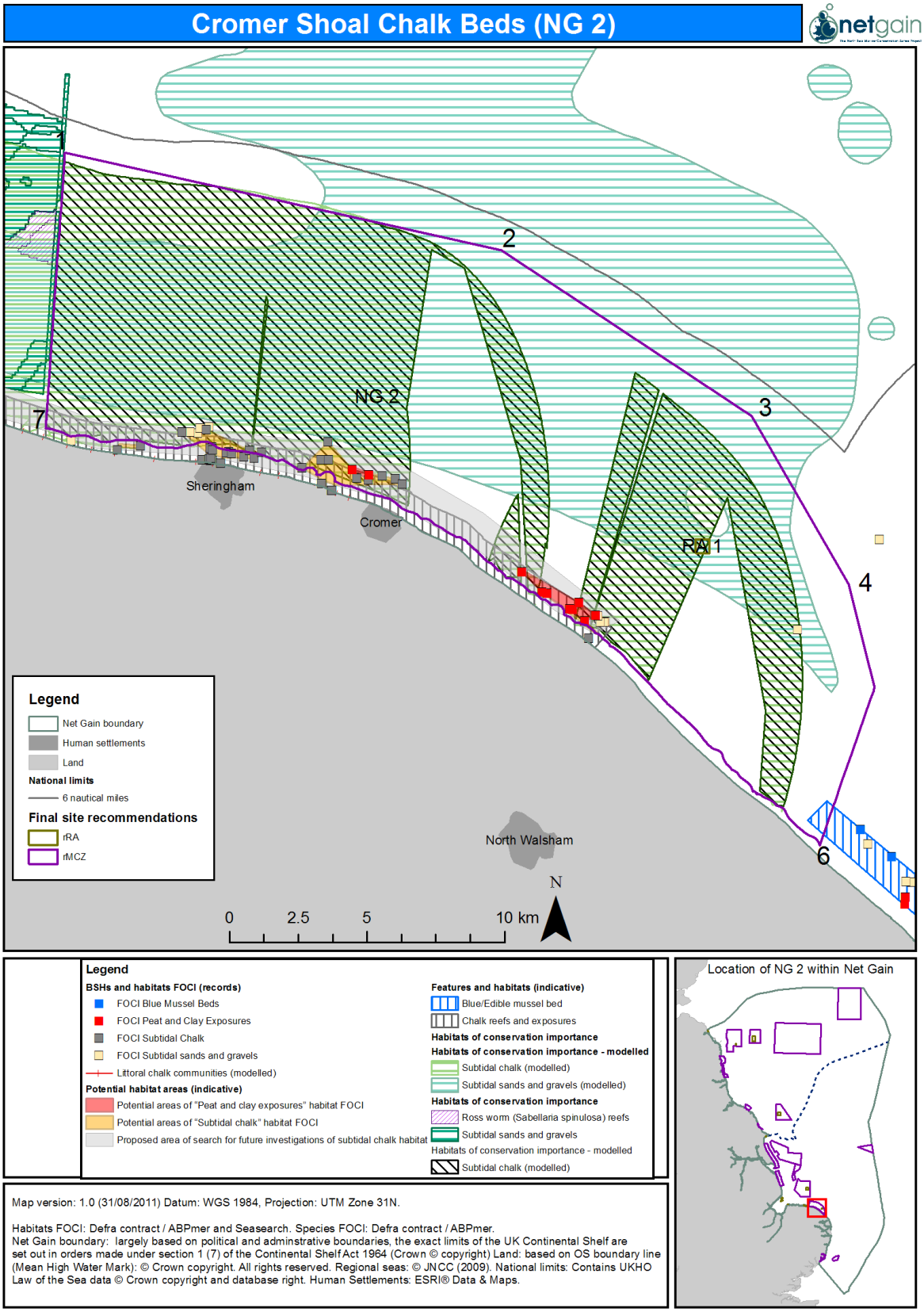


Figure 7.17 FOCI habitat and species present within NG 2

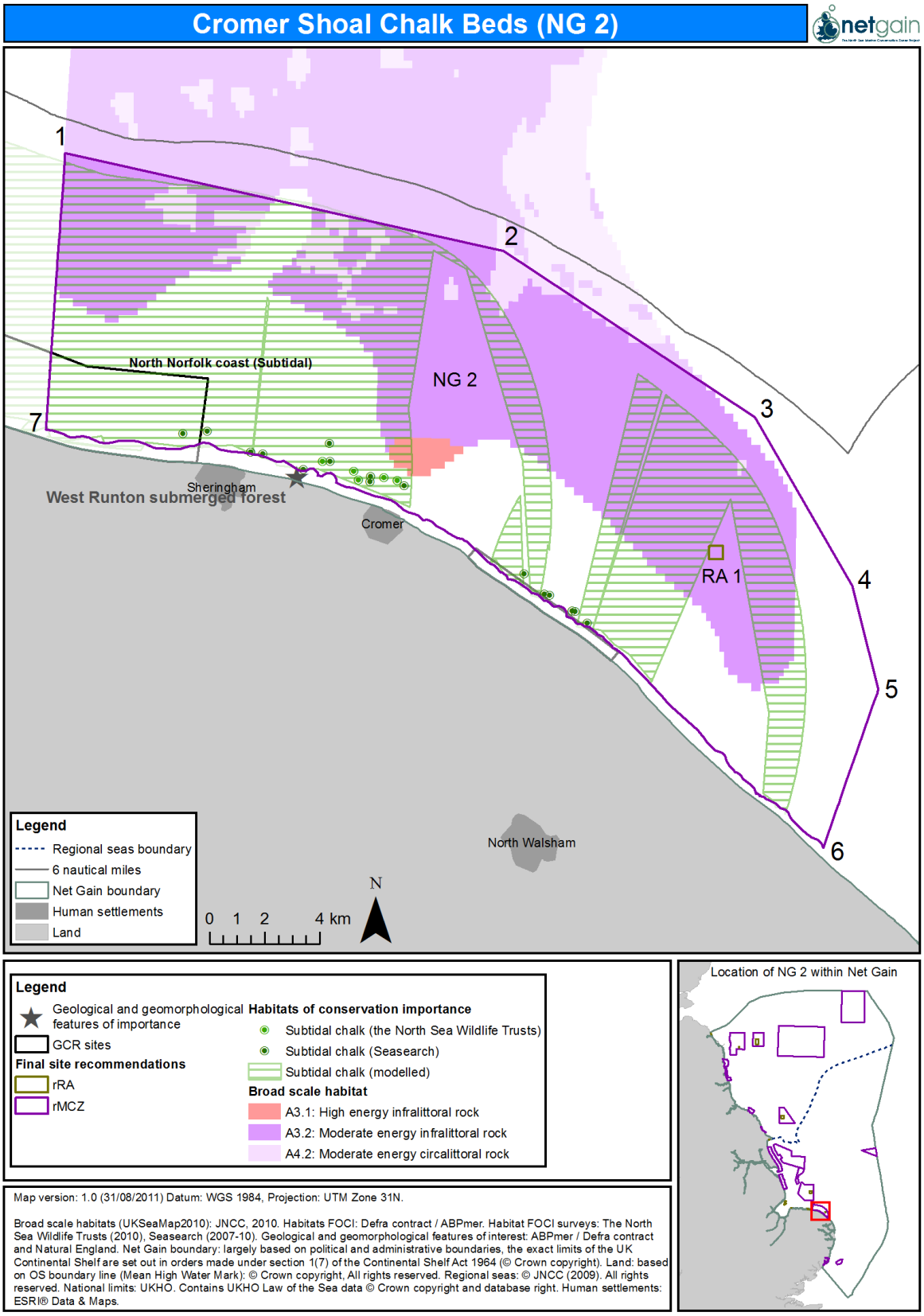


Figure 7.18 Features put forward for recommendation in NG 2

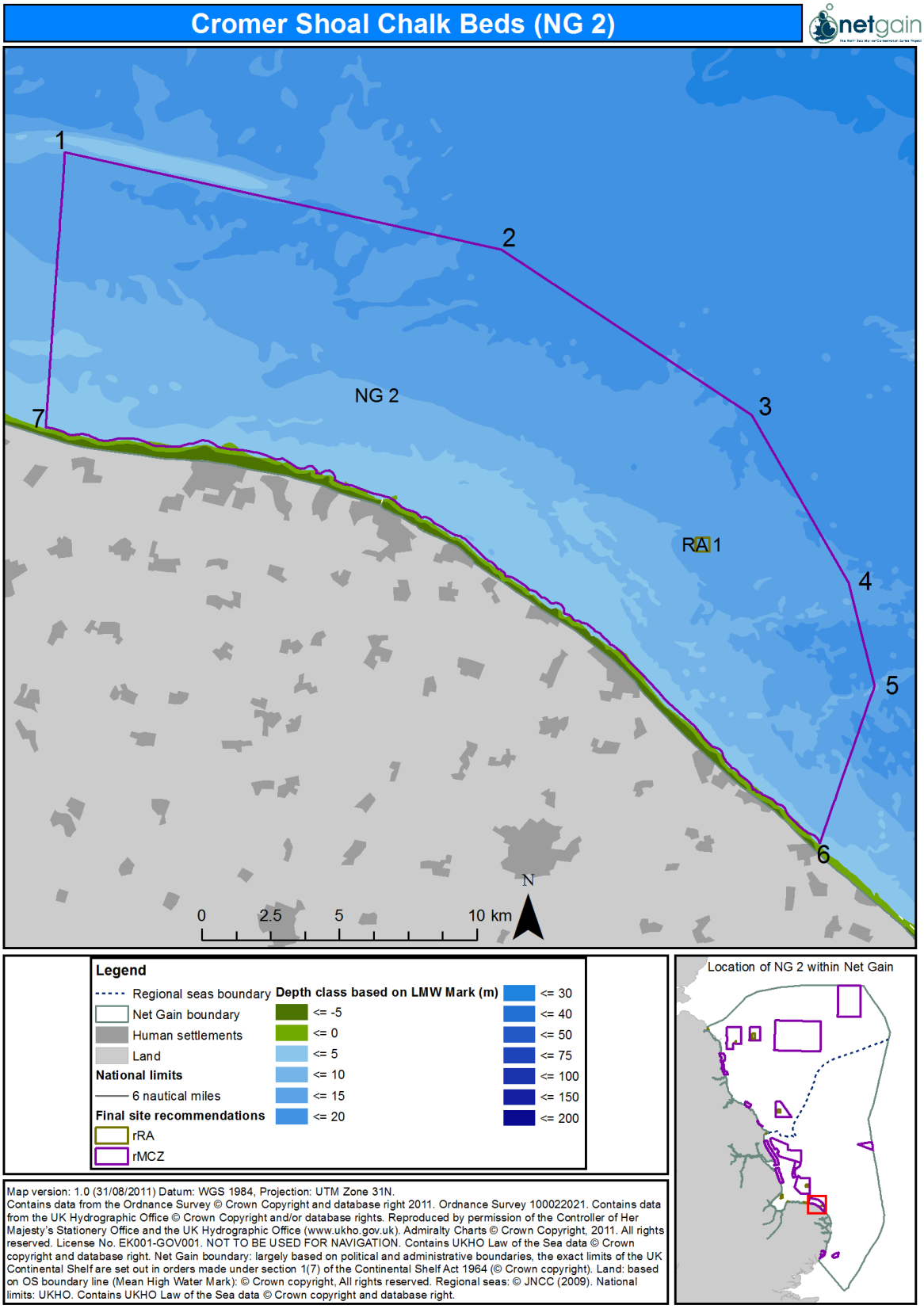
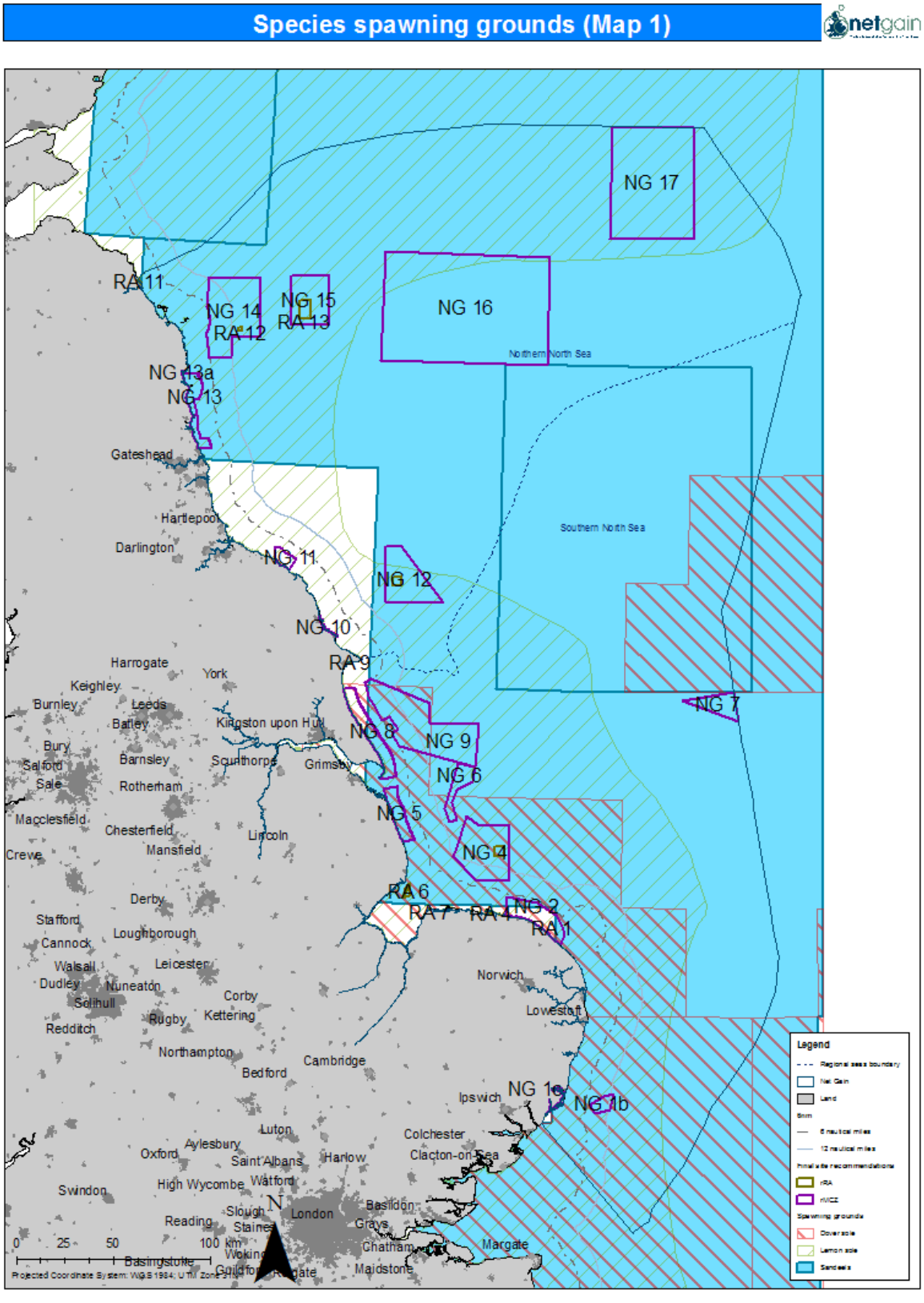
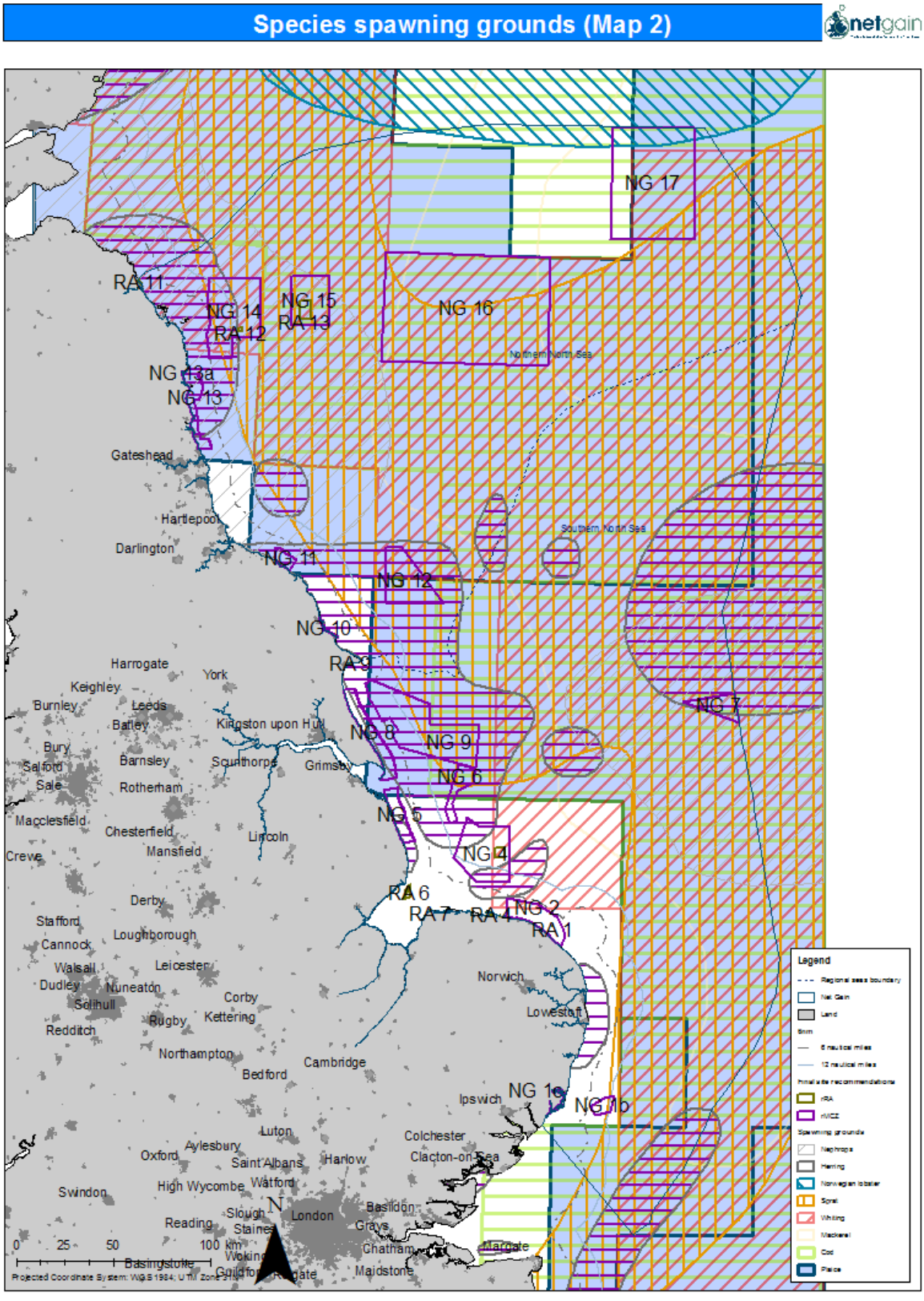


Figure 7.19 Bathymetry of NG 2



Spawning data: Defra contract ME5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.20 Spawning grounds (map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.21 Spawning grounds (map 2)

Site boundary

NG 2, Cromer Shoal Chalk Beds has been developed from the combination of previous dMCZ sites NG2.02 and NG2.04.The western end of the site aligns with The Wash and North Norfolk Coast SAC.

The site boundary lies approximately 1-2km seaward from the 3nm limit. It encompasses Byelaw 12: Inshore trawling restriction, a seasonal byelaw from June 1st until October 1st with an extent out to the 3nm limit.

The site originally followed the mean high water mark however, following discussions within the Regional Hub meetings, the decision was made to exclude 200m from the mean low water mark to allow for coastal defence development, and measures according to the coastline management plans. The 200m allows for the development of these coastal defences, and permits the likes of barges to bring materials required safely without impact to the rMCZ protected features.

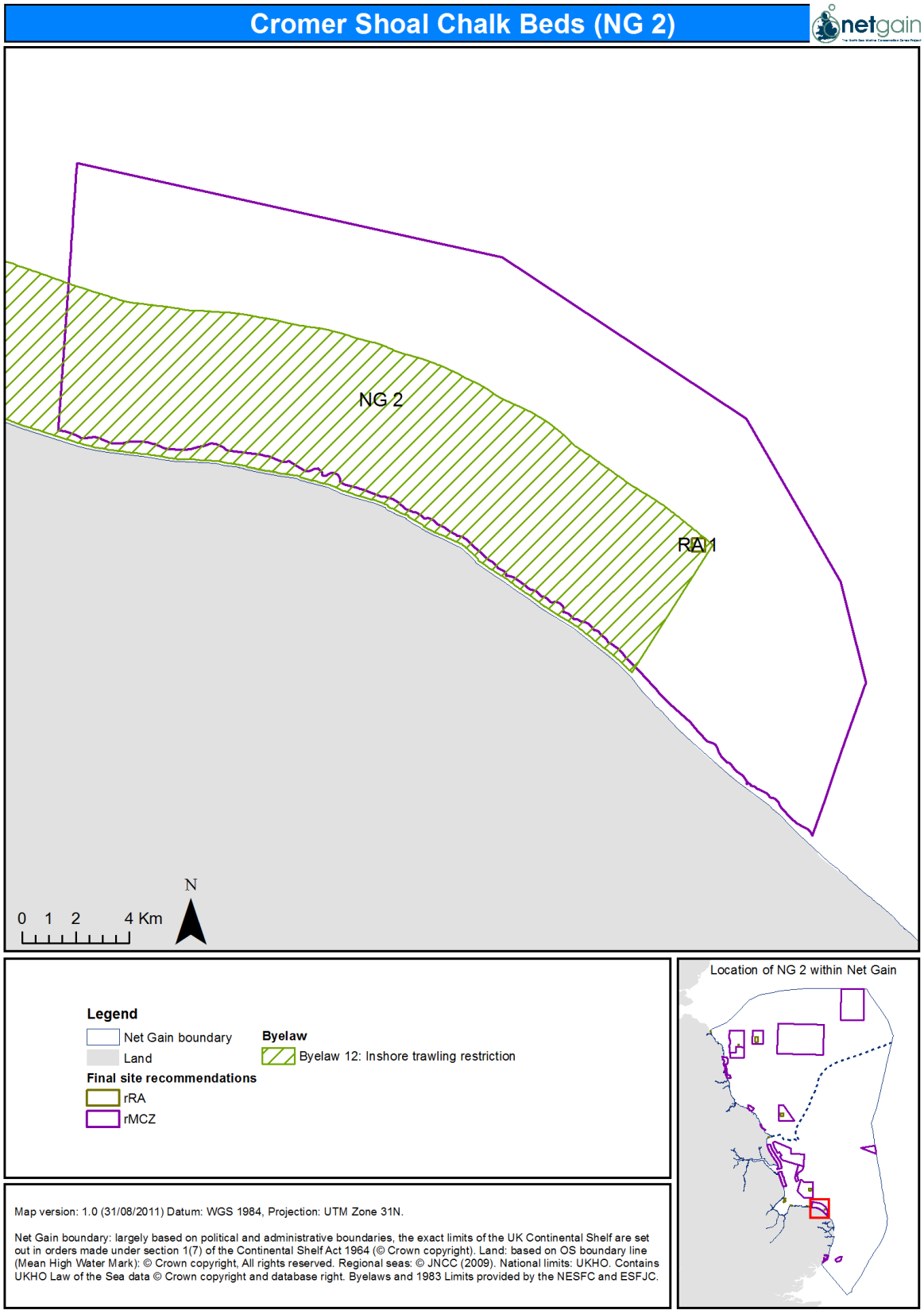


Figure 7.22 NG 2 site boundary with associated fishery management locations

Conservation objectives

Table 7.15 Conservation objectives for site NG 2, A3.1: High energy infralittoral rock

Conservation Objective	
1 Maintain/ recover	High energy infralittoral rock is representative of shallow water rock, below the tides exposed to very strong waves and currents. Subject to natural change, maintain the High energy infralittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of High energy infralittoral rock in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	High energy infralittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — M-H — L

	Physical removal (extraction of substratum)	M	L
	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Water clarity changes	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.16 Conservation objectives for site NG 2, A3.2: Moderate energy infralittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy infralittoral rock is exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, maintain the Moderate energy infralittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy infralittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy infralittoral rock is sensitive to the pressures listed below: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — M-H — L Structural abrasion/penetration: Structural damage to seabed >25mm — M-H — L

	Introduction or spread of non-indigenous species & translocations (competition)	M	L
	Physical change (to another seabed type)	M	L
	Physical removal (extraction of substratum)	M	L
	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Water clarity changes	L-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.17 Conservation objectives for site NG 2, A4.2: Moderate energy circalittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, maintain the Moderate energy circalittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy circalittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy circalittoral rock is sensitive to the pressures listed below: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L Physical removal (extraction of substratum) — M-H — L

	Removal of non-target species (lethal)	M-H	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Salinity changes - local	L-H	L
	Surface abrasion: damage to seabed surface features	L-H	L
	Siltation rate changes (low)	NS-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Removal of target species (lethal)	NS-M	H
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.18 Conservation objectives for site NG 2, Subtidal chalk

Conservation Objective	
1 Maintain/ recover	Subtidal chalk is on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Subtidal chalk in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal chalk in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal chalk is sensitive to the pressures listed below:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	H
Physical loss (to land or freshwater habitat)	H	H
Introduction or spread of non-indigenous species & translocations (competition)	M	L
Physical removal (extraction of substratum)	M	M
Siltation rate changes (high)	M	L

	Structural abrasion/penetration: Structural damage to seabed >25mm	M	M
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Water clarity changes	NS-M	M
	Organic enrichment	L	L
	Removal of non-target species (lethal)	L	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L	L
	Siltation rate changes (low)	L	H
	Surface abrasion: damage to seabed surface features	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.19 Conservation objectives for site NG 2, North Norfolk Coast (subtidal) geological feature

Conservation Objective	
1 Maintain/ recover	The North Norfolk Coast (subtidal) geological containing gently sloping abandoned cliffs separated from sand and shingle beaches by extensive saltmarshes and intertidal flats. Subject to natural change, maintain the North Norfolk Coast (subtidal) geological feature in favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**<u>Geological/ Geomorphological</u>** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the North Norfolk Coast Coast (subtidal) geological feature in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	North Norfolk Coast (subtidal) geological feature is sensitive to the pressures: Energy production –at sea (wind turbines) Energy production - at sea (wave turbines)

	Energy production – at sea (tidal turbines) Energy production – on land (power stations, including nuclear) Extraction – quarrying Extraction – navigational dredging (capital, maintenance) Extraction – sand and gravel Beach replenishment Infrastructure – cables and pipelines (installation) Infrastructure – cables and pipelines (operation) Infrastructure – coastal (ports, marinas, leisure facilities) Infrastructure – coastal defence and land claim Infrastructure – offshore (artificial reefs) Infrastructure – offshore (oil and gas platforms) Infrastructure – offshore (wind and wave turbines) Waste disposal – munitions (chemical and conventional) Waste disposal – navigational dredging (capital, maintenance) Waste disposal – quarrying (geological material)
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

The western boundary of the site aligns with The Wash and North Norfolk Coast SAC, and the site is adjacent to the North Norfolk Coast SAC, SPA, SSSI and Ramsar site. Between the site and the coastline the following geological SSSIs are present, Sidestrand and Trimmingham Cliffs, Weybourne Cliffs, East Runton Cliffs, Beeston Cliffs and West Runton Cliffs.

The closest Net Gain sites to NG 2 are the reference areas within the North Norfolk Area, rRA 2a and 2b, Reed Lagoon and Arnold's Marsh, rRA 3, Glaven Reedbed, rRA 4, Blakeney Marsh and rRA 5, Blakeney seagrass.

The table below shows rMCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.20 MPAs within or adjacent to NG 2

MPA Type	Site Name	Features Protected
SAC	The Wash and North Norfolk Coast	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.5: Subtidal macrophyte-dominated sediment A5.6: Subtial biogenic reefs Ross worm (*Sabellaria spinulosa*) reefs Seagrass beds Sea-pen and burrowing megafauna communities Sheltered muddy gravels Subtidal sands and gravels Coastal saltmarsh Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SAC	North Norfolk Coast	Not in GAP table Coastal Lagoons Vegetation Sand dunes
SPA	North Norfolk Coast	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds
SSSI	North Norfolk Coast	A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Coastal saltmarsh Saline lagoons
Ramsar site	North Norfolk Coast	Not in GAP table Wetland site for migrating bird species
SSSI	Beeston Cliffs	Not in GAP table Geological Botanical
SSSI	East Runton Cliffs	Not in GAP table Geological
SSSI	Sidestrand and Trimmingham Cliffs	Not in GAP table Geological Botanical Invertebrate
SSSI	West Runton Cliffs	Not in GAP table Geological
SSSI	Weybourne Cliffs	Not in GAP table Geological Sand martin and fulmar colonies

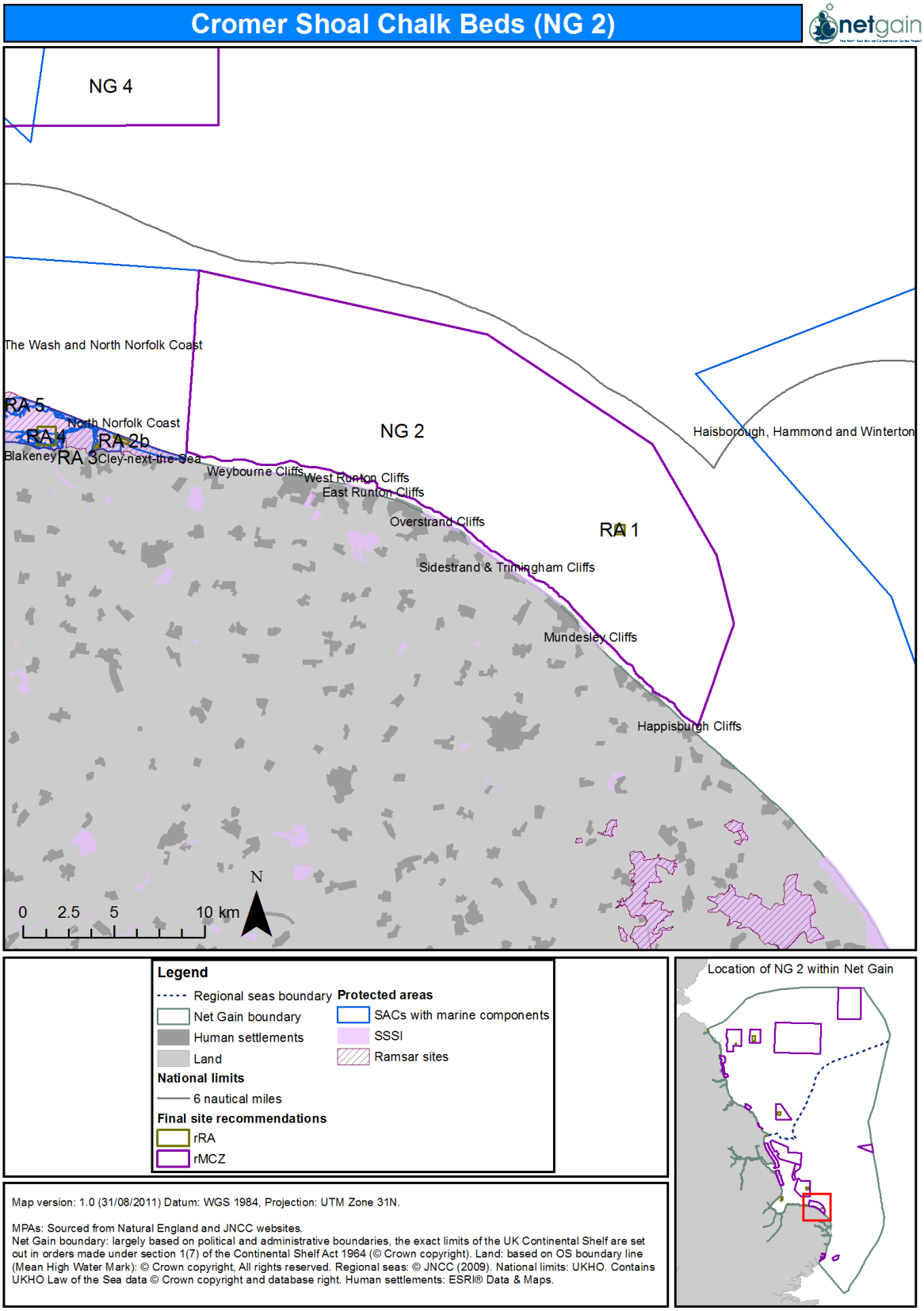


Figure 7.23 MPAs/rMCZs within or adjacent to NG 2

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The level of support was good (the site was scored as '3'), reiterating previous consensus achieved at Regional Hub meetings. However, the confidence in the data was felt to be low (with specific questions being asked around the available evidence on modelled data for subtidal chalk habitats).

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement
- RSPB:- Support / strongly support

Table 7.21 Supporting documentation

Information	Type of information	Source
Blue mussel beds	Survey	Eastern IFCA, 2011
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat: A5.2: Subtidal sand	Survey: records	Seasearch, 2007-2010
Broad-scale habitat: A5.2: Subtidal sand	Survey: records	North Sea Wildlife Trusts, 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal chalk, Peat and clay exposures, Subtidal sands and gravels	Survey: records	Seasearch, 2007-2010
Subtidal chalk, Peat and clay exposures, Subtidal sands and gravels	Survey: records	North Sea Wildlife Trusts, 2010
Subtidal chalk, Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

BRODIE, J., D. JOHN., I. TITTLEY., M. HOLMES., D. WILLIAMSON. 2007. *Important Plant Areas for algae: a provisional review of sites and areas of importance for algae in the United Kingdom*. Plantlife International, Salisbury, UK.

CLARK, J., S. DOLEMAN., E. HOYT. 2010. Towards Marine Protected Areas for Cetaceans in Scotland, England and Wales: A scientific review identifying critical habitat with key recommendations. Whale and Dolphin Conservation Society, Chippenham, UK, 178pp *Towards marine protected areas for cetaceans in Scotland, England and Wales*. A report from the WDCS Scotland and critical habitat/ MPA programmes.

EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY, 2011. *Blue mussel beds survey.*

HISCOCK, J. 2011. *Clump of Blue Mussels*. Available: http://www.marlin.ac.uk/speciesfullreview.php?speciesID=3848. Last accessed 10 Aug 2011.

JNCC. 2011. *North Norfolk Coast, SPA description*. Available: http://jncc.defra.gov.uk/default.aspx?page=2008. Last accessed 10 August 2011.

LANGMEAD, O., E. JACKSON., C. GRIFFITHS., P. WILKES., M. NEILLY., D. LEAR., I. LUCKRAFT., A.FOGGO., H. TYLER- WALTERS. 2010. *UK marine benthic diversity layer*. Report to the Department of Environment, Food and Rural Affairs from the Marine Life Information Network (MarLIN) Plymouth: Marine Biological Association of the UK, subcontracted by ABPmer, Southampton. Defra Contract No. MB0102 Task 2F, Report No. 20.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

MYALL, S. 2011. Mysterious unknown purple sea sponge discovered off the east coast. The Mirror. Available at: http://www.mirror.co.uk/news/top-stories/2011/08/15/mysterious-unknown-purple-sea-sponge-discovered-off-the-east-coast-115875-23345418/. Last accessed: 17 August 2011.

NATIONAL TRUST. 2011. *Blakeny National Nature Reserve – Seals*. Available at: http://www.nationaltrust.org.uk/main/w-vh/w-visits/w-findaplace/w-blakeney/w-blakeney-wildlife_and_habitats/w-blakeney-seals.htm. Last accessed: 17 August 2010

NATURAL ENGLAND. 2011. *Blue mussel beds*. Available at: http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/habitats/bluemusselbeds.aspx. Last Accessed 13 Aug 2011

NORTH SEA WILDLIFE TRUST, 2010. *Broad-scale habitat survey records.*

REDHEAD, J. 2011. *SAP response to Net Gain final recommendations*. Available at: http://www.netgainmcz.org/scipanel.php. Last accessed 09 August 2011.

RSPB, 2010. RSPB species foraging ranges, mean, mean maximum and maximum, received from Martin Kerby 2010

RSPB. 2011. *Birds by name*. Available at: http://www.rspb.org.uk/wildlife/birdguide/name/a/. Last accessed 10 Aug 2011.

Seasearch. 2007-2010. *Habitat surveys.*

SPRAY, R. & D. WATSON. 2010(a). *North Norfolk's Chalk Reef, A report on marine surveys conducted by Seasearch East.* Available at: http://www.seasearch.co.uk/downloads/Norfolk%20Chalk%20Reef%20report%202010.pdf. Last accessed 12 Aug 2011.

SPRAY, R. & . D. WATSON. 2010(b). *Seasearch East – 2010, marine surveys conducted by Seasearch East.* Available at: http://www.seasearch.co.uk/downloads/East%20Anglia%20Summary%202010.pdf. Last accessed 12 Aug 2011.

SPRAY, R. 2011 pers.comm. (email)

THE WILDLIFE TRUSTS, 2010. *Areas of additional pelagic ecological importance (APEI) data layer.*

THE WILDELIFE TRUSTS' NORTH SEA PROJECT. 2011. Seaweed surveyor videos. Available at: http://www.northseawildlife.org.uk/news-and-events/seaweed-surveyor-videos/. Last accessed 17 August 2011.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

WEST, R., M. GRENHAM.,J. KIRBY. 2010. *Survey of Eelgrass species (Zostera spp.) on intertidal habitats within the Wash and North Norfolk Coast Marine Special Area on Conservation*. Natural England

7.4 Marine Conservation Zone: NG 4, Wash Approach

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. The ecological description has been updated to reflect RSPB feedback on the IA. No changes have been made to recommendations or boundaries.

Site name

NG4, Wash Approach (site contains rRA 8, Wash Approach rRA)

Site centre location

53° 15’ 04’’N, 0° 56’ 31’’E
53.251471°, 0.942282°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

724.52km² / 72,452.48ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

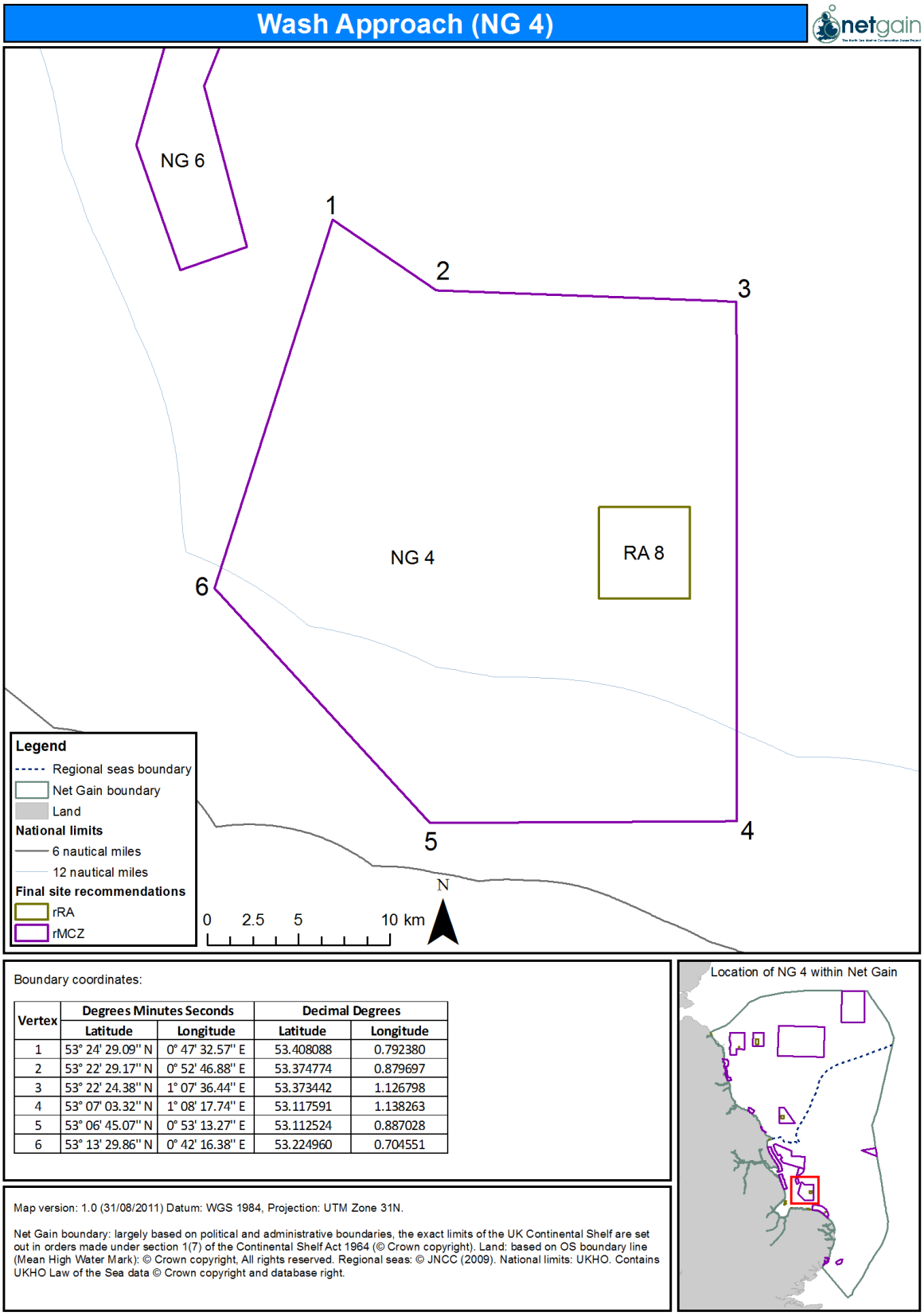
Table 7.22 Features proposed for designation within NG 4, Wash Approach

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.2 Subtidal sand	125.69 km²
Broad-scale habitat	A5.4 Subtidal mixed sediment	414.05 km²
Habitat of conservation importance	n/a	n/a
Habitat of conservation importance	Subtidal sands and gravels Subtidal sands and gravels (modelled)	141.63km² 32 points 483.48 km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.23 Features within NG4, Wash Approach not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.1: Subtidal coarse sediment	Feature was not included because adequacy targets were met elsewhere[20]
Broad-scale habitat	A5.6: Subtidal biogenic reefs	Discussion within the hub concluded that the feature should not be included because it is already protected by the Inner Dowsing, Race Bank and North Ridge SAC. In addition there is only a very small portion of the habitat, 0.04km² present within the site
Habitat of conservation importance	Ross worm (*Sabellaria spinulosa*) reefs	Discussion within the hub concluded that the feature should not be included because it is already protected by the Inner Dowsing, Race Bank and North Ridge SAC
Species of conservation importance	n/a	n/a

[20] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 24' 29.09" N	0° 47' 32.57" E	53.408088	0.792380
2	53° 22' 29.17" N	0° 52' 46.88" E	53.374774	0.879697
3	53° 22' 24.38" N	1° 07' 36.44" E	53.373442	1.126798
4	53° 07' 03.32" N	1° 08' 17.74" E	53.117591	1.138263
5	53° 06' 45.07" N	0° 53' 13.27" E	53.112524	0.887028
6	53° 13' 29.86" N	0° 42' 16.38" E	53.224960	0.704551

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.24 Location and extent of site NG4 (Wash Approach)

Site summary

NG 4 is located approximately 25km off the Lincolnshire Coast and 20km north of the North Norfolk Coast at Wells–next-the-Sea. The depths within the site range between 0-20m (Figure 7.29) and the seabed is composed of subtidal sandbank complexes, circalittoral mixed sediments and areas of biogenic reefs of *Sabellaria spinulosa*. The site also contains mixed circalittoral sediments within the Race Channel and sediments to the east of the Dudgeon Shoal and Race Bank. The site is a known foraging area for sea birds and also attracts feeding seals throughout the year.

Detailed site description

NG4 is located approximately 25km off the South Lincolnshire coast near Skegness and 20km north of the north Norfolk coast at Wells–next-the-Sea. This site is recommended for designation for the following broadscale habitat types and Habitats of Conservation Importance; subtidal sand, subtidal mixed sediments and subtidal sands and gravels.

There is a diverse range of habitats in this area, including sandbank complexes and areas of mixed circalittoral sediment between the sandbank systems, the Race Channel, and the area of mixed sediment to the east of Dudgeon Shoal. As the site is located at the entrance to the Wash it is important with respect to tidal flows and sediment transport processes into the Wash and along the Norfolk coast (Natural England, 2010b).

NG4 overlaps with the Inner Dowsing, Race Bank and North Ridge SAC for the protection of Annex I sandbanks and *Sabellaria spinulosa* reefs. The sand bank complexes within the site comprise the Race Bank, North Ridge and Dudgeon Shoal banks. The topography, extent, depth and distribution of the sandbanks reflect energy conditions within the site and the stability of the sandbank features. The sedimentary component of the sandbanks was derived from coastal erosion processes over the last 5000 years following the last glacial retreat and marine inundation (Cooper et al., 2008). These active sinusoidal sandbanks are a dynamic environment and may be susceptible to changes over time. The areas between these main sandbank features are composed of circalittoral mixed sediments of predominantly sand and gravelly sands. These areas support a diverse mosaic of biotopes dominated by the ascidian *Molgula* sp. along with a number of nemertean worms and polychaetes of the genera *Pomatoceros, Caulleriella, Polycirrus, Pholoe,* and *Lumbrineris*.

NG4 also contains Race Channel to the south of the sandbank complexes, and an extensive area of circalittoral mixed sediments forms part of the site to the east of the Dudgeon Shoal and Race Bank sandbank complexes. The circalittoral mixed sediments of the Race Channel are highly representative of this broadscale habitat type with a mosaic of dispersed cobble fields, pockets of gravel and ribbons of coarse sand. The mixed sediments here support a well developed epifaunal turf of hydroids, bryozoans, erect sponges and anemones. The biological communities forming this epifaunal turf can have a stabilising effect on the sediments and support an increased level of biodiversity supporting such macro benthic organisms such as pink shrimp, squat lobsters, crab and a number of polychaete species (Natural England, 2010b). The circalittoral mixed sediment areas to the east of the Dudgeon Shoal and Race Bank are also representative of this broadscale habitat feature.

There is survey data to verify the presence of the Ross worm (*Sabellaria spinulosa)* reefs (Tyler-Walters, 2009). Recent surveys using multibeam and sidescan sonar in conjunction with Hamon grabs and drop down video with photography have confirmed the presence of Ross worm (*Sabellaria spinulosa*) reefs (Annex 1 biogenic reef) within the Inner Dowsing, Race Bank and North Ridge SAC and a final report is due to be drawn up in March 2012 (Saunders, 2011*,* Pers. Comm.). These worms live in tubes they build out of sand particles and biogenic reefs form when they occur in high densities and the tubes stick together (Natural England, 2010a). Agglomerations of this species create important epifaunal and infaunal communities which increase biomass and support higher trophic interactions (Natural England, 2010b).

Plankton surveys show the area to be of moderate ecological importance as a nursery and spawning ground to a variety of commercial species including herring, Dover sole, lemon sole, whiting and sandeels (Ellis, et al. 2010) (Figure 7.30; Figure 7.31). Other commercial fisheries include whelk, skates and rays and crustaceans. Other common fish species such as thornback ray, dragonet, weever fish and sea scorpions can also be found at this site (Natural England, 2010a).

NG4 is an area known for its high sea bird productivity. Survey data shows it lies within foraging range of northern fulmar, northern gannet and sandwich tern (RSPB, 2010). Key prey items include small pelagic shoaling fish, marine invertebrates and sandeel (RSPB, 2010).

The area is a popular feeding site for seals all year round as it is close to a colony of common seal *(Phoca vitulina*) at the entrance of the Inner Wash and sightings are common (Clark et al., 2010; Natural England, 2010a; Centrica, 2007; Scira Offshore Energy, 2006). Harbour porpoise sightings are also regularly observed (Natural England, 2010b; Centrica, 2007).

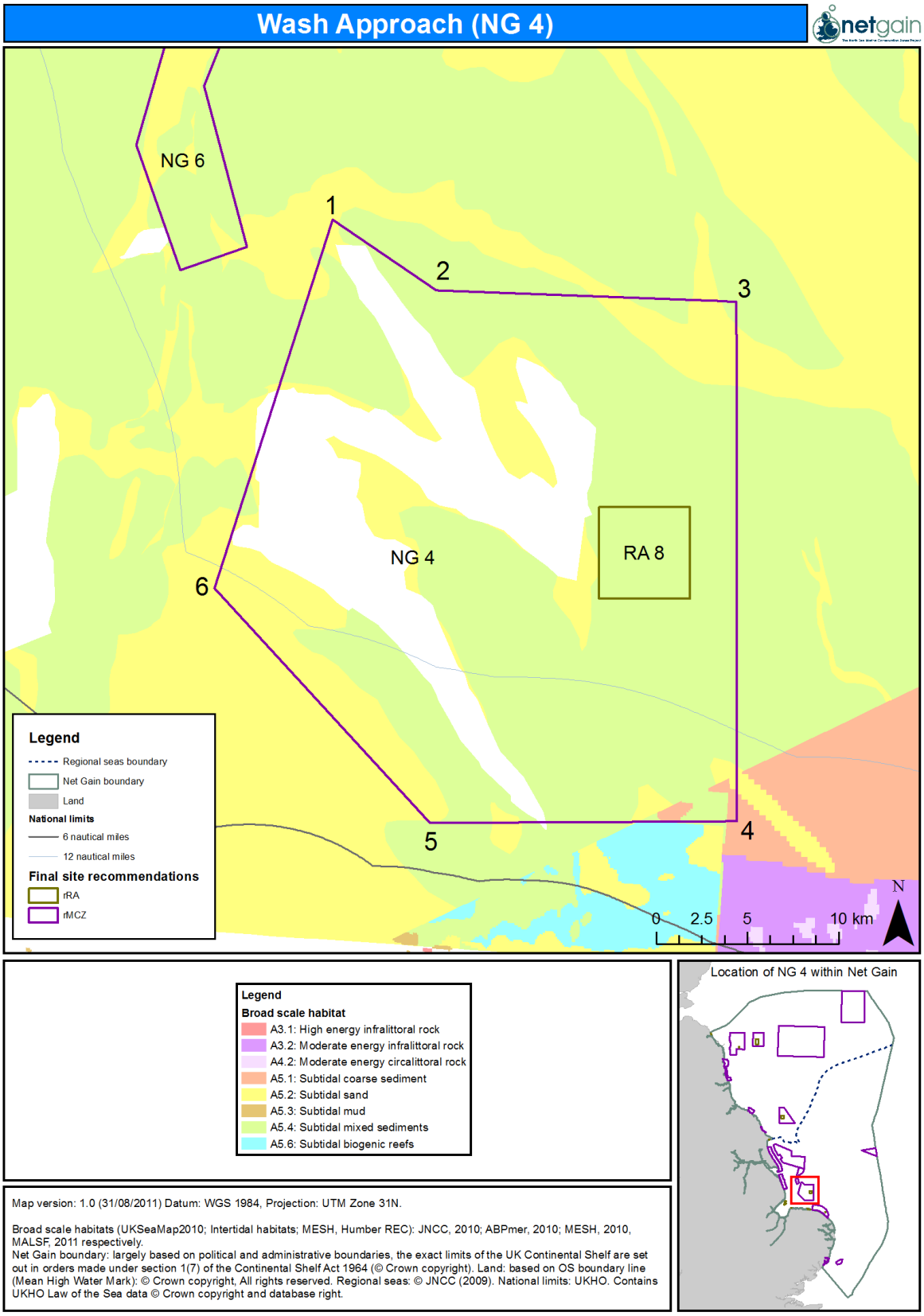


Figure 7.25 Broad-scale habitat present within NG 4

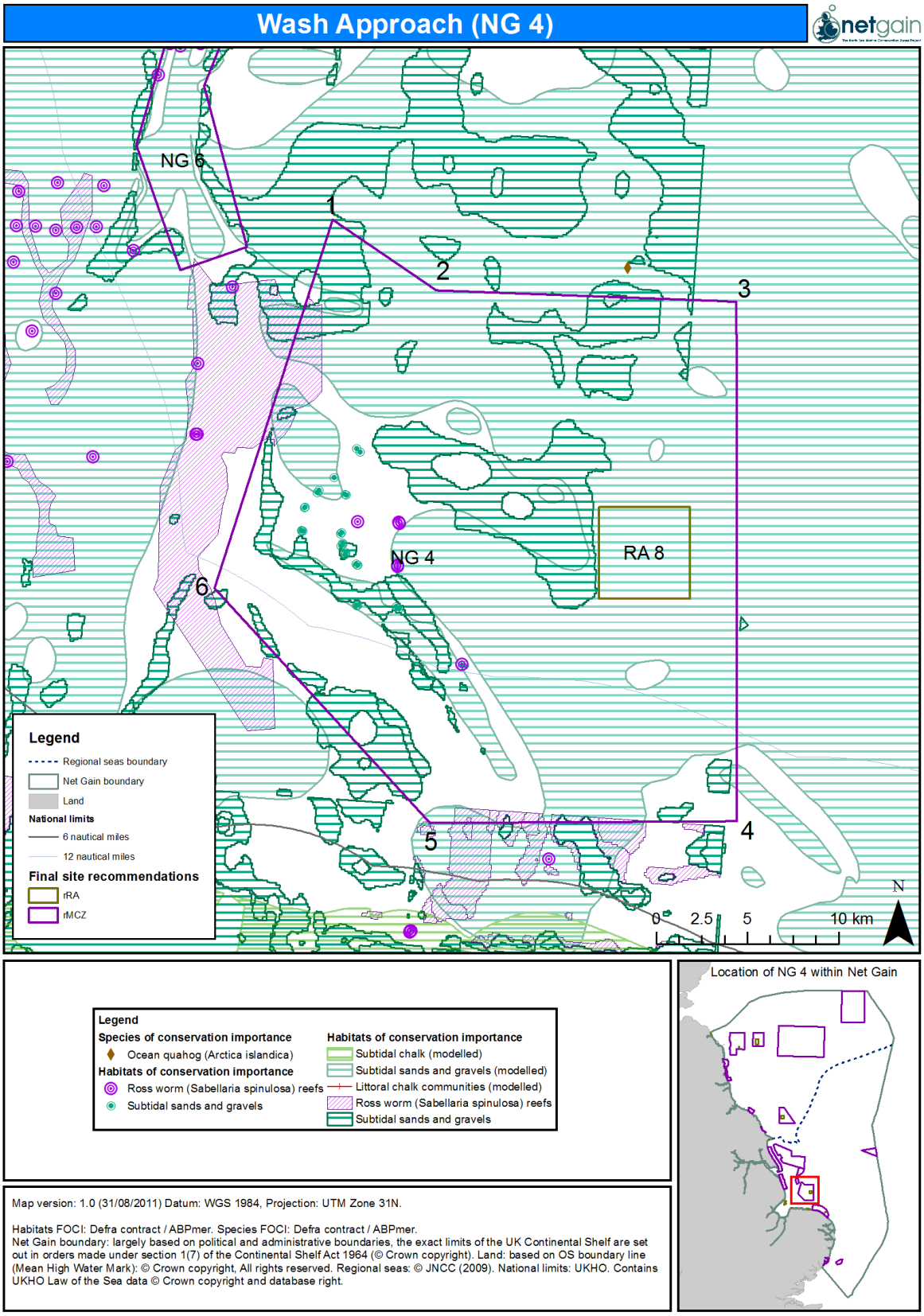


Figure 7.26 FOCI habitat and species present within NG 4

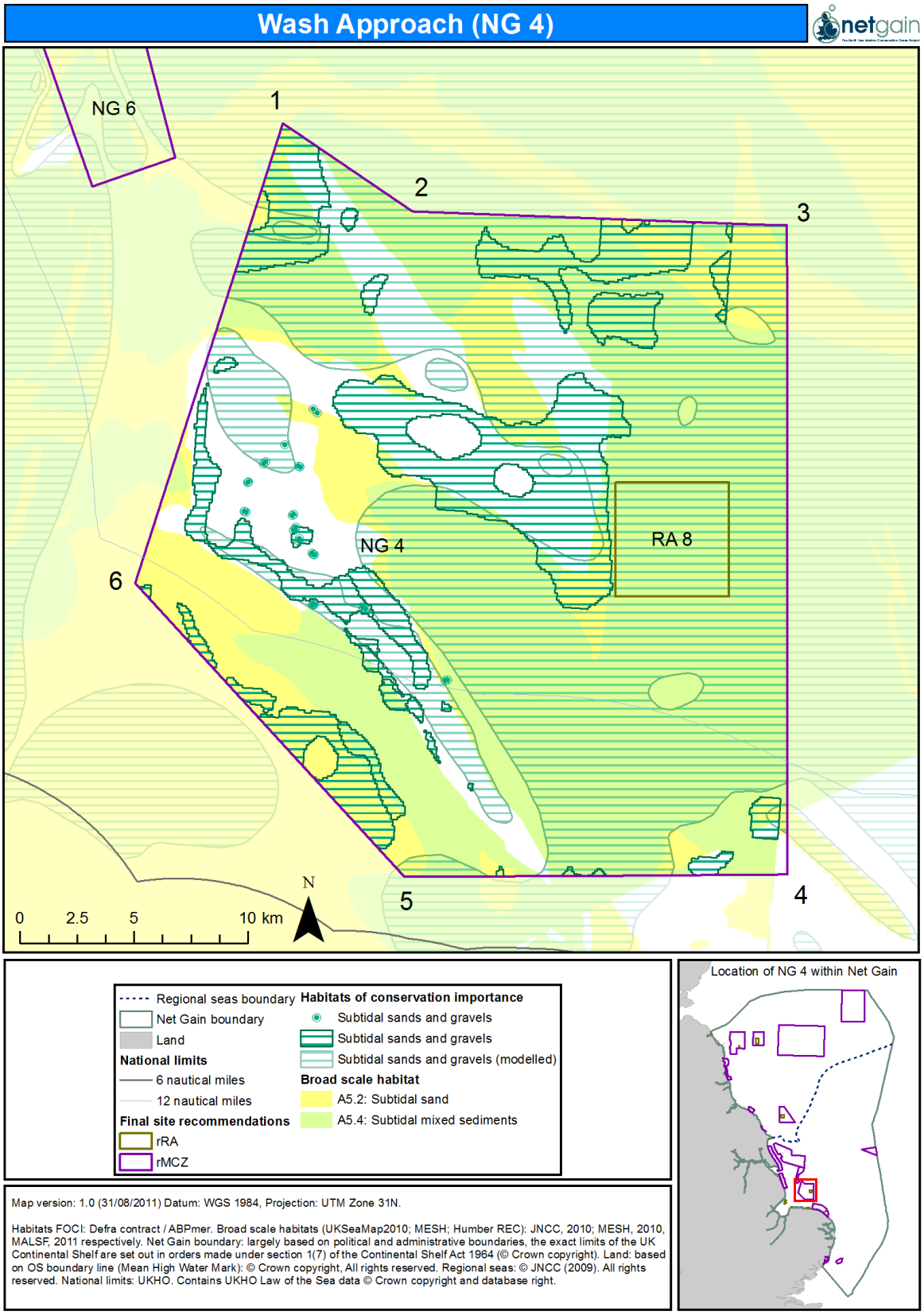


Figure 7.27 Features put forward for recommendation within NG 4

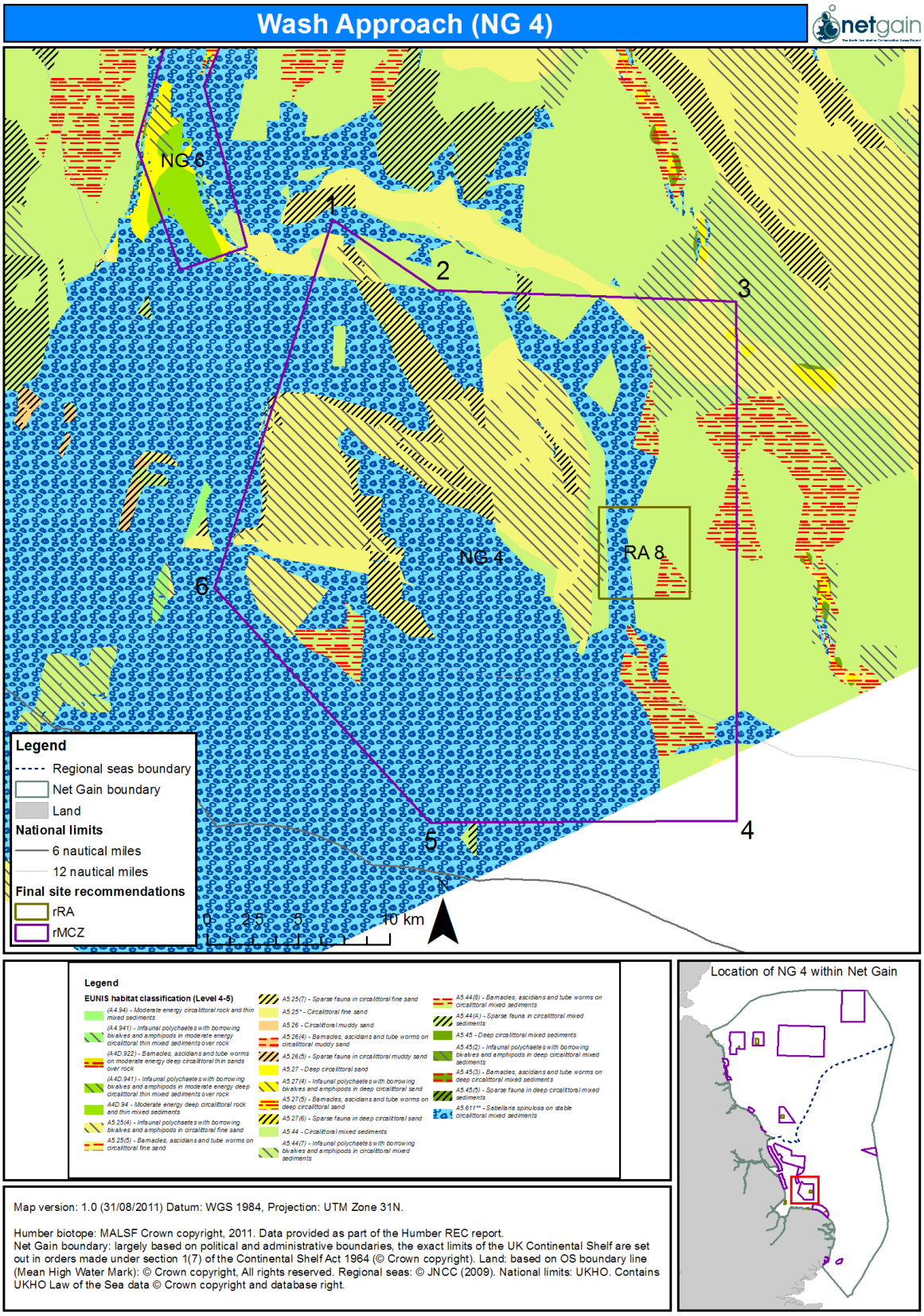


Figure 7.28 **Additional broad-scale habitat data: Humber Regional Environmental Characterisation**

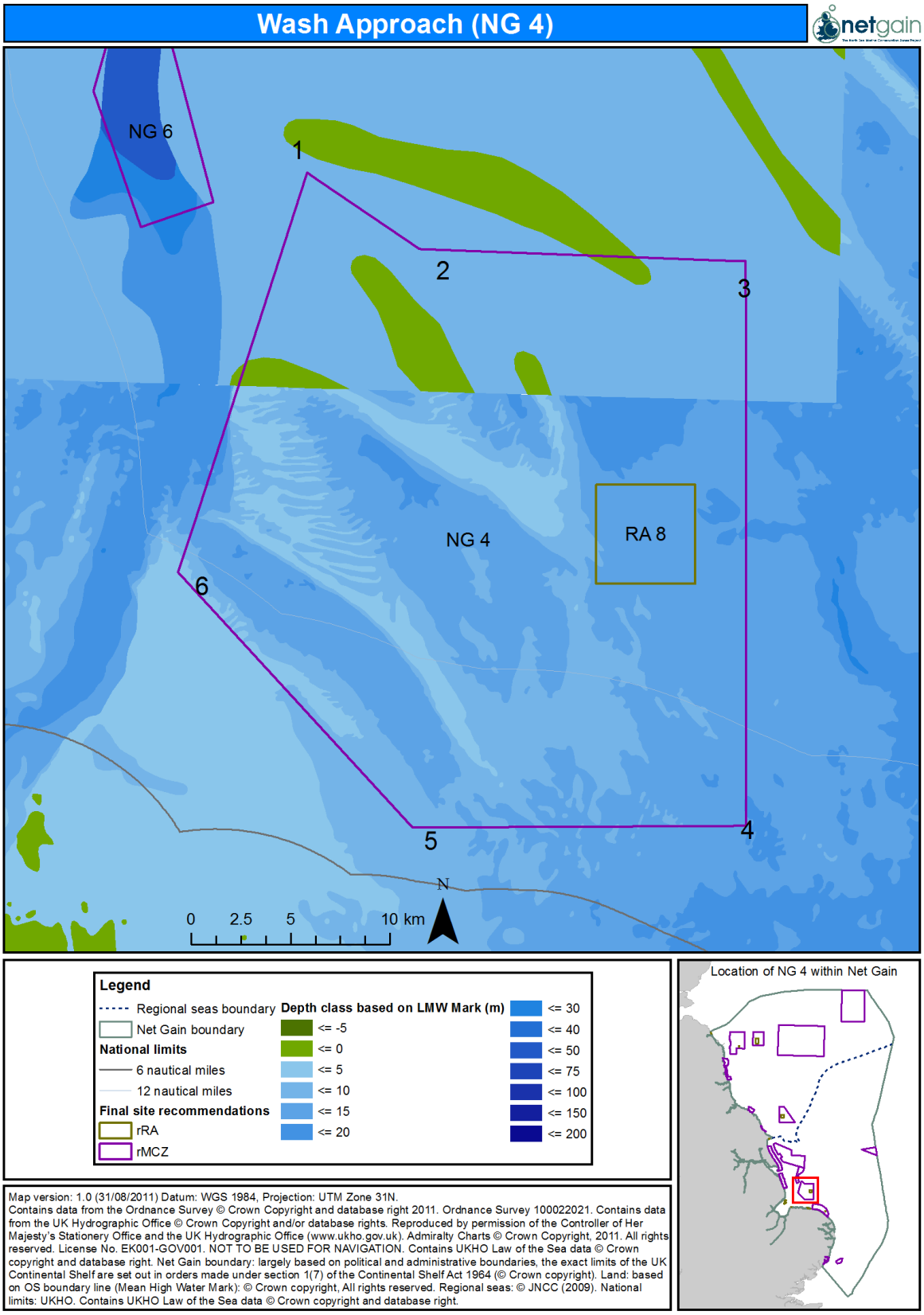
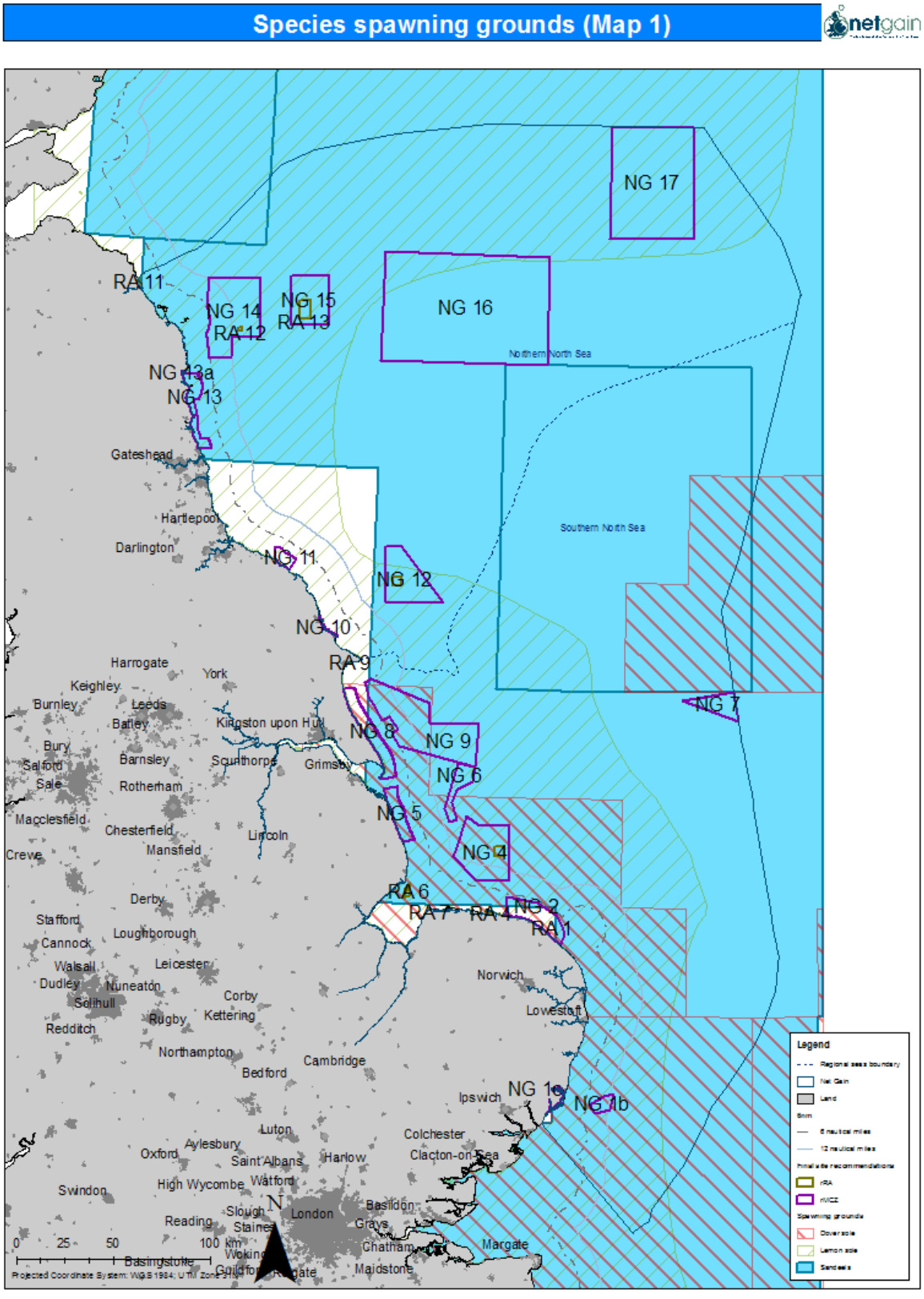
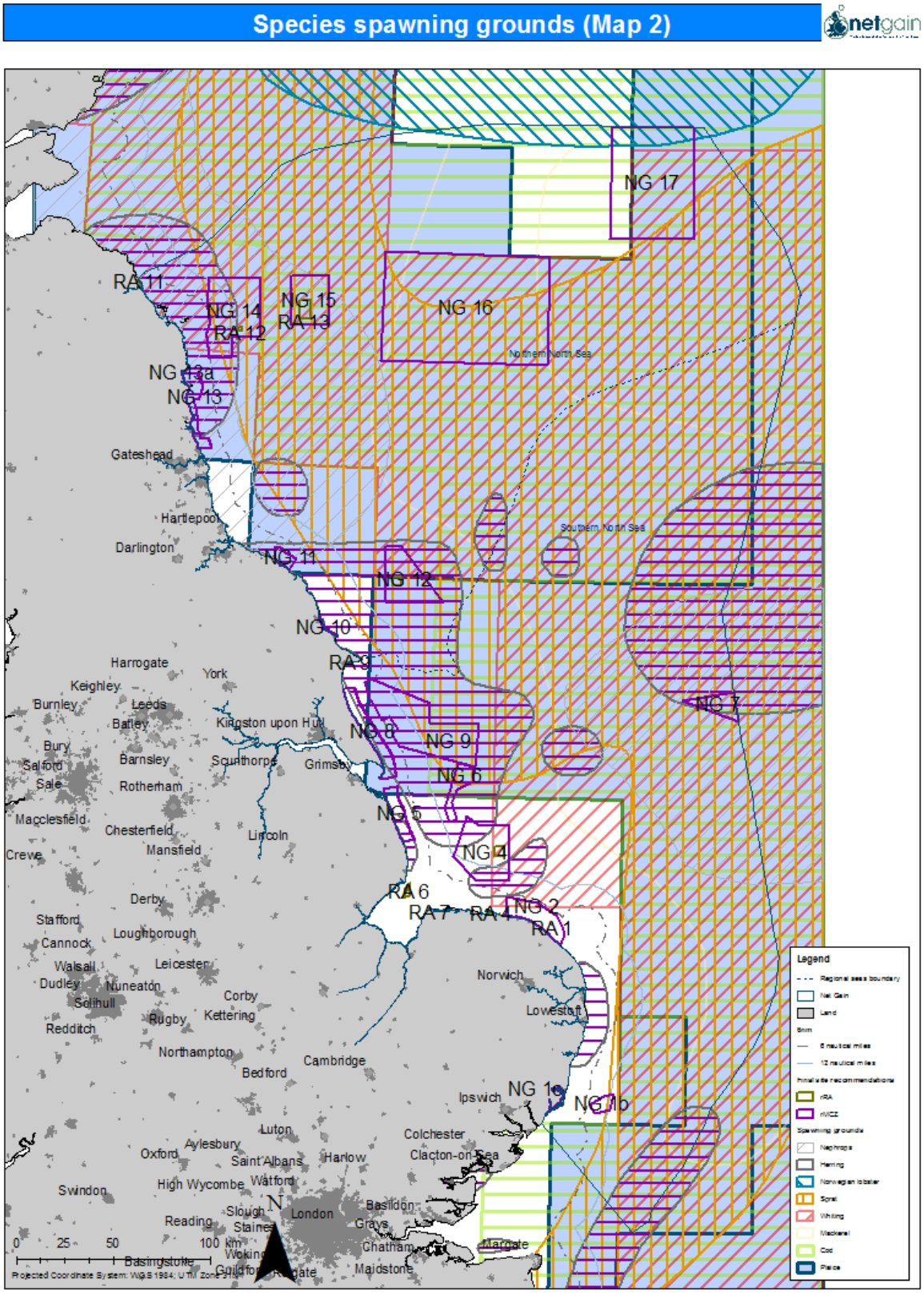


Figure 7.29 Bathymetry of NG 4



Spawning data: Defra contract ME5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.30 Spawning grounds (map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.31 Spawning grounds (map 2)

Site boundary

The site boundary of NG4, Wash Approach was consolidated from the original sites NG2.05 and NG2.06 (which originally shared a common boundary), as it made deliberations and discussions more straight forward. Discussions within the March Regional Hub agreed to a 1000m clip off the northern boundary of the site where it lies alongside a licensed production area. During the same meeting, discussions were held about moving the western boundary, to follow a contour, but were not carried forward.

Conservation objectives

Table 7.24 Conservation objectives for site NG 4, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the features makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — H — L

	Physical removal (extraction of substratum)	L-H	M
	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Subtidal sand is sensitive to the pressures listed below. Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.25 Conservation objectives for site NG 4, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal mixed sediments in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Physical removal (extraction of substratum)	H	L
Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	H	L

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Subtidal mixed sediments is sensitive to the pressures listed below. Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.26 Conservation objectives for site NG 4, Subtidal sands and gravels

Conservation Objective	
1 Maintain/ recover	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Subtidal sands and gravels in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sands and gravels in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sands and gravels are sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Surface abrasion: damage to seabed surface features	NS-H	M-H
Physical change (to another seabed type)	M	H
Physical removal (extraction of substratum)	M	H

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	M-H
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L-M
	Removal of target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	M-H
	Siltation rate changes (low)	NS-M	M-H
	Salinity changes - local	L	
Human activities	Subtidal sands and gravels is sensitive to the pressures listed below. Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 8 falls within NG 4, protecting subtidal mixed sediments. A large portion of the site overlaps with the Inner Dowsing, Race Bank and North Ridge SAC.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.27 MPAs within or adjacent to NG 4

MPA Type	Site Name	Features Protected
SAC	Inner Dowsing, Race Bank and North Ridge	A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal biogenic reefs Ross worm (*Sabellaria spinulosa*) reefs Subtidal sands and gravels

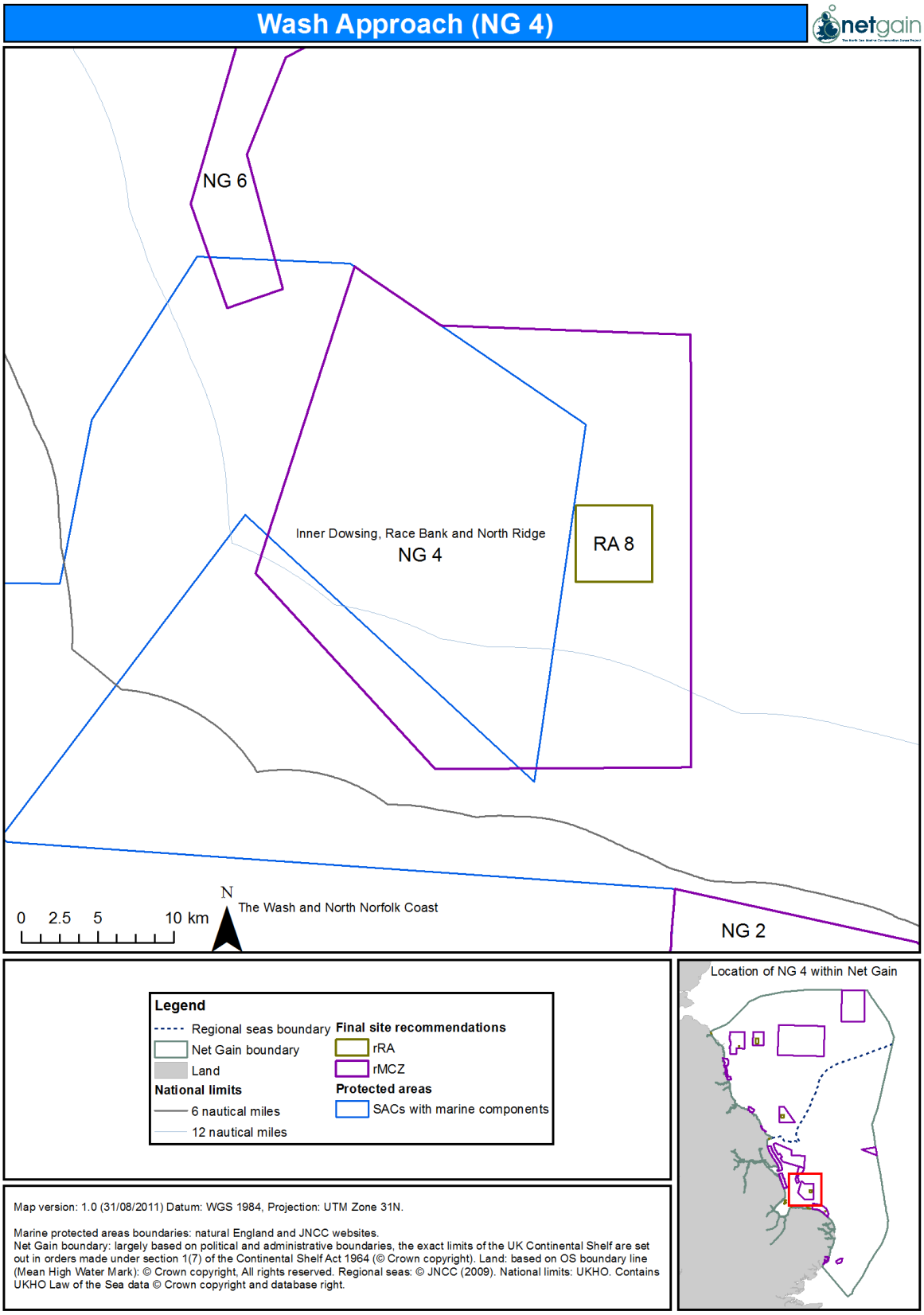


Figure 7.32 MPAs/rMCZs within or adjacent to NG 4

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The one group at the second LGM that considered this site gave it consensus support (scoring it '3'), although fishing interests (from all sectors of the industry) recorded their general reservations about not just this site, but all sites.

Confidence in the underlying data was moderate ('M') and it was noted that this situation has improved with the availability of the new REC data. As an ancillary it was noted that there was no clear data (evidence) that potting is actually damaging to an extent that the activity would require management and affected features would need to recover.

Overall, the site was felt to be of low potential contention, although this would be dependent on the detail of any management measures ultimately adopted.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- Marine Aggregates:- Against (but would move to support if buffer distances between rMCZ boundary and aggregate interests are confirmed as being sufficient to mitigate for indirect pressures)
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation –concern however over recent NE/JNCC guidance on size of buffers required to avoid additional mitigation requirements on licensed aggregate sites
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.28 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Broad-scale habitat	Survey	Tappin, et al. 2011
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Ross worm (*Sabellaria spinulosa*) reefs, Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Ross worm (*Sabellaria spinulosa*) occurrences	Survey: records	CEFAS, 1989-2005.
Ross worm (*Sabellaria spinulosa*) occurrences	Survey: records	Tappin, et al. 2011
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

CEFAS, 1989-2005. *Ross worm (Sabellaria spinulosa) occurrences from grab and beam trawl surveys.*

CENTRICA, 2007. Lincs Offshore Windfarm Environmental Statement.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

COOPER, W., I. TOWNEND., P. BALSON. 2008. *A synthesis of current knowledge on the genesis of the Great Yarmouth and Norfolk Bank Systems*. The Crown Estate, 69 pp. ISBN: 978-0-9553427-8-3.

ELLIS, J.R., MILLIGAN, S., READDY, L., SOUTH, A., TAYLORE, N. and BROWN, M. 2010. Mapping the spawning and nursery grounds of selected fish for spatial planning. Report to the Department of Environment, Food and Rural Affairs from Cefas. Defra Contract No. MB5301.

JNCC. 2011. Annex 1 sandbanks. Available at: http://jncc.defra.gov.uk/page-1452 . Last accessed 18 August 2011.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs*. JNCC report No. 431.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

SAUNDERS, 2011*,* Pers. Comm.

SCIRA OFFSHORE ENERGY LTD, 2006. Sheringham Shoal Offshore Windfarm Environmental Statement.

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ DOCE, D., GREEN, M., GALLYOT, J., GEORGIOU, L., BRUTTO, D., MARZIALETTI, S., HOPLA, E., RAMSAY, E., FIELDING, H. 2011. *The Humber Regional Environmental Characterisation*. British Geological Survey Open Report OR/10/54. 357pp. MALSF, Crown copyright.

THE WILDLIFE TRUSTS, 2010. *Areas of additional pelagic ecological importance (APEI) data layer.*

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.5 Marine Conservation Zone: NG 5, Lincs Belt

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. Inclusion of addendum revisions (as issued on 15/09/11) as follows: 1. Revision of conservation objectives for subtidal coarse sediment, subtidal sand, subtidal mixed sediments from recover to maintain; 2. Inclusion of omitted conservation objective for subtidal sands and gravels FOCI (table 7.33a); 3. Associated revisions to Annex 2 Vulnerability Assesment with relation to subtidal sediments and beach replenishment. The ecological description of the site has been updated to reflect RSPB feedback on the IA.

Site name

NG 5, Lincs Belt

Site centre location

53° 24' 27'' N, 0° 16' 21'' E
53.407687°, 0.272599°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

175.50km² / 17,549.70ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.29 Features proposed for designation within NG 5, Lincs Belt

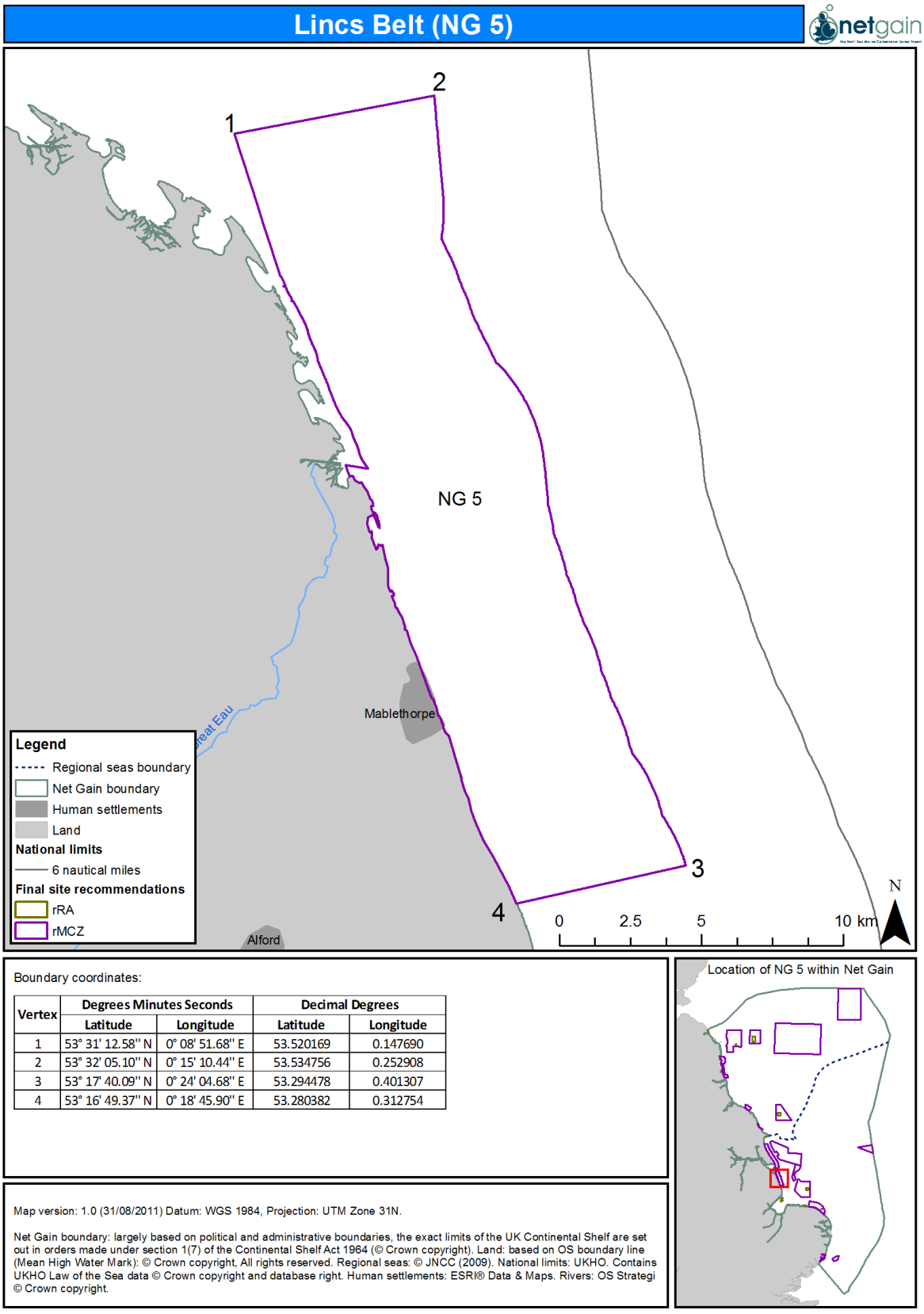
Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.1: Subtidal coarse sediment	33.83 km²
Broad-scale habitat	A5.2: Subtidal sand	74.30 km²
Broad-scale habitat	A5.4: Subtidal mixed sediment	66.14 km²
Habitat of conservation importance	Peat and clay exposures	Local knowledge
Habitat of conservation importance	Subtidal sands and gravels Subtidal sands and gravels (modelled)	4.42 km² 19.77 km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.30 Features within NG 5, Lincs Belt not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	Feature not put forward for designation because only a very small portion present within the site 0.58km², however discussions within the LGM indicate that the extent may be larger than this[21]
Habitat of conservation importance	Littoral chalk communities (modelled)	Feature not put forward because it is considered that the extent of the site is too deep for these communities to be present
Habitat of conservation importance	Ross worm (*Sabellaria spinulosa)* reefs	Ross worm reefs are not considered to be present within this site and have therefore not been put forward for recommendation
Habitat of conservation importance	Subtidal chalk (modelled)	Feature not put forward because it is considered that the extent of the site is too deep for these communities to be present
Species of conservation importance	European eel (*Anguilla anguilla*)	This feature has not been put forward for designation because of the unreliability of the data and exact location of the species presence[22]
Geological feature	n/a	n/a

[21] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.

[22] Discussions held during the July, 2011 LGM suggest that this site could benefit from including the European Eel, as the site is close to the area where freshwater, juveniles and adults are present. The feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations the feature has not been put forward for designation and has not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 31' 12.58" N	0° 08' 51.68" E	53.520169	0.147690
2	53° 32' 05.10" N	0° 15' 10.44" E	53.534756	0.252908
3	53° 17' 40.09" N	0° 24' 04.68" E	53.294478	0.401307
4	53° 16' 49.37" N	0° 18' 45.90" E	53.280382	0.312754

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps. Rivers: OS Strategi © Crown copyright.

Figure 7.33 Location and extent of site NG5 (Lincs Belt)

Site summary

NG 5 lies along the Lincolnshire coast line in the East of England, with the northern portion of the site within the Humberside County. The site is characterised by open coast sediments in the nearshore and shallow coastal waters to the 3nm. The site has been recommended as representative of circalittoral sands and circalittoral coarse and mixed sediments and for peat and clay exposures. The depth of the site is up to 10m deep, identified in data received from UKOA (Figure 7.38). Most of the site experiences high wave energy and moderate current energy at the seabed (UKSeaMap, 2010) with significant sediment transport loading throughout the site (van der Molen, 2002). The habitats present within the site support a good diversity of both benthic and pelagic species and provide foraging opportunities for seabirds. The coastal area of Donna Nook, north of the village of North Somercotes is a nationally important haul out and breeding area supporting a resident grey seal colony of 4,000 individuals, including 1,300 pups annually (Lincolnshire Wildlife Trust 2011, pers. comm.).

Detailed site description

NG 5 is recommended for designation due to the presence of broad-scale habitat types A5.1: Subtidal sands, A5.2: Subtidal coarse sediment and A5.4: Subtidal mixed sediments. The site also includes two habitats of conservation importance (Lincolnshire Wildlife Trust, 2011; Tyler-Walters, et al. 2009): Subtidal sands and gravels, and peat and clay exposures. Other habitats present within the site include A2.2: Intertidal sand and muddy sand, littoral chalk communities (modelled), Ross worm (*Sabellaria spinulosa*), subtidal chalk (modelled) and European eel (*Anguilla anguilla*).

NG 5 is located on the north Lincolnshire coast, extending from approximately 2km north of North Coates at the mouth of the Humber, to its most southern point approximately 3km south of Sandilands. The eastern boundary aligns with the 3nm limit, and the north western boundary runs parallel to the Humber Estuary European Marine Site which is a designated SAC, SPA, SSSI and RAMSAR site.

The majority of the site experiences high wave energy at the seabed >1.2 Nm^{-2} and moderate current energy at the seabed of between 0.13-1.16Nm^{-2} (UK SeaMap, 2010). Tidal currents dominate the bedload transport (van der Molen, 2002) with the majority of material being transported south towards the Wash (Kenyon and cooper, 2005 in Tappin, et al. 2011). In the inshore areas, surge currents are high at between 0.6 and 0.8 cm/ sec (Flather, 1987). Longshore sediment transfer is split at the centre of NG5 with net movements both north and south: towards the Humber and Wash respectively (Kenyon and Cooper, 2005 in Tappin, et al. 2011). The majority of the site is underlain by subtidal chalk covered by Pleistocene till, which is supported by the modelled data for subtidal chalk present within the site.

The benthic habitats at this part of the Lincolnshire Coast are characterised by open coast sediments in the near shore with mobile sands and unconsolidated post glacial deposits further out forming extensive sheets of gravel and sandy gravel in shallow coastal waters out to 3 nm limit.

The broad-scale habitat types present within the site are A5.1: Subtidal sands, A5.2: Subtidal coarse sediment and A5.4: Subtidal mixed sediments. The Humber Regional Environmental Characterisation survey identified habitats to a EUNIS level four. Within NG 5 two habitats were found, NG 5 A5.25: Circalittoral fine sand and A5.44: Circalittoral mixed sediments (Tappin, et al. 2011) (Figure 7.37). The biotopes associated with these habitat types include characteristic species of polychaete worms such as *Ophelia borealis* and *Glycera*, with occasional amphipods such as *Urothoe* and the mollusc *Goodalia*. Biotopes associated with coarser sediments such as SS.Ssa.OSa.BcreCdunDgro can provide attachment for epifaunal species species such as hydroids and bryozoans for example *Flustra foliacea*. The sandy habitats within the site also support a range of infaunal polychaete worms including *Mediomastus*, *Polynoidae* and *Chone duneri* (Tappin, et al. 2011) with the gravelly sands characterised by nemertean species (Foster-Smith et al. 1999) Local knowledge of peat and clay

exposures present within the site suggest that they may form a blocky clay reef providing habitat for burrowing bivalves (Lincolnshire Wildlife Trust, 2011 pers. comm.).

Epifaunal sampling of southern NG 5 has shown that there are brown shrimp (*Crangon crangon*) in this area, a commercially important species (Solyanko, et al. 2010; Allen and Allen, 2007). Several fish species have also been recorded within NG 5 and it is likely that the location serves as a nursery ground for many fish, as species that actively use the inshore area have been found to be small bodied or in juvenile form (Solyanko, *et al.* 2010). Characteristic fish include sprat (*Sprattus sprattus)*, golden grey mullet (*Liza aurata*), lesser pipefish (*Syngnathus rostellatus*) and commercial species; lemon sole (*Microstomus kitt)*, plaice (*Pleuronectes platessa)* and herring (*Clupea harengus)* (Solyanko, *et al.* 2010), the latter two being UK Biodiversity Action Plan species (UKBAP, 1999). In Regional Hub meetings the commercial fishing representatives confirmed the importance of the site for spawning grounds for sole, herring and edible crab (Net Gain, 2010).

NG5 receives an annual influx of several tern species (*Sterna* spp.) (RSPB, 2011 pers. comm.), all of which are part of the Annex 1 EC Birds Directive (2009/147/EC). The little tern (*Sterna albifrons)*, a species that is also protected under: Species of European Conservation Concern (SPEC 3) and a UK species of high conservation concern (Allen*,* et al. 2003) is of principal importance, with breeding colonies in the Saltfleetby-Theddlethorpe Dunes SSSI (The Wildlife Trusts, RSPB and Seasearch, 2010). *S. albifrons* have a limited foraging range, usually within the intertidal area with an average distance of approximately 4km from nesting sites (Allcorn, et al., 2003); therefore NG5 would encompass the greater part if not all, of their feeding area. The site has the potential to be utilised by several other seabirds species including puffin (*Fratercula arctica),* common guillemot *(Uria aalge),* black legged kittiwake *(Rissa tridactyla)*, fulmar (*Flumar glacialis)* (RSPB, 2010) and northern gannet (*Morus bassanus)* (EYRG, 2010).

NG5 borders several national nature reserves (NNR), of these Donna Nook, both a Lincolnshire Wildlife Trust reserve and NNR is of great importance for marine mammals, as it is used as a 'haul out' by grey seals (*Halichoerus grypus)* throughout the year and as a breeding site. It is a major UK site (Abt*,* et al.2002) with approximately 4,000 grey seals present (Lincolnshire Wildlife Trust, 2011 pers. comm) and over 1,300 seal pups born every year (Lincolnshire Wildlife Trust, 2009). Maximum feeding distances in grey seals have been estimated at 135km (Prime and Hammond, 1990); as such NG5 may be used as a foraging site due to its close proximity, especially by newly weaned pups. It is also worth noting that common seal (*Phoca vitulina)* may utilise the southern part of NG 5 for foraging from their breeding site near the Wash (English Nature, 2003). Both species of seal are listed under Annex 2 for the EU Habitats Directive (Allen, et al. 2003).

Pinniped: Common seal (*Phoca vitulina)* ©Jonathan Butterfield

Crustacean: Brown shrimp (*Crangon crangon)* ©Jonathan Butterfield

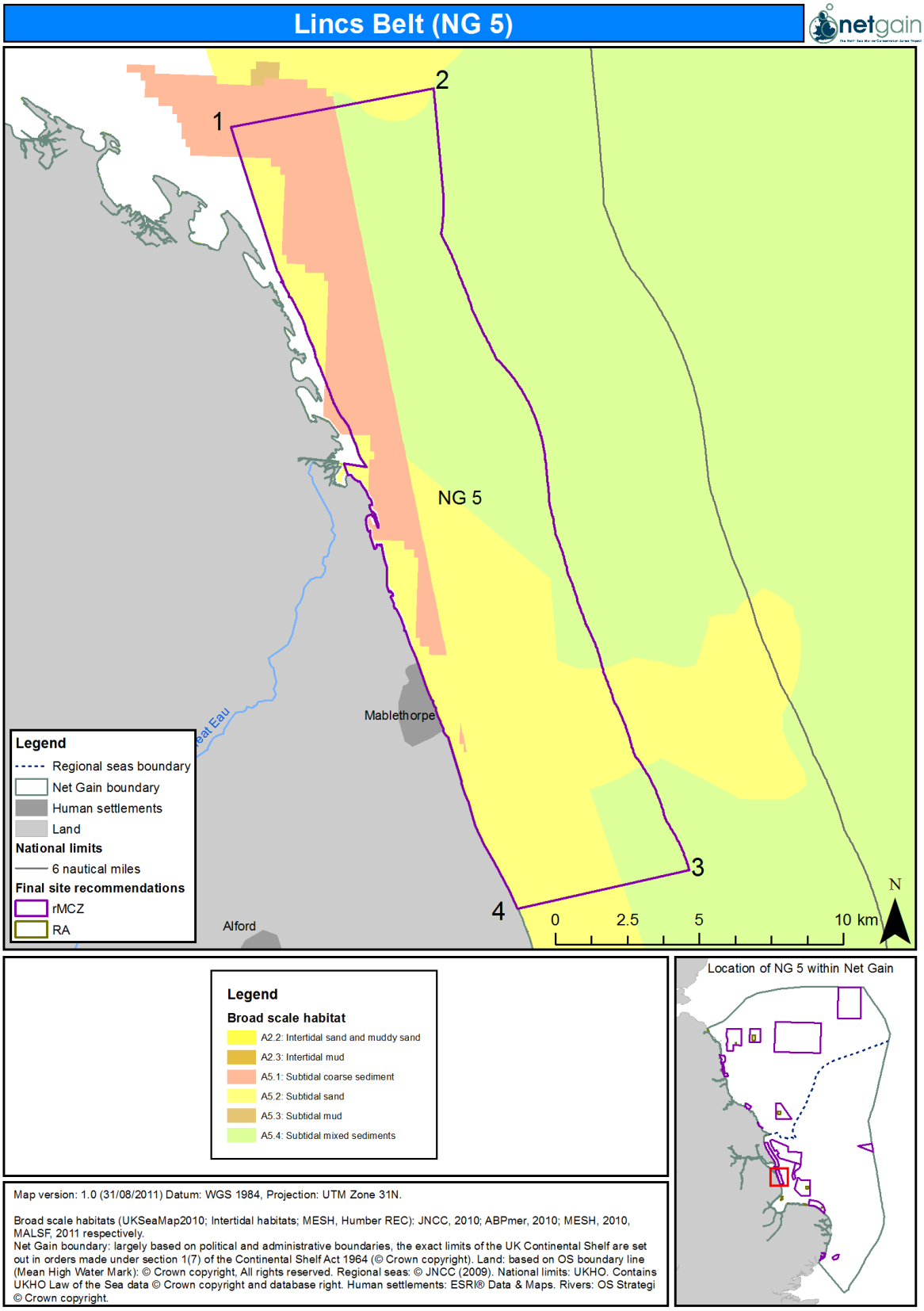


Figure 7.34 Broad-scale habitat present within NG 5

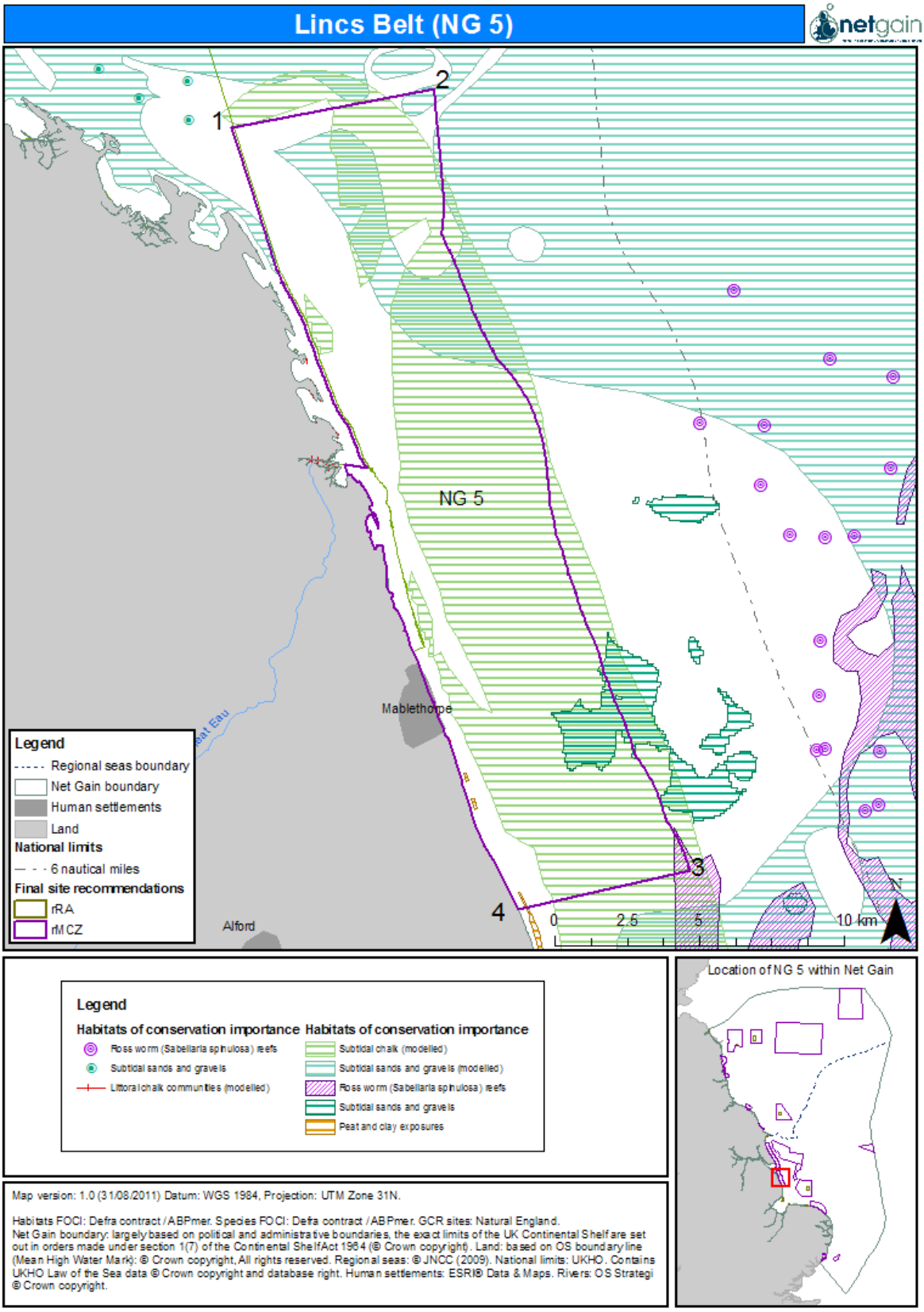


Figure 7.35 FOCI habitat and species present within NG 5

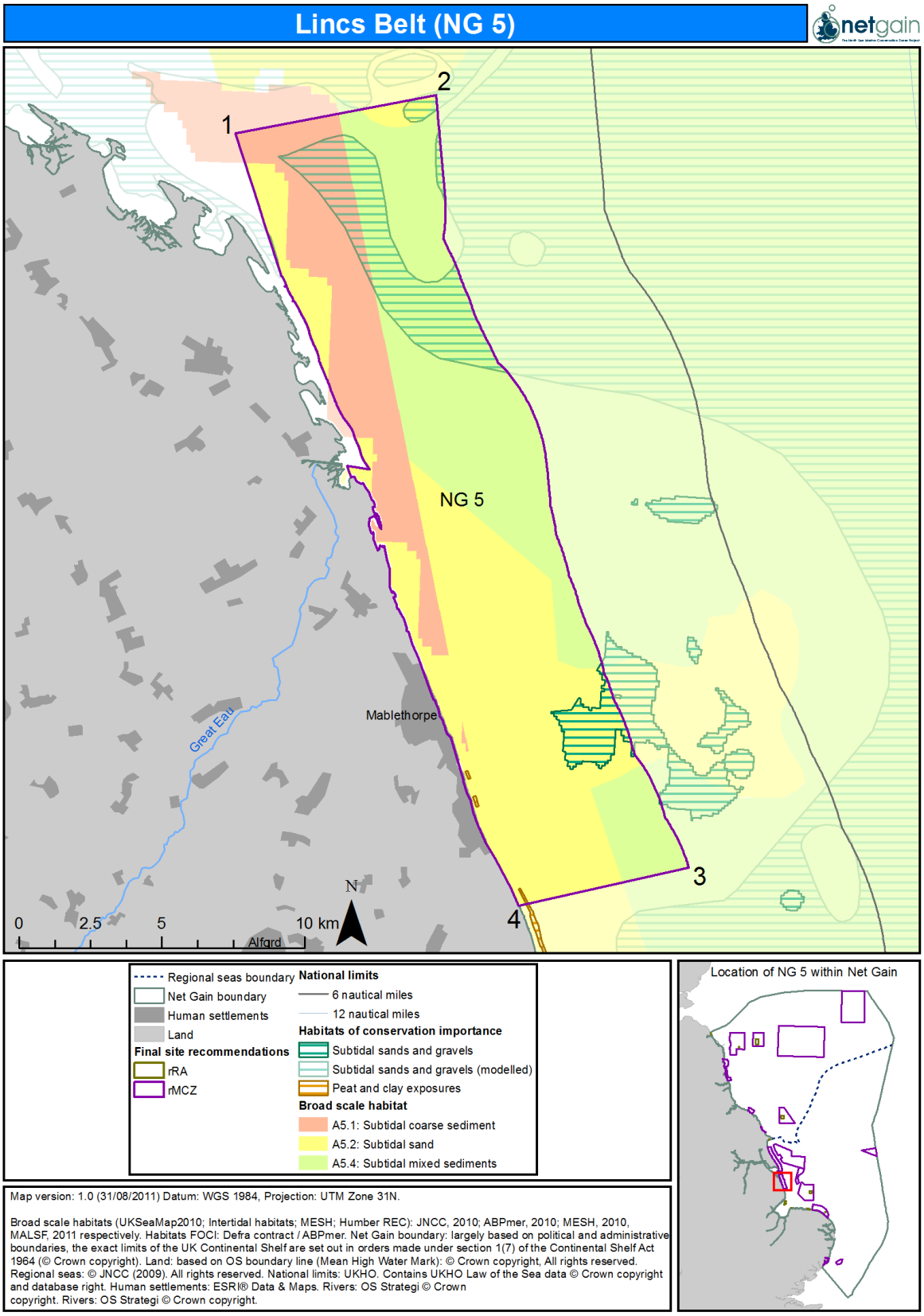


Figure 7.36 Features put forward for recommendation in NG 5

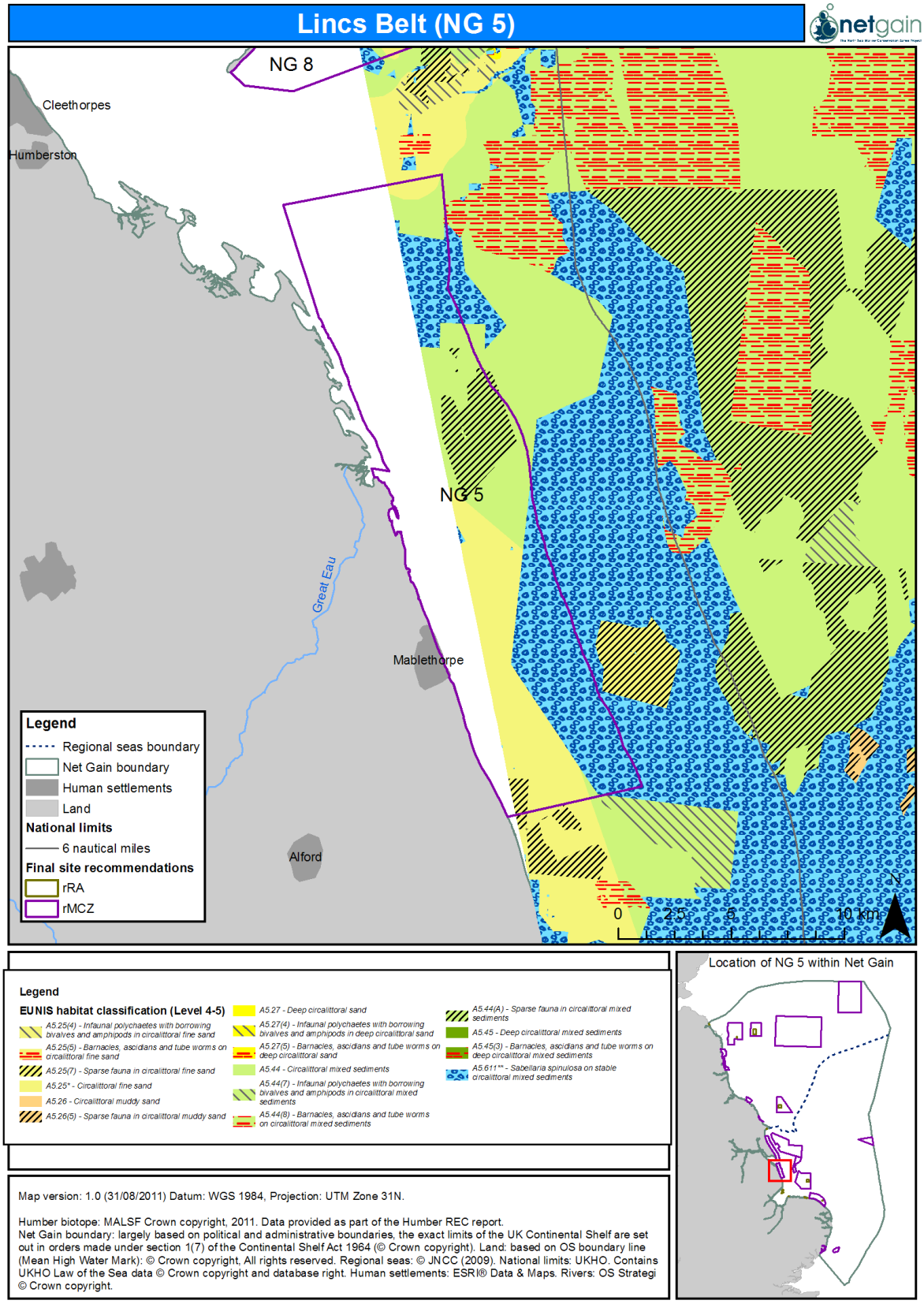


Figure 7.37 **Additional broad-scale habitat data; Humber Regional Environmental Characterisation**

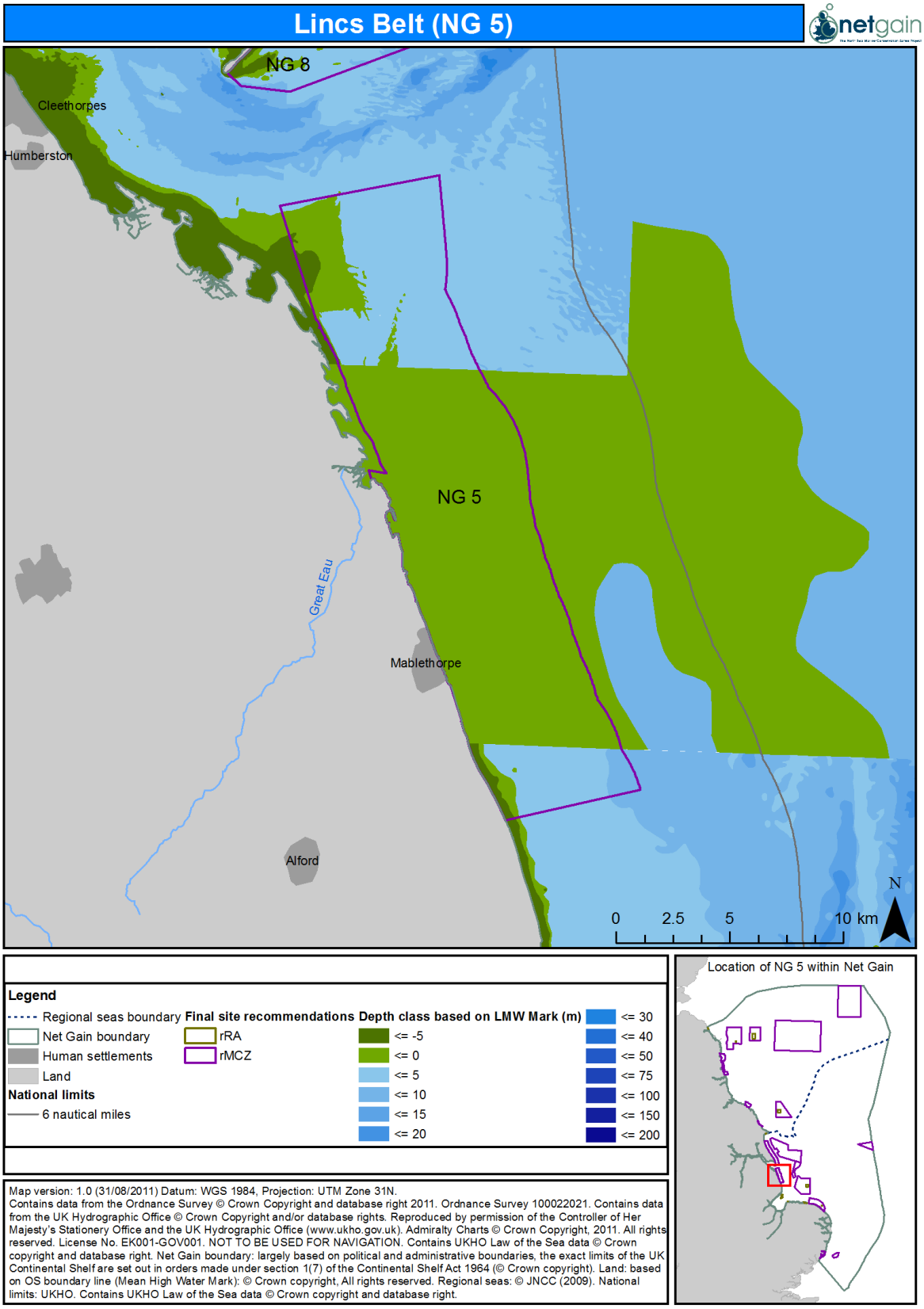


Figure 7.38 Bathymetry of NG 5

Site boundary

NG 5, Lincs Belt is a coastal site with the eastern boundary clipped to the 3nm limit and the north western boundary clipped to the Humber Estuary SAC, SPA and SSSI. The decision was made in the May Regional Hub meetings to reduce the northern boundary to allow for a gap at the Humber Estuary mouth with NG 8, Holderness Inshore. Approximately 7.5km of the north eastern boundary of the site is in close proximity to a seasonal byelaw closure from the last day of June to October 1st to any type of dredging gear.

Conservation objectives

Table 7.31 Conservation objectives for site NG 5, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — L-H — L Surface abrasion: damage to seabed surface features — NS-H — L

	Physical change (to another seabed type)	M	L
	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.32 Conservation objectives for site NG 5, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures listed below:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Siltation rate changes (high)	H	L
Physical removal (extraction of substratum)	L-H	M

	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.33 Conservation objectives for site NG 5, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal mixed sediments in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — L Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm — H — L

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.33(a) Conservation objectives for site NG 5, Subtidal sands and gravels

Conservation Objective	
1 Maintain/ recover	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Subtidal sands and gravels in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sands and gravels in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sands and gravels are sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Surface abrasion: damage to seabed surface features	NS-H	M-H
Physical change (to another seabed type)	M	H
Physical removal (extraction of substratum)	M	H

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	M-H
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L-M
	Removal of target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	M-H
	Siltation rate changes (low)	NS-M	M-H
	Salinity changes - local	L	
Human activities	Subtidal sands and gravels is sensitive to the pressures listed below. Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.34 Conservation objectives for site NG 5, Peat and clay exposures

Conservation Objective	
1 Maintain/ recover	Peat and clay exposures are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Peat and clay exposures in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Peat and clay exposures in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Peat and clay exposures is sensitive to the pressures listed below:

Pressure	**Sensitivity**	**Confidence**
Emergence regime changes (sea level) - regional/national	H	L
Physical change (to another seabed type)	H	H
Physical loss (to land or freshwater habitat)	H	H
Atmospheric climate change	M	L

	Temperature changes - regional/national	M	L
	Emergence regime changes - local	L	L
	Physical removal (extraction of substratum)	L	M
	Removal of non-target species (lethal)	L	L
	Siltation rate changes (high)	L	M
	Structural abrasion/penetration: Structural damage to seabed >25mm	L	M
	Wave exposure changes - local	L	L
	Wave exposure changes - regional/national	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

NG 5, Lincs Belt north western boundary borders with the Humber Estuary SAC and SSSI, a portion of the Humber Estuary SPA lies within the western area of the site along with Saltfleetby-Theddlethorpe Dunes SSSI.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.35 MPAs within or adjacent to NG 5

MPA Type	Site Name	Features Protected
SAC	Humber Estuary	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.4: Intertidal mixed sediments A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.2: Subtidal sand A5.3: Subtidal mud A5.4: Subtidal mixed sediments Seagrass beds Sheltered muddy gravels Subtidal sands and gravels Estuarine rocky habitats Tentacled lagoon-worm (*Alkmaria romijni*)
SPA	Humber Estuary	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Seagrass beds
SSSI	Humber Estuary	A1.3: Low energy intertidal rock A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.7: Intertidal biogenic reefs A3.3: Low energy infralittoral rock A5.2: Subtidal sand A5.3: Subtidal mud Coastal saltmarsh Intertidal mudflats Saline lagoons Estuarine rocky habitats
SSSI	Saltfleetby-Theddlethorpe Dunes	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds Coastal saltmarsh Intertidal mudflats

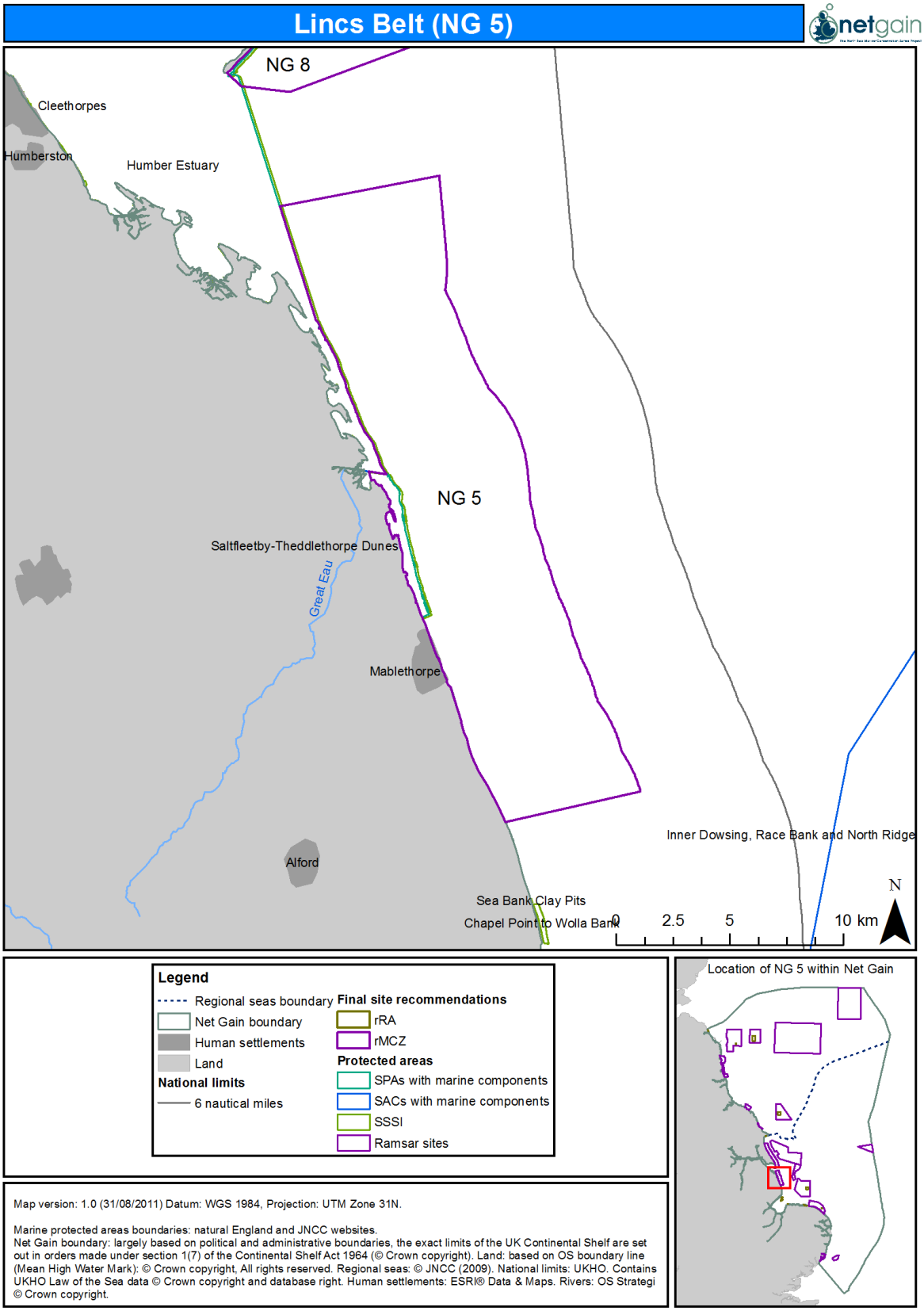


Figure 7.39 MPAs/rMCZs within or adjacent to NG 5

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The three groups that considered this site were very supportive of it, scoring it '3', '4' and'4'. They felt that the quality of the site was strengthened by ongoing local survey work and commented that it linked well with on-shore areas of high nature conservation value and to the adjacent Humber Estuary European Marine Site.

Confidence in the underlying data was generally moderate (one 'L' score and two 'M's), with comments being made relating to the value of the modelled data at the site. Some inferences could be made from the information on bird assemblages, but in terms of hard data less was perhaps known about this site relative to others. The confidence in the data used to underpin site selection increased through the process as the original data was augmented with local knowledge from stakeholders – the original data was very poor. Data on locations of peat and clay exposures were provided by Lincolnshire Wildlife Trust (although local fishermen contested this, suggesting that the areas were mud). All substrates in this area were suggested as being very mobile. It was commented that, for taking the site forwards, data should be robust.

The site was felt by all three groups to have a low level of potential contention associated with it. Because the conservation objective for all of the features at the site proposed for designation were set to maintain contention in the short term is likely to be low but will ultimately depend on what management is put in place in the future. The group felt that the boundaries of the site had been chosen carefully and that activities relating to beach replenishment and MOD works had been taken into account. Generally, activities at the site were compatible with the features so contention should be low.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- NFFO - commercial fishing:- Strongly against (would want southern boundary of site moving to minimise socio-economic impacts; *note: the southern boundary was moved north of its original position to minimise socioeconomic impacts at the 3rd iteration*)
- RSPB:- Strongly support
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.36 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Broad-scale habitat	Survey	Tappin, et al. 2011
European eel	Combination of historical and recent records	Ellis, et al. 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Littoral chalk communities	Modelled data	Tyler-Walters, et al. 2009
Peat and clay exposures	Local knowledge	Lincolnshire Wildlife Trust, 2011
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Ross worm (*Sabellaria spinulosa*) reefs, Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal chalk, Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

ABT, K. F., HOYER, N., KOCH, L., and ADELUNG, D., 2002. *The dynamics of grey seals (Halichoerus grypus) off Amrum in the south–eastern North Sea — evidence of an open population*. Journal of Sea Research, 47**,** 55–67.

ALLCORN, R., EATON, M.A., CRANSWICK, P.A., PERROW, M., HALL, C., SMITH, L., REID, J., WEBB, A., SMITH, K.W., LANGSTON, R.H.W. and RATCLIFFE, N., 2003. *A Pilot Study of Breeding Tern Foraging Ranges in NW England and East Anglia in Relation to Potential Development Areas for Offshore Windfarms.* Sandy: RSPB/ WWT/JNCC.

ALLEN, J.H. and ALLEN, M.S.J., 2007. *Lincshore Coastal Defence Strategy: Environmental Monitoring 200.,* Unpublished Environment Agency Report, ZZB109-F-2008, IECS.

ALLEN, J., BOYES, S., BURDON, D., CUTTS, N., HAWTHORNE, E., HEMINGWAY, K., JARVIS, S., JENNINGS, K., MANDER, L., MURBY, P., PROCTOR, N., THOMSON, S. and WATERS, R., 2003. *The Humber Estuary: A comprehensive review of its nature conservation interest.* English Nature Report 547 IECS.

BROOKS, A.J., ROBERTS, H., KENYON, N.H. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 8: *Task 2A - Mapping of Geological and Geomorphological Features.* ABP Marine Environmental Research Ltd.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

EAST YORKSHIRE RINGING GROUP-EYRG (2010) *Gannet feeding ranges from Bempton cliffs via satellite tagging.* Available from http://www.eyrg.co.uk/Articles/Microsoft%20Word%20-

%20Progress%20report2%20Bempton%20gannets%20RHWL%20220211%20pdf.pdf (accessed on 12/08/11).

ELLIS, J.R., READDY, L., SOUTH, A. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 15: Task 2B - Distribution of highly mobile species*. ABP Marine Environmental Research Ltd.

ENGLISH NATURE (EN), 2003. *The Humber Estuary European Marine Site.English Nature's advice given under Regulation 33(2) of the Conservation (Natural Habitats, and c.).* Regulations 1994.

EVANS, C.D.R., CROSBY, A., WINGFIELD, R.T.R., JAMES, J.W.C., SLATER, M.P. and NEWSHAM, R., 1998. *Inshore seabed characterisation of selected sectors of the English coast*. British Geological Survey Technical Report WB 98/45.

FLATHER, R .A., 1987. *Estimates of extreme conditions of tide and surge using a numerical model of the north–west European continental shelf*. Estuarine, Coastal and Shelf Science, Vol. 24, 69–93.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 24: Task 2I. Intertidal habitats datalayer (Final)*. ABP Marine Environmental Research Ltd.

KENYON, N.H. and COOPER, B. 2005. *Sand banks, sand transport and offshore wind farms, report for ABP Marine Environmental Research Ltd, Southampton*. In Tappin, D. R., Pearce, B., Fitch, S., Dove, D., Geary, B., Hill, J. M., Chambers, C., Bates, R., Pinnion, J., Diaz Doce, D., Green, M., Gallyot, J., Georgiou, L., Brutto, D., Marzialetti, S., Hopla, E., Ramsay, E., and Fielding, H., 2011, The Humber Regional Environmental Characterisation. British Geological Survey Open Report OR/10/54. pp.14

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs*. JNCC report No. 431.

JNCC AND NATURAL ENGLAND, 2010. *Marine conservation zone projects: identifying marine conservation zones, a quick reference guide*.

LINCOLNSHIRE WILDLIFE TRUST (LWT), 2009. *Seal Pup counts for Donna Nook NNR, 1981-2009, LWT.*

LINCOLNSHIRE WILDLIFE TRUST, in press, 2011. *The Lincolnshire Biodiversity Plan.* Third edition.

LINCOLNSHIRE WILDLIFE TRUST, 2011. Net Gain ecological benefit meetings. pers.comm.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

NET GAIN, 2010. *2nd Iteration Report* (29.10.10)

PRIME, J. H., and HAMMOND, P. S., 1990. *The diet of grey seals from the south–western North Sea assessed from analysis of hard parts found in faeces*. Journal of Applied Ecology, 27, 435–447.

RSPB, 2010*. Species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby.

SOLYANKO, K., MAZIK, K., LEIGHTON, A., BURDON, D., MUSK, W., BAILEY, M., BAULCOMB, C. and DAWES, O., 2010. *Lincshore Coastal Defence Strategy: Environmental Monitoring 2009*. Unpublished Environment Agency Report, ZBB725-F-2010, IECS.

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ DOCE, D., GREEN, M., GALLYOT, J., GEORGIOU, L., BRUTTO, D., MARZIALETTI, S.,

HOPLA, E., RAMSAY, E., FIELDING, H. 2011. *The Humber Regional Environmental Characterisation*. British Geological Survey Open Report OR/10/54. 357pp. MALSF, Crown copyright.

THE WILDLIFE TRUSTS, RSPB and SEASEARCH, 2010. *Biodivers Areas within the Net Gain region: A supportive guide to aid stakeholder identification of ecological interest areas that meet aspects of the Ecological Network Guidance.* November, 2010.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

UKBAP, 1999. *UK Biodiversity Group, Tranche 2 Action Plans, Maritime Species and Habitats*. Available from: http://jncc.defra.gov.uk/PDF/UKBAP_Tranche2-ActionPlans-Vol5-1999.pdf (accessed on 12/08/11).

UKSEAMAP, 2010. *Interactive Map* available from at: http://jncc.defra.gov.uk/page-5534&LAYERS=PredictedHabitats,UKCS (accessed on 09/08/11).

VAN DER MOLEN, J., 2002. *The influence of tides, wind and waves on the net sand transport in the North Sea.* Continental Shelf Research, 22, 2739–2762.

7.6 Marine Conservation Zone: NG 6, Silver Pit

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Inclusion of omitted conservation objective table for the Inner Silver Pit geological feature, and addition of this feature to table 7.37. Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG6, Silver Pit

Site centre location

53° 32’ 38’’N, 0° 43’ 43’’E
53.544161°, 0.728749°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

168.09km² / 16,808.87ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.37 Features proposed for designation within NG6, Silver Pit

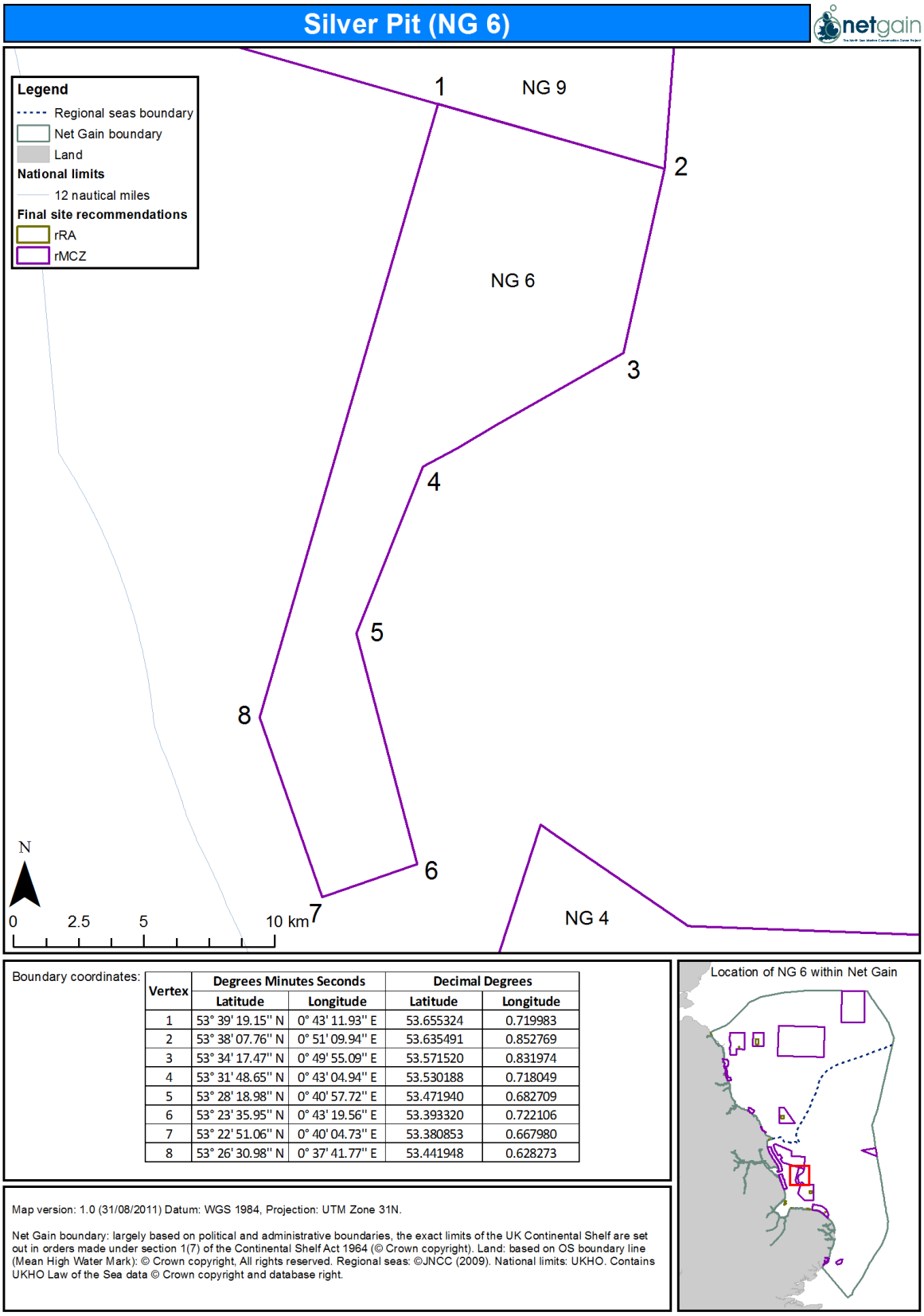
Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.2: Subtidal sand	41.52km²
Broad-scale habitat	A5.4: Subtidal mixed sediments	126.53km²
Habitat of conservation importance	Ross worm (*Sabellaria spinulosa*) reefs	9 points, 0.05km²
Habitat of conservation importance	Subtidal sands and gravels Subtidal sands and gravels (modelled)	16.88 km² 105.03km²
Species of conservation importance	n/a	n/a
Geological feature	North Sea glacial tunnel valleys (Inner Silver Pit)	150 km²[23]
Other feature	n/a	n/a

[23] The full extent of the feature within the site boundaries is unknown. The extent shown in table 7.37 has been estimated from bathymetry data.

Table 7.38 Features within NG6, Silver Pit not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	n/a	n/a
Habitat of conservation importance	n/a	n/a
Species of conservation importance	Ocean quahog (*Artica islandica*)	The site was developed primarily for the geological, broad-scale habitat and habitat FOCI features. The one occurrence of Ocean quahog within the site meant that this species was not put forward for designation during Regional Hub meetings[24].

[24] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 39' 19.15" N	0° 43' 11.93" E	53.655324	0.719983
2	53° 38' 07.76" N	0° 51' 09.94" E	53.635491	0.852769
3	53° 34' 17.47" N	0° 49' 55.09" E	53.571520	0.831974
4	53° 31' 48.65" N	0° 43' 04.94" E	53.530188	0.718049
5	53° 28' 18.98" N	0° 40' 57.72" E	53.471940	0.682709
6	53° 23' 35.95" N	0° 43' 19.56" E	53.393320	0.722106
7	53° 22' 51.06" N	0° 40' 04.73" E	53.380853	0.667980
8	53° 26' 30.98" N	0° 37' 41.77" E	53.441948	0.628273

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: ©JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right.

Figure 7.40 Location and extent of site NG6 (Silver Pit)

Site summary

NG 6 is located approximately 26km to the east of the Lincolnshire Coast at Theddlethorpe. The depth of the site is between 10-50m deep (Figure 7.45), with the seabed composed mostly of sediments and areas of Ross worm (*Sabellaria spinulosa*) reefs. The site has been recommended for MCZ designation for the Inner Silver Pit feature, which is an example of a North Sea post glacial tunnel valley. The Silver Pit feature supports diverse and abundant benthic communities. The steeply sloping sides and the valley floor of the feature comprise mixed subtidal sediments and areas of biogenic reef. The site also supports several foraging birds, marine mammals and provides a spawning ground for commercially important fish species.

Detailed site description

NG 6 is being recommended for designation due to the presence of broad-scale habitat types A5.2: subtidal sands and A5.4: subtidal mixed sediments, along with habitats of conservation importance subtidal sands and gravels and Ross worm (*Sabellaria spinulosa*) reefs. The species of conservation importance, Ocean quahog (*Arctica islandica*) is also present within the site but is not being put forward for recommendation.

NG 6 is an offshore, rMCZ located approximately 30km east off the Holderness coastline, at Spurn Head in the north and extends south 25km off the Lincolnshire coast at Theddlethorpe. The site contains the Inner Silver Pit, which is a large post glacial tunnel valley feature over 50km long, extending north into NG 9. The feature is characteristic of Southern North Sea tunnel valleys with little sediment infill. The depth of the site ranges from 11.5m to over 98.5m within the deep central channels, which is not identified in the bathymetry data (Figure 7.45).

The underlying bedrock of NG 6 is Cretaceous chalk, which within the Silver Pit is frequently exposed or covered by thin layers of sediment. The valley walls themselves comprise of a number of different quaternary formations; Bolders Bank and Swarte Bank are more prominent in the southern section of the site with Egmond Ground and Sand Hole formations in the north. This in itself is an important feature of the site as there is still debate on how the Silver Pit formed geologically (Donovan, 1972; Wingfield, 1990; Praeg, 2003). The channel morphology includes areas of thin sediment cover and rock on the sea bed**,** small sand waves, hummocky glacial deposits, slope failure deposits and glacial terraces. The site experiences moderate current energy at the seabed between 0.13-1.16 nm^{-2}, and dominant current direction in the area is south (OSPAR, 2000).

The site supports diverse and abundant benthic communities. The Silver Pit has been the subject of a recent comprehensive study about the benthic biological communities that are present (Tappin, et al. 2011). The broad-scale habitat types present within the site contain taxonomically diverse faunal assemblages including Ross worm (*Sabellaria spinulosa*) reef habitats mussel beds, brittle stars, sea squirts, hydroids and bryozoans. The mixed subtidal sediment habitats also contain a range of characterising infaunal polychaetes, burrowing bivalves, amphipods and sipunculids.

The Silver Pit margin sediments are in general sandy gravels, although there is a larger mud component on the eastern margins. The northern areas of the tunnel valley also support habitats associated with muddier sediments. In areas with larger sediment types hydroids, bryozoans and encrusting tube worms (*Pomatoceros*) are present, along with bivalves molluscs (*Nucula*), several species of infaunal polychaetes (*Polydora*, *Lumbrineris* and *Mediomastus*) and occasional amphipods (*Ampelisca*). The channel floor of the Silver Pit supports a benthic community of high biodiversity comprising extensive reef complexes o*f* Ross worm (*Sabellaria spinulosa*) reefs as well as aggregations of the brittle stars (*Ophiothrix fragilis* and *Ophiura albida*).

The western slopes of the geological feature are dominated by the Ross worm *(Sabellaria spinulosa)*, a biogenic reef building polychaete. It is known that the presence of the Ross worm in 'reef' form

gives rise to a taxonomically diverse faunal assemblage of species (Irving, 2009) and are found in association with blue mussels (*Mytilus edulis*) (Pohler, 2004) another Annex 1 species (Maddock, 2008). Two main habitats have been identified for the Ross worm (*Sabellaria spinulosa*) in NG 6. The first, SS.SBR.Sabspin, Ross worms on stable ciralittoral mixed sediment (JNCC, 2011b) supports a range of epifaunal species including the queen scallop (*Aequipecten opercularis*), squat lobster (*Galathea*) and the commercially important pink shrimp (*Pandalus*) along with other infaunal polychaetes and encrusting hydroids and bryozoans. The second, SS.SBR.SspiMedu, is similar to SS.SBR.Sabspin but with the addition of blue mussels (*Mytilus edulis*). The eastern slope mixed sediments have been found to have different characterising infaunal and epifaunal species comprising habitats of high biodiversity value. These include the burrowing amphipod *Urothoe elegans* a number of infaunal polychaete species and sea squirts, hydroids and bryozoans.

Typical biotopes in NG 6 include:

- CR.RTS.DRTS.S.BAscPo barnacles, sea squirts (ascidians) and tube worms on ciralittoral rock and thin sands;
- CR.RTS.BcreCdunDgro, barnacles (*Balanus crenatus*), polychaete worms (C*hone duneri*) and sea squirts (*Dendrodoa grossularia*) on circalittoral rock in thin mixed sediment with gravels and pebbles providing attachment for a high abundance of encrusting fauna whilst supporting infaunal communities in the finer sediments;
- SS.SSa.CMuSa, infalittoral muddy sand, contains epibenthic megafauna such as occasional crabs (*Liocarcinus* spp.) burrowing anemones and frequent brittle stars (*Ophiura*).
- SS.SMx.CMx.ApriBelePo, with molluscs (*Abra prismatica*) arthropods (*Bathyporeia elegans*) and polychaete worms in sandy mixed sediment contains a high species diversity (JNCC, 2011), 118 of both infaunal and epifaunal animals (Tappin, et al. 2011). Infaunal species include polychaete worms; *Ophelia borealis*, *Polycirrus*, *Notomastus* and *Glycera*, burrowing bivalves; *Goodallia* and *Nucula*, along with amphipod crustaceans; *Urothoe*, *Stenathoe* and *Bathyporeia.* Epifaunal organisms *Flustra foliacea* and soft coral *Alcyonium digitatum* occur if larger gravels and pebbles are present (Tappin, et al. 2011).

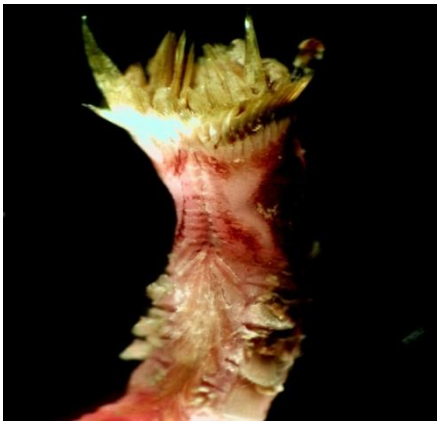
In addition to the descriptions above, more extensive survey data has been provided to Net Gain from the Humber Regional Environmental Characterisation and broad-scale habitats have been classified to a EUNIS level 4 providing more descriptive information about the habitat site (Figure 7.44). Habitats present include A5.25: Circalittoral fine sand, A5.26: Circalittoral muddy sand, A5.44: Circalittoral mixed sediments, A5.45: Deep circalittoral mixed sediments; A4D.94: Moderate energy deep circalittoral rock

The area is also known to provide spawning grounds for several commercial species: lemon sole (*Microstomus kitt),* sprat (*Sprattus sprattus*), whiting (*Merlangius merlangus*), cod (*Gadus morhua*), Dover sole (*Solea solea*), plaice (*Pleuronectes platessa*)*, (*Figure 7.49) and herring (*Clupea harengus*) (Jones, et al, 2004) with the latter five being part of a grouped species biodiversity action plan (UKBAP) (BRIG, 2007).

NG 6 has the potential to be utilised by many seabird species for foraging and resting including puffin (*Fratercula arctica),* common guillemot *(Uria aalge),* black legged kittiwake *(Rissa tridactyla)*, fulmar (*Flumar glacialis)* and northern gannet (*Morus bassanus*) (Figure 7.46; Figure 7.47; Figure 7.48) (JNCC, 2010), along with several migratory species, including shearwaters, petrels and skuas (Jones et al., 2004).

It is also worth noting that white beaked dolphin (*Lagenorhynchus albirostris*), minke whale (*Balaenoptera acutorostrata*) and harbour porpoise *(Phocoena phocoena*) have been sighted in small numbers within NG 6 with the latter more abundant (Evans et al, 2003).

Bird*:* Great Skua (*Stercorarius skua)*
©Jonathan Butterfield



Polychaete: Ross worm *(Sabellaria spinulosa)*
©Jonathan Butterfield

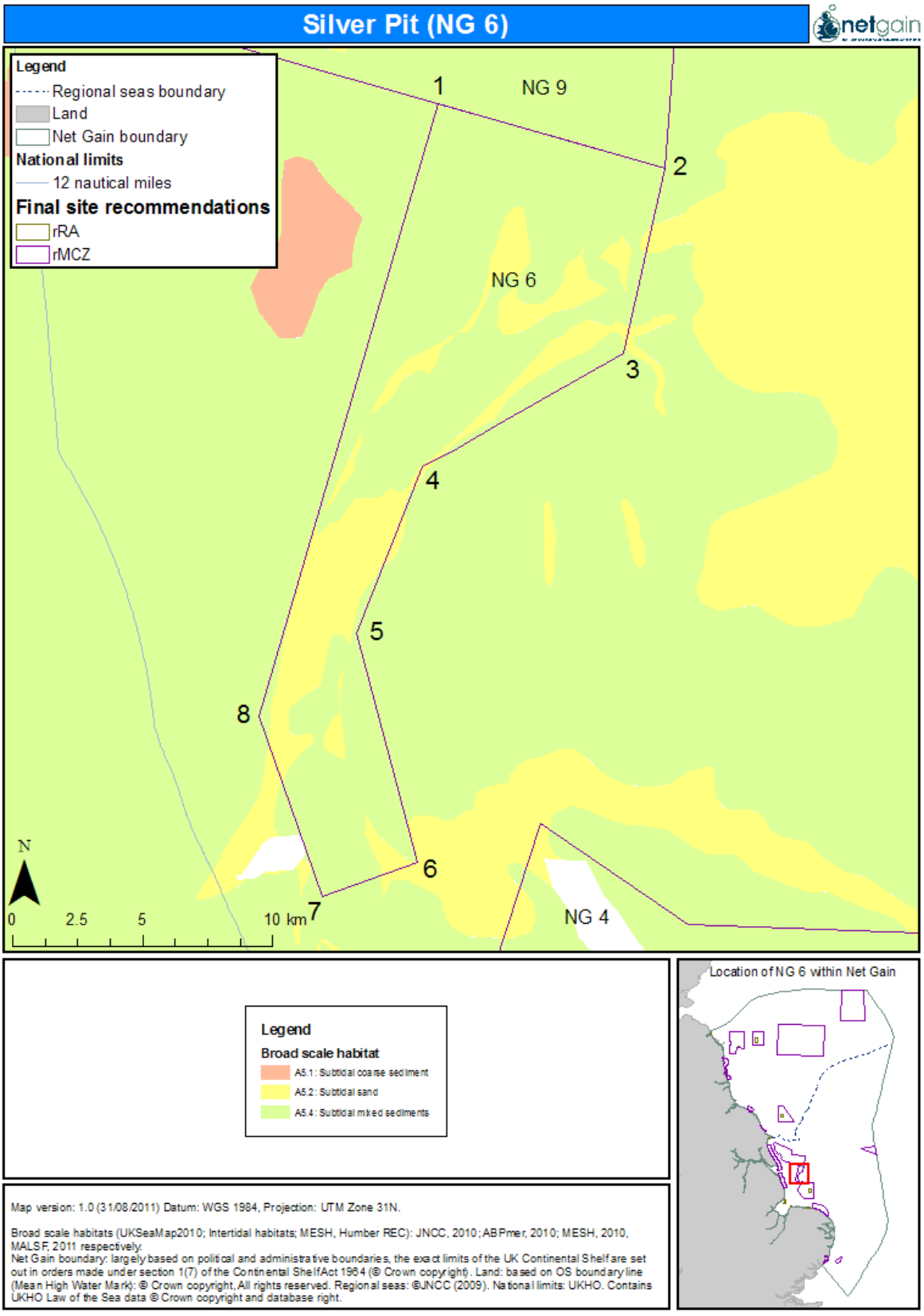


Figure 7.41 Broad-scale habitats present within NG 6

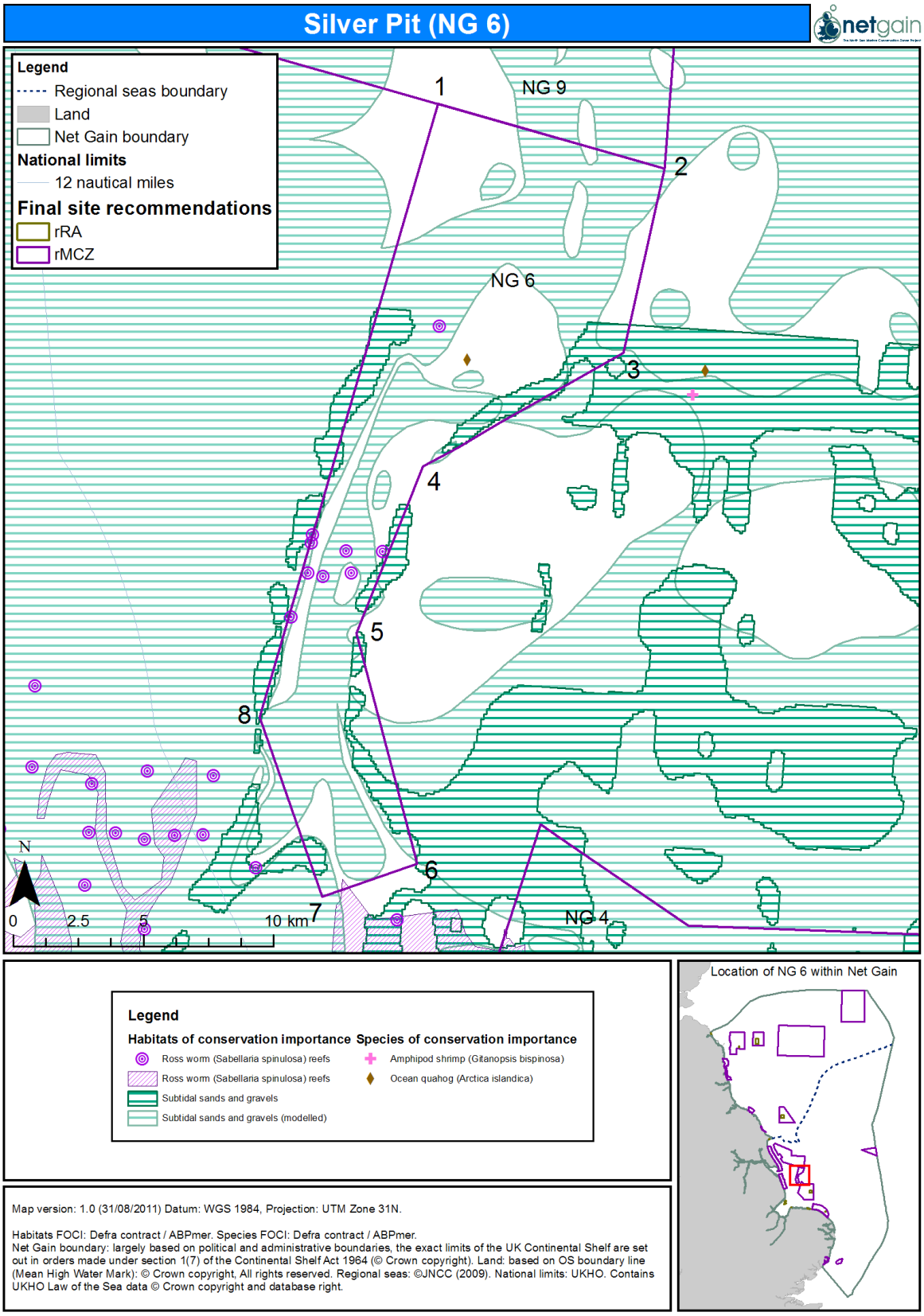


Figure 7.42 FOCI habitat and species present within NG 6

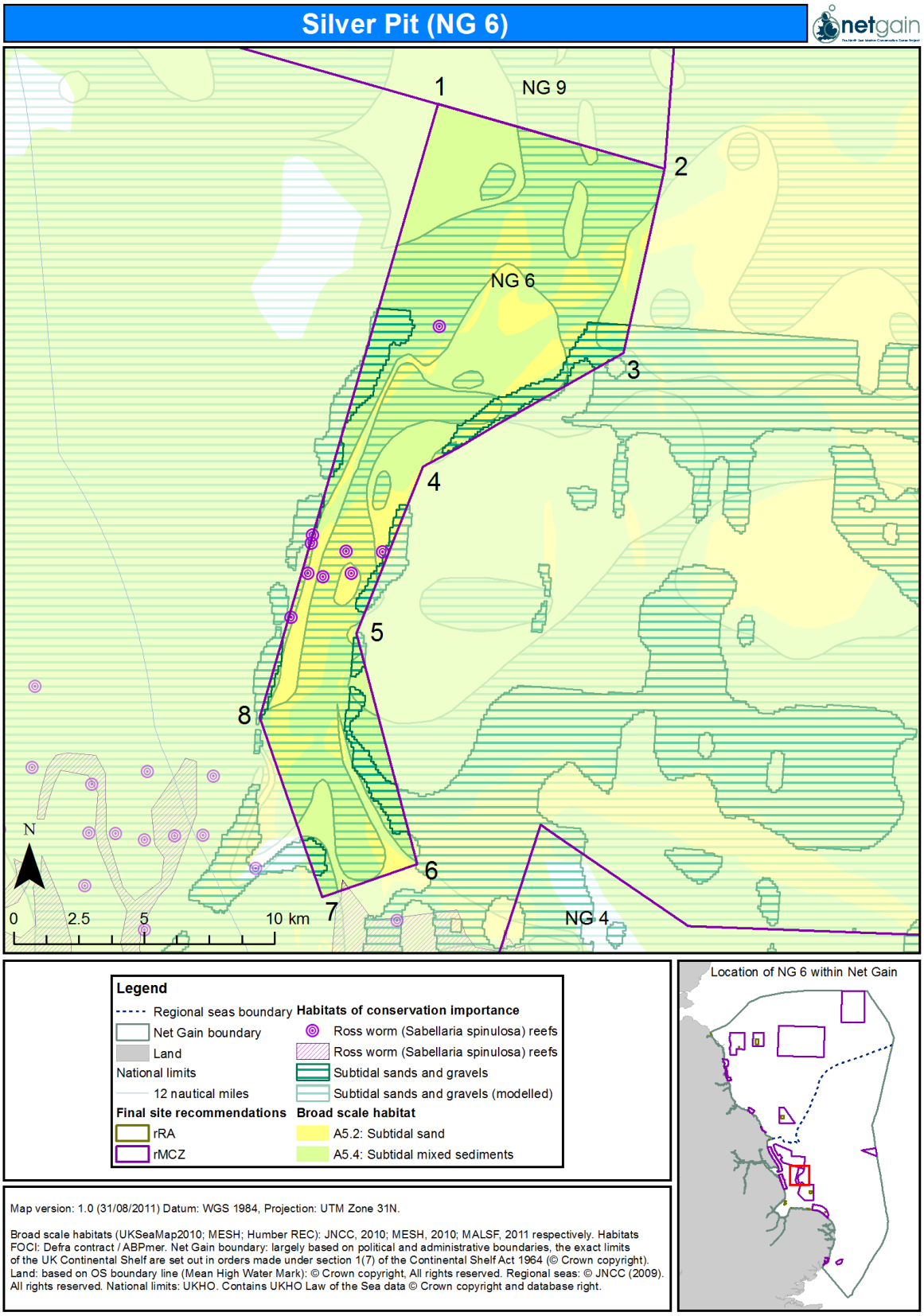


Figure 7.43 Features put forward for recommendation in NG 6

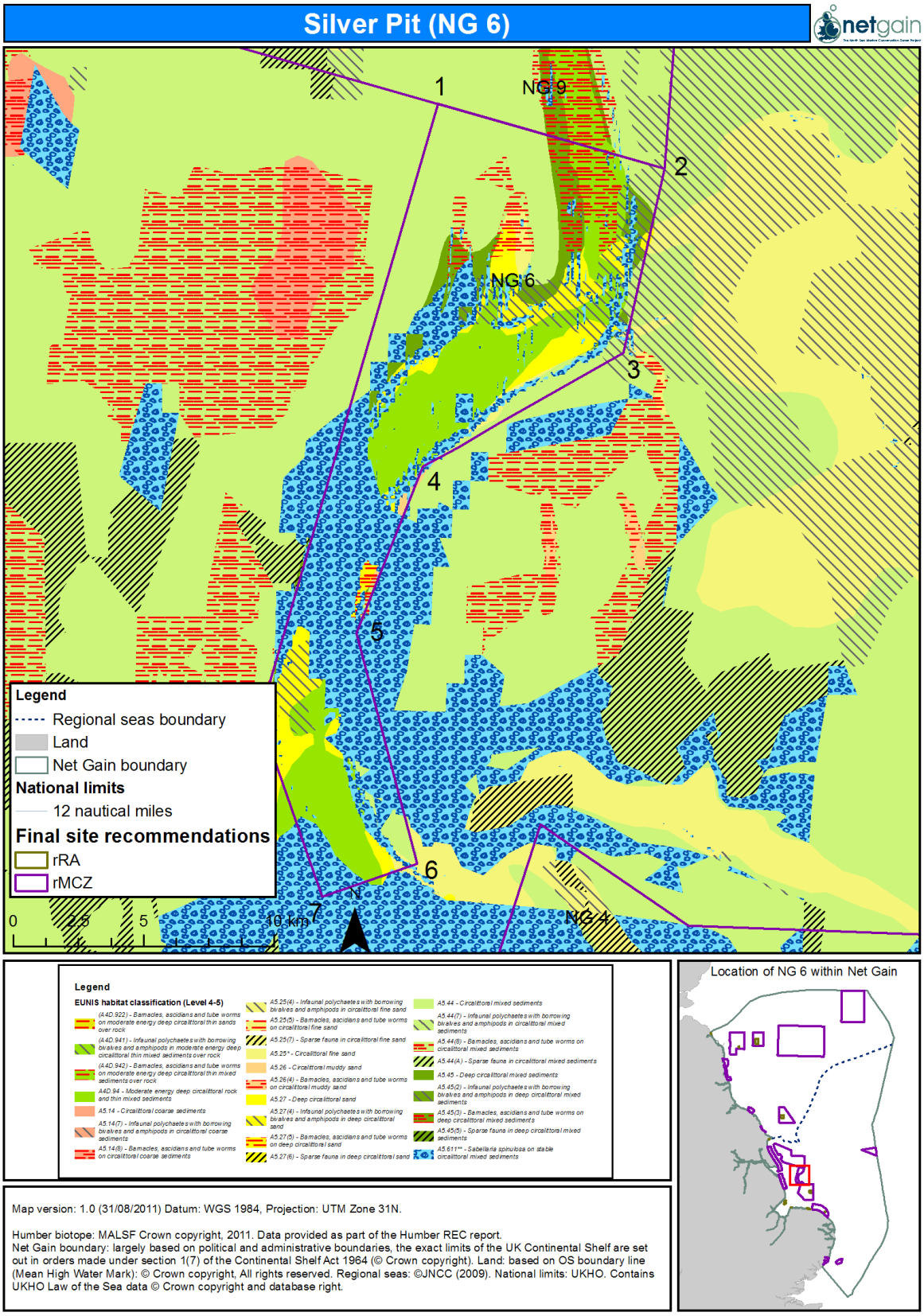


Figure 7.44 **Additional broad-scale habitat data: Humber Regional Environmental Characterisation**

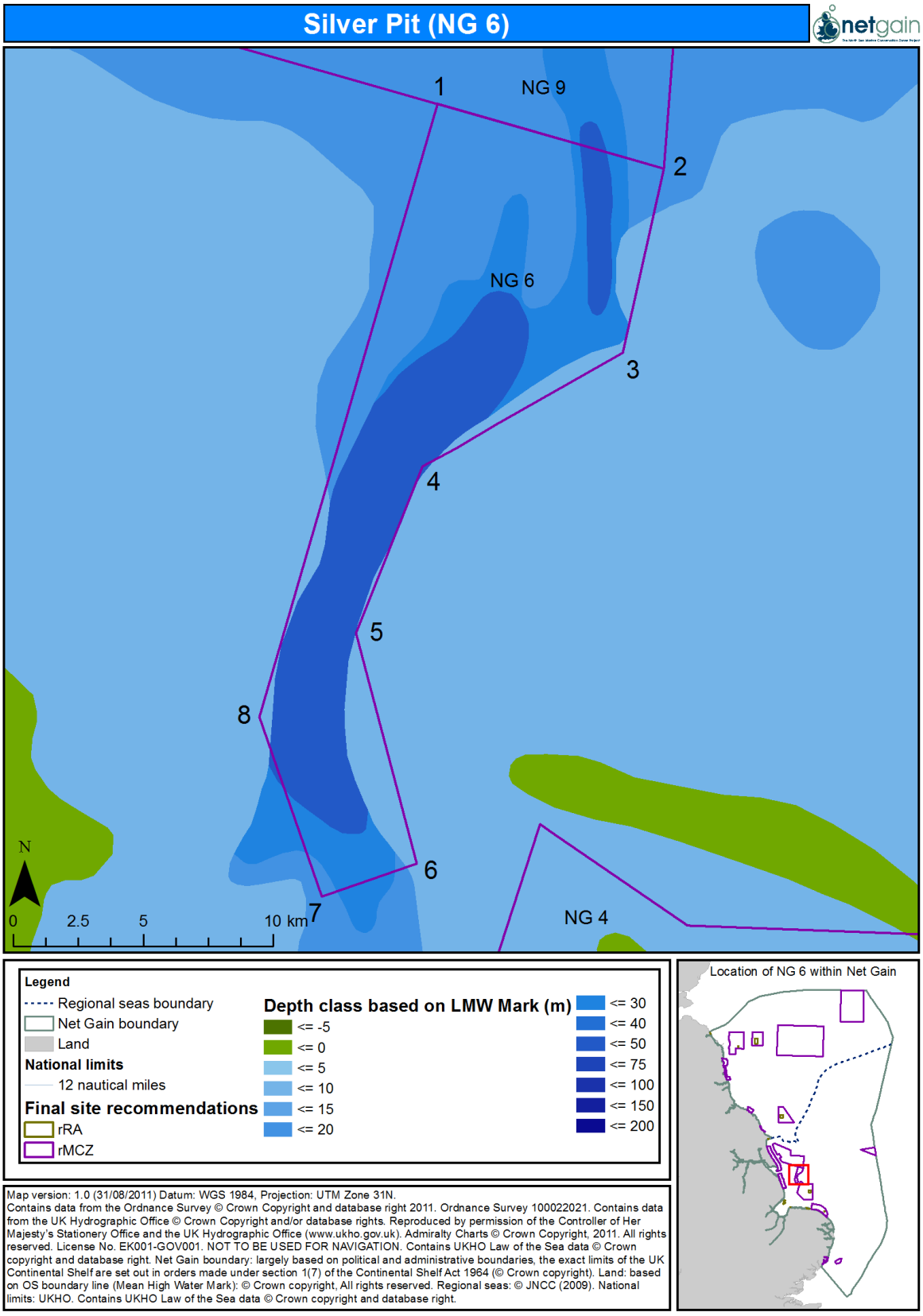
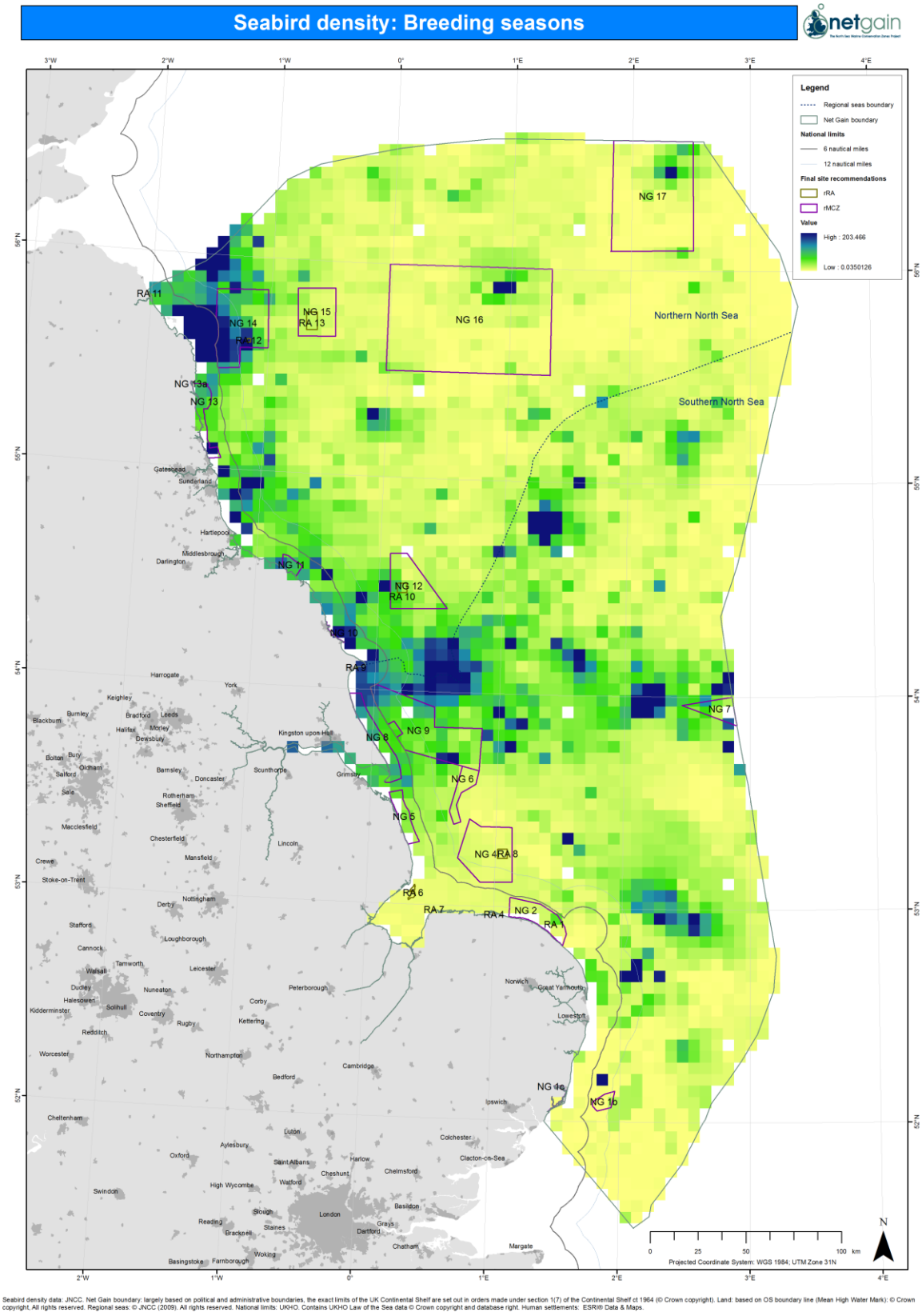


Figure 7.45 Bathymetry of NG 6



Seabird density data: JNCC. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.46 ESAS seabird density: breeding seasons

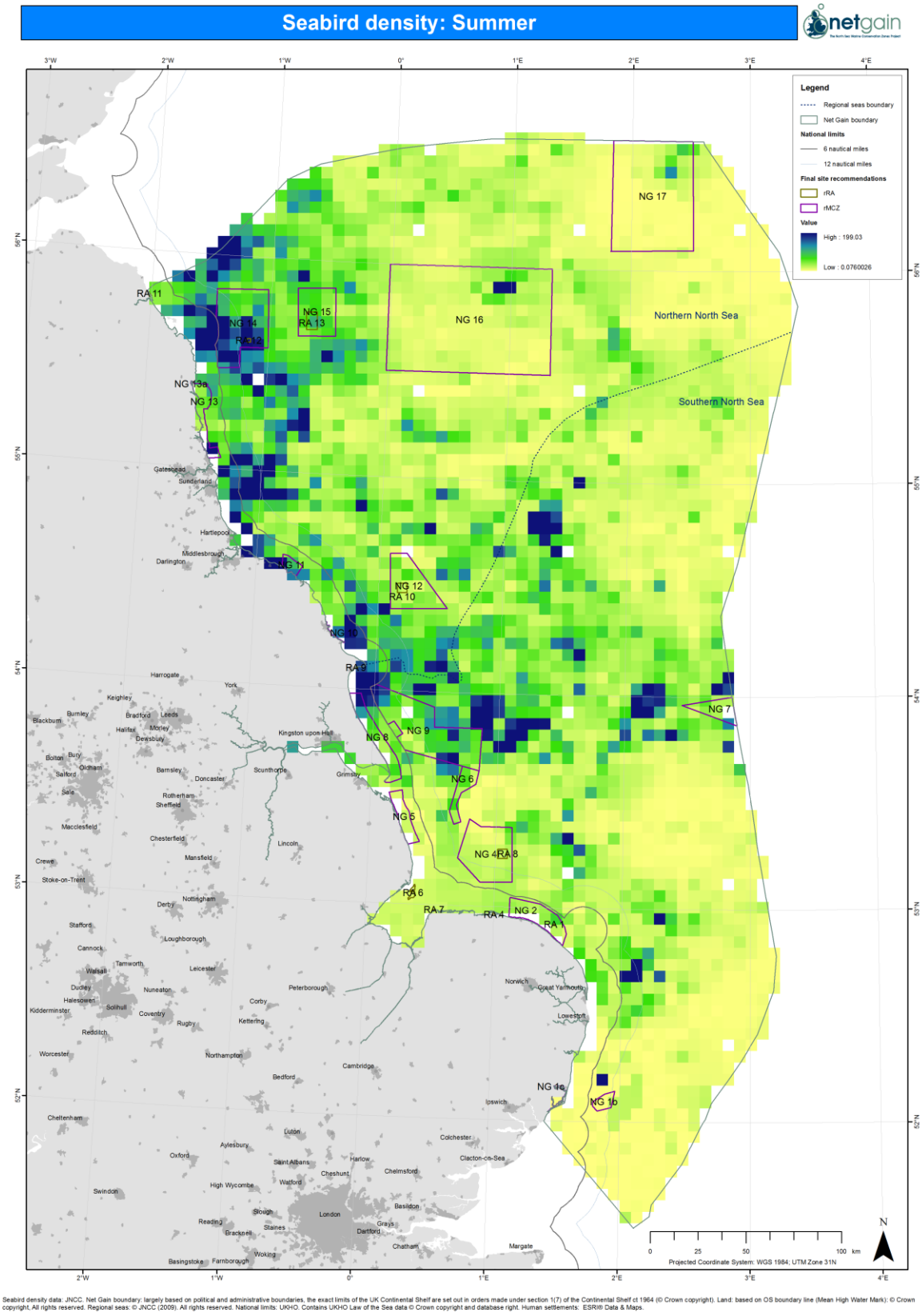


Figure 7.47 ESAS seabird density: summer

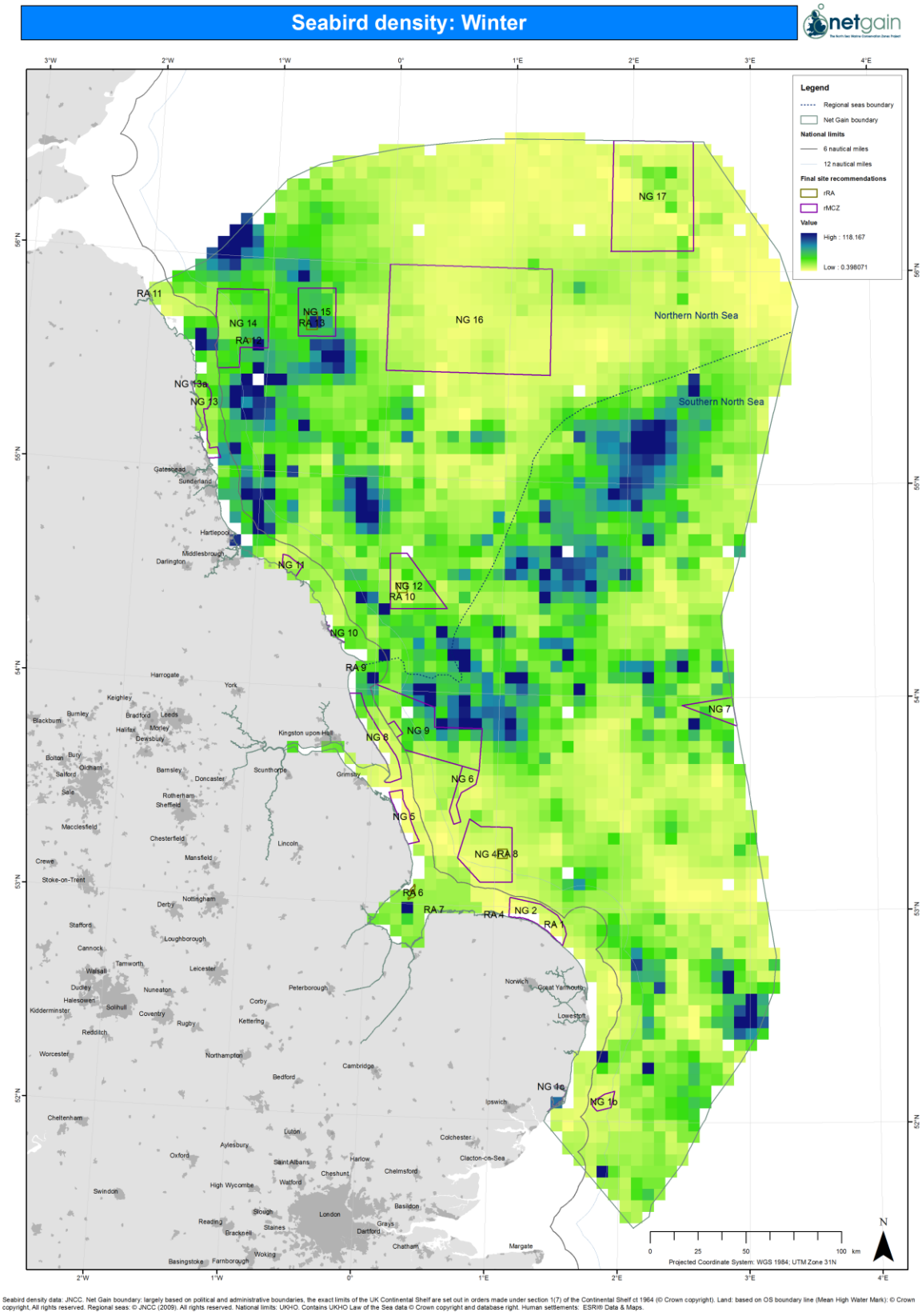
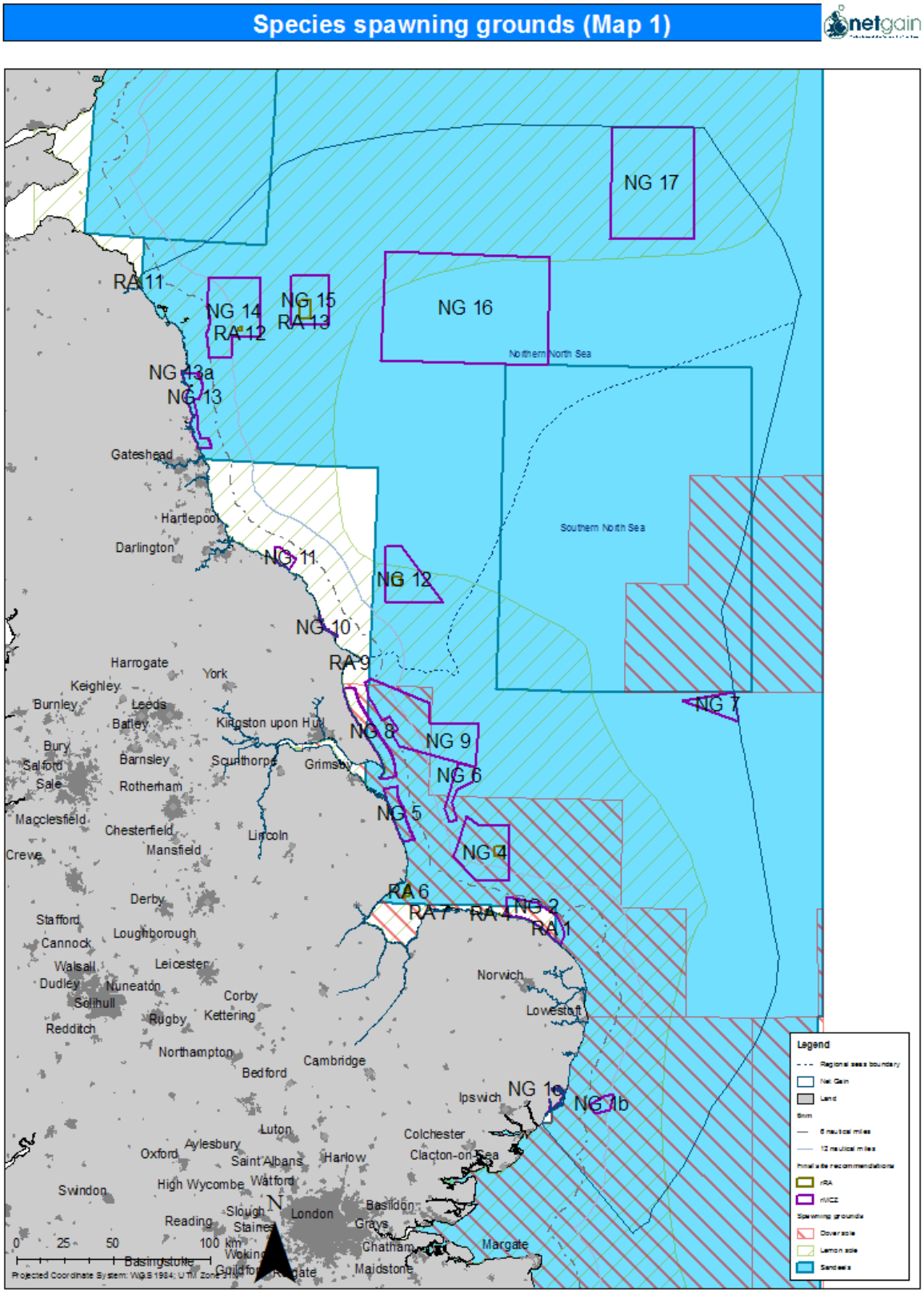
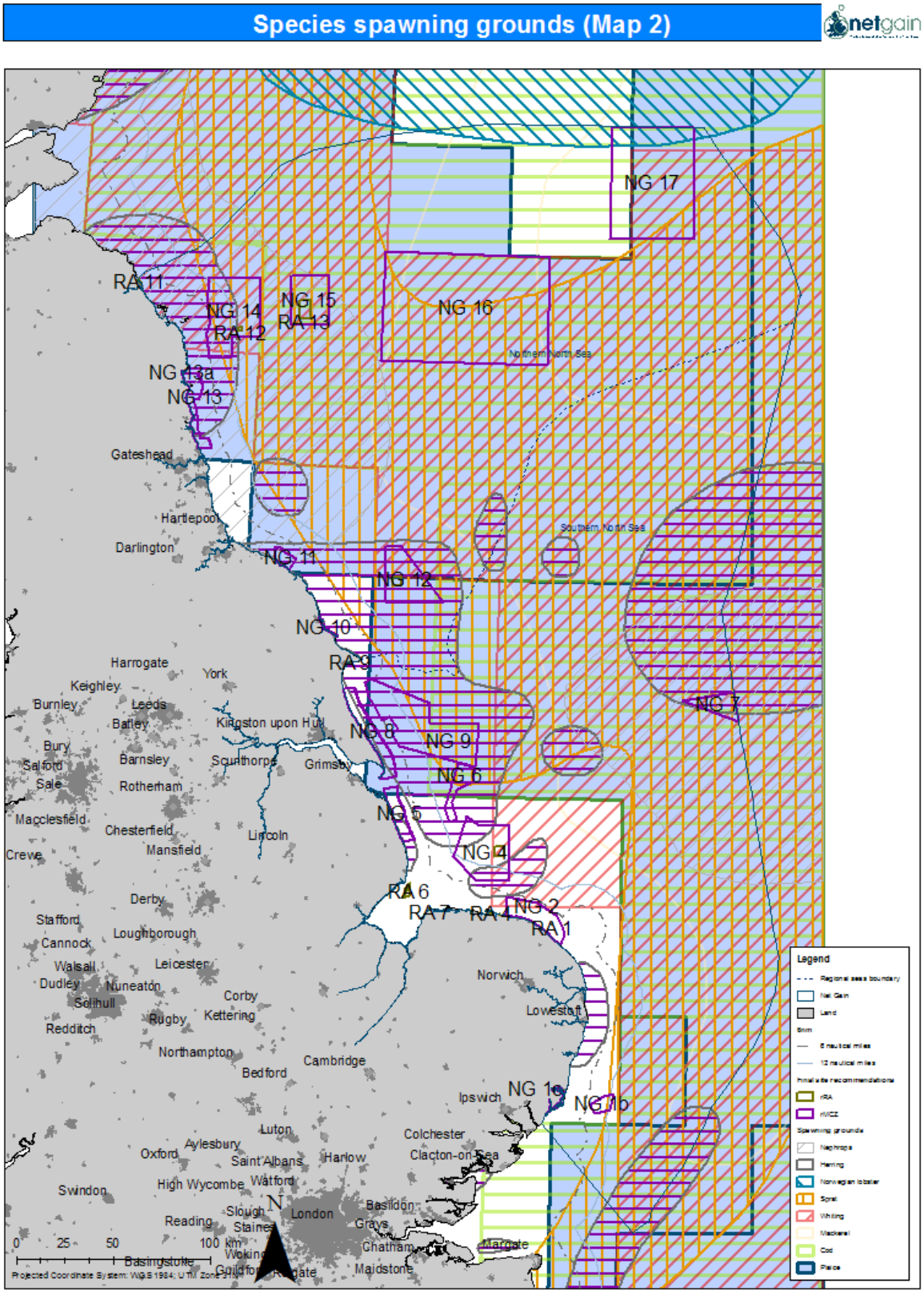


Figure 7.48 ESAS seabird density; winter



Spawning data: Defra contract ME5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas: © JNCC (2009). Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.49 Spawning grounds (map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas: © JNCC (2009). Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.50 Spawning grounds (map 2)

Site boundary

NG 6 was developed from the original sites NG 2.09 and NG 2.11 from the 2nd iteration. The northern boundary of NG 6 is aligned with the south eastern boundary of NG9 to protect as much of the Inner Silver Pit geological feature as possible, with the boundaries in places clipped tightly to the Inner Silver Pit feature. There was recommendation from the Regional Hub to extend the site to cover the entirety of the feature to ensure its protection, but given that the rest of the feature was already protected within NG9, and this site fell in another Hub, further discussions about this change were left, with the recommendation for the SNCBs to consider this as an option.

Conclusions from Hub discussions about the south/west boundary were to cut the current boundary to exclude the aggregate activities that were occurring within the site. The Hub did look at setting the boundary or a reference area to cover Ross worm (*Sabellaria spinulosa*) reefs within the area of aggregate activity, but the point was made that this feature is already protected in the Inner Dowsing, Race Bank and North Ridge SAC.

Conservation objectives

Table 7.39 Conservation objectives for site NG 6, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal sand to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — H — L

	Physical removal (extraction of substratum)	L-H	M
	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.40 Conservation objectives for site NG 6, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal mixed sediments to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures: **Pressure** / **Sensitivity** / **Confidence** Physical change (to another seabed type) / H / L Physical loss (to land or freshwater habitat) / H / L Physical removal (extraction of substratum) / H / L Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm / H / L

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.41 Conservation objectives for site NG 6, Ross worm (*Sabellaria spinulosa*) reefs[25]

Conservation Objective	
1 Maintain/ recover	Ross worm (*Sabellaria spinulosa*) reefs are on the UK List of Priority Species and Habitats (UK BAP) and OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, maintain the Ross worm (*Sabellaria spinulosa*) reefs in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Ross worm (*Sabellaria spinulosa*) reefs in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3	Ross worm (*Sabellaria spinulosa*) reefs is sensitive to the pressures: **Pressure** **Sensitivity** **Confidence**

[25] Feedback received from JNCC suggested that this feature is more sensitive to the pressures than the underlying broad-scale habitat on which it is locate and should have a conservation objective of "recover". Whilst Net Gain comments are duly noted, the position that was developed through discussion with the RSG (Ross worm (*Sabellaria spinulosa*) reefs set to maintain has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub meetings has therefore been maintained.

Pressures	Physical change (to another seabed type)	H	L
	Physical loss (to land or freshwater habitat)	H	L
	Physical removal (extraction of substratum)	H	L
	Removal of non-target species (lethal)	H	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	H	M
	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Siltation rate changes (high)	M	L
	Temperature changes - regional/national	M	L
	Emergence regime changes (sea level) - regional/national	L	L
	Salinity changes - local	L	L
	Surface abrasion: damage to seabed surface features	L	M
	Water flow (tidal current) changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.42 Conservation objectives for site NG 6, Subtidal sands and gravels

Conservation Objective	
1 Maintain/ recover	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the Subtidal sands and gravels to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sands and gravels in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sands and gravels is sensitive to the pressures listed below: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Surface abrasion: damage to seabed surface features — NS-H — M-H Physical change (to another seabed type) — M — H Physical removal (extraction of substratum) — M — H

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	M-H
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L-M
	Removal of target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	M-H
	Siltation rate changes (low)	NS-M	M-H
	Salinity changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.42a Conservation objectives for site NG 6, North Sea glacial tunnel valleys (Inner Silver Pit) geological feature

Conservation Objective	
1 Maintain/ recover	Inner Silver Pit is a glacial tunnel valley with sensitivities to pressures such as aggregate extraction and platform extraction construction. This geological feature is believed to be in good condition currently. Subject to natural change, maintain the North Sea glacial tunnel valleys (Inner Silver Pit) geological feature in favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**Geological/ Geomorphological** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the North Sea glacial tunnel valleys (Inner Silver Pit) geological feature in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	North Sea glacial tunnel valleys (Inner Silver Pit) geological feature is sensitive to the pressures: Guidance for the pressures that the feature is sensitive to have not been provided to the Net Gain regional project.

Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

The southern portion of NG 6 overlaps with the Inner Dowsing, Race Bank and North Ridge SAC, and the northern boundary of the site aligns with rMCZ NG 9.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.43 MPAs within or adjacent to NG 6

MPA Type	Site Name	Features Protected
SAC	Inner Dowsing, Race Bank and North Ridge	A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal biogenic reefs Ross worm (*Sabellaria spinulosa*) reefs Subtidal sands and gravels

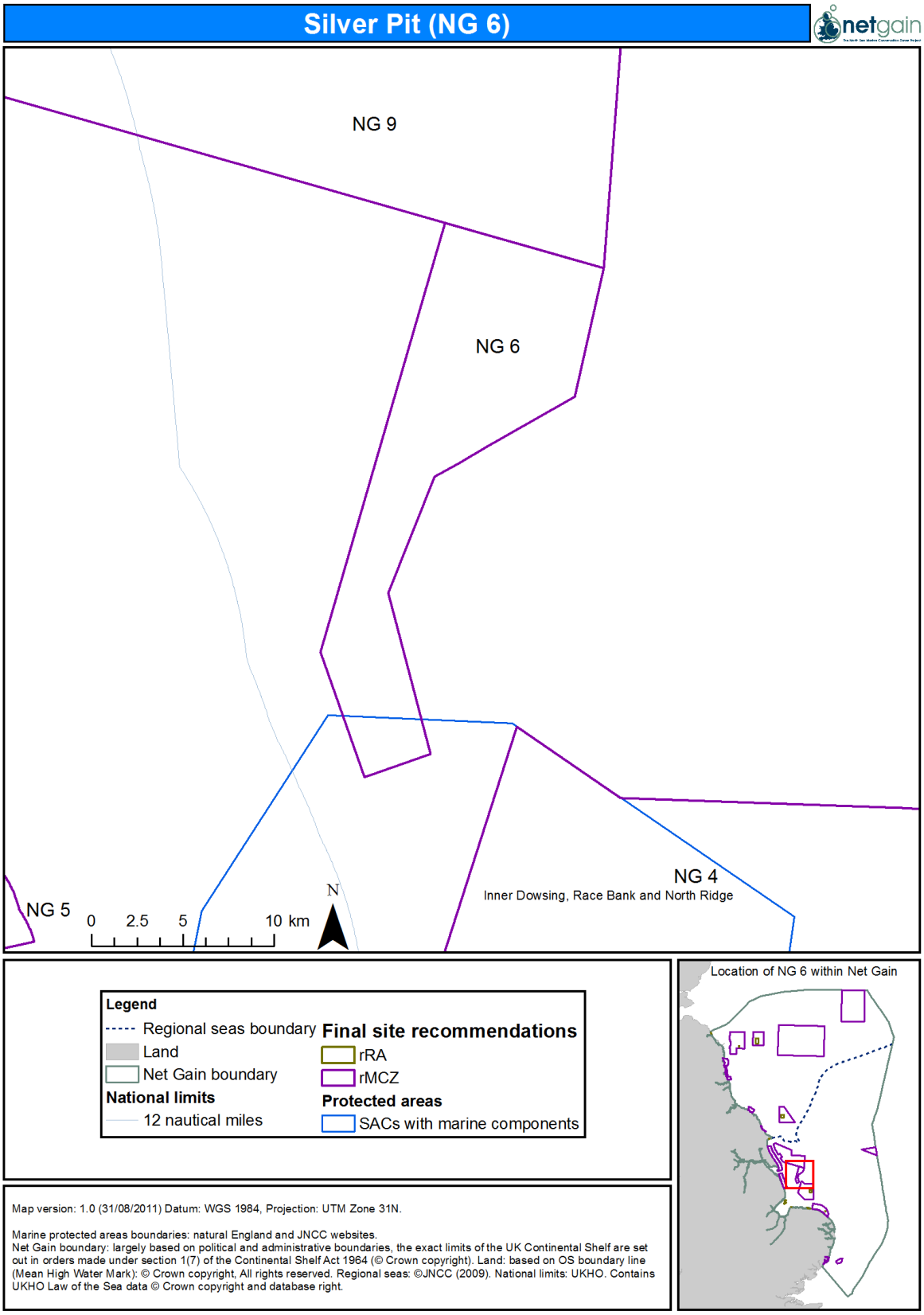


Figure 7.51 MPAs/rMCZs within or adjacent to NG6

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The consensus support for this site was good with one group 'supporting' the site ('3') whilst two other groups' consensus was for 'strong support' (i.e. a score of ' 4'). The site gained strong support and was viewed as being a 'different kind of site'; it was felt to be diverse and valuable and was the stand out feature of the network. The consensus support for the site was given from an ecological standpoint (fishing interests felt support for the site should be recorded as 'strongly against'). Notwithstanding this it was noted that the site is of high ecological importance, although consideration should perhaps be given to removing *Sabellaria* as one of the designated features – it is not representative and there are better areas for this feature within Net Gain already included within other MPAs.

Views on data quality ranged across all three classes ('L', 'M' and 'H') reflecting (respectively) the reliance on what was mostly modelled data; the fact that more surveys are required to support modelled data; and the increased information provided by the REC datasets.

Contention was generally felt likely to be high ('M', 'H' and 'H') although this reflected the potential impacts on one sector – commercial fishing. The site was felt likely to be contentious with the trawling sector (for which the site has a high socio-economic importance) in particular, although it was unlikely to be contentious with other sectors. There was no representative from the UK fishing fleet within one of the groups although a representative from the French fleet commented that whilst contention may be low for other sectors it would be high for commercial fishing.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- French commercial fishing sector:- Strongly against
- Marine Aggregates:- Against (but would move to support if buffer distances between rMCZ boundary and aggregate interests are confirmed as being sufficient to mitigate for indirect pressures)
- NFFO - commercial fishing:- Strongly against (important fishing area)
- RSPB:- Strongly support (one of the most ecologically diverse sites in the network)
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation –concern however over recent NE/JNCC guidance on size of buffers required to avoid additional mitigation requirements on licensed aggregate sites
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.44 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Broad-scale habitat	Survey	Tappin, et al. 2011
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Ocean quahog (Artica islandica)	Combination of historical and recent records	Seeley, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Ross worm (*Sabellaria spinulosa*) reefs	Survey	Tappin, et al. 2011
Ross worm (*Sabellaria spinulosa*) occurrences	Survey: records	Tappin, et al. 2011
Spawning grounds	Modelled data	Ellis, et al. 2010
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

BIODIVERSITY REPORTING AND INFORMATION GROUP (BRIG), 2007, *Report on the Species and Habitat Review, to the UK Standing Committee*, available from: http://jncc.defra.gov.uk/PDF/UKBAP_Species+HabitatsReview-2007.pdf, (accessed on 18/08/11).

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

DONOVAN , D.T., 1972. *The geology and origin of the silver pit and other closed basins in the north sea*. Proceedings of the Yorkshire Geological and Polytechnic Society, 39, 267–293.

ELLIS, J.R., MILLIGAB, S., READDY, L., SOUTH, A., TAYOR, N. and BROWN, M. 2010. *Mapping the spawning and nursery grounds of selected fish for spatial planning*. Report to the Department of Environment, Food and Rural Affairs from Cefas. Defra Contract No. MB5301.

EVANS, P.G.H., ANDERWALD, P. and BAINES, M.E.,2003. *UK Cetacean Status Review*. Report to English Nature & Countryside Council for Wales, Oxford

FIELDING, H., 2011, *The Humber Regional Environmental Characterisation*. British Geological Survey Open Report OR/10/54.

IRVING, R., 2009. *The identification of the main characteristics of stony reef habitats under the habitats directive*. Summary report of an inter-agency workshop, JNCC, no. 432.

JNCC, 2011. *Ciralittoral mixed sediments biotope*, available from: http://www.jncc.gov.uk/marine/biotopes/biotope.aspx?biotope=JNCCMNCR00000323, (accessed on 18/08/11).

JNCC, 2011b. *Sabellaria spinulosa* on stable ciralittoral mixed sediments biotope, available from: http://www.jncc.gov.uk/marine/biotopes/biotope.aspx?biotope=JNCCMNCR00001112 (accessed on 18/08/11).

JNCC AND NATURAL ENGLAND, 2010. *Marine conservation zone projects: identifying marine conservation zones, a quick reference guide*.

JONES, L.A., COYLE, M.D., EVANS, D., GILLILAND, P.M., & MURRAY, A.R., 2004. *Southern North Sea Marine Natural Area Profile: A contribution to regional planning and management of the seas around England*. Peterborough: English Nature.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

OSPAR, 2000, Quality *Status Report for the entire OSPAR maritime area*, published by OSPAR available from: http://www.ospar.org/eng/doc/pdfs/qec2.pdf , (accessed on 18/08/11).

POHLER, S.M.L., 2004. *The Sabellariid worm colonies of Suva Lagoon, Fiji*. The South Pacific Journal of Natural Science*,* 22, 36–42.

PRAEG, D., 2003. *Seismic imaging of mid–Pleistocene tunnel–valleys in the North Sea Basin—high resolution from low frequencies.* Journal of Applied Geophysics, 53, 273–298

RSPB, 2010. *Species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby.

SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P., ADAMS, L. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 14: Task 2B - Mapping of species with limited mobility (Benthic Species). ABP Marine Environmental Research Ltd.

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ, D., D, GREEN, M., GALLYOT, J., GEOGIOU, L., BRUTTO, D., MARZIALETTI, S., HOPLA, E., RAMSAY, E., and WINGFIELD, R.T.R., 1990, *The origin of major incisions within the Pleistocene deposits of the North Sea.* Marine Geology, 91, 31–52.

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ DOCE, D., GREEN, M., GALLYOT, J., GEORGIOU, L., BRUTTO, D., MARZIALETTI, S., HOPLA, E., RAMSAY, E., FIELDING, H. 2011. *The Humber Regional Environmental Characterisation*. British Geological Survey Open Report OR/10/54. 357pp. MALSF, Crown copyright.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

UKSEAMAP, 2010. *Interactive Map*, available from at: http://jncc.defra.gov.uk/page-5534&LAYERS=PredictedHabitats,UKCS ,(accessed on 18/08/11).

7.7 Marine Conservation Zone: NG 7, Markham's Triangle

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 7, Markham's Triangle

Site centre location

53° 56' 32''N, 2° 44' 06''E
53.94245°, 2.735097°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

200.13km² / 20,012.86ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

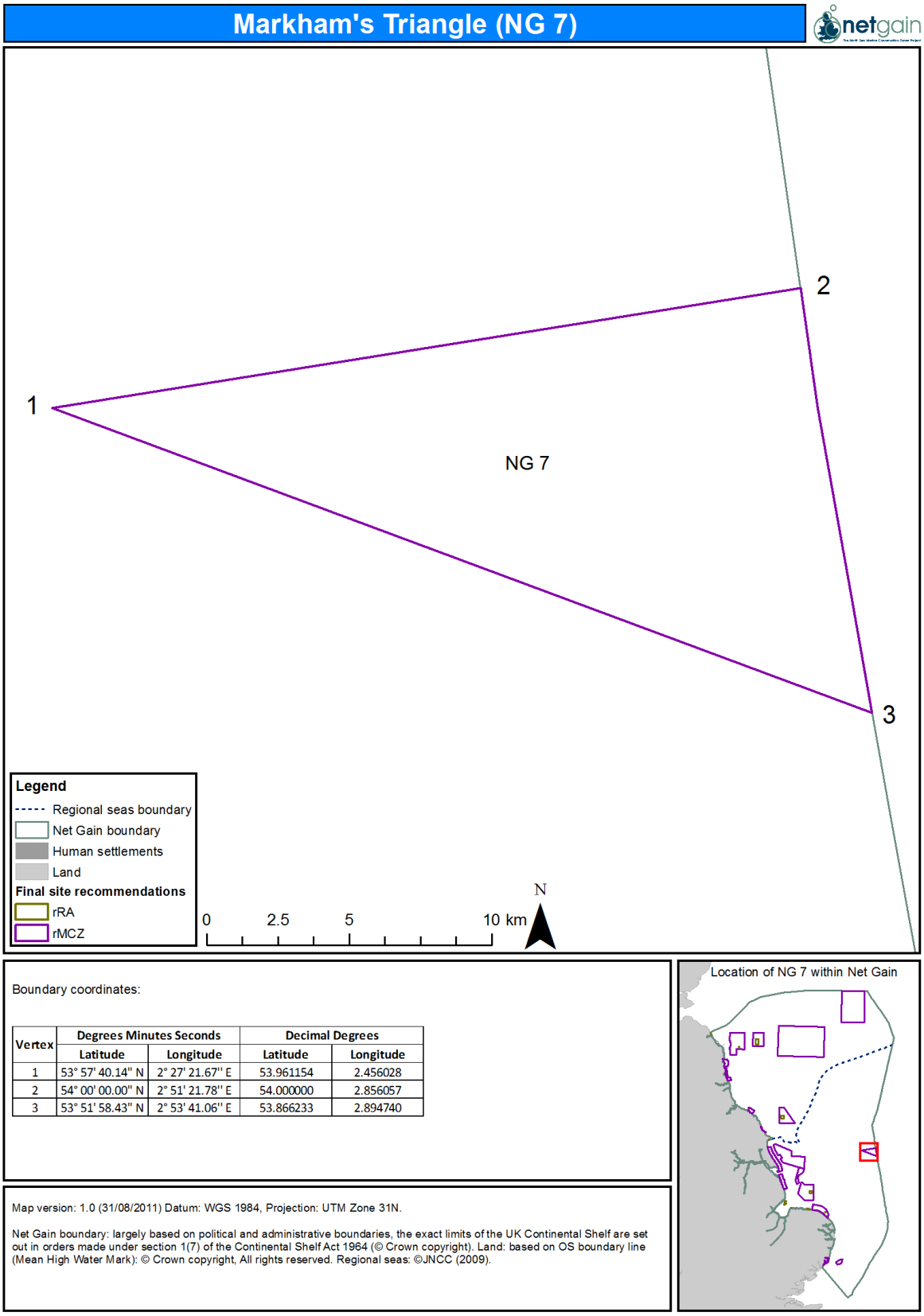
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.45 Features proposed for designation within NG 7, Markham's Triangle

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.1: Subtidal coarse sediment	167.73km²
Broad-scale habitat	A5.2: Subtidal sand	30.76km²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a
Other feature	n/a	n/a

Table 7.46 Features within NG 7, Markham's Triangle not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	Because this site had developed from an earlier site in the 2nd iteration which was subsequently moved to this current location, stakeholders only carried over a restricted list of features for designation. This feature was not present in the original site and so was not considered for designation in this replacement site.
Broad-scale habitat	A5.4: Subtidal mixed sediment	Because this site had developed from an earlier site in the 2nd iteration which was subsequently moved to this current location, stakeholders only carried over a restricted list of features for designation. This feature was not present in the original site and so was not considered for designation in this replacement site.
Habitat of conservation importance	Subtidal sands and gravels (modelled)	Targets have been adequately met within other sites.
Species of conservation importance	European eel (*Anguilla anguilla*)	Unsure about the exact location of this species, and its importance to the site.
Geological feature	n/a	n/a



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 57' 40.14" N	2° 27' 21.67" E	53.961154	2.456028
2	54° 00' 00.00" N	2° 51' 21.78" E	54.000000	2.856057
3	53° 51' 58.43" N	2° 53' 41.06" E	53.866233	2.894740

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: ©JNCC (2009).

Figure 7.52 Location and extent of site NG 7 (Markham's Triangle)

Site summary

The location of NG 7 is 137km from the Humberside coastline in the East of England, with depth ranges between 30-50m deep (Figure 7.56). The seabed is composed of two broad-scale habitats that are put forward for recommendation, subtidal coarse sediment and subtidal sand; other features present include very small areas of rock, mixed sediments and larger areas of subtidal sands and gravels. The site lies adjacent to the Cleaverbank SAC which is put forward for the protection of harbour porpoise, grey seal and harbour seal and it is very likely that these species will be present within NG 7 given the similarities of coarse sediment habitats. To the north of the site lies the Outer Silver Pit which supports communities of crustaceans, marine mammals, fish, algae and other species.

Detailed site description

Site NG7 (Markhams Triangle) is being recommended for MCZ status based upon the presence of two broad scale habitat types; subtidal coarse sediment and subtidal sand. The recommended site encompasses a total surface area of 200.13km^2 of which subtidal coarse sediment represents 83.65% (167.73km^2), and subtidal sand represents 15.38% (30.76km^2). Bathymetry indicates that this site is relatively shallow.

Although relatively little is known directly about the flora and fauna of NG 7, it shares boundaries with two very important sites in the North Sea, the cSAC Cleaver Bank and the Outer Silver Pit North Sea Glacial Tunnel valley, and NG7 provides excellent connectivity between the two. The Outer Silver Pit provides some of the richest fishing grounds in the North Sea because of the productivity associated with the geological feature and water depths exceeding 80m (Jones, et al. 2004). The Outer Silver Pit area can act as refuge for crab and lobster from the colder shallower waters of the North Sea during cold winters (Rogers & Stocks, 2001).

The site sits directly adjacent to the Western boundary of the cSAC Cleaver Bank, which contains some of the highest macrobenthos diversity in the Dutch EEZ with 44% of the species being endemic to this area (Noordzee Natura 2000, 2011). The Habitat Directive species harbour porpoise (*Phocoena phocoena*), grey seal (*Halichoerus grypus*), and harbour seal (*Phoca vitulina*) (Noordzee Natura 2000, 2011) are present. The harbour porpoise, is one of the most commonly distributed cetaceans found in European waters (Reid et al., 2003), which feed primarily upon gadoid fish and sandeels; this can bring them in to contact with fishing nets (Santos & Pierce, 2003) especially in areas such as the Outer Silver Pit. Harbour seals and grey seals spend approximately 80% of their time at sea undertaking activities such as foraging, mating, and travelling (Deerenberg, et al. 2010). Shallow sandy sediments (Subtidal sand) are an ideal habitat for sandeels (a species of conservation importance) which form an important diet constituent for marine mammals (particularly seals) such as those protected within the Cleaver bank feature, and also form an important food source for sea birds (JNCC, 2011).

Subtidal coarse sediments and subtidal sands are the two most common subtidal habitats around the United Kingdom (Maddock, 2008). The flora and fauna associated with these habitats is dependent upon the level of local environmental stress. Areas of strong tidal action have little flora so the resident species tend to be burrowers such as polychaetes, bivalves, and amphipods (Maddock, 2008). This abundance of burrowing species makes ideal prey for mobile predators such as crabs, seals, and dolphins.

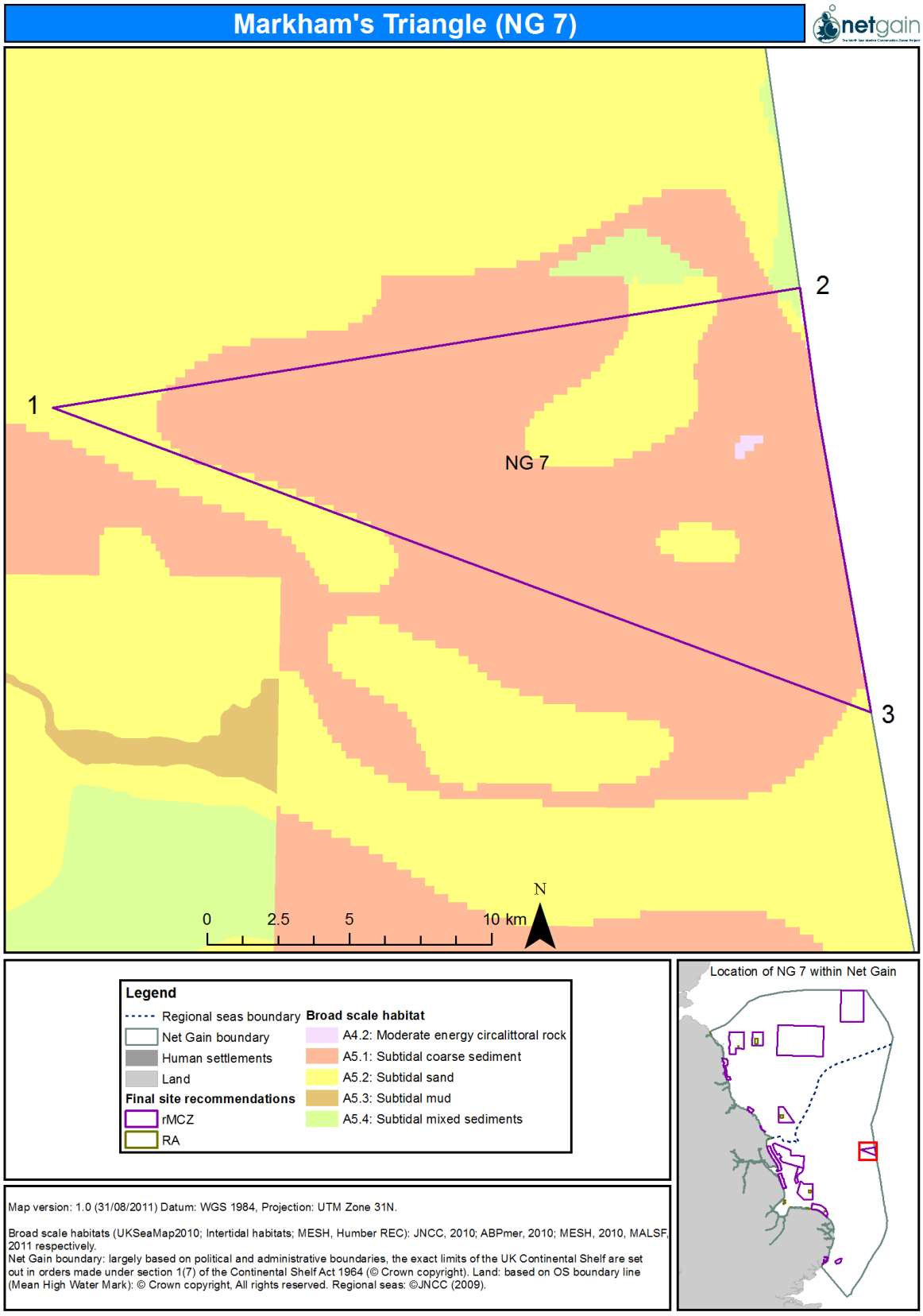


Figure 7.53 Broad-scale habitat present within NG 7

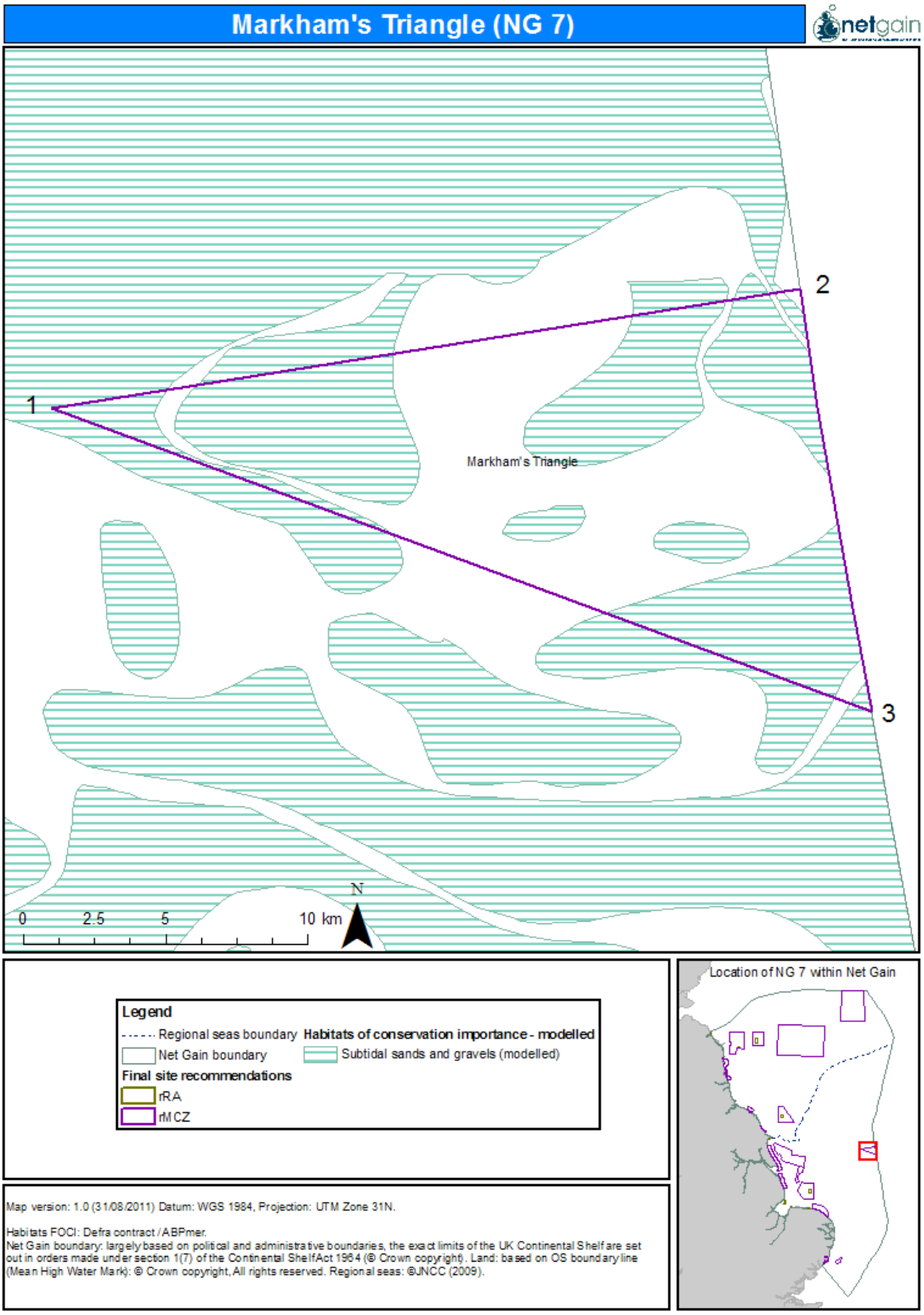


Figure 7.54 FOCI habitat present within NG 7

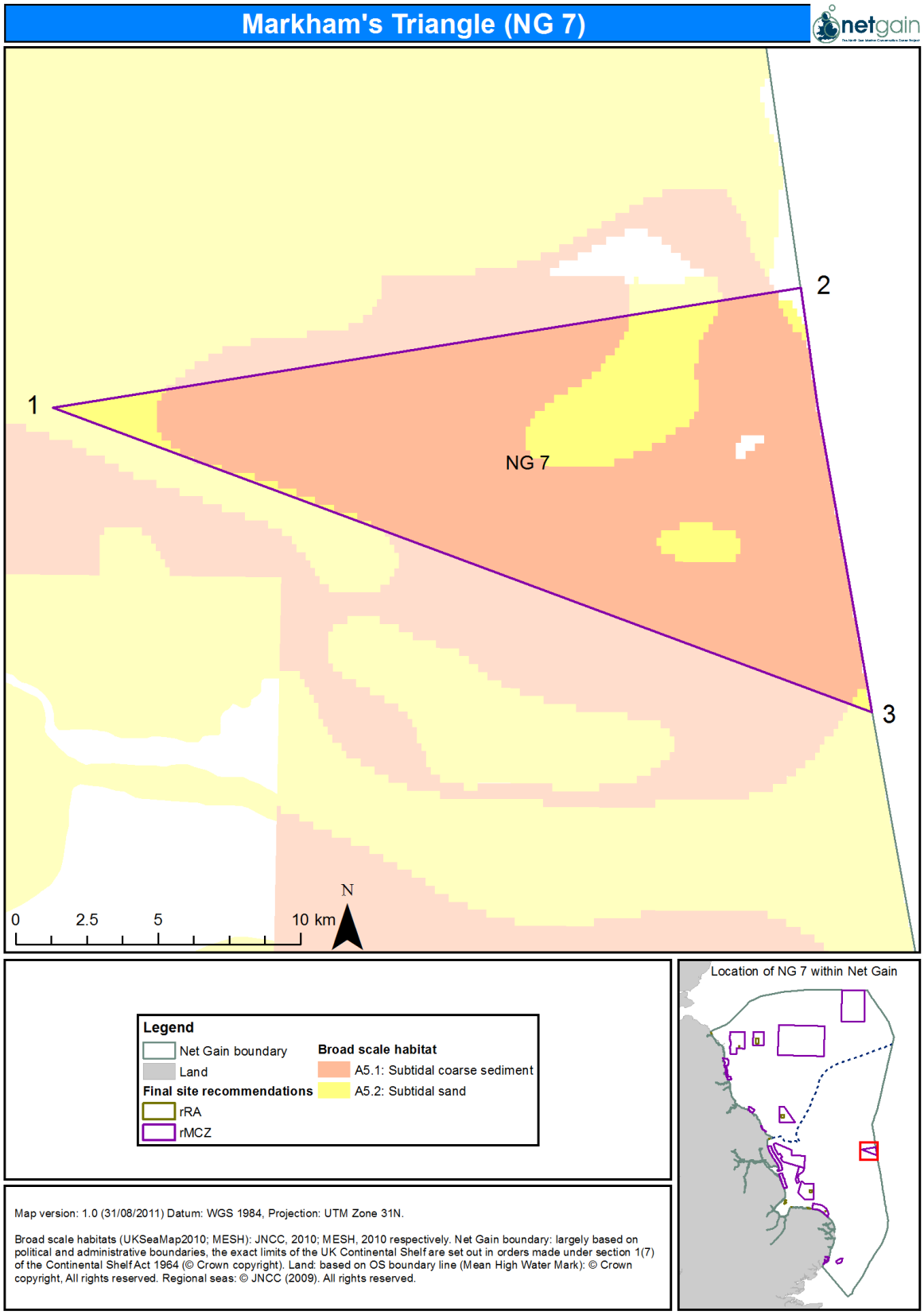


Figure 7.55 Features put forward for recommendation in NG 7

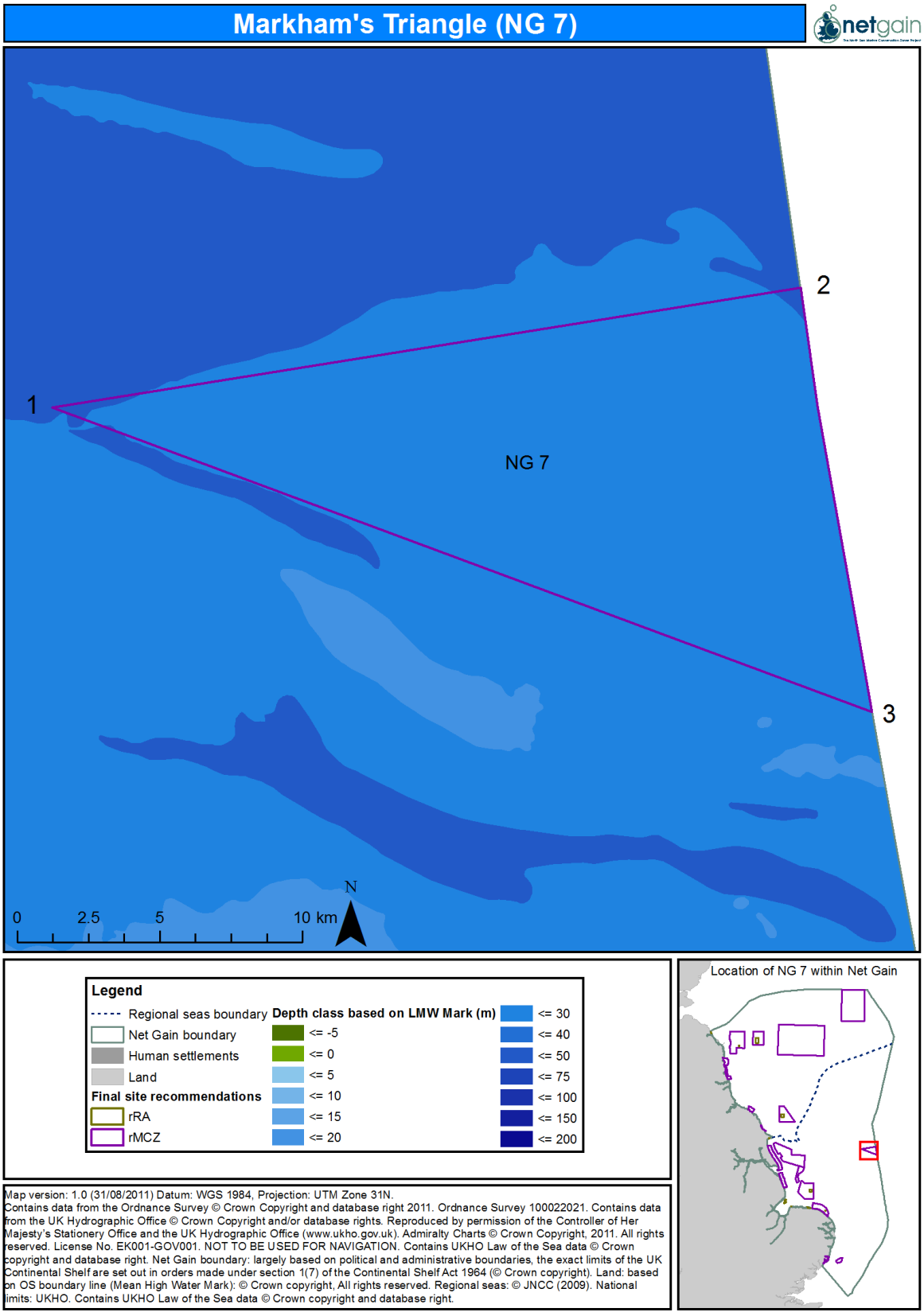


Figure 7.56 Bathymetry of NG 7

Site boundary

The development of the boundary was from the original site, NG2.11 which was much larger. There were specific objections from the commercial fishing sector to move forward with this proposed boundary, this was taken into account by the group and the site was moved and reduced in size by 50% to limit potential impacts whilst retaining its conservation benefits. The coverage of the broad-scale habitat A5.1: Subtidal coarse sediment was retained to ensure adequacy and connectivity were maintained. Following the SAP advice the decision was made in the April Hub to clip the northern boundary on the edge of the Outer Silver Pit to make the site a triangle shape.

Conservation objectives

Table 7.47 Conservation objectives for site NG 7, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal coarse sediment to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — L-H — L Surface abrasion: damage to seabed surface features — NS-H — L

	Physical change (to another seabed type)	M	L
	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.48 Conservation objectives for site NG 7, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal sand to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — H — L Physical removal (extraction of substratum) — L-H — M

	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within ENG requirement section.

This site lies adjacent to the Cleaver Bank candidate SAC.

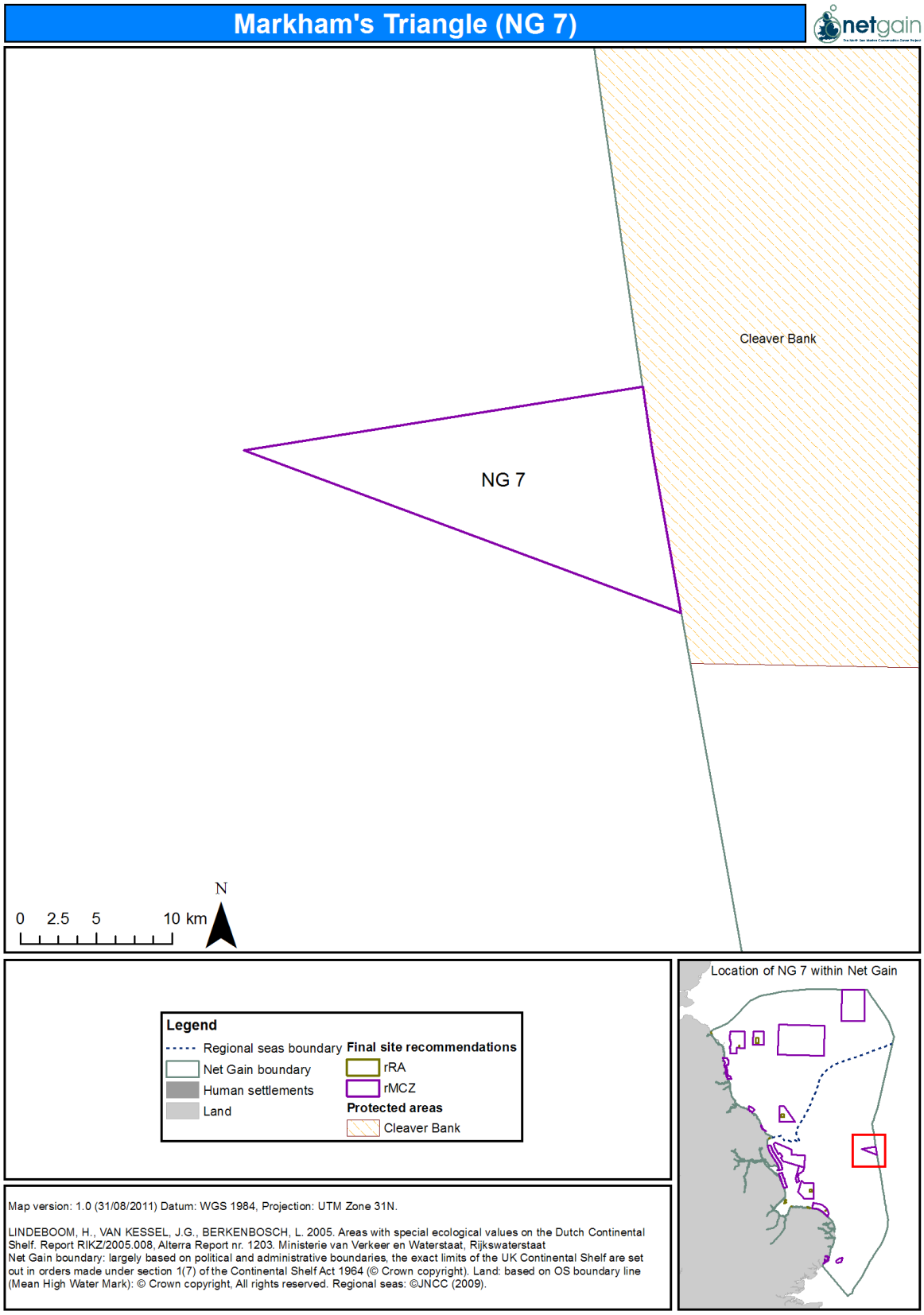


Figure 7.57 MPAs/rMCZs within or adjacent to NG 7

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The consensus view for site NG7 was one of support (one group scoring it 2-3, the other 3-4). In general the groups were happy with this site. It was suggested that the consensus view on support would be higher if the features' Conservation Objectives were set to maintain. It was noted that management measures for the site should be developed in line with those of the (adjacent) Cleaver Bank area, which is currently in the Natura process.

The quality of underlying data was felt to be moderate.

Potential contention at the site was thought likely to be generally high (one 'H' and one 'M-H') with concerns relating to fishing activities in the area being cited as the underlying reason for this. The site would be likely to be contentious mainly for beam/otter trawling but detail would inevitably depend on the management measures that are proposed and implemented. Due to the proximity to the Outer Silver Pit, in the 3rd iteration boundaries were clipped to the edge of that feature to reduce socioeconomic impact.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- French commercial fishing sector:- Strongly against
- Dutch commercial fishing sector:- Strongly against
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation

The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.49 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
European eel	Combination of historical and recent records	Ellis, et al. 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Additional MPA site: Cleaver Bank	Coordinates	Lindeboom, et al. 2005
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal sands and gravels	Modelled data	Tyler-Walters, 2009

References

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

DEERENBERG, C., TEAL, L.R., BEARE, D. & VAN DER WAL, J.T. 2010. *FIMPAS project – Pre-assessment of the impact of fisheries on the conservation objectives of Dutch marine protected area*. Institute for Marine Resources & Ecosystem Studies

ELLIS, J.R., READDY, L., SOUTH, A. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 15: Task 2B - Distribution of highly mobile species.* ABP Marine Environmental Research Ltd.

JNCC (2011). *Habitat account – Marine, coastal and halophytic habitats: 1110 Sandbanks which are slightly covered by seawater all of the time*. < http://jncc.defra.gov.uk/ProtectedSites/SAC selection/habitat.asp?FeatureIntCode=H1110 > Accessed 07/08/11.

JONES, L.A., COYLE, M.D., EVANS, D., GILLILAND, P.M. & MURRAY, A.R. 2004. *Southern North Sea Marine Natural Area Profile: A contribution to regional planning and management of the seas around England.* Peterborough: English Nature.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

LINDEBOOM, H., VAN KESSEL, J.G., BERKENBOSCH, L. 2005. *Areas with special ecological values on the Dutch Continental Shelf.* Report RIKZ/2005.008, Alterra Report nr. 1203. Ministerie van Verkeer en Waterstaat, Rijkswaterstaat.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

REID, J.B., EVANS, P.G.H. & NORTHRDIGE, S.P. 2003. *Atlas of cetacean distribution in north-west European waters.*

ROGERS, S. & STOCKS, R. (2001). *North Sea Fish and Fisheries*. CEFAS

SANTOS, M.B. & PIERCE, G.J. (2003). The diet of Harbour Porpoise (*Phocena phocena*) in the North-east Atlantic. *Oceanography and Marine Biology: an American Review* **41**: 355-390.

THE WILDLIFE TRUSTS, 2010. *Areas of additional pelagic ecological importance (APEI) data layer.*

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.8 Marine Conservation Zone: NG 8, Holderness Inshore

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. The ecological description has been updated to reflect RSPB feedback to the IA. No changes have been made to recommendations or boundaries.

Site name

NG 8, Holderness Inshore

Site centre location

53° 46’ 28’’N, 0° 02’ 01’’E
53.77481°, 0.033689°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

307.14km² / 30,714.49ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

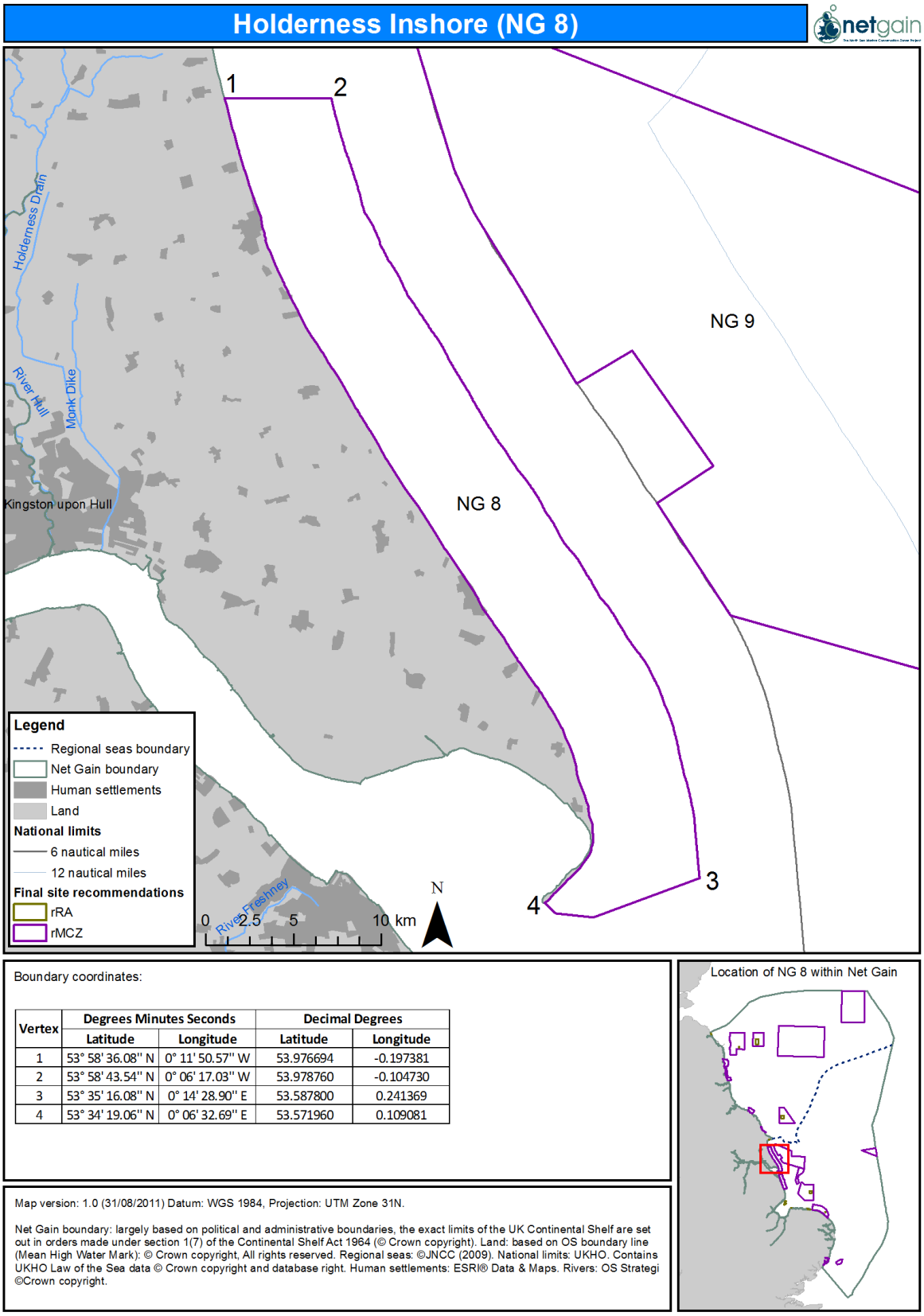
Table 7.50 Features proposed for designation within NG 8, Holderness Inshore

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A2.4: Intertidal mixed sediments	1.66km²
Broad-scale habitat	A5.1: Subtidal coarse sediment	217.54km²
Broad-scale habitat	A5.2: Subtidal sand	19.04km²
Habitat of conservation importance	Peat and clay exposures	1 point
Habitat of conservation importance	Subtidal chalk, Subtidal chalk (modelled)	1 point 182.40km²
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	101 points 98.43km²
Habitat of conservation importance	Ross worm (*Sabellaria spinulosa*) reefs	4 points
Species of conservation importance	n/a	n/a
Geological feature	Spurn head	16.11km²
Other feature	n/a	n/a

Table 7.51 Features within NG 8, Holderness Inshore not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	Very small amount of feature present within the site 0.54km², and adequacy targets met in other sites[26]
Broad-scale habitat	A5.4: Subtidal mixed sediment	This feature is new to the site as a result of updated REC data that was received following the finalisation of features for designation, there 68.4km² present within the site[26]
Habitat of conservation importance	Littoral chalk communities (modelled)	3.6km line, feature not put forward for recommendation because of uncertainty of presence within the site
Species of conservation importance	European eel (*Anguilla anguilla*)	The feature has not been put forward for recommendation because it is highly mobile species and is more appropriately protected elsewhere in areas such as estuaries

[26] Discussions held during the July, 2011 LGM suggested that this feature could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations this feature has not been put forward for designation and has not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 58' 36.08" N	0° 11' 50.57" W	53.976694	-0.197381
2	53° 58' 43.54" N	0° 06' 17.03" W	53.978760	-0.104730
3	53° 35' 16.08" N	0° 14' 28.90" E	53.587800	0.241369
4	53° 34' 19.06" N	0° 06' 32.69" E	53.571960	0.109081

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: ©JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps. Rivers: OS Strategi ©Crown copyright.

Figure 7.58 Location and extent of site NG8 (Holderness Inshore)

Site summary

NG 8 is located north of the Humber Estuary mouth in Humberside in the North East of England, the most southern portion of the site includes The Binks and Spurn Head geological feature. The depths of the site range between 10m above mean low water mark and 15m deep (Figure 7.63), with the seabed mostly composed of sediment habitats and subtidal chalk. Previous surveys within the site also indicate that there are a number of cobble/stony habitats present (Irving, 2009). The seabed habitats in NG 8 support a diverse and dense coverage of epibiotic hydroid/bryozoan turf, sponges and other encrusting fauna (University of Hull, 2008), biogenic reefs (that include *Sabellaria spinulosa*) (Maddock, 2008), benthic, demersal and juvenile fish species, a small number of elasmobranch species as well as commercially significant crustaceans (Allen, 2008). The seaward side of NG 8 and the northern portion of the site are important for foraging bird species such as kittiwakes, guillemots, razor bills and puffins. The Spurn Head geological feature is hugely important for migrant birds, being one of the top destinations within England. The northern end of Spurn Head is critical for breeding little terns, which are rare and very vulnerable and only have a limited foraging range (<5km) from their nesting sites. The site encompasses an Inshore Fisheries and Conservation Authority no trawl zone and would be likely to provide a good example of low impacted seabed (The Wildlife Trusts, RSPB and Seasearch, 2010).

Detailed site description

NG8 is being recommended due to the presence of broad-scale habitat types A2.4: Intertidal mixed sediments, A5.1: Subtidal sand, A5.2: subtidal coarse sediment. These support several habitats of conservation importance: subtidal chalk, subtidal sands and gravels, peat and clay exposures and Ross Worm (*Sabellaria spinulosa*) reefs. Other habitats that are present but not put forward for protection include A2.2: Intertidal sand and muddy sand, A5.4: Subtidal mixed sediments, littoral chalk communities and European eel. The area is also recommended for the geological feature of interest, Spurn Head (GCR, 2003).

NG8 is located on the Holderness coast, with the northern boundary at Skipsea, and the southern boundary at Spurn Head. The site extends offshore to the 3nm limit and incorporates The Binks geological feature at the mouth of the Humber Estuary. Wave energy at the sea bed is high, while current energy at the sea bed is moderate (UKSeaMap, 2010). The dynamics of the system denote erosion of the cliffs and of the seabed resulting in vast amounts of sediment finding its way into the sea; approximately 1 million m^3 per year of sediments result from cliff erosion and 2 million m^3 from the erosion of the seabed up to 2km offshore. All this material, primarily consisting of muds is transported south by the wave driven currents. This material is suspended and the majority passes into the Humber Estuary where it forms mudflats - an EC Habitats Directive Annex 1 habitat. The sediment is also important in providing protection from flooding to much of the area fronting the estuary (IECS, 1994).

In general the inshore area extends to approximately 10-12m depth which is consistent with the data layer provided by UKHO suggesting the site is up to 15m deep (Figure 7.63), passing into a gentle slope seaward; depths are rarely greater than about 15m in the south and up to 45m in the north, both the shore and the gentle slope offshore are incised into glacial till. At Spurn the near shore area is reduced down to approximately 6m depth, due to the accumulation of sands at its base (Evans, et al. 1998).

The underlying bedrock of the area is chalk covered by extensive deposits of glacial till (Evans, et al. 1998), with small amounts of exposed subtidal chalk to the north of Hornsea. More subtidal deposits of chalk combined with exposed peat and clay occur near Withernsea. Subtidal sands are prevalent from Kilnsea south to Spurn Head. Evidently, intertidal sands dominate the near shore zone, with the greater part of NG8 containing subtidal course sediments. Spurn Head, already forming part of the Humber Estuary European Marine Site (Special Area of Conservation and Special Protection Area) is a unique example of a dynamic spit system as it extends well across the mouth of

a macrotidal estuary; few similar features are able to maintain comparable size and length in a setting with such a large tidal range. Due to its unusually long recorded history it is used for comparative studies with other long term data sets for example in Dungeness (GCR, 2003). The Spurn Head geological feature also contains 'The Binks' an area of terminal moraine which traps sediment reducing erosion to the Spurn Head feature.

Additional data received by Net Gain for the Humber Regional Environmental Characterisation project identified habitats to a EUNIS level 4. Two habitats fell within NG 8, A5.25: Circalittoral fine sand and A5.44: Circalittoral mixed sediments (Figure 7.62). Previous surveys in this area have shown a number of different cobble/stoney habitats (Irving, 2009) throughout NG8 often with a diverse and sometimes dense coverage of hydroid/bryozoan turf with a variety of sponges and other encrusting fauna (Allen, 2008). Typical taxa include a variety of hydroids such as *Nemertesia* sp., *Sertularia* sp., *Halecium* sp., *Hydrallmania falcata* and *Kirchenpaueria pinnata*, colonial bryozoans *Flustra foliacea* and soft corals such as *Alcyonium digitatum* or sponges such as *Suberites* sp. or *Halichondria* sp (Allen, 2008; Allen, 2008b; Allen, 2008c; Allen, 2000). Biotopes include:

- CR.HCR.XFa.FluHocu - bryozoan (*Flustra foliacea*) and sponge (*Haliclona oculata*) with rich faunal turf on tide swept mixed substrata;
- CR.HCR.XFA.SpNemAdia - Sparse sponge, hydroid (*Nemertesia* spp.) and sea chervil (*Alcyonidium diaphanum*) on mixed substrata;
- SS.SMx.CMx.FluHyd - bryozoan (*Flustra foliacea*) and hydroid (*Hydrallmania falcata*) on tide swept mixed sediment (Allen, 2008).

Several areas contain dense quantities of filamentous red algae (Allen, 2008). It is also notable that commercially significant crustaceans; lobster (*Homarus gammarus),* edible crab (*Cancer pagurus)* and velvet swimming crab (*Necora puber)* are very abundant over much of the area and these species comprise a nationally important shellfishery.

Several fish species have been recorded within NG8. Sandy areas are characterised by fish species including sandeels (*Hyeroplus* spp.) (Colclough, 2010), dab (*Limanda limanda),* gobies (Gobiidae), and pipefish (*Syngnathus spp*.) (Allen, 2008). Mixed sediment and cobble reef areas support gadoids such as whiting (*Merlangius merlangus)*, poor cod (*Trisopterus minutus)*, saithe (*Pollachius virens)* and pouting (*Trisopterus luscus)*, which can occur in high numbers. High numbers of small or juvenile gadoid fish species including codling are also present, particularly in areas with red algae (Allen, 2008). A variety of other small demersal fish species such as dragonets (Callionymidae), gobies (Gobiidae) and wrasse (Labridae) have been identified in this area along with small numbers of elasmobranch species (Allen, 2008). The adjacent Humber estuary is recognised as an important nursery area for several fish species (Figure 7.64; Figure 7.65). As such NG8 may be used as a migratory path in progression of life stages in young gadoids and may account for numbers of codling in this area.

NG8 also contains several areas of the biogenic reef building polychaete Ross worm *(Sabellaria spinulosa)* and Honeycomb worm *(Sabellaria alveolata),* the reefs of which are listed under Annex 1 of the EC Habitats Directive and as such are included in the UK Biodiversity Action Plans (BAPs) priority habitats (Maddock, 2008). Ross worm (*Sabellaria spinulosa*) has a wide distribution over the area, forming reefs at East Newton and Easington, although most commonly it occurs in low lying encrusting form (Allen *et al.*, 2006). Densities can be extremely high; with several areas attaining >3000 individuals per 0.01m^2 though generally <600 per 0.01m^2 (Allen, 2008); numbers in the Spurn section range between 1 to 32 individuals per 0.1m^2 (Allen et al., 2006). *S. alveolata* is predominantly an intertidal species although it may extend into the shallow sublittoral. It is most abundant on the south and west coasts, with only isolated records along the UK eastern coastline (Allen, 2008). It has however, been found in the southern section of NG8; ranging in abundance from 1 to 467 individuals per 0.1m^2 with areas east of Spurn containing in general 300 individuals (Allen, et al. 2006).

Due to the location of NG8 and its proximity to the Flamborough Head and Bempton Cliffs SPA and RSPB reserve, the northern part of the site is of particular importance to several breeding birds which utilise the area for foraging; these most notably include puffin (*Fratercula arctica),* common guillemot *(Uria algae),* European shag *(Phalacrocorax aristotelis),* great cormorant *(P. carbo),* black legged kittiwake *(Rissa tridactyla)*, fulmar (*Flumar glacialis*) (RSPB, 2010) and northern gannet (*Morus bassanus)* (EYRG, 2010). NG8 encompasses The Lagoons SSSI, which receives an annual influx of little tern (*Sterna albifrons)*, a species that is protected under Annex 1 of the EC Birds Directive (2009/147/EC), and is a Species of European Conservation Concern (SPEC 3) and a UK species of high conservation concern (Red List) (English Nature, 2003). *S. albifrons* has a limited foraging range for a seabird; usually in the intertidal area with an average distance of approximately 4km from nesting sites (Allcorn et al., 2003) therefore NG8 would encompass the greater part of its feeding area, and the species may also breed at the site. The Spurn National Nature Reserve is also important for a variety of resident, wintering and passage migrant birds such as brent goose (*Branta bernicla*), golden plover (*Pluvialis apricaria*), knot (*Calidris canutus)*, dunlin (*Calidris alpina*), curlew (*Numenius arquata*) and redshank (*Tringa tetanus*). NG8 is an important migration route; consequently some birds will stop here if bad weather blows them inshore (RSPB 2012, pers. comm.).

Lobster- Homarus gammarus
©JonathanButterfield

Soft Coral: Alcyonium digitatum
©JonathanButterfield

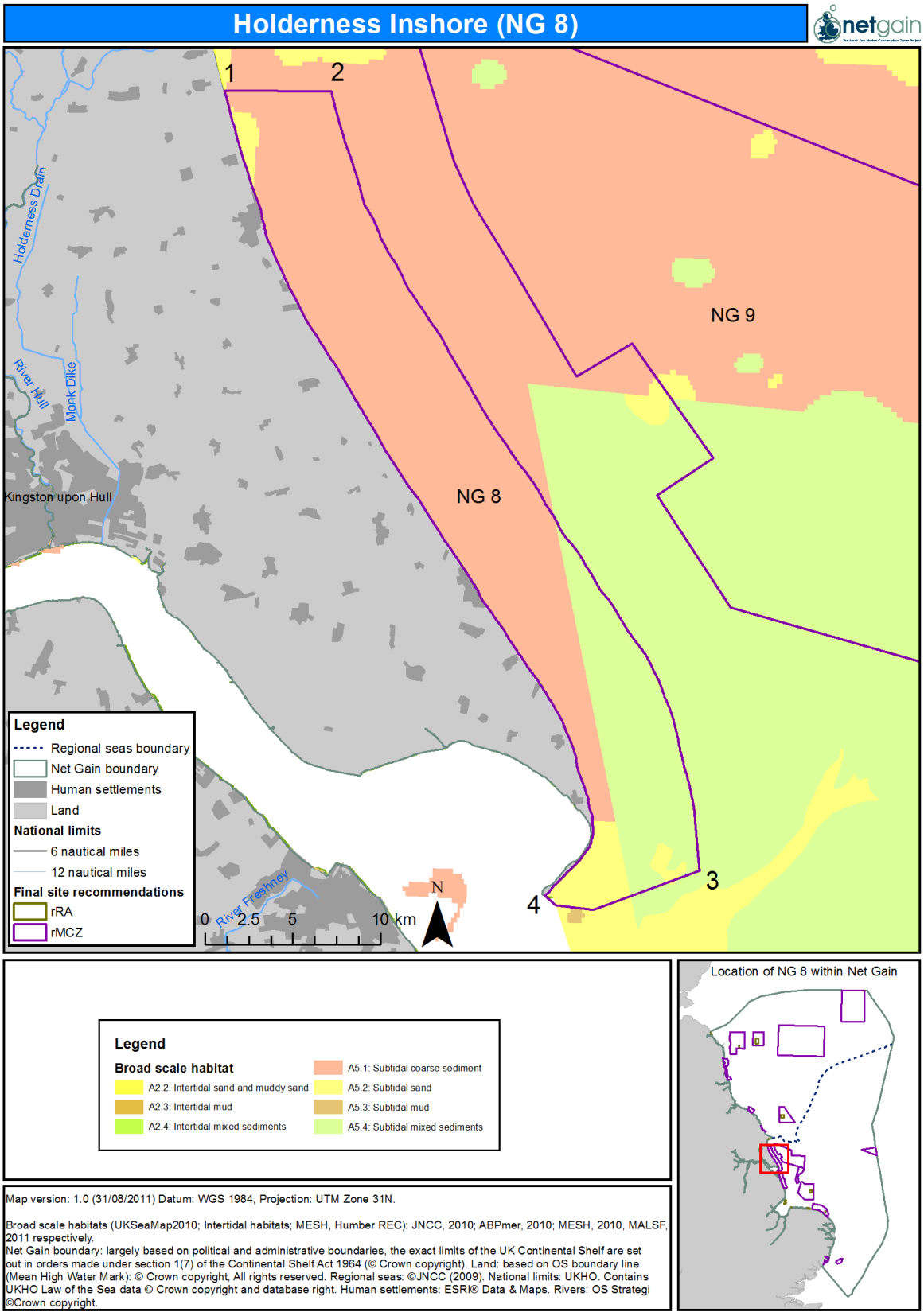


Figure 7.59 Broad-scale habitats present within NG 8

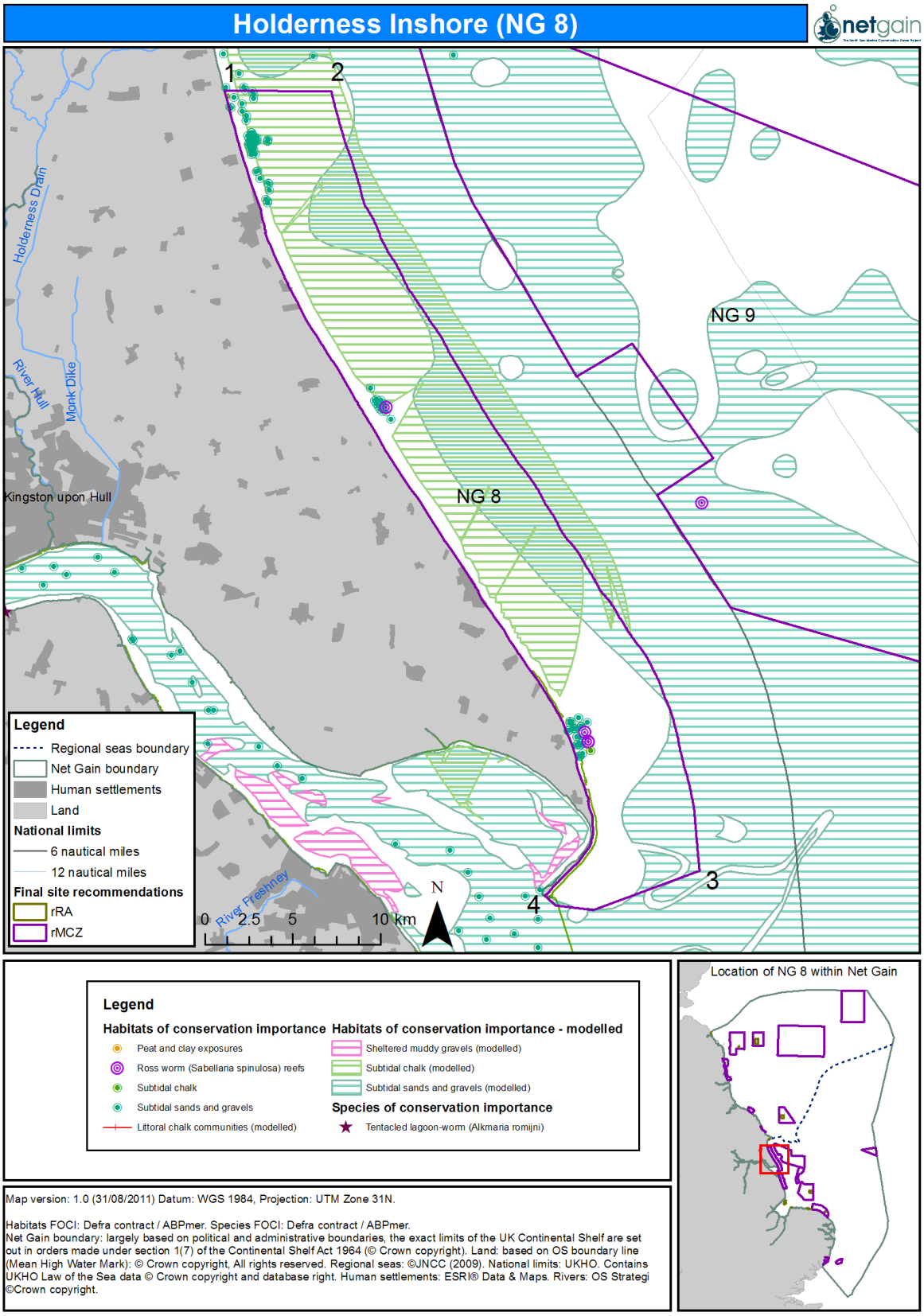


Figure 7.60 FOCI habitat and species present within NG 8

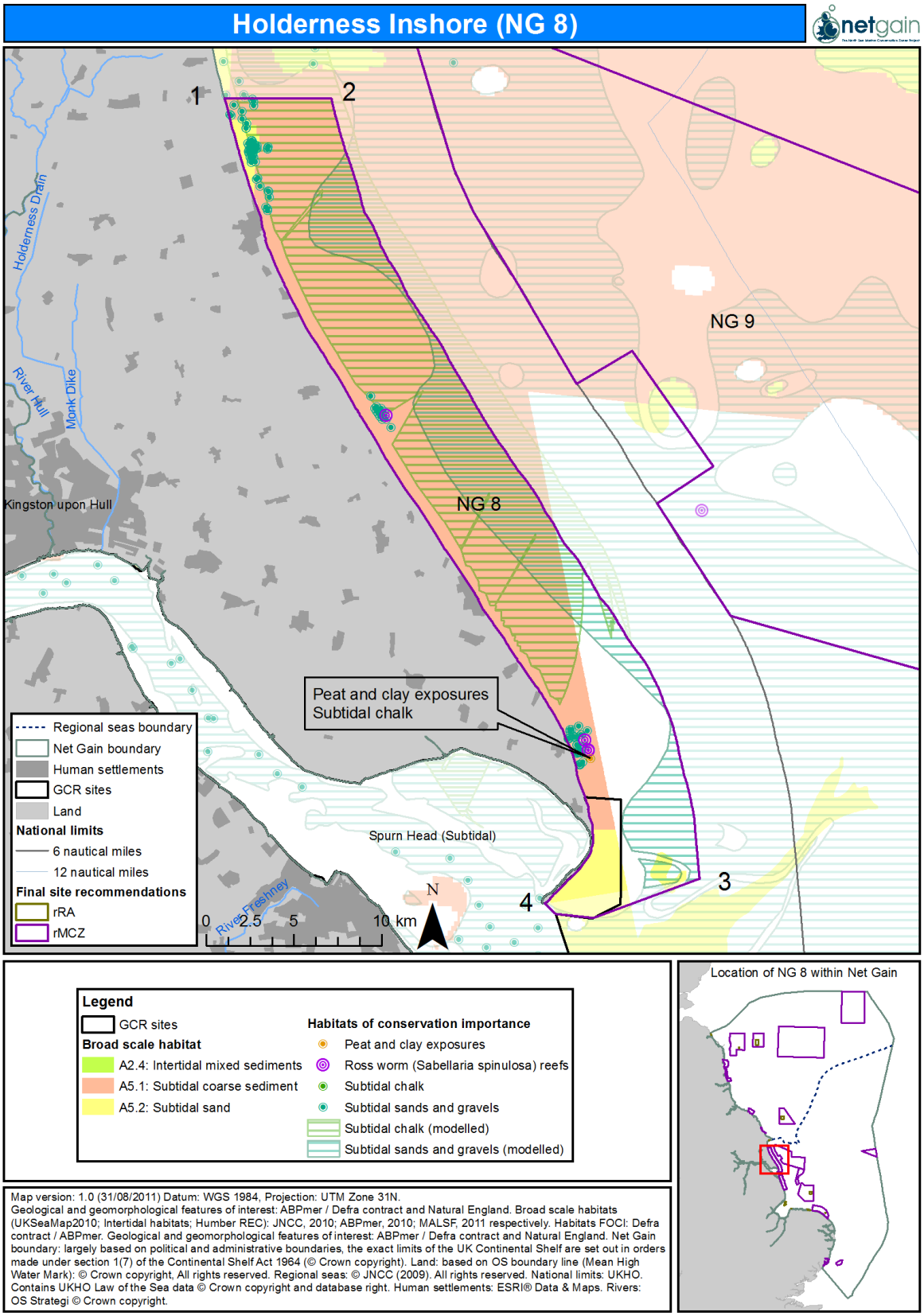


Figure 7.61 Features put forward for recommendation in NG 8

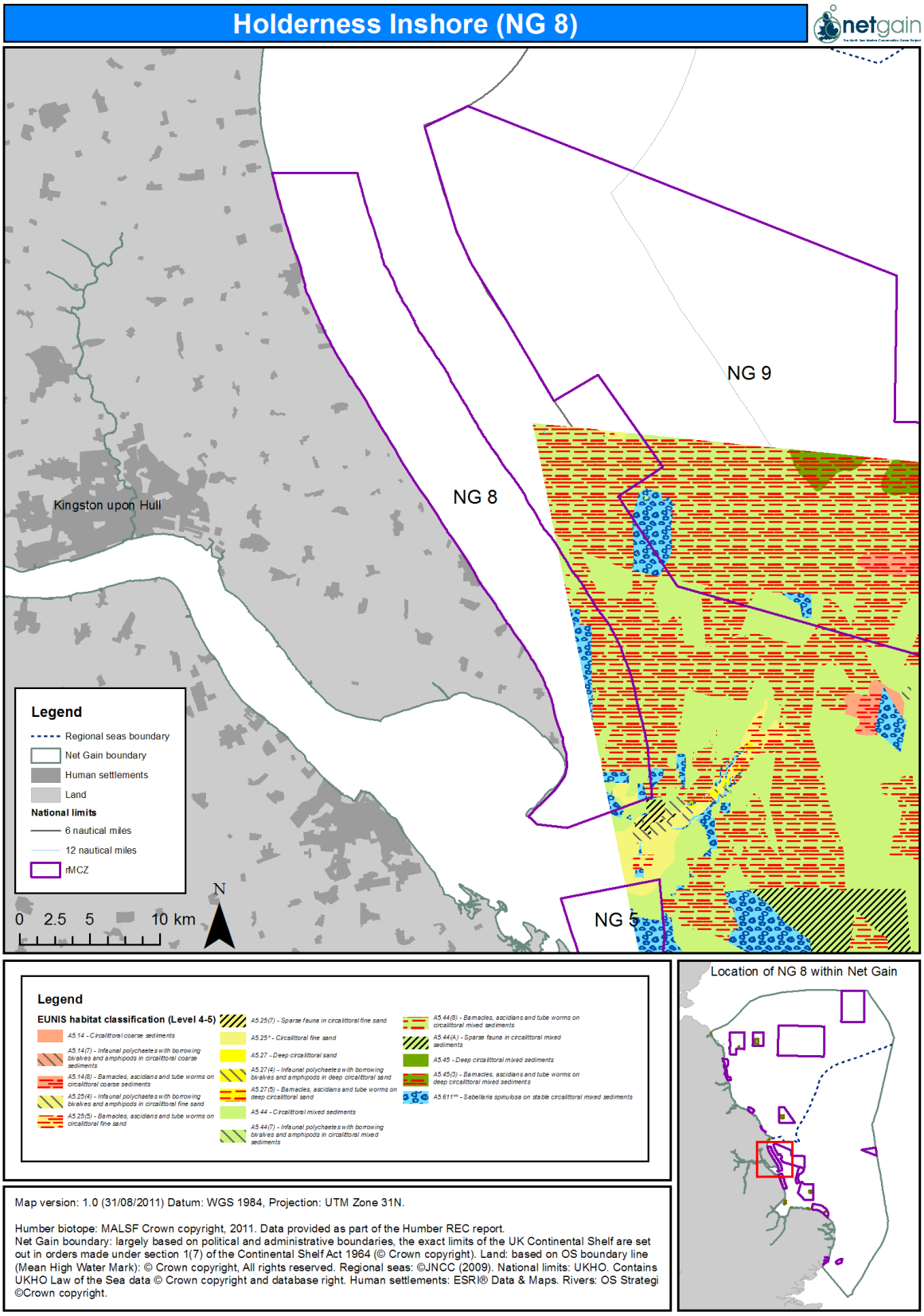


Figure 7.62 **Additional broad-scale habitat data: Humber Regional Environmental Characterisation**

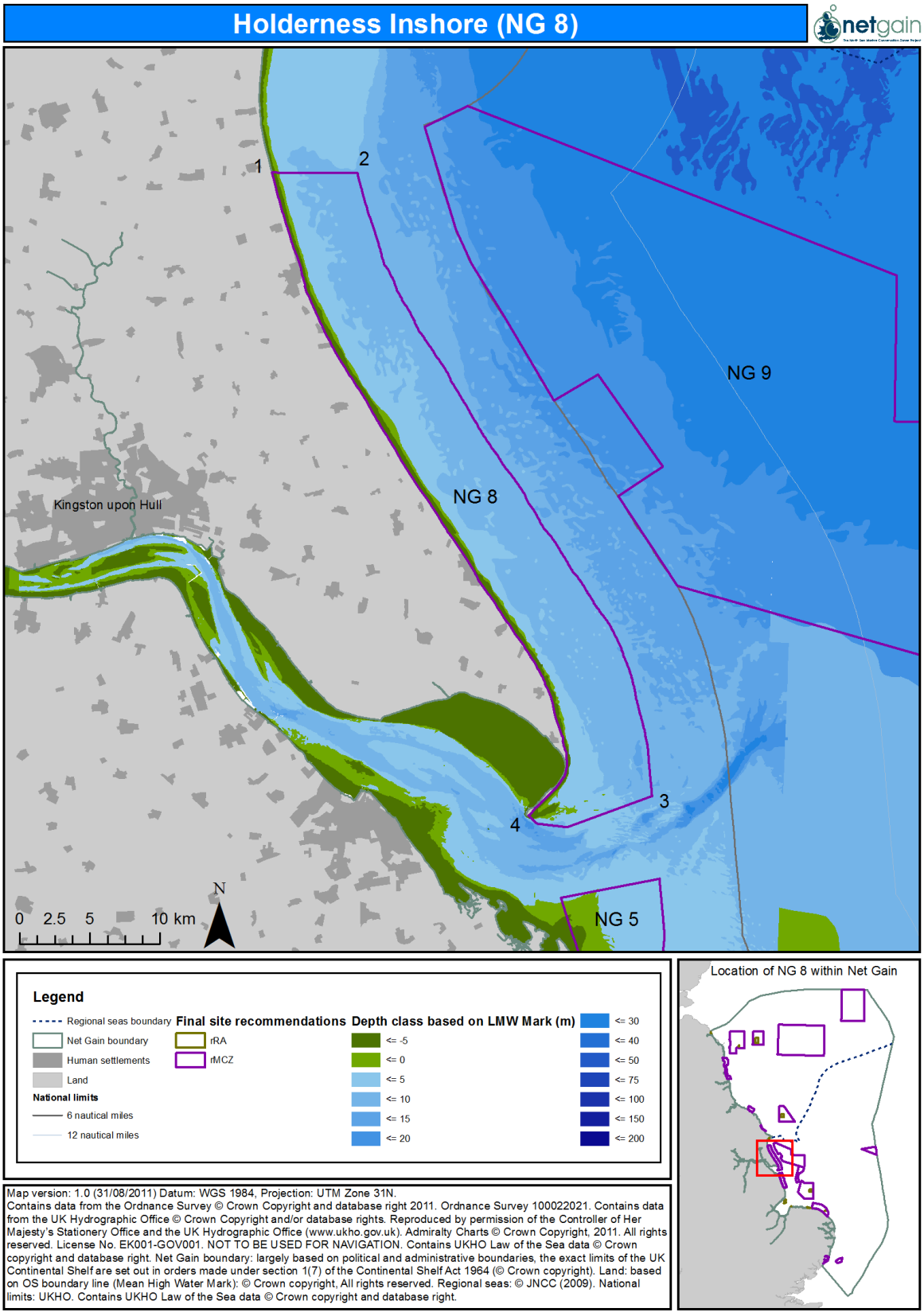
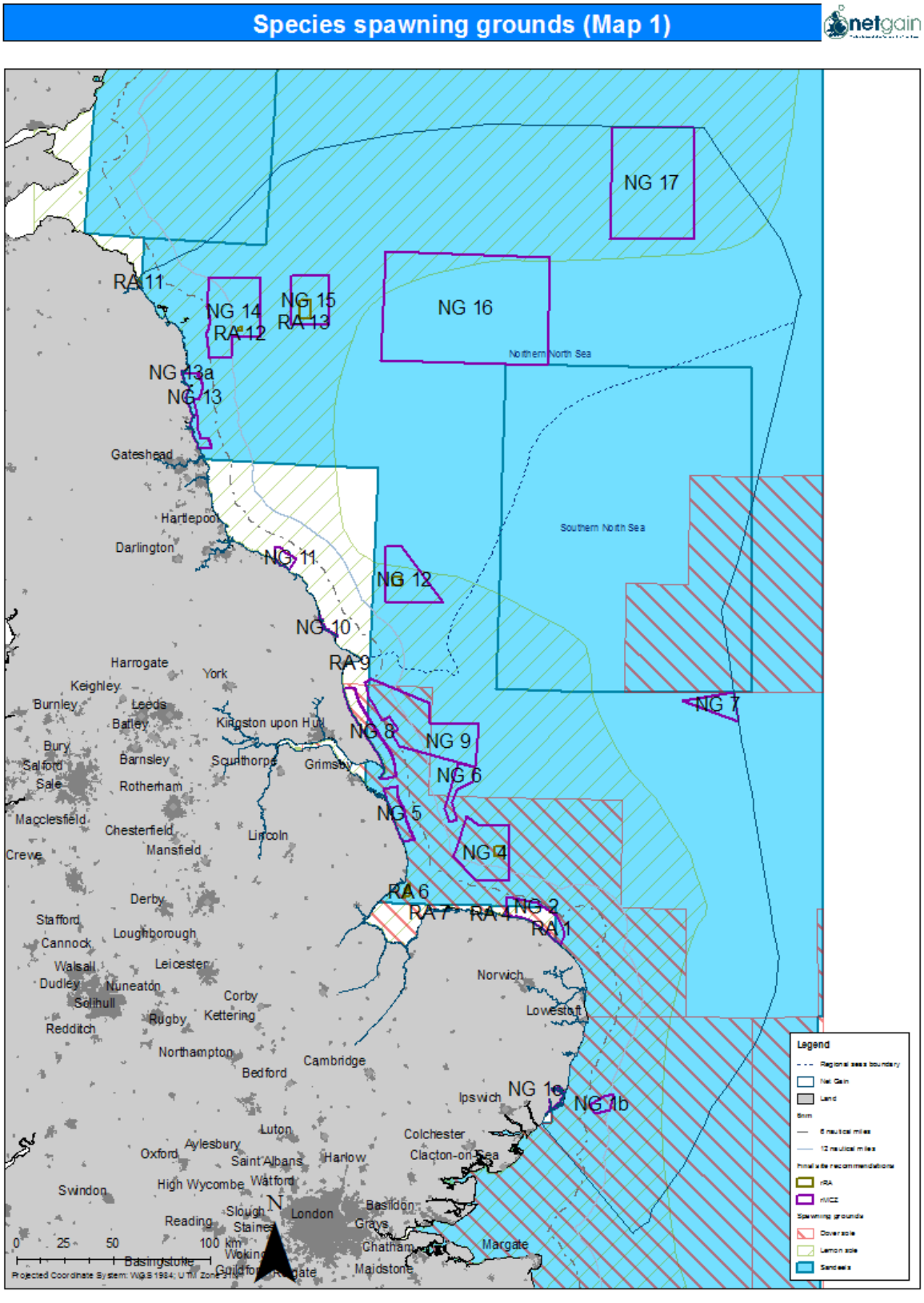
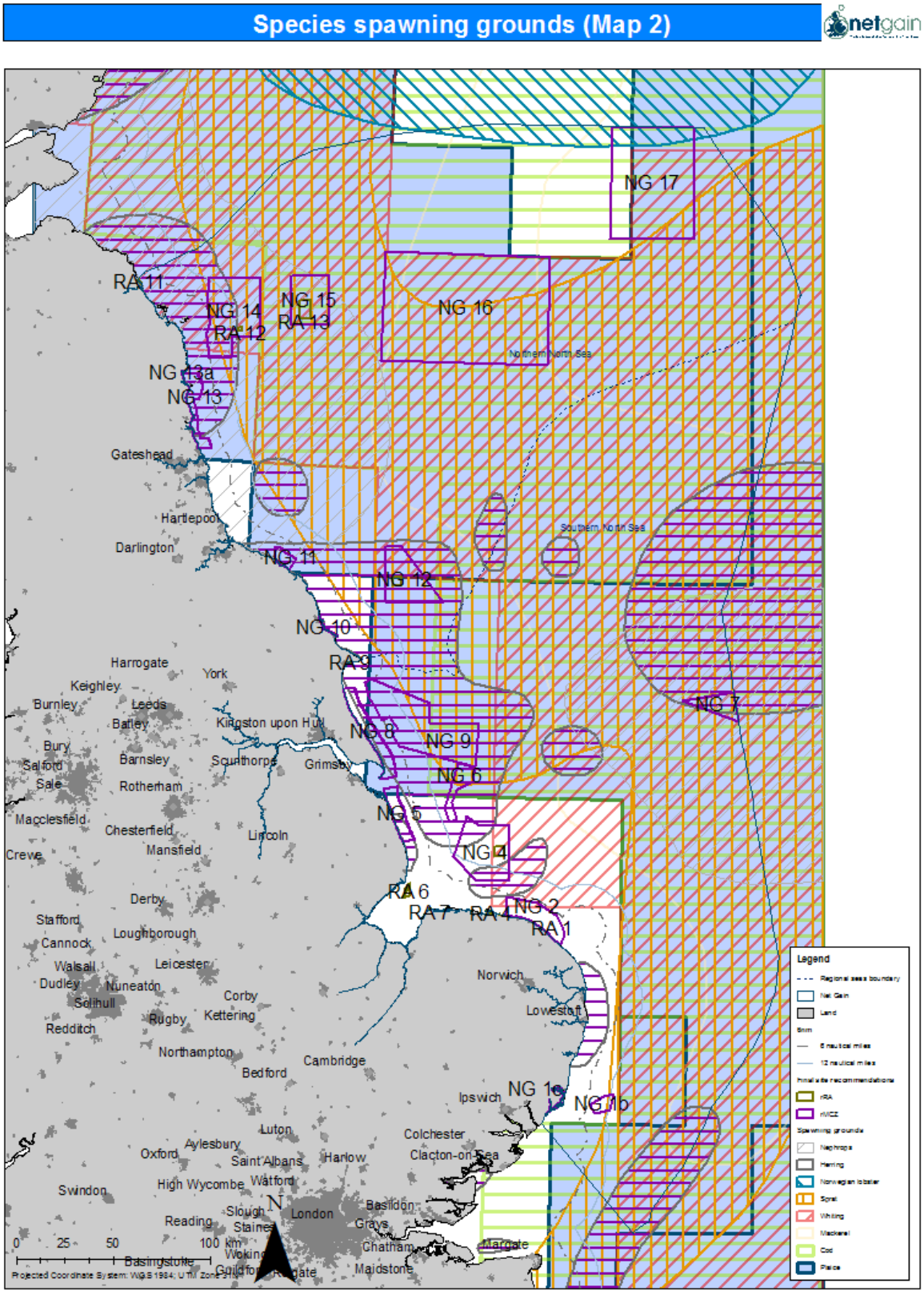


Figure 7.63 Bathymetry of NG 8



Spawning data: Defra contract ME5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.64 Spawning ground (map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.65 Spawning ground (map 2)

Site boundary

The NG 8 site boundary has been developed to align with the NESFC no-trawl zone as was the previous original site NG2.12. The southern boundary has been altered from the no trawl zone to protect the seaward element of the Spurn Head geological feature, which incorporates The Binks. The site extends from Skipsea in the north to Spurn Head in the south. Previously NG 8 connected with NG 5 in the south however following Hub meeting discussions a gap was allowed for the Humber Estuary to be easily accessed and shipping lanes to be maintained. The seaward side of the site aligns with a seasonal byelaw restricting dredging from the last day of June to the first day of October.

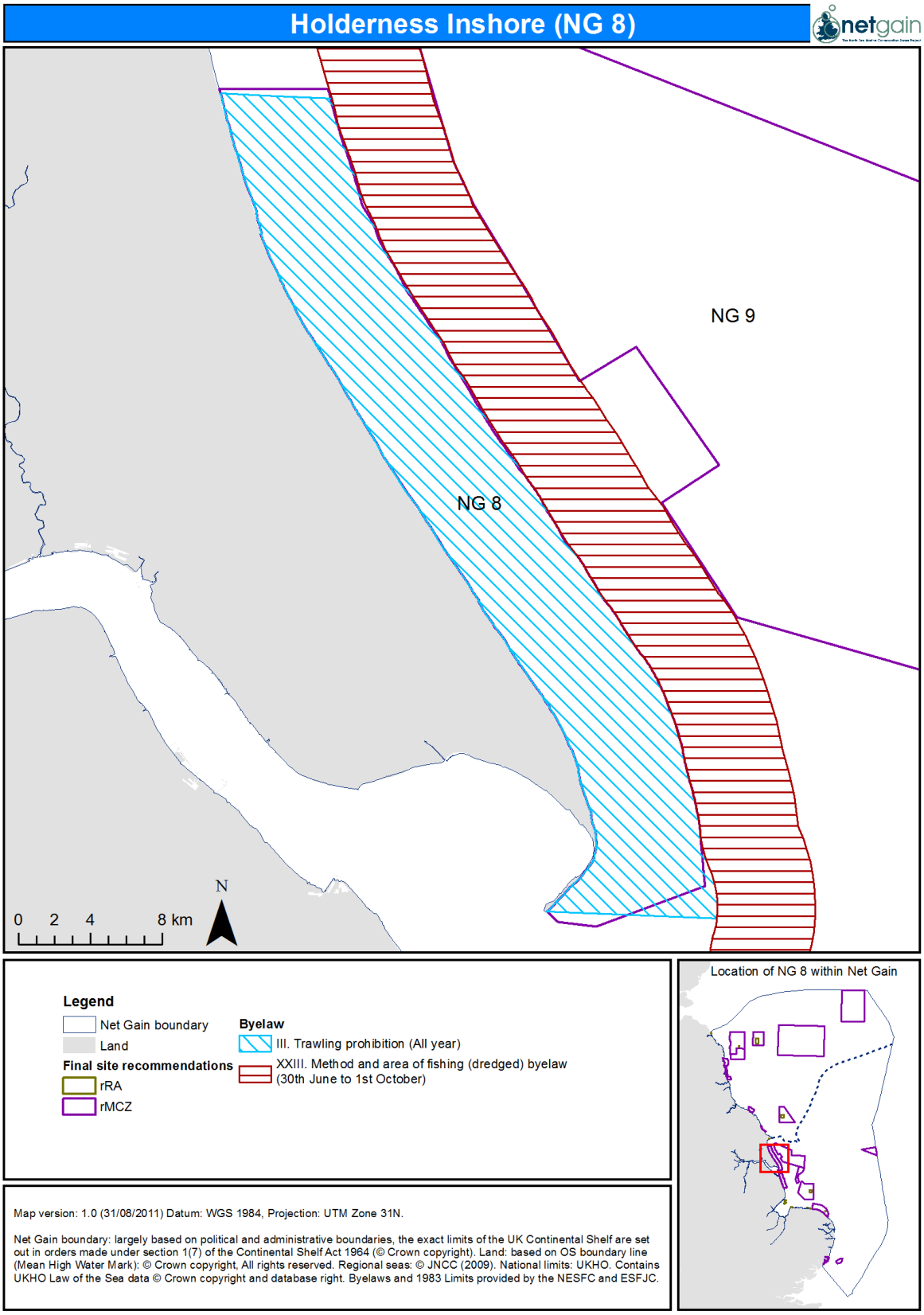


Figure 7.66 NG 8 site boundary with associated fishery management locations

Conservation objectives

Table 7.52 Conservation objectives for site NG 8, A2.4: Intertidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Intertidal mixed sediment is an uncommon broad habitat found at a few scattered sites in the British Isles in the south-west and northeast of England, East Anglia, west Wales and north-western Europe. Subject to natural change, maintain the Intertidal mixed sediments in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal mixed sediments in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal mixed sediments is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — L

	Siltation rate changes (high)	H	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Atmospheric climate change	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	M	L
	Physical change (to another seabed type)	M	L
	Removal of non-target species (lethal)	M	L
	Siltation rate changes (low)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Water clarity changes	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Removal of target species (lethal)	L-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.53 Conservation objectives for site NG 8, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — L-H — L Surface abrasion: damage to seabed surface features — NS-H — L Physical change (to another seabed type) — M — L

	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.54 Conservation objectives for site NG 8, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — H — L Physical removal (extraction of substratum) — L-H — M

	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ site contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.55 Conservation objectives for site NG 8, Peat and clay exposures

Conservation Objective	
1 Maintain/ recover	Peat and clay exposures are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Peat and clay exposures in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Peat and clay exposures in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Peat and clay exposures is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Emergence regime changes (sea level) - regional/national — H — L Physical change (to another seabed type) — H — H Physical loss (to land or freshwater habitat) — H — H Atmospheric climate change — M — L

	Temperature changes - regional/national	M	L
	Emergence regime changes - local	L	L
	Physical removal (extraction of substratum)	L	M
	Removal of non-target species (lethal)	L	L
	Siltation rate changes (high)	L	M
	Structural abrasion/penetration: Structural damage to seabed >25mm	L	M
	Wave exposure changes - local	L	L
	Wave exposure changes - regional/national	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.56 Conservation objectives for site NG 8, Subtidal chalk

Conservation Objective	
1 Maintain/ recover	Subtidal chalk is on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Subtidal chalk in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal chalk in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal chalk is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	H
Physical loss (to land or freshwater habitat)	H	H
Introduction or spread of non-indigenous species & translocations (competition)	M	L
Physical removal (extraction of substratum)	M	M

	Siltation rate changes (high)	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	M
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Water clarity changes	NS-M	M
	Organic enrichment	L	L
	Removal of non-target species (lethal)	L	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L	L
	Siltation rate changes (low)	L	H
	Surface abrasion: damage to seabed surface features	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.57 Conservation objectives for site NG 8, Spurn Head (subtidal) geological feature

Conservation Objective	
1 Maintain/ recover	Spurn Head is a SSSI (Site of Special Scientific Interest). The site is a shingle ridge, and geomorphologists monitor its changing shape and, in spring and autumn, migrating birds pause here in their thousands, attracting visitors to the bird observatory. The sea continues to build and erode this unique hooked peninsula of sand and shingle. Subject to natural change, maintain the Spurn Head (subtidal) geological feature to favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**Geological/ Geomorphological** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the Spurn Head (subtidal) geological feature in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Spurn Head (subtidal) geological feature is sensitive to the pressures: Energy production – at sea (wind turbines)

	Energy production – at sea (wave turbines) Energy production – at sea (tidal turbines) Energy production – on land (power stations, including nuclear) Extraction – quarrying Extraction – navigational dredging (capital, maintenance) Extraction – sand and gravel Beach replenishment Infrastructure – cables and pipelines (installation) Infrastructure – cables and pipelines (operation) Infrastructure – coastal (ports, marinas, leisure facilities) Infrastructure – coastal defence and land claim Infrastructure – offshore (artificial reefs) Infrastructure – offshore (oil and gas platforms) Infrastructure – offshore (wind and wave turbines) Waste disposal – munitions (chemical and conventional) Waste disposal – navigational dredging (capital, maintenance) Waste disposal – quarrying (geological materials)
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

The southern end of NG 8 includes small portions of the Humber Estuary SAC, SPA and SSSI, Dimlington Cliffs SSSI, The Lagoons SSSI and in the north the Withow Gap, Skipsea SSSI. The closest rMCZs are NG 9 approximately 6km away and NG 5 approximately 4.5km away.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.58 MPAs within or adjacent to NG 8

MPA Type	Site Name	Features Protected
SAC	Humber Estuary	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.4: Intertidal mixed sediments A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.2: Subtidal sand A5.3: Subtidal mud A5.4: Subtidal mixed sediments Seagrass beds Sheltered muddy gravels Subtidal sands and gravels Estuarine rocky
SPA	Humber Estuary	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Seagrass beds
SSSI	Dimlington Cliff	Not in GAP table Geological
SSSI	Humber Estuary	A1.3: Low energy intertidal rock A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.7: Intertidal biogenic reefs A3.3: Low energy infralittoral rock A5.2: Subtidal sand A5.3: Subtidal mud Coastal saltmarsh Intertidal mudflats Saline lagoons Estuarine rocky habitats
SSSI	The Lagoons	A3.3: Low energy infralittoral rock Saline lagoons
SSSI	Withow Gap, Skipsea	Not in GAP table Geological

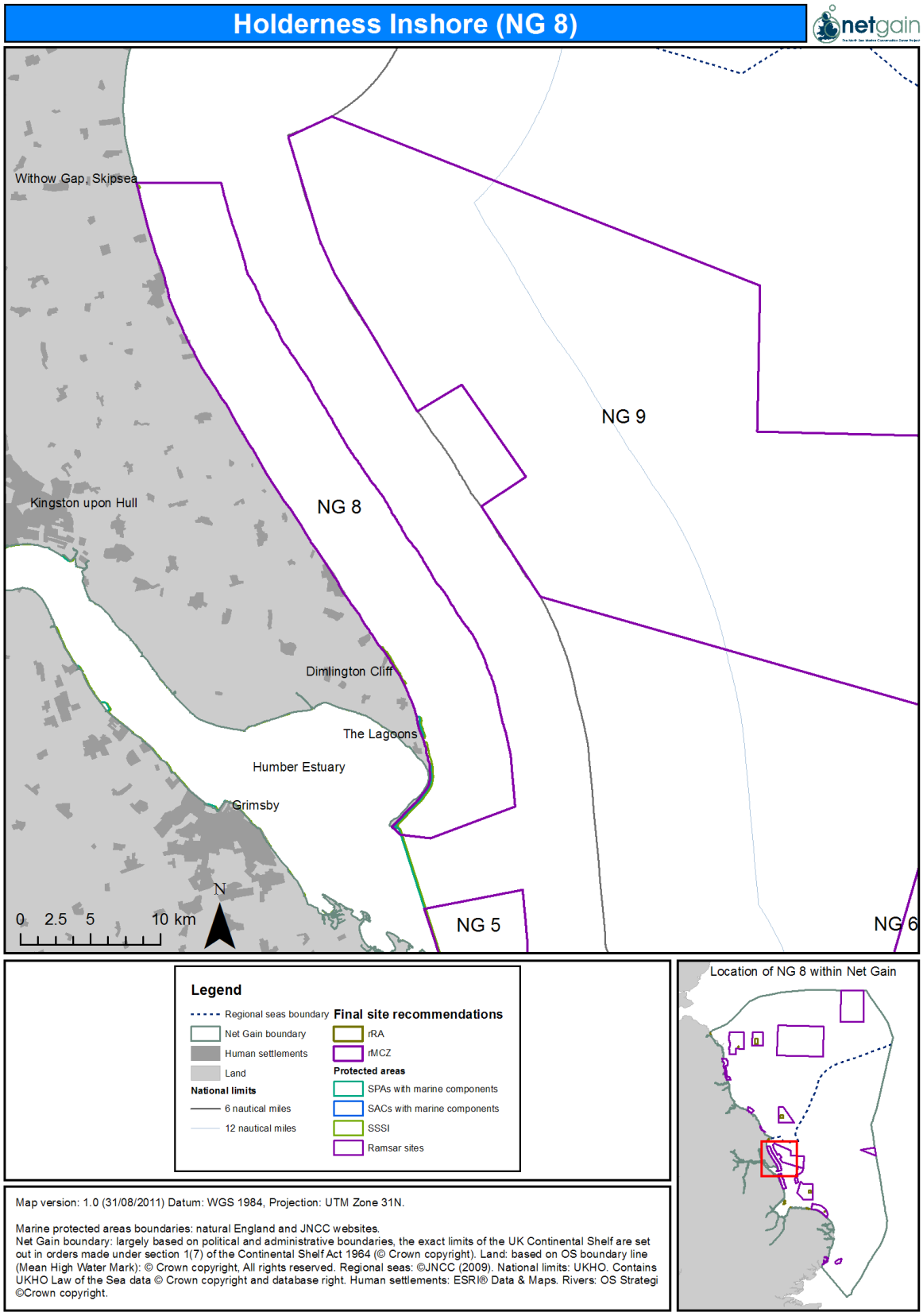


Figure 7.67 MPAs/rMCZs within or adjacent to NG 8

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

This site enjoyed strong support (with one score of '3' and two of '4'). It was noted that the site was well supported by everybody so long as there were to be no changes to current activities.

The underlying data was felt to be of moderate quality (three scores of 'M') although there was more of a differential for specific habitat types (e.g. one group felt that data quality was 'L' for chalk whilst for other habitats it was 'H'). Stakeholders reported that, on two separate drift dives, no evidence of chalk had been recorded – consequently there was some uncertainty as to whether chalk should be included as a feature. Other comments related to the intertidal data suggesting that some of the data was questionable – although the introduction of REC data helped. Confidence in the GCR data layer was identified as a potential issue with accuracy around the location of the in-site GCR features being questioned.

Contention over the site was felt to be generally low (two scores of 'L', one of 'L-M'). There may be some concerns around planned cable and pipeline routes. Contention would remain low so long as the site's Conservation Objectives stay as 'maintain' and current activities are allowed to continue. It was noted that this area is a very important lobster and crab fishery.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- Marine Aggregates:- Against (but would move to support if buffer distances between MCZ boundary and aggregate interests are confirmed as being sufficient to mitigate for indirect pressures)
- RSPB:- Strongly support (if little tern listed as a feature)
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to MCZ designation
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.59 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Survey	Tappin, et al. 2011
European eel	Combination of historical and recent records	Ellis, et al. 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Littoral chalk communities	Modelled data	Tyler-Walters, et al. 2009
Peat and clay exposures, Subtidal chalk, Subtidal sands and gravels, Ross worm (*Sabellaria spinulosa*) reefs	Combination of historical and recent records	Tyler-Walters, et al. 2009
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal chalk, Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

ALLCORN, R., EATON, M.A., CRANSWICK, P.A., PERROW, M., HALL, C., SMITH, L., REID, J., WEBB, A., SMITH, K.W., LANGSTON, R.H.W. and RATCLIFFE, N. (2003). *A Pilot Study of Breeding Tern Foraging Ranges in NW England and East Anglia in Relation to Potential Development Areas for Offshore Windfarms.* Sandy: RSPB/ WWT/JNCC.

ALLEN, J.H., 2000. *The analysis and prediction of the shallow subtidal benthic communities along the east coast of England.* Unpublished Ph.D thesis, University of Hull, 308pp.

ALLEN, J.H., 2008, *Ecological Assessment of Yorkshire Coast Prohibited Trawling Areas.* Report to North Eastern Sea Fisheries Committee, Institute of Estuarine and Coastal Studies, University of Hull.

ALLEN, J.H., 2008b. *Benthic Invertebrate Assessment of the Marine Environment at Aldbrough Gas* Storage Facility: 2007. Draft Report to SSE (Hornsea) Ltd. Institute of Estuarine and Coastal Studies, University of Hull.

ALLEN, J.H., 2008c. *Humber Gateway Offshore Windfarm Biotope & Cobble Reef Report.* Report to Environmental Resources Management Ltd. Institute of Estuarine and Coastal Studies, University of Hull.

ALLEN J.H., BURLINSON, F. & BURDON, D., 2006. *Humber Gateway Offshore Windfarm Sabellaria Report.* Report to Environmental Resources Management Ltd, Institute of Estuarine and Coastal Studies, University of Hull.

BROOKS, A.J., ROBERTS, H., KENYON, N.H. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 8: *Task 2A - Mapping of Geological and Geomorphological Features*. ABP Marine Environmental Research Ltd.

COLCLOUGH, S. 2010. *Marine Fish Nursery in the Humber, Tees, Tweed, Tyne, Wear, Yorkshire Esk, Wansbeck, Great Ouse and Wash, Alde, Bure Waveney & Yare and Coquet Estuaries.* Report A: Marine Fish Nursery Function in the Humber Estuary. Environment Agency.

EAST YORKSHIRE RINGING GROUP (EYRG), 2010. G*annet feeding ranges from Bempton cliffs via satellite tagging,* available from http://www.eyrg.co.uk/Articles/Microsoft%20Word%20-%20Progress%20report2%20Bempton%20gannets%20RHWL%20220211%20pdf.pdf (accessed on 07/08/11)

ELLIS, J.R., READDY, L., SOUTH, A. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 15: Task 2B - Distribution of highly mobile species.* ABP Marine Environmental Research Ltd.

ENGLISH NATURE (EN), 2003. *The Humber Estuary: A comprehensive review of its nature conservation interest.* Report 547.

EVANS, C.D.R., CROSBY, A., WINGFIELD, R.T.R., JAMES, J.W.C., SLATER, M.P. and NEWSHAM, R., 1998. *Inshore seabed characteristaion of selected sectors of the English coast*. British Geological Survey Technical Report WB 98/45.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 24: Task 2I. Intertidal habitats datalayer (Final). ABP Marine Environmental Research Ltd.

GEOLOGICAL CONSERVATION REVIEW (GCR), 2003. *Coastal Geomorphology of Great Britain.* Chapter 8: Sand spits and tombolos – GCR site reports Volume 28.

INSTITUTE OF ESTUARINE AND COASTAL STUDIES (IECS) 1994. *Humber estuary & Coast* available from: http://www.hull.ac.uk/iecs/pdfs/he&c.pdf (accessed on 10/08/11).

IRVING, R., 2009. *The identification of the main characteristics of stony reef habitats under the habitats directive, summary report of an inter-agency workshop.* JNCC, no. 432.

JNCC AND NATURAL ENGLAND, 2010. *Marine conservation zone project, identifying marine conservation zones, a quick reference guide.*

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

RSPB, 2010*. Species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby.

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ DOCE, D., GREEN, M., GALLYOT, J., GEORGIOU, L., BRUTTO, D., MARZIALETTI, S., HOPLA, E., RAMSAY, E., FIELDING, H. 2011. *The Humber Regional Environmental Characterisation.* British Geological Survey Open Report OR/10/54. 357pp. MALSF, Crown copyright.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

THE WILDLIFE TRUSTS, RSPB and SEASEARCH, 2010. *Biodiverse Areas within Net Gain region: A supportive guide to aid stakeholder identification of ecological interest areas that meet aspects of the Ecological Network Guidance.* November, 2010.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

WEBS, 2009. *The wetland bird survey, summary for Spurn Head (3844) during 2008-2009*, available from: http://b1x1.bto.org/websonline/observations/site-summeries-mnths.jsp?locid=LOC649301&year=2008&prot=WEBSC (accessed on 19/08/11).

UKSEAMAP, 2010. *Interactive Map* available from at: http://jncc.defra.gov.uk/page-5534&LAYERS=PredictedHabitats,UKCS (accessed on 07/08/11).

7.9 Marine Conservation Zone: NG 9, Holderness Offshore

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 9, Holderness Offshore

Site centre location

53° 49’ 05’’N, 0° 26’ 21’’E
53.818208°, 0.439465°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

1,176.10km² / 117,609.87ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

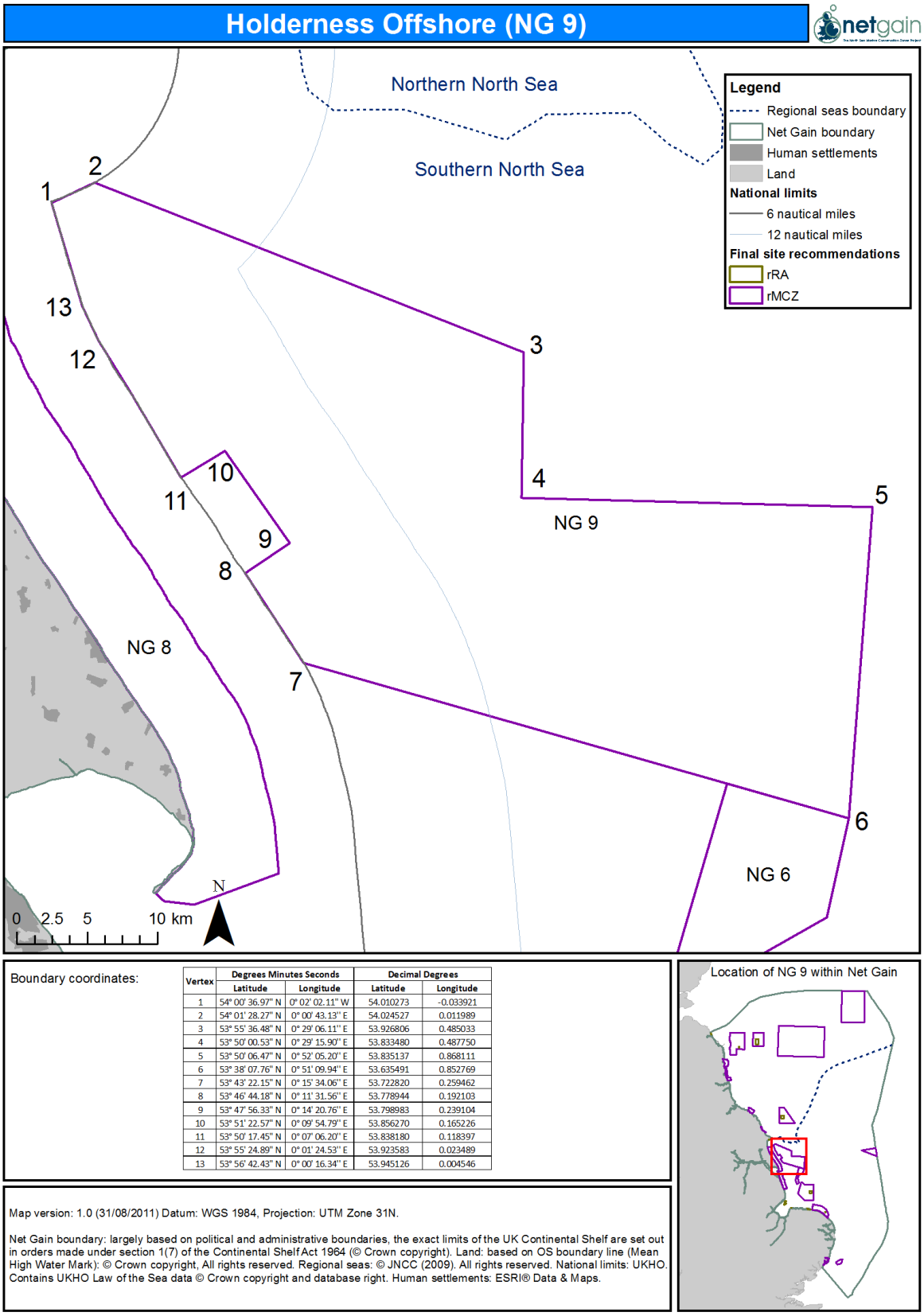
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.60 Features proposed for designation within NG 9, Holderness Offshore

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.1: Subtidal coarse sediment	536.45km²
Broad-scale habitat	A5.4: Subtidal mixed sediment	610.36km²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.61 Features within NG 9, Holderness Offshore not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.2: Subtidal sand	The site was originally identified purely for the contribution of subtidal coarse sediment and it was suggested that the site be designated for that feature alone. Subsequently more detailed data layers were received which showed that the site was equally important for subtidal mixed sediment as it was for subtidal coarse sediment and it was agreed that this feature should be recommended for designation as well. Subtidal sand was still disregarded.
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	The site was originally identified purely for the contribution of subtidal coarse sediment and it was suggested that the site be designated for that feature alone. Subsequently more detailed data layers were received which showed that the site was equally important for subtidal mixed sediment as it was for subtidal coarse sediment and it was agreed that this feature should be designated for as well. Subtidal sand and gravels were still disregarded.
Habitat of conservation importance	Ross worm (*Sabellaria spinulosa*) reefs	The site was put forward for broad-scale habitats and this feature was not considered.
Species of conservation importance	n/a	n/a



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	54° 00' 36.97" N	0° 02' 02.11" W	54.010273	-0.033921
2	54° 01' 28.27" N	0° 00' 43.13" E	54.024527	0.011989
3	53° 55' 36.48" N	0° 29' 06.11" E	53.926806	0.485033
4	53° 50' 00.53" N	0° 29' 15.90" E	53.833480	0.487750
5	53° 50' 06.47" N	0° 52' 05.20" E	53.835137	0.868111
6	53° 38' 07.76" N	0° 51' 09.94" E	53.635491	0.852769
7	53° 43' 22.15" N	0° 15' 34.06" E	53.722820	0.259462
8	53° 46' 44.18" N	0° 11' 31.56" E	53.778944	0.192103
9	53° 47' 56.33" N	0° 14' 20.76" E	53.798983	0.239104
10	53° 51' 22.57" N	0° 09' 54.79" E	53.856270	0.165226
11	53° 50' 17.45" N	0° 07' 06.20" E	53.838180	0.118397
12	53° 55' 24.89" N	0° 01' 24.53" E	53.923583	0.023489
13	53° 56' 42.43" N	0° 00' 16.34" E	53.945126	0.004546

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.68 Location and extent of site NG9 (Holderness Offshore)

Site summary

NG 9 is located 11.4km offshore from NG 8, Holderness Inshore rMCZ site on the East Yorkshire coast of England. The depth range in the site is between 10 and 50m deep (Figure 7.73) and the seabed is mostly composed of sediment habitats, with subtidal coarse sediment and subtidal mixed sediment being put forward for recommendation. Encompassing the northern portion of the Inner Silver Pit geological feature (the southern portion being within rMCZ NG 6) this area of the site has good species biodiversity on the canyon walls, and is an ecologically important area providing substrate and habitat for many species. The northern portion of the site captures the Flamborough front with highest current speeds being reached in spring and summer. The front provides areas of upwelling providing food for birds and cetaceans.

Detailed site description

NG9 is being recommended for designation due to the presence of broad-scale habitat types A5.2: subtidal sands, A5.1: subtidal course sediment and A5.4: subtidal mixed sediments. The site also includes the habitats of conservation importance subtidal sands and gravels and Ross worm (*Sabellaria spinulosa*) reefs.

NG9 is situated offshore, starting 6 nm off the Holderness coast, level with Barmston in the north extending to Kilnsea in the south and continuing east approximately 50km. It is situated between the Humber Gateway and Westermost Rough Round two windfarm sites in the west/southwest and the Round three Hornsea windfarm site to the north east.

In addition to the data layers that Net Gain hold, reports by Evans, et al. 1998 have indicated that the area is underlain by chalk, covered by an extensive till sheet, parts of which are traversed by distinctive low, commonly asymmetrical ribs, running parallel to the coast, formed of cobbles and boulders (Evans, et al. 1998). In general the sea bed of the western side of the site is approximately 10-12m deep, sloping uniformly eastwards to about 30m over a distance of about 15km. Further offshore to the east this becomes slightly steeper attaining approximately 45m depth, a gentle slope then returns that falls to more than 50m (Evans, et al. 1998), this is consistent with the bathymetry data layer provided from UKOA which suggests that the site is between 10 and 50m deep (Figure 7.73).

The southeast of the site contains the northern channel of the Inner Silver Pit post glacial tunnel valley feature. The northern part of the channel contains circalittoral mixed sediment habitats including muddy sediments in deeper water and areas of thin mixed sediments over rock characterised by barnacles, ascidians and tubeworms (Tappin, et al. 2011). Several studies have been undertaken in the adjacent areas of NG 9 and correlate with sediment characteristics of the site (Allen, 2008; Allen, et al. 2006; Tappin, et al. 2011).

The majority of the site experiences moderate wave and current energy at the seabed with lower wave energy towards the east of the site (UK SeaMap, 2010). Tidal currents near NG9 primarily occur in a southwest and northeast direction; across the Hornsea zone tidal currents are thought to run at between 0.28 ms^{-1} and 0.62 ms^{-1}. A key oceanographic feature in the vicinity of NG9 is that of the 'Flamborough Front', an area of the sea where upwelling occurs: cold, deeper, stratified waters of the northern North Sea meet the warmer, shallower, well-mixed waters of the southern North Sea. This may give the site increased ecological significance as it provides nutrient rich warm waters enhancing primary production via plankton growth (IPC, 2010).

Offshore areas in deep waters are typically less perturbed by natural disturbance and are among the most diverse marine habitats (Maddock, 2008). Typical habitats in this area may include SS.SCS.OCS Offshore circalittoral coarse sediment, SS.SSa.OSa Offshore circalittoral sand and SS.SMx Sublittoral mixed sediment. Previous surveys near NG9 have shown a number of different functional communities usually dominated by infaunal invertebrates in sand oriented sediments overlain with gravels and/or shell fragments, although towards the south of the site localised muddy sediments

can occur (Tappin, et al. 2011). Typical species would include polychaetes such as *Ophelia borealis*, *Polycirrus* and *Spiophanes* species. Nemertean worms and the bivalves *Mysella bidentata* and *Goodallia triangularis* would occur along with burrowing amphipods, in particular *Urothoe elegans*, *Bathyporeia* and *Ampelisca* species. Where there is increased gravel content *Glycera* can occur. Depending on the amount of gravels in the site a number of epifaunal species can become attached such as small sea squirts, particularly *Dendrodoa grossularia*, the tube worm *Pomatoceros lamarckii* and a range of encrusting bryozoans (Tappin, et al. 2011).

The southeast of NG9, incorporates the northern section of the Inner Silver Pit, in which the brittle star, *Ophiothrix fragilis* has been identified in high abundances (Tappin, et al. 2011). It is notable that the commercially significant crustaceans European lobster *(Homarus gammarus),* edible or brown crab (*Cancer pagurus*) and scallops are abundant over much of the area and these species comprise a nationally important shellfishery. Fish species, lemon sole (*Microstomus kitt)*, plaice (*Pleuronectes platessa)* and sprat (*Sprattus sprattus)* have known spawning and nursery areas in NG9 (Figure 7.78; Figure 7.79).

The biogenic reef building polycheate Ross worm (*Sabellaria spinulosa*), has been established in areas to the south, between Spurn and the perimeter of NG9 (Allen, 2008). This species is defined under Annex 1 of the EC Habitats Directive and is also included in the UK Biodiversity Action Plans priority habitats (Maddock, 2008). Although it has a wide distribution over the area, it occurs mainly in a low lying encrusting form (Allen, et al. 2006), with one record in reef form.

Due to the location of NG9 and its proximity to the Flamborough Head and Bempton Cliffs SPA and RSPB reserve, the site is of particular importance to several breeding seabird species. A number of species utilise the area for foraging due to the 'Flamborough front', these most notably include puffin (*Fratercula arctica),* common guillemot *(Uria aalge),* European shag *(Phalacrocorax aristotelis),* great cormorant (*P. Carbo*), black legged kittiwake *(Rissa tridactyla)*, fulmar (*Flumar glacialis)* (RSPB, 2010) and northern gannet (*Morus bassanus)* (EYRG, 2010).

Three main species of marine mammals have been documented in the NG9 site, common seal (*Phoca vitulina),* grey seal (*Halichoerus grypus)* and harbour porpoise (*Phocoena phocoena)* (Mander, et al. 2009). Although their distribution is seasonally variable harbour porpoise has been shown to follow a dispersal pattern similar to foraging aggregations of kittiwake and auk species trailing the 'Flamborough front' especially further offshore (Mander, et al. 2009).

Fulmar (*Fulmarus glacialis*)
©Jonathan Butterfield

Mollusc: Queen scallop (*Aequipecten opercularis*)
©Jonathan Butterfield

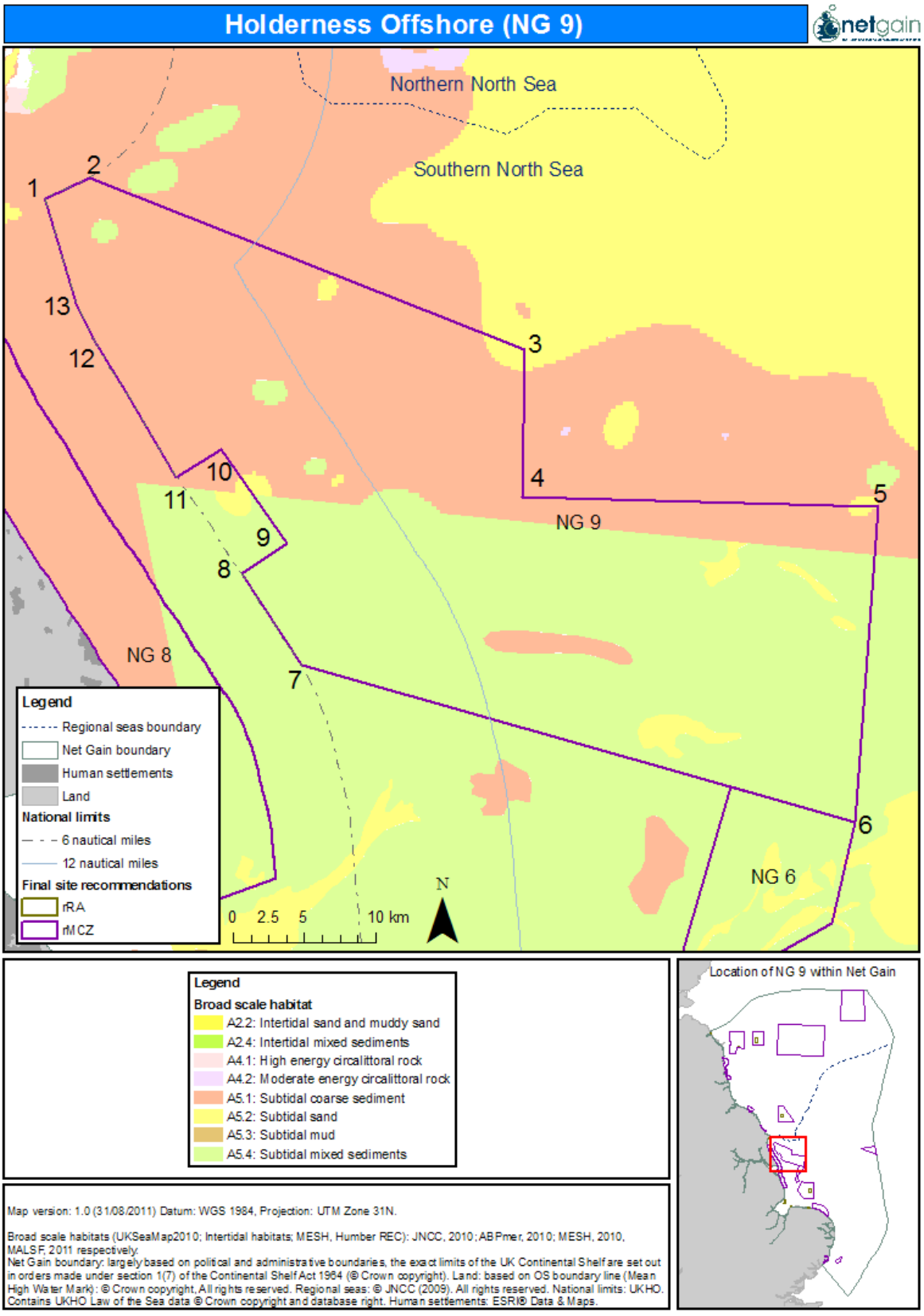


Figure 7.69 Broad-scale habitat present within NG 9

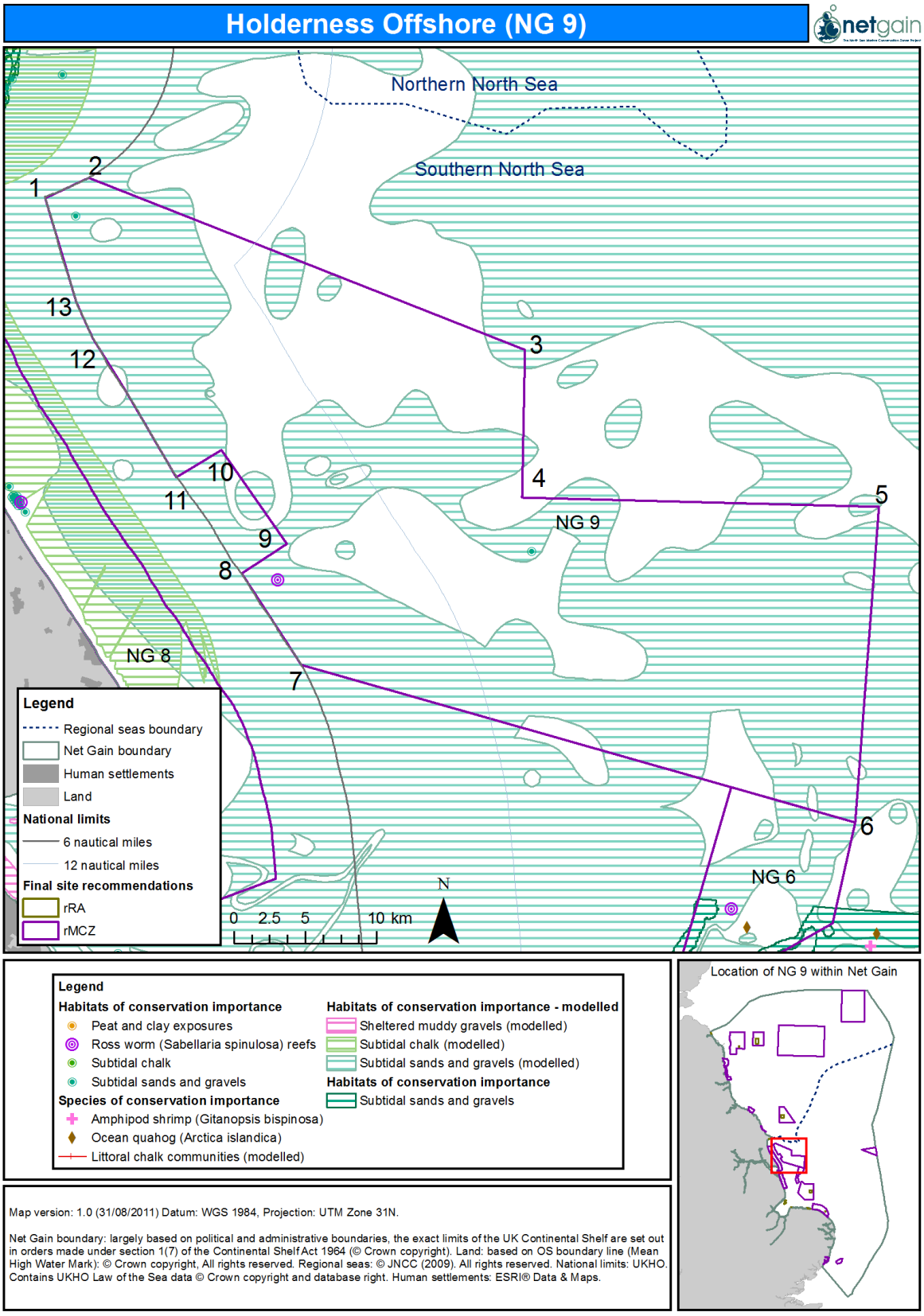


Figure 7.70 FOCI habitats and species present within NG 9

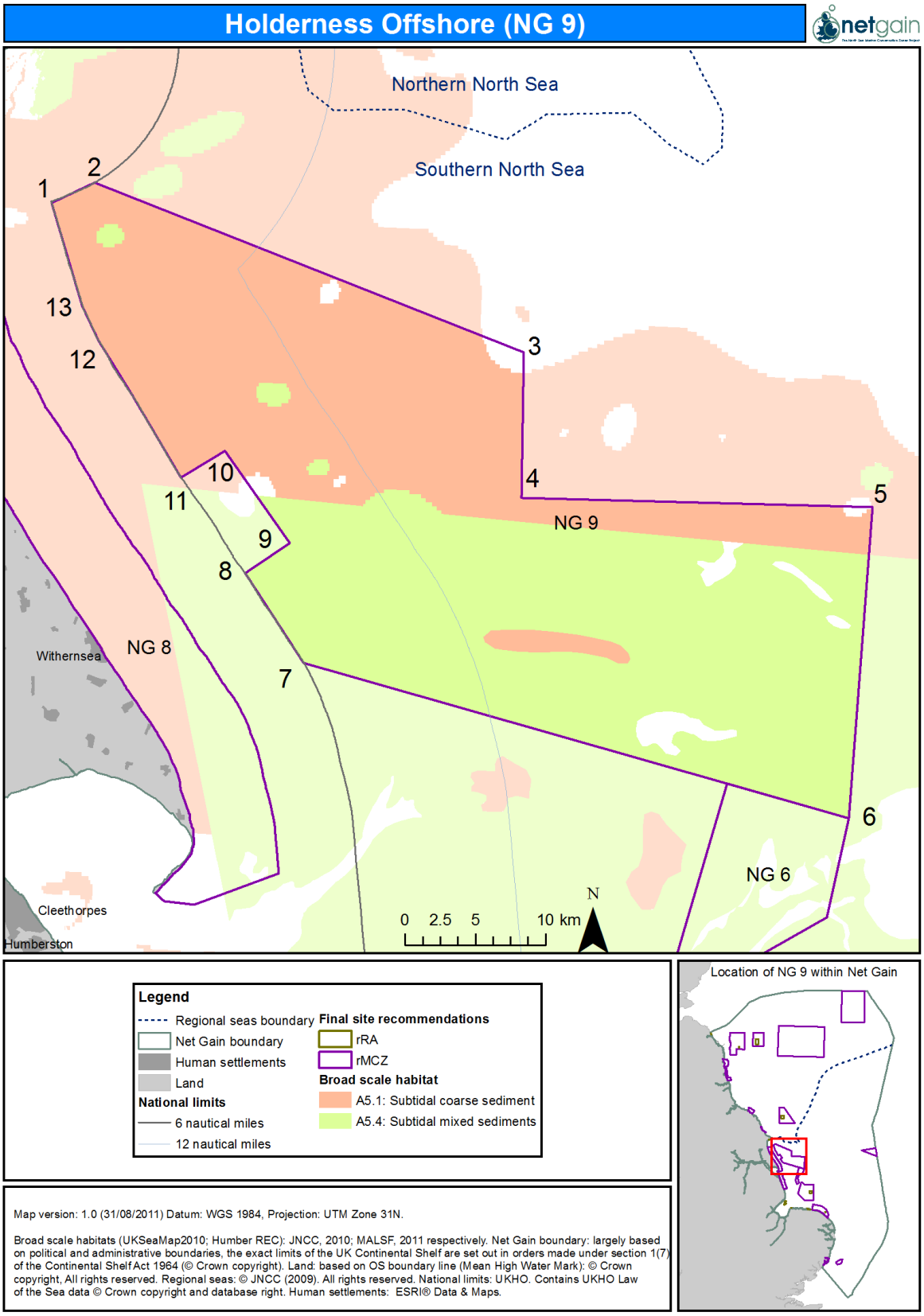


Figure 7.71 Features put forward for recommendation in NG 9

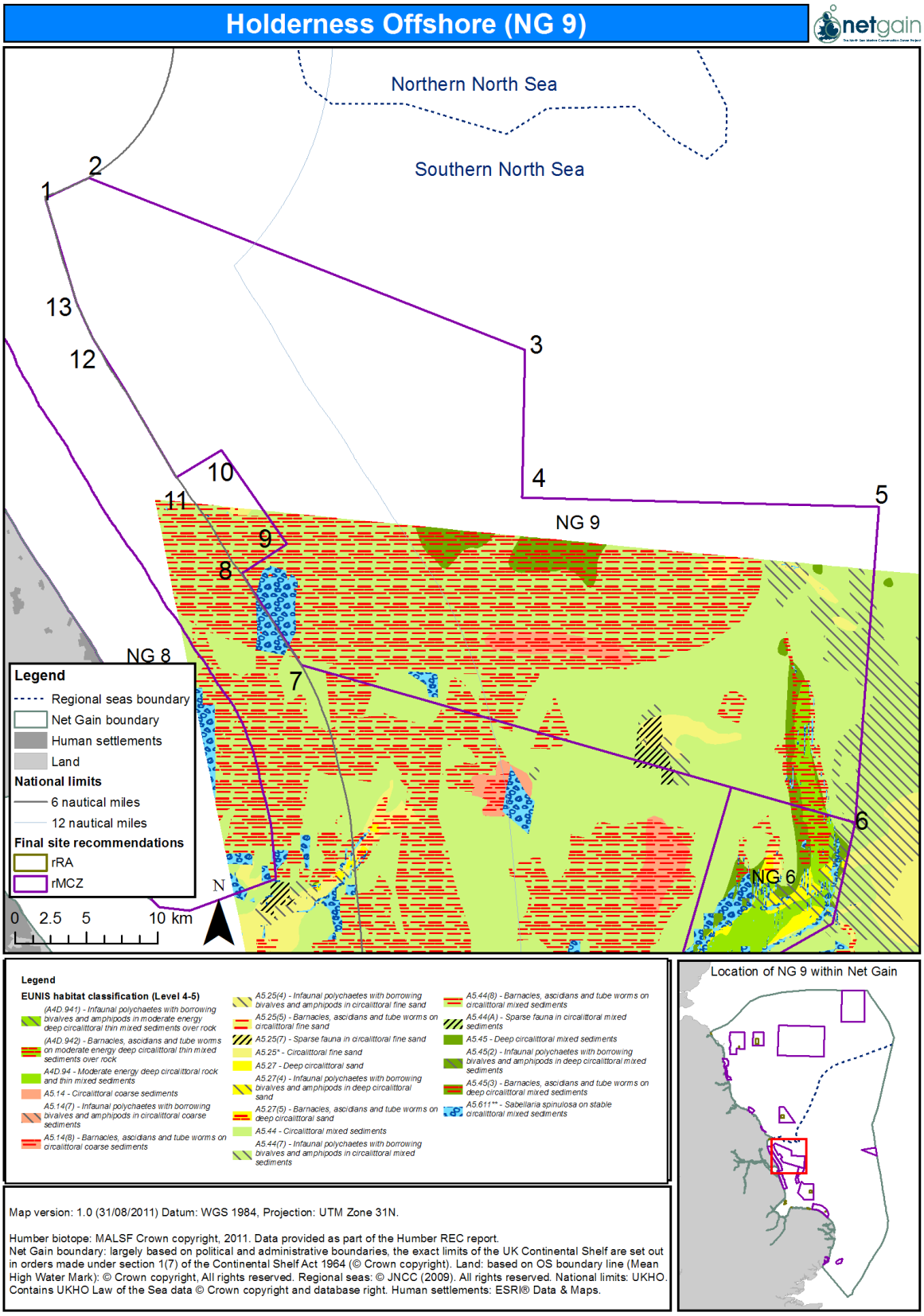


Figure 7.72 **Additional broad-scale habitat data; Humber Regional Environmental Characterisation**

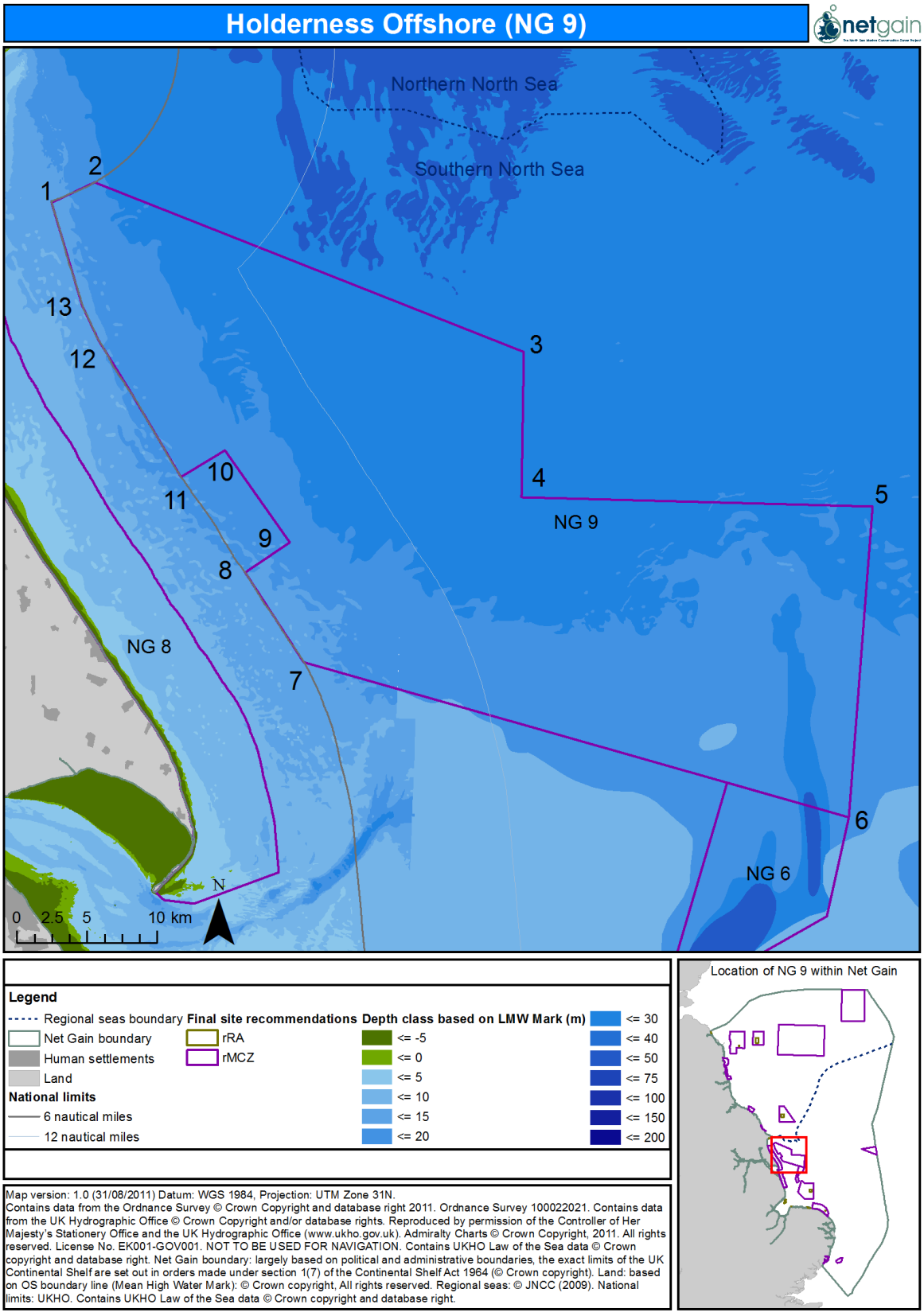


Figure 7.73 Bathymetry of NG 9

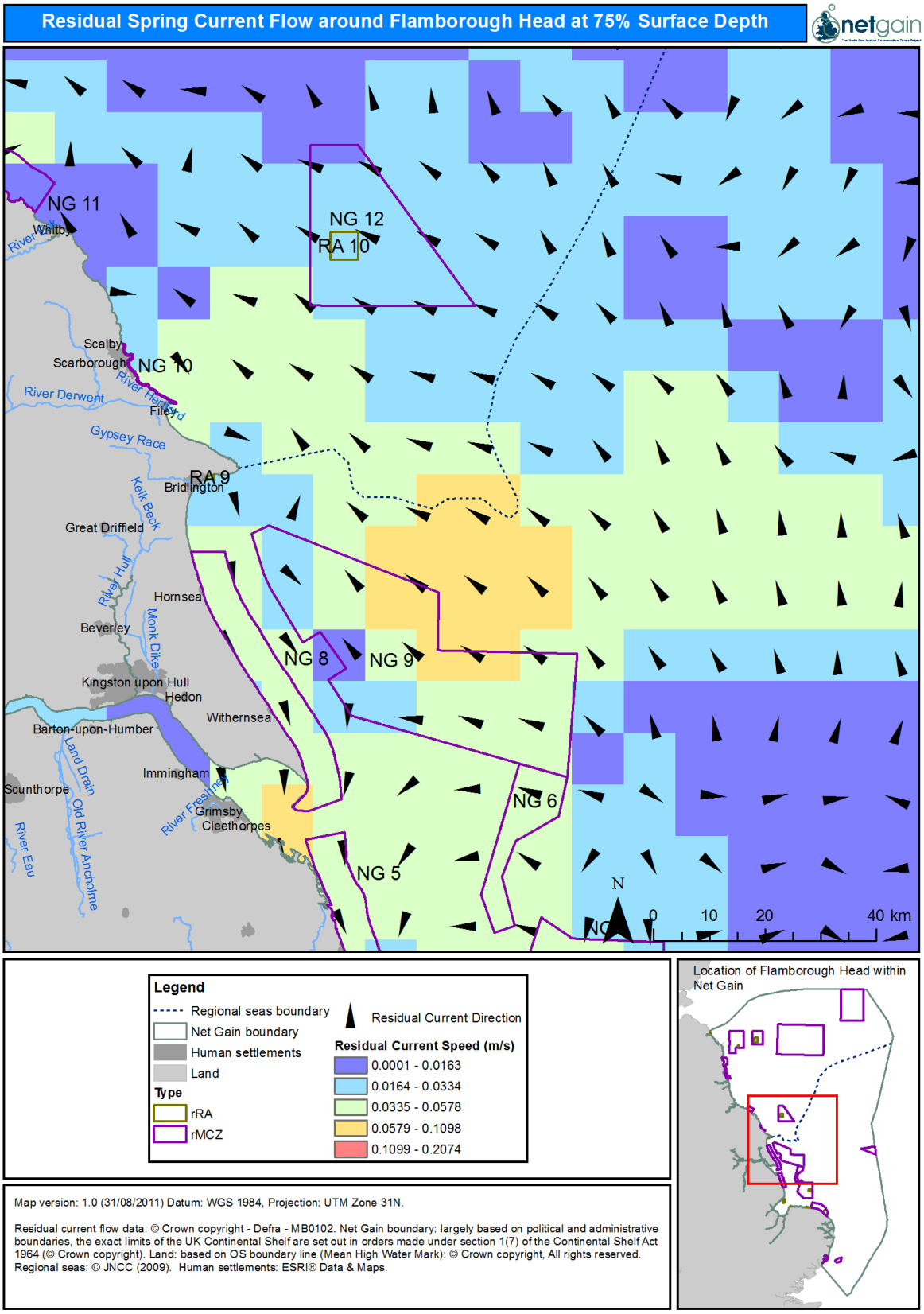


Figure 7.74 Residual spring current flow around Flamborough Head at 75% surface depth

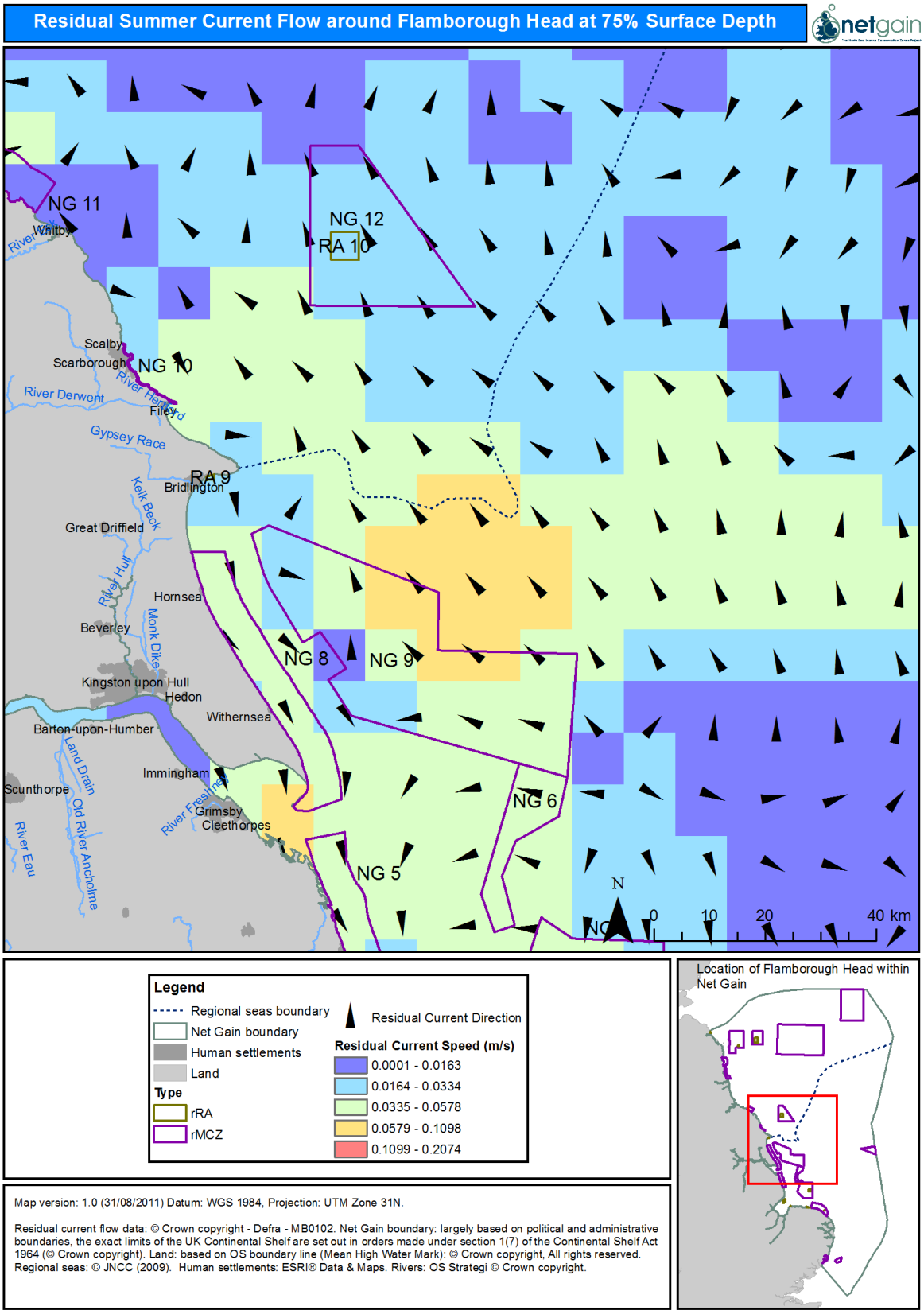


Figure 7.75 Residual summer current flow around Flamborough Head at 75% surface depth

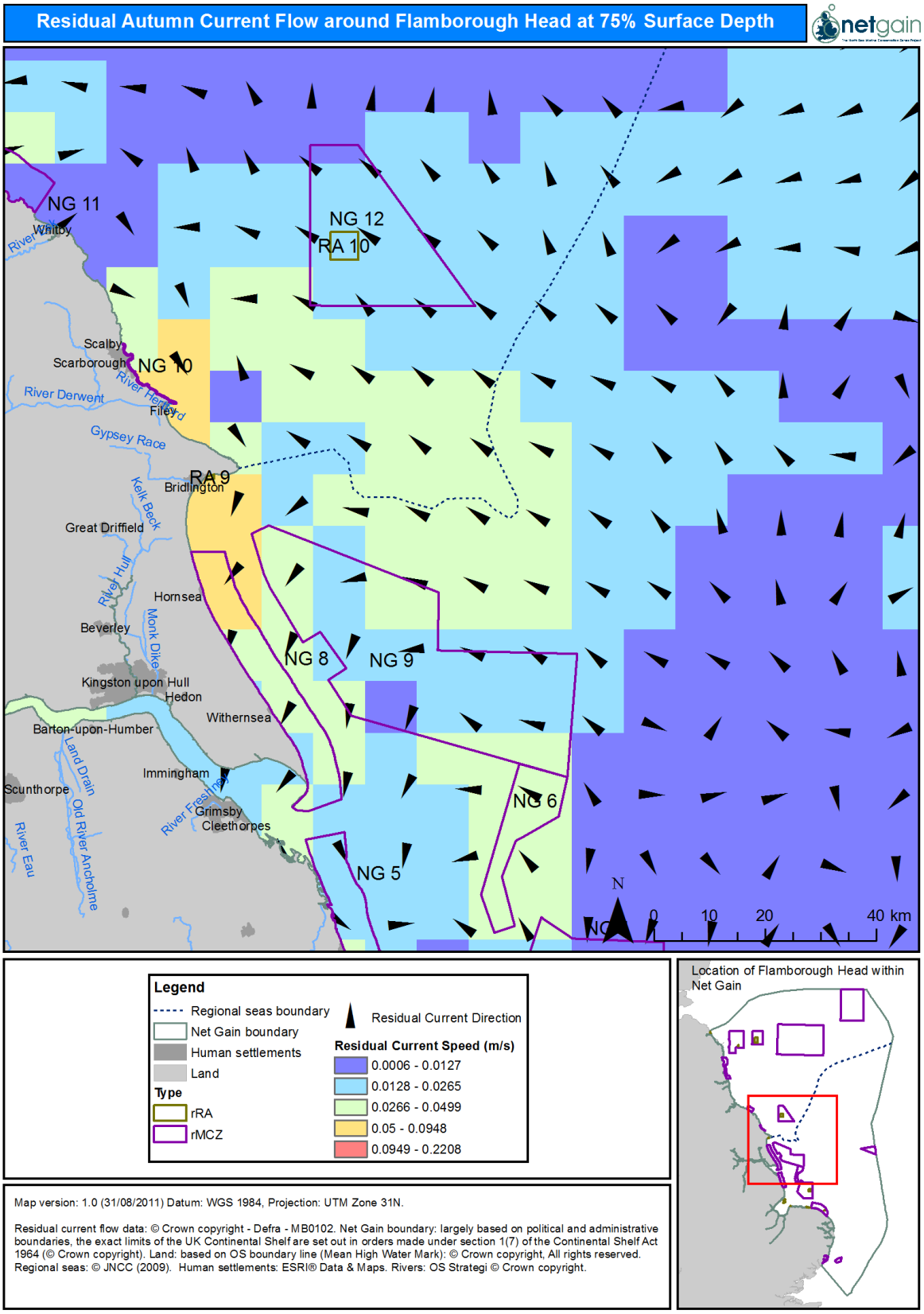


Figure 7.76 Residual autumn current flow around Flamborough Head at 75% surface depth

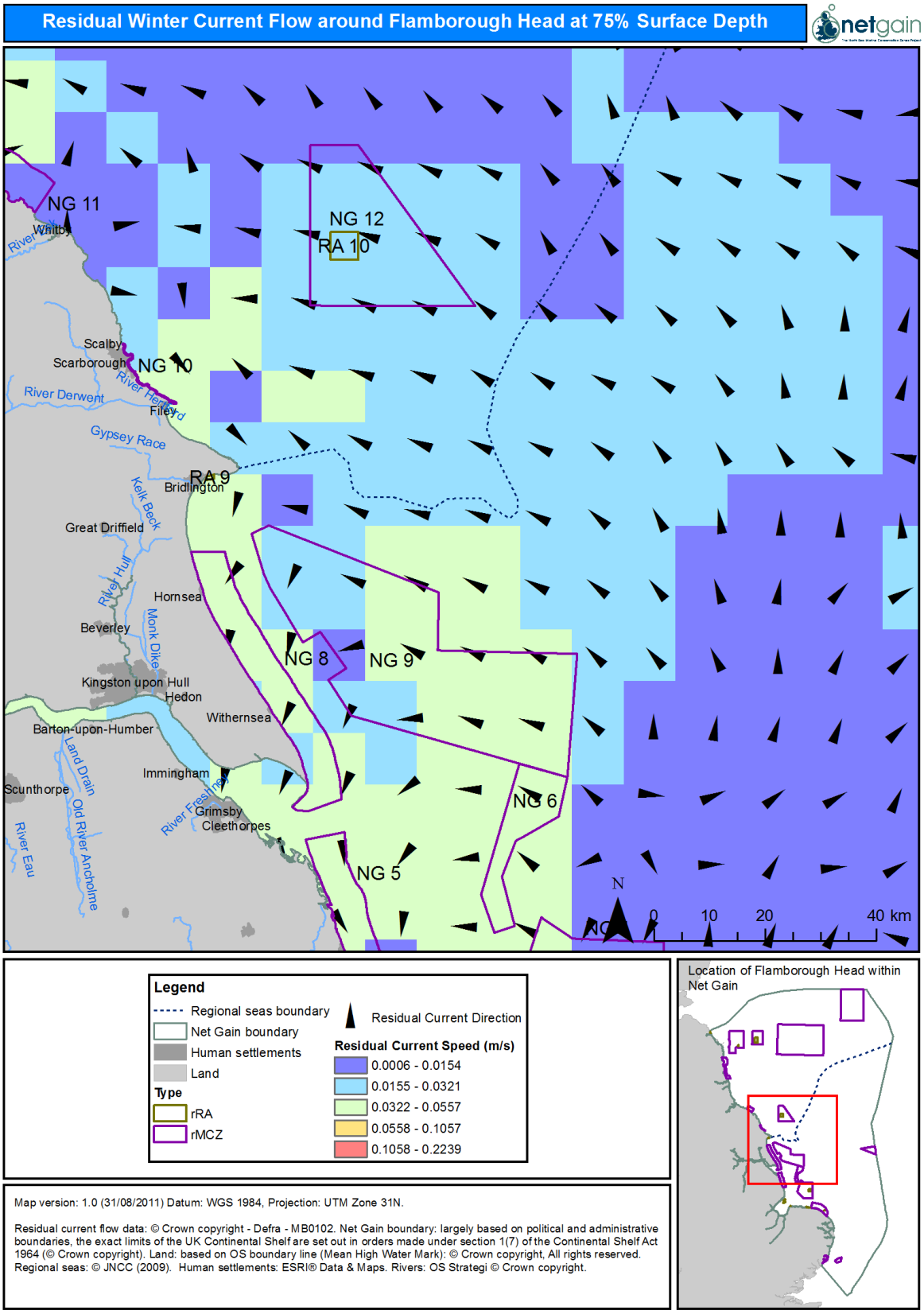
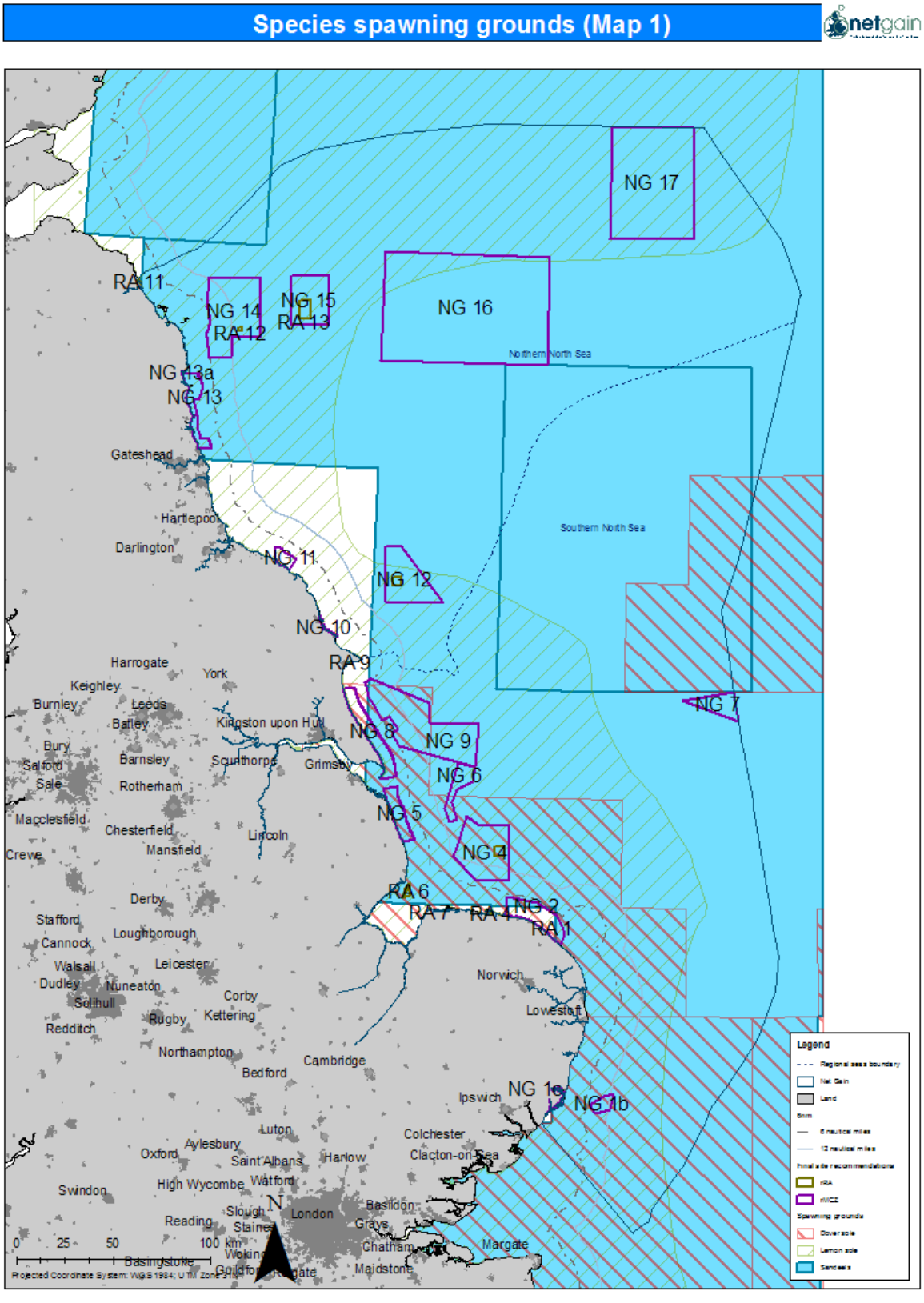
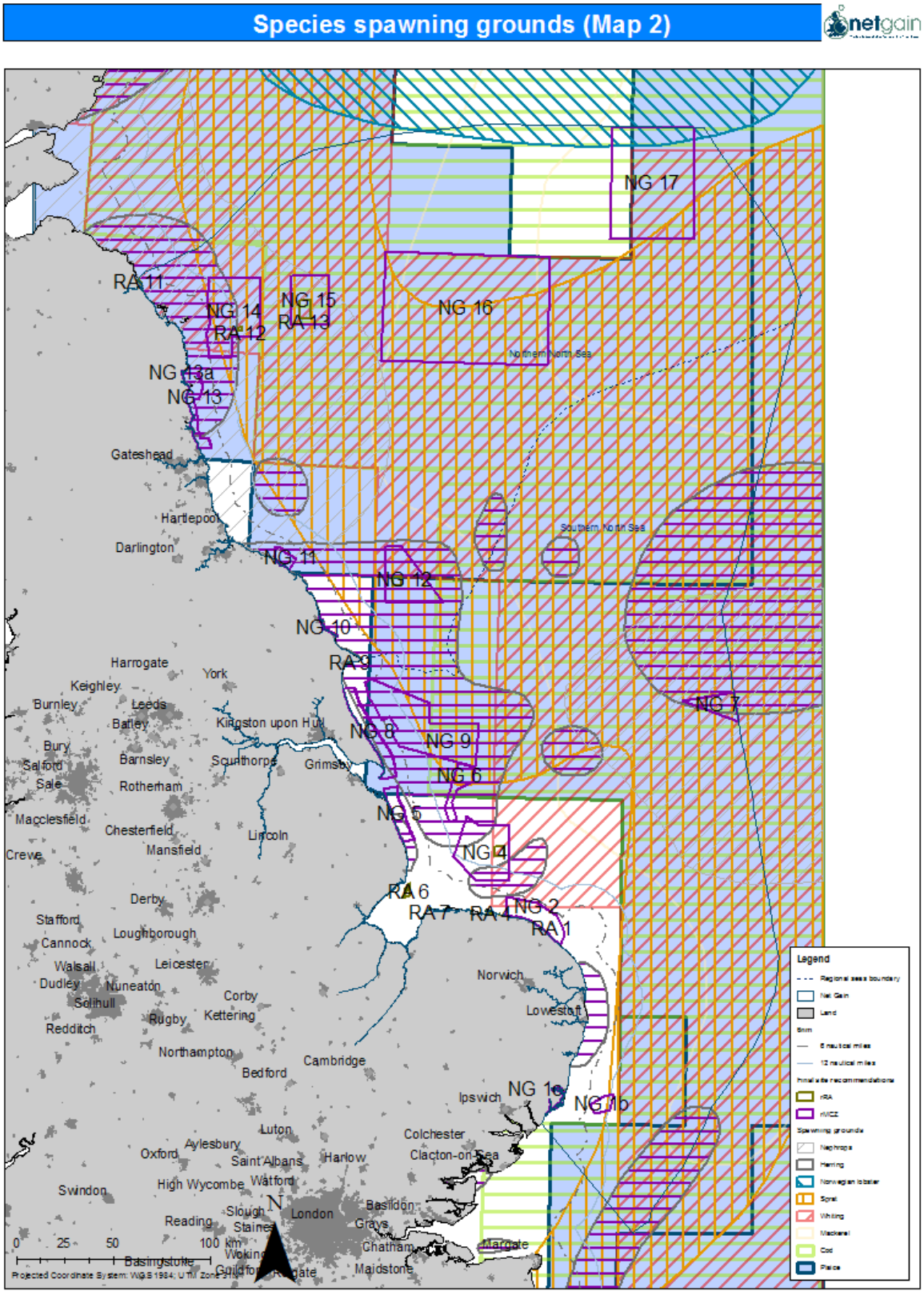


Figure 7.77 Residual winter current flow around Flamborough Head at 75% surface depth



Spawning data: Defra contract ME5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.78 Spawning grounds (map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.79 Spawning grounds (map 2)

Site boundary

This site was developed from three previous overlapping sites (NG2.10, NG2.13 and the northern section of NG2.09) containing A5.1: Subtidal coarse sediment and A5.4 Subtidal mixed sediments. This combination of the three sites accommodates seabird “hotspots” and other areas of ecological importance.

Following discussions in the Hub, the western boundary was clipped to the 6nm limit, leaving a “corridor” between the adjacent NG 8, which is clipped to the 3nm limit to allow for limited and legitimate diversification for inshore fisheries and for offshore developers. This was additionally supported by the adequacy targets being met elsewhere for the recommended features. Alternative discussions that supported the option to join sites NG8 and NG9 included a simplification of boundaries for management purposes and the provision of a level of protection for static gear fisheries to avoid the displacement of static gear (if left open the corridor has the potential to become an area of high mobile gear activity which would be largely incompatible with the static gear operation), ultimately this would provide socio-economic benefits for static gear fishing, with increased buy-in from this sector.

The 6nm boundary of the site aligns with a NESFC and ESFJC seasonal byelaw for any type of dredging gear from June 30th until October 1st.

The boundary that runs along the 6nm limit is clipped to the boundary of a windfarm and has provided a 500m buffer to accommodate. The north eastern boundary removed a triangle section from the original boundary to allow for a Round 3 windfarm footprint.

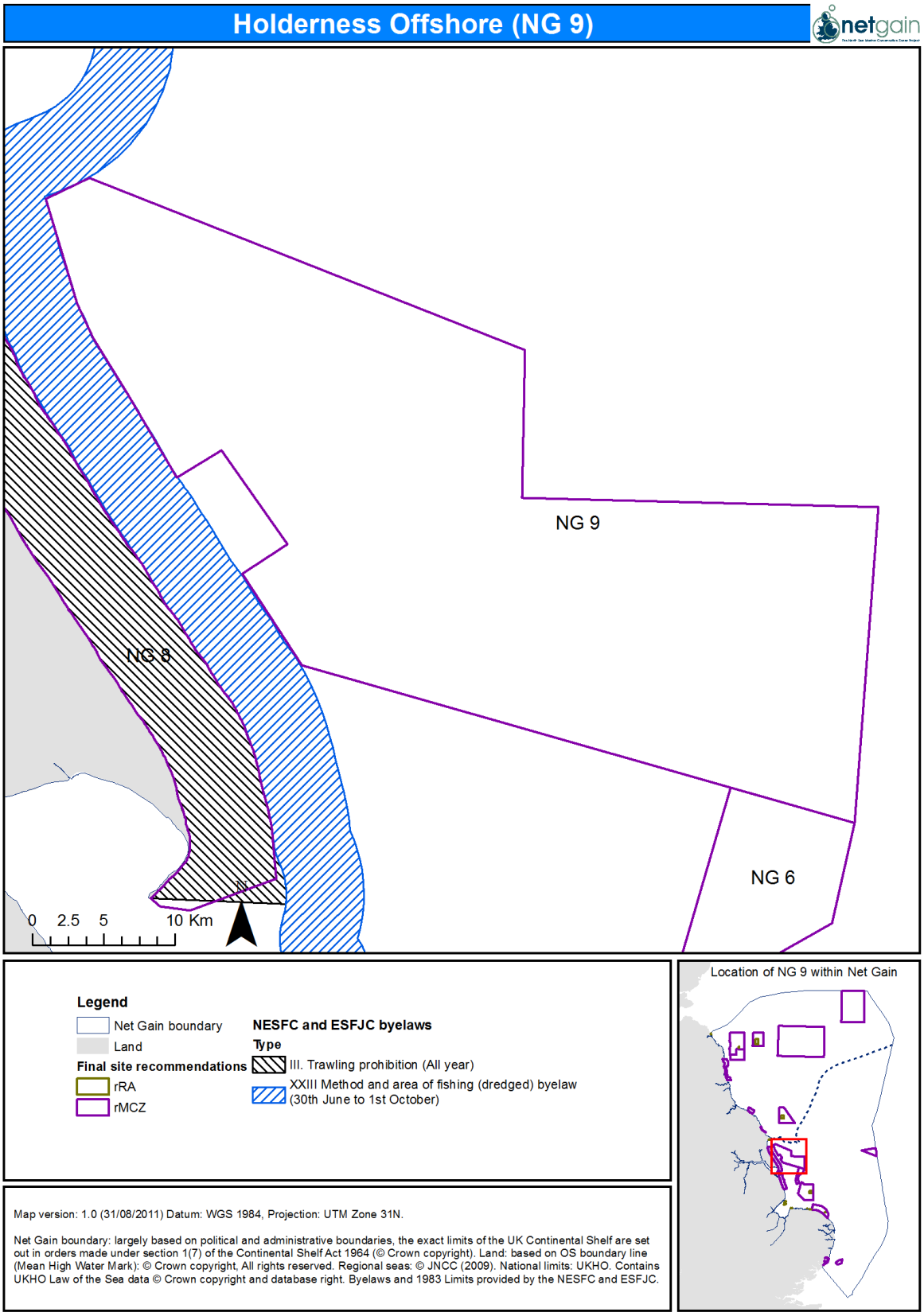


Figure 7.80 NG 9 site boundary with associated fishery management locations

Conservation objectives

Table 7.62 Conservation objectives for site NG 9, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal coarse sediment to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — L-H — L Surface abrasion: damage to seabed surface features — NS-H — L

	Physical change (to another seabed type)	M	L
	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.63 Conservation objectives for site NG 9, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal mixed sediments to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — L Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm — H — L

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

NG 9, Holderness Offshore does not fall in any present MPA sites. The south eastern side of the site aligns with NG 6, to provide protection for the Inner Silver Pit geological feature. On the coastal side of the site NG 8 lies approximately 6km away.

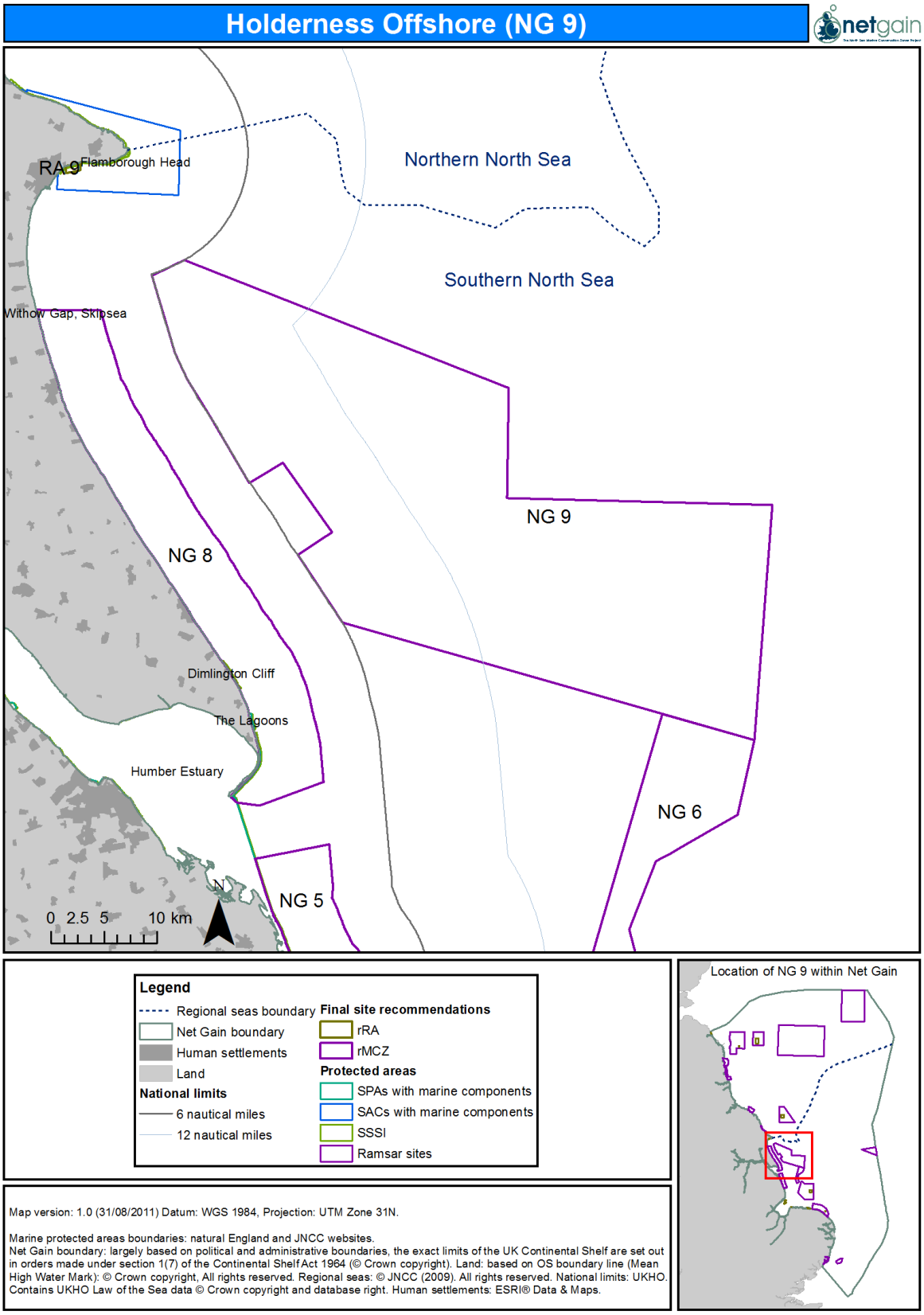


Figure 7.81 MPAs/rMCZs within or adjacent to NG 9

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site received good support (two scores of '3' plus one of '4'). Its importance as a fish and shellfish breeding ground was highlighted. There was currently felt to be good support from local potters and fishing interests, which was expected to remain given that current activities should be allowed to continue.

Data quality was felt to be moderate to high; although there were some concerns over the reliability/quality of underlying data. The quality of data for the same feature may vary across an area - data may often be very site-specific so whilst it is of high quality at one location, it may be of lower quality at another. It is therefore difficult to extrapolate a view on its quality overall. The degree of confidence in the underlying data in the northern portion of site in particular was questioned.

Views on contention covered the full range, from 'L' through to 'H'. Whilst it was noted that contention would be dependent on the range of management measures that were adopted, it was pointed out that any impact of management measures on static gear fisheries and the renewable sector would be contentious. There may also be some concerns about the north-eastern vertex of the site with respect to implications for beam trawling. The site covers an international fishing area; there are seasonal benthic fisheries for ground fish/scallops, and the area is utilised by French otter trawlers and Dutch beam trawlers. The area would be contentious for mobile gear fishers, given the suggested restrictions on this activity. The site was however supported by static fishers on the proviso that there would be no additional restrictions resulting in a change to their activity. One group summarised the contention issues as 'general contention – low; benthic fishing – moderate-high'

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- French commercial fishing sector:- Strongly against due to likely restrictions on activity
- Marine Aggregates:- Against (but would move to support if buffer distances between MCZ boundary and aggregate interests are confirmed as being sufficient to mitigate for indirect pressures)
- Dutch commercial fishing sector:- Strongly against due to likely restrictions on activity
- RSPB:- Support
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to MCZ designation – concern however over recent NE/JNCC guidance on size of buffers required to avoid additional mitigation requirements on licensed aggregate sites
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.64 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	McBreen, 2010
Broad-scale habitat	Survey	Tappin, et al. 2011
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010
Ross worm (*Sabellaria spinulosa*) reefs	Survey	Tappin, et al. 2011
Ross worm (*Sabellaria spinulosa*) reef occurrences	Survey: records	CEFAS, 1989-2005
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

ALLEN, J.H., 2008, *Humber Gateway Offshore Windfarm Biotope & Cobble Reef Report*. Report to Environmental Resources Management Ltd. Institute of Estuarine and Coastal Studies. University of Hull.

ALLEN, J.H., BURLINSON, F. and BURDON, D., 2006. *Humber Gateway Offshore Windfarm Sabellaria Report.* Report to Environmental Resources Management Ltd, Institute of Estuarine and Coastal Studies, University of Hull.

CEFAS. 1989-2005. *Ross worm (Sabellaria spinulosa) occurrences from grab and beam trawl surveys.*

EAST YORKSHIRE RINGING GROUP-EYRG, 2010. *Gannet feeding ranges from Bempton cliffs via satellite tagging*, available from http://www.eyrg.co.uk/Articles/Microsoft%20Word%20-%20Progress%20report2%20Bempton%20gannets%20RHWL%20220211%20pdf.pdf (accessed on 10/08/11).

EVANS, C.D.R., CROSBY, A., WINGFIELD, R.T.R., JAMES, J.W.C., SLATER, M.P. and NEWSHAM, R., 1998. *Inshore seabed characterisation of selected sectors of the English coast*. British Geological Survey Technical Report WB 98/45.

IPC, 2010. *SCOPING OPINION, Proposed Hornsea Project One Offshore Wind Farm, Infrastructure planning commission.*

JNCC AND NATURAL ENGLAND, 2010. *Marine conservation zone projects: identifying marine conservation zones, a quick reference guide.*

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

MANDER, L., EADES, R.A & CUTTS, N.D., 2009. *Occurrence and distribution of marine mammals off the Holderness coast: sightings made during aerial seabird surveys. Naturalist* 134: pp 129-134

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

RSPB, 2010. *RSPB species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby 2010

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ DOCE, D., GREEN, M., GALLYOT, J., GEORGIOU, L., BRUTTO, D., MARZIALETTI, S., HOPLA, E., RAMSAY, E., FIELDING, H. 2011. *The Humber Regional Environmental Characterisation.* British Geological Survey Open Report OR/10/54. 357pp. MALSF, Crown copyright.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

UKSEAMAP, 2010. *Interactive Map* available from: http://jncc.defra.gov.uk/page-5534&LAYERS=PredictedHabitats,UKCS (accessed on 09/08/11).

7.10 Marine Conservation Zone: NG 10, Castle Ground

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. The ecological description has been updated to reflect RSPB feedback on the IA. No changes have been made to recommendations or boundaries.

Site name

NG 10, Castle Ground

Site centre location

54° 15’ 21’’N, 0° 21’ 08’’W
54.255858°, -0.352408°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

3.70km² / 370.40ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

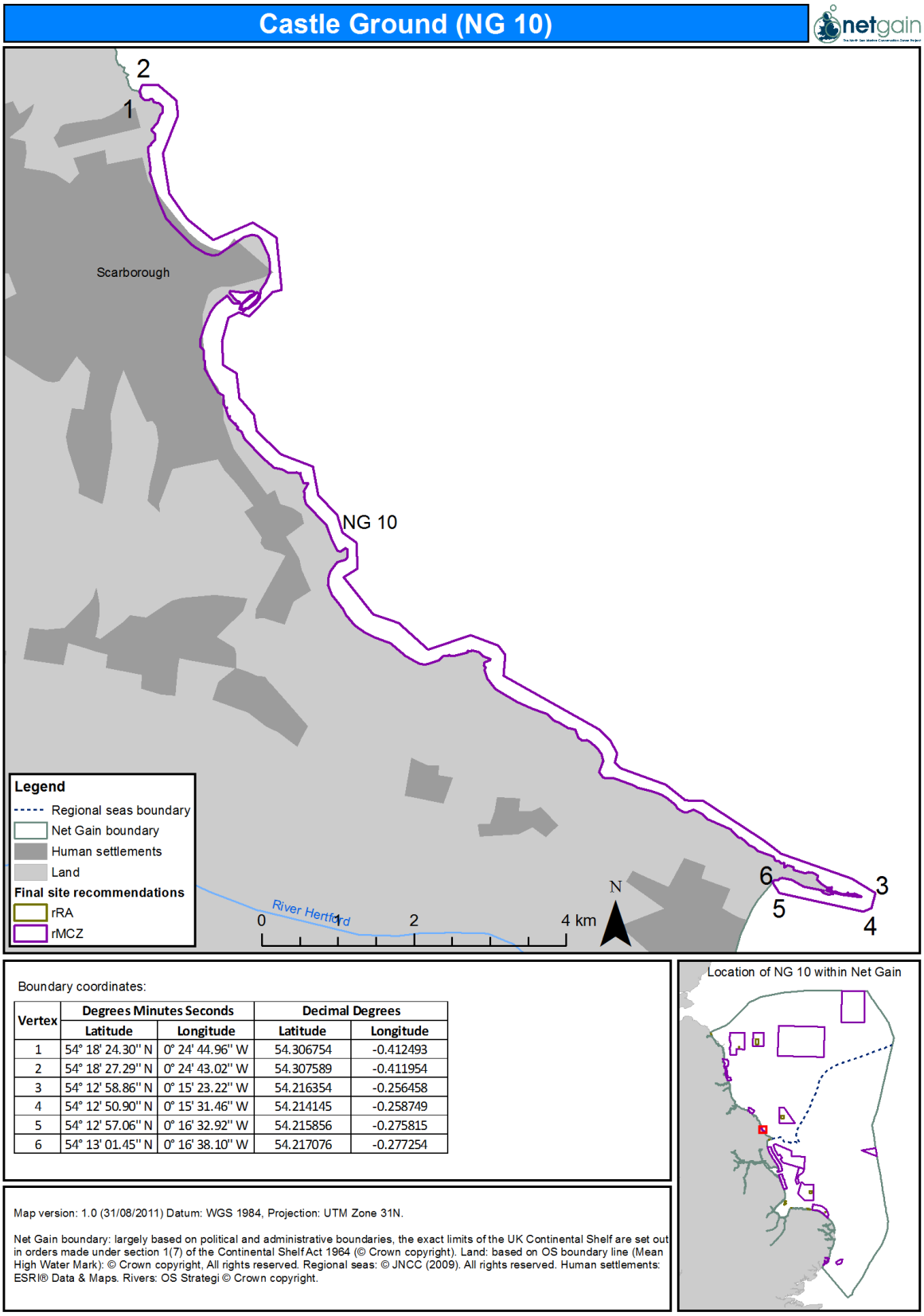
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.65 Features proposed for designation within NG 10, Castle Ground

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A1.1: High energy intertidal rock	0.08km²
Broad-scale habitat	A1.2: Moderate energy intertidal rock	0.44km²
Broad-scale habitat	A1.3: Low energy intertidal rock	0.03km²
Broad-scale habitat	A2.1: Intertidal coarse sediment	0.06km²
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	0.62km²
Broad-scale habitat	A2.3: Intertidal mud	0.02km²
Habitat of conservation importance	Intertidal underboulder communities	3 points
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.66 Features within NG 10, Castle Ground not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A3.1: High energy infralittoral rock	It was agreed at the regional hub that this site was to be restricted to the intertidal area, therefore this feature should not be included. Its apparent presence within the site is likely to be an artefact of poor resolution of the data.
Broad-scale habitat	A5.2: Subtidal sand	It was agreed at the regional hub that this site was to be restricted to the intertidal area, therefore this feature should not be included. Its apparent presence within the site is likely to be an artefact of poor resolution of the data.
Habitat of conservation importance	Littoral chalk communities	Although present at the site this feature was poorly represented spatially and was therefore not considered for designation.
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	It was agreed at the regional hub that this site was to be restricted to the intertidal area, therefore this feature should not be included. Its apparent presence within the site is likely to be an artefact of poor resolution of the data.
Habitat of conservation importance	Subtidal chalk Subtidal chalk (modelled)	It was agreed at the regional hub that this site was to be restricted to the intertidal area, therefore this feature should not be included. Its apparent presence within the site is likely to be an artefact of poor resolution of the data.
Habitat of conservation importance	Blue mussel beds	Although present at the site this feature was poorly represented spatially and was therefore not considered for designation.
Species of conservation importance	n/a	n/a



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	54° 18' 24.30" N	0° 24' 44.96" W	54.306754	-0.412493
2	54° 18' 27.29" N	0° 24' 43.02" W	54.307589	-0.411954
3	54° 12' 58.86" N	0° 15' 23.22" W	54.216354	-0.256458
4	54° 12' 50.90" N	0° 15' 31.46" W	54.214145	-0.258749
5	54° 12' 57.06" N	0° 16' 32.92" W	54.215856	-0.275815
6	54° 13' 01.45" N	0° 16' 38.10" W	54.217076	-0.277254

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.82 Location and extent of site NG10 (Castle Ground)

Site summary

NG 10 is a coastal site running from Filey Brigg in the south to just north of Scarborough in the North East of England. The depth range of the site is between 10m above mean low water mark and 5m deep (Figure 7.86), and the seabed is characterised by intertidal rocky and sediment features. The site has good benthic biodiversity and is used as a spawning location by fish species. Sea bird species such as kittiwake and turnstone use the intertidal zone for foraging and the subtidal waters offshore of NG 10 are an important area for large numbers of kittiwake, guillemot, razorbill, gannets and puffins. The coastal areas of NG 10 provide nesting and breeding habitat for these offshore foraging species with c.11, 500 breeding pairs within the site. Approximately 50% of the English population of purple sandpiper are found within NG 10 (mostly associated with Cayton, Cornelian and South Bays SSSI and the south of the Scarborough and Filey Brigg SSSI).

Detailed site description

This site was proposed due to its mosaic of intertidal features. This includes six broad scale habitats A2.2: Intertidal sand and muddy sand, A2.1: Intertidal coarse sediments, A1.2: Moderate energy intertidal rock, A1.1: High energy intertidal rock, A1.3: Low energy intertidal rock and A2.3: Intertidal mud. The habitat of conservation importance intertidal underboulder communities is also a feature of this site. The site covers a total surface area of 3.70km^2. Physically the site sits along the Yorkshire coast and runs from Scalby Mills (Lat 54.306754, Long -0.412493) to the north of Scarborough all the way down to the southern extension of Filey Brigg (Lat 54.217076, Long -0.277254) approximately 14.5 km to the south.

Rapid cliff erosion is the main sediment source on the Yorkshire coast. Beaches are replenished by a complex sediment transport system of which these eroding cliffs are an integral part. The large sand beach in Filey Bay consists of fine-medium sand, muddy sand/sandy mud and coarse or mixed sediment habitats (Allen, 2008) eroded from the Upper Jurassic sequence in the cliffs of Filey Brigg (English Nature, 2001). Beaches can be made up from shingle and small sand, with wave-cut rocky platforms, which reduce erosion rates and absorb wave energy so are considered natural coastal defences (English Nature, 2001). Most of the coast of NG10 has no man-made coastal defences, allowing for erosion and other natural coastal processes, referred to as a 'Do Nothing' coast protection policy. Where there are defences, localised cliff erosion can be prevented (English Nature, 2001) i.e. at Scarborough where significant defences were installed using the dark grey and hard igneous rock (Larvikite) from Larvik in Norway, around the castle headland. Given the presence of these hard defences it is likely that this small section of the site would not achieve favourable condition.

The inclusion of an intertidal site as a MCZ can have a positive effect on the associated terrestrial coastline. Cayton, Cornelain and South Bays SSSI, in the middle of NG10, for instance includes cliffs that are of importance for species rich vegetation and assemblages of invertebrates (Royal Haskoning, 2007).

NG10 supports areas of sandy shores where the sediment is well aerated and drained and particle size ranges from 0.02-2mm. Sandy shores provide habitats for a number of species including worms, e.g. the lugworm (*Arenicola marina*), and razor shells (Family Solenidae). The strandline is where flotsam (ship wreckage and algae) and jetsam (items discarded from ships i.e. rubbish and plastic) are deposited by the sea during high tides. The main energy input of sandy shores comes from natural flotsam. Algae are a natural flotsam and can provide marine and terrestrial invertebrates with suitable habitats, which also provide important food sources for wading birds.

All rocky shores in Scarborough (Scalby Mills – North Bay and Holbeck/Black Rocks – South Bay) and Filey Brigg (north and south side) follow general patterns of floral and faunal zonation (Hull, 1995). The shores are typically defined by the species present at different tidal heights (low tide-high tide) and wave exposure of the site. Some species present on these shores are only found in the north of

the country. Rocky shore flora and fauna provide habitat and food sources for larger offshore species, e.g. fish eat zooplankton and copepods (Phylum Arthropoda) and marine mammals eat fish, crabs and snails.

In a study conducted in 1995, 225 species were found belonging to 10 different Phyla at Filey Brigg, at the Spittals, the wreck of the Eglantine at the end of the Brigg and High Brigg at the seaward side. The greatest number of species belonged to the Mollusca, Algae and Arthropoda Phyla and the least number to the Echinodermata and Tunicata Phyla (Table 7.67). Mussels beds have been recorded at Filey Brigg since 1965 (Seed, 1969) and still find the Brigg a suitable habitat.

Table 7.67 The 10 Phyla identified at Filey Brigg in 1995, descriptions and numbers of species

Phylum	Description	No. of species
Mollusca	Unsegmented invertebrates	43
Algae	Photosynthetic organisms - can be unicellular, colonial or multicellular	40
Arthropoda	Segmented invertebrates with jointed limbs and an exoskeleton	38
Annelida	Segmented worms	24
Bryozoa	Colonial sessile animals	21
Chordata (Pisces)	Subphylum of Chordata - fish	20
Cnidaria	Sea anemones, jellyfish, hydroids, corals, sea pens and sea fens	14
Porifera	Sponges – sessile, filter feeding animals	9
Echinodermata	Brittlestars, sea stars, starfish, sea urchins, sea cucumbers	8
Chordata (Tunicata)	Subphylum of Chordata - animals with a nerve cord and notochord as larva but not as adults	8

The coastal areas in and around NG10 are rich in plankton providing ideal inshore and offshore habitats for fish spawning and nursery grounds. Herring spawning and nursery areas occur inshore from the Tees estuary down to Flamborough (

Table 7.68). Sprat and cod both spawn offshore, with the cod spawning area extending inshore in the vicinity of Flamborough (Natural England, 2011). The area is an important spawning ground for lemon sole and also as an important nursery ground for cod, whiting, plaice, and lemon sole (Figure 7.87; Figure 7.88).

The National Biodiversity Network (NBN), report eight separate occurrences of the lesser sandeel (*Ammodytes tobianus*) in the South Bay area of Scarborough (National Biodiversity Network, 2011). This is the most abundant species of sandeel found in British waters and is indicative of a sandy habitat (Rowley & Wilding, 2008). As the sand eel is an important prey for a variety of predators (e.g. fish, sea birds, and mammals), they provide an important link between pelagic species and species further up the food chain (Fisheries.no, 2011).

Table 7.68 Fish use of site NG10 indicating direct or indirect use of NG10.

Common Name	Scientific Name	Spawning	Nursery	Use of NG 10
Herring	*Clupea harengus*	YES	YES	Directly
Sprat	*Sprattus sprattus*	YES	YES	Directly
Cod	*Gadus morhua*	YES	NO	Directly/indirectly
Lemon sole	*Microstomus kitt*	YES	YES	Indirectly
Whiting	*Merlangius merlangus*	NO	YES	Indirectly

Plaice	*Pleuronectes platessa*	NO	YES	Directly/indirectly

Marine mammals are common in the North Sea, including to the east of NG10. Recent sightings include harbour porpoises (*Phocoena phocoena*) (May, June, July and August 2011) and minke whale (*Balaenoptera acutorostrata*) (July, 2011) off the coast at Scarborough (Sea Watch Foundation, 2011). Past sightings include a beluga whale (*Delphinapterus leucas*) sighted off the Scarborough coast (Evans *et al*., 2003). Two species of seal in Britain, the grey (*Halichoerus grypus*) and harbour (*Phoca vitulina*), have a colony at Old Horse Rocks, Gristhorpe Bay just north of Filey Brigg. These mammals will feed on intertidal animals and fish found in NG10.

The cliffs from Filey to Scarborough provide habitats for nesting and breeding seabird species such as puffin (*Fratercula arctica*), guillemot (*Uria aalge*), razorbill (*Alca torda*), gannet (*Morus bassanus*), and kittiwake (*Rissa tridactyla*). There are approximately 11,500 breeding pairs on these cliffs, and cliffs adjacent to NG10 (e.g. Flamborough and Bempton Cliffs SPA). These species have been given the 'amber status' by the RSPB Category of Conservation Importance.

The area from Cayton Bay to Filey Brigg is recognised as a productivity and biodiversity hot spot. The area is sheltered and rich in zooplankton, molluscs and crustaceans providing support for wintering eider (The Wildlife Trusts, RSPB and Seasearch, 2010). During winter the intertidal area at Filey Brigg supports nationally significant numbers of purple sandpiper (*Calidris maritima*) (Royal Haskoning, 2007); 50% of the English population are found in this area. The intertidal zone is also important for foraging seabirds such as turnstone (*Arenaria interpres*), which is usually present between August and May. Guillemot, gannet, razorbill, shag, eider, red-throated diver and velvet scoter forage in the area offshore from NG10 (RSPB 2012, pers. comm.).

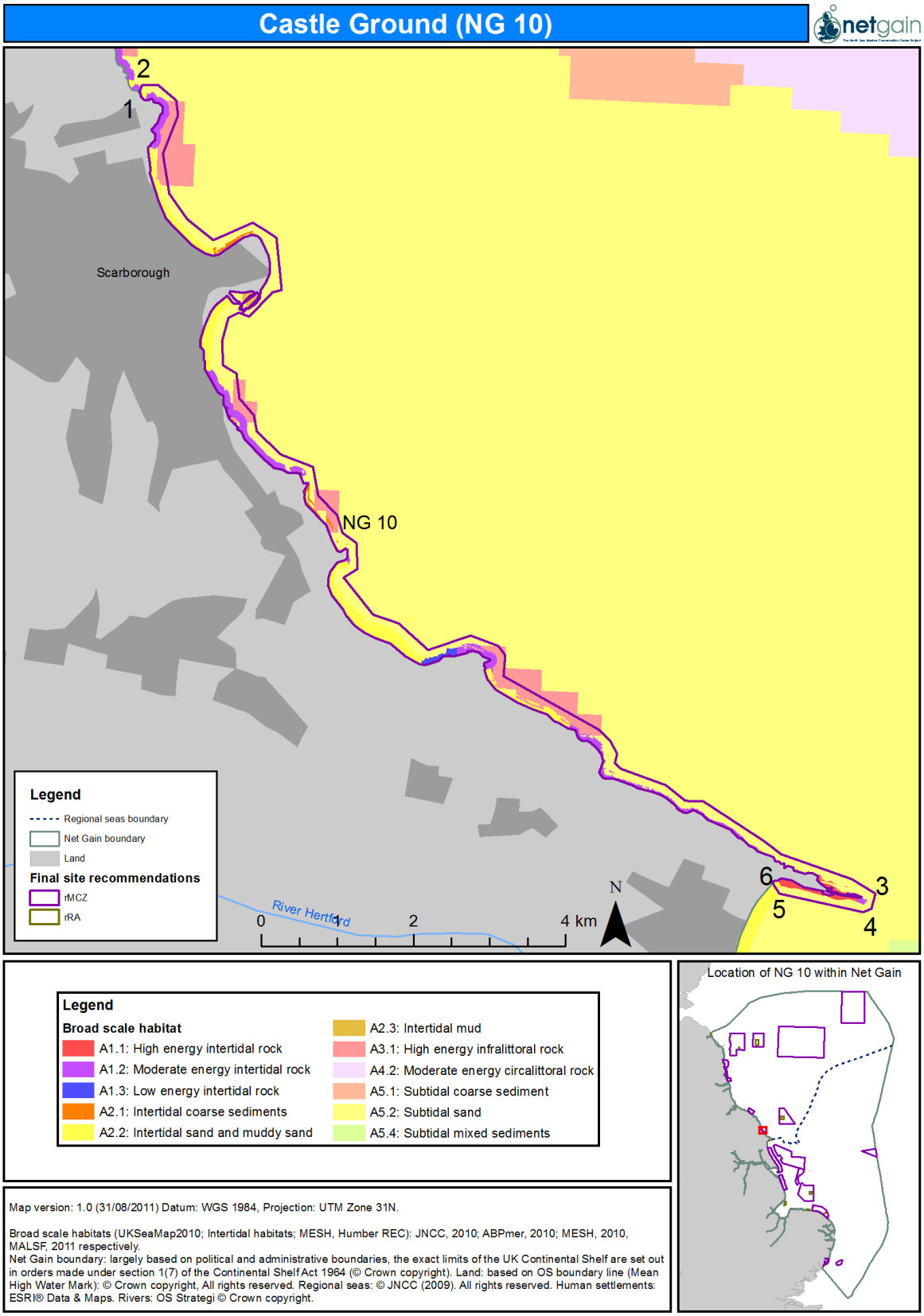


Figure 7.83 Broad-scale habitat present within NG 10

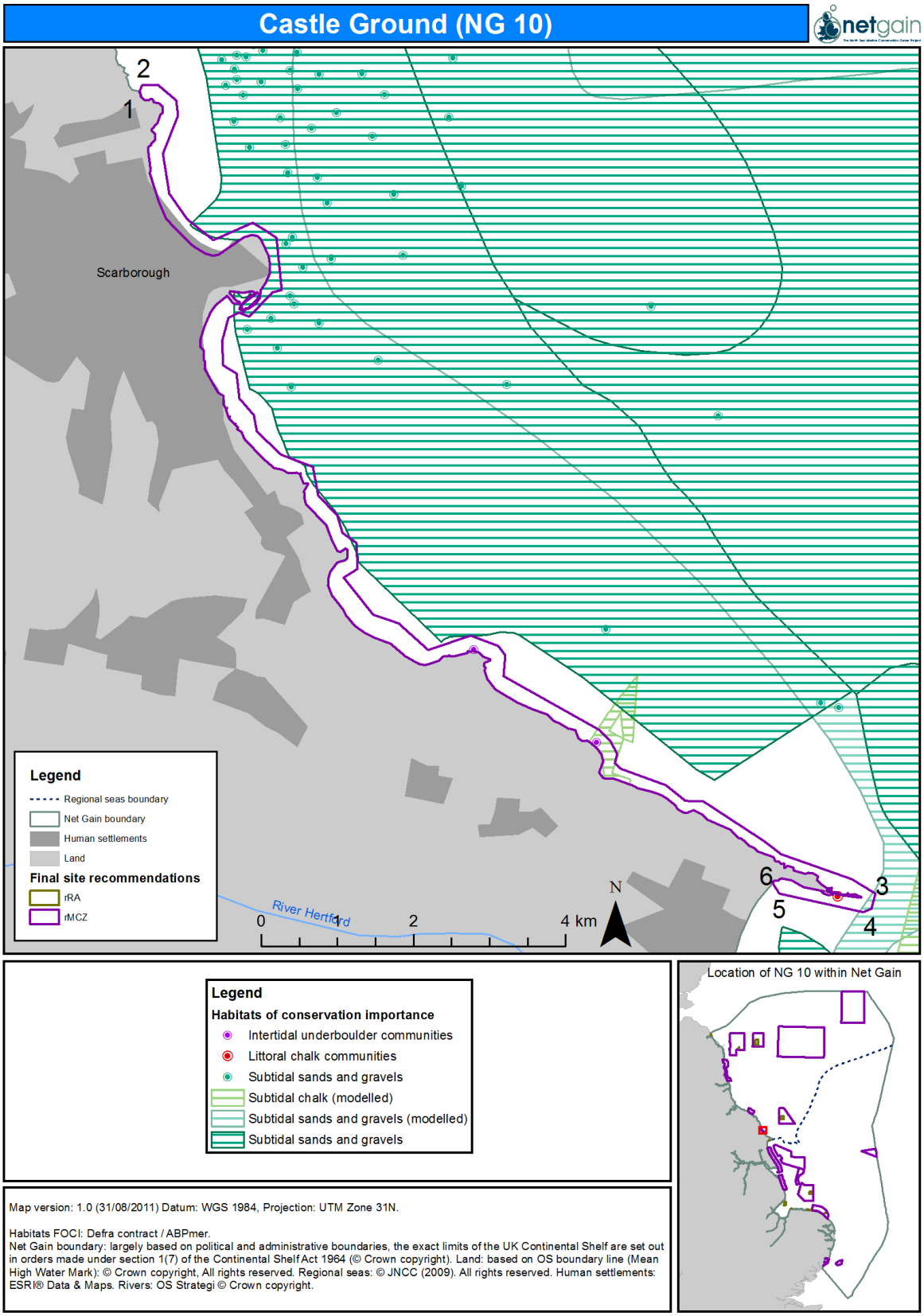


Figure 7.84 FOCI habitats and species present within NG 10

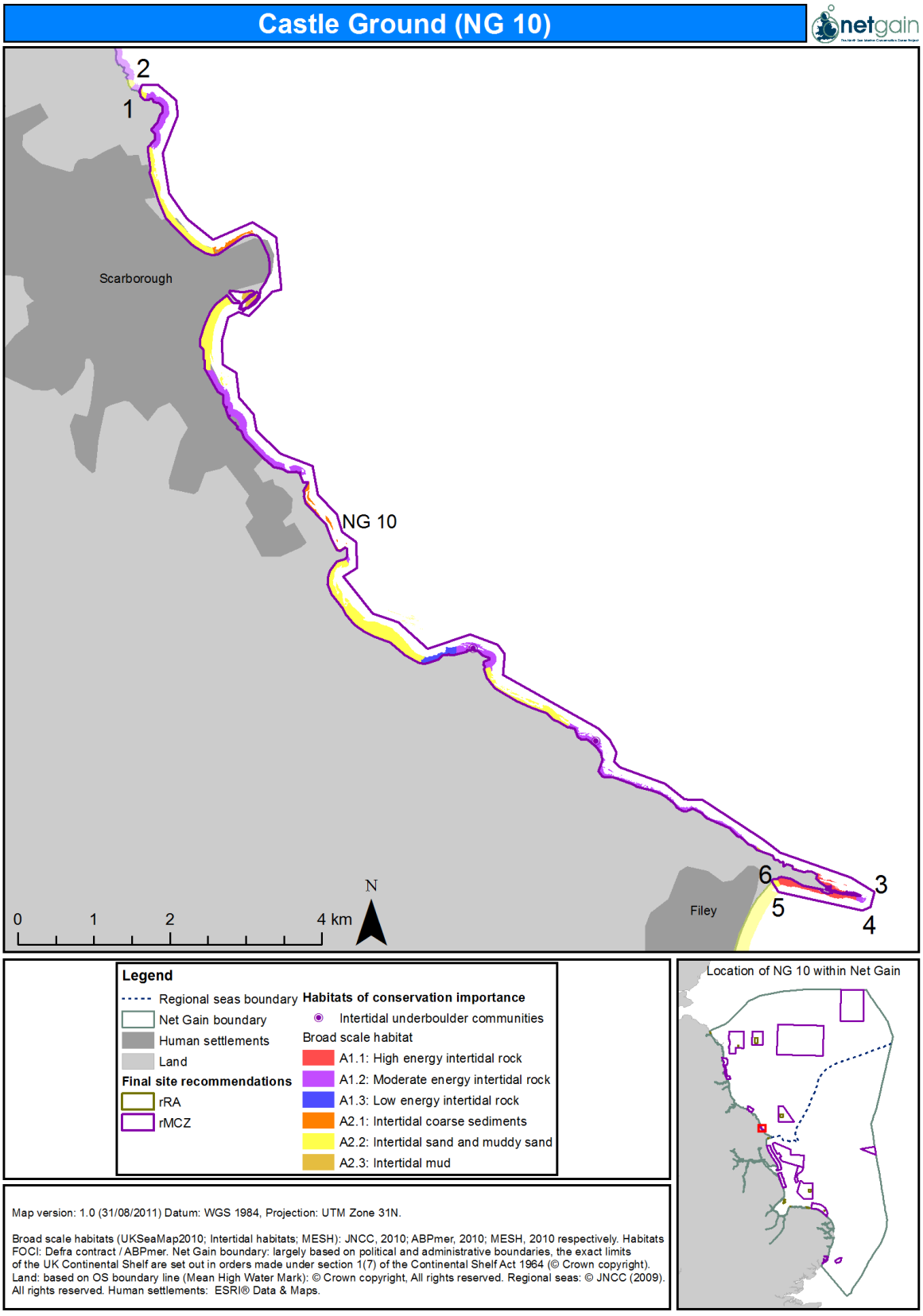


Figure 7.85 Features put forward for recommendation in NG 10

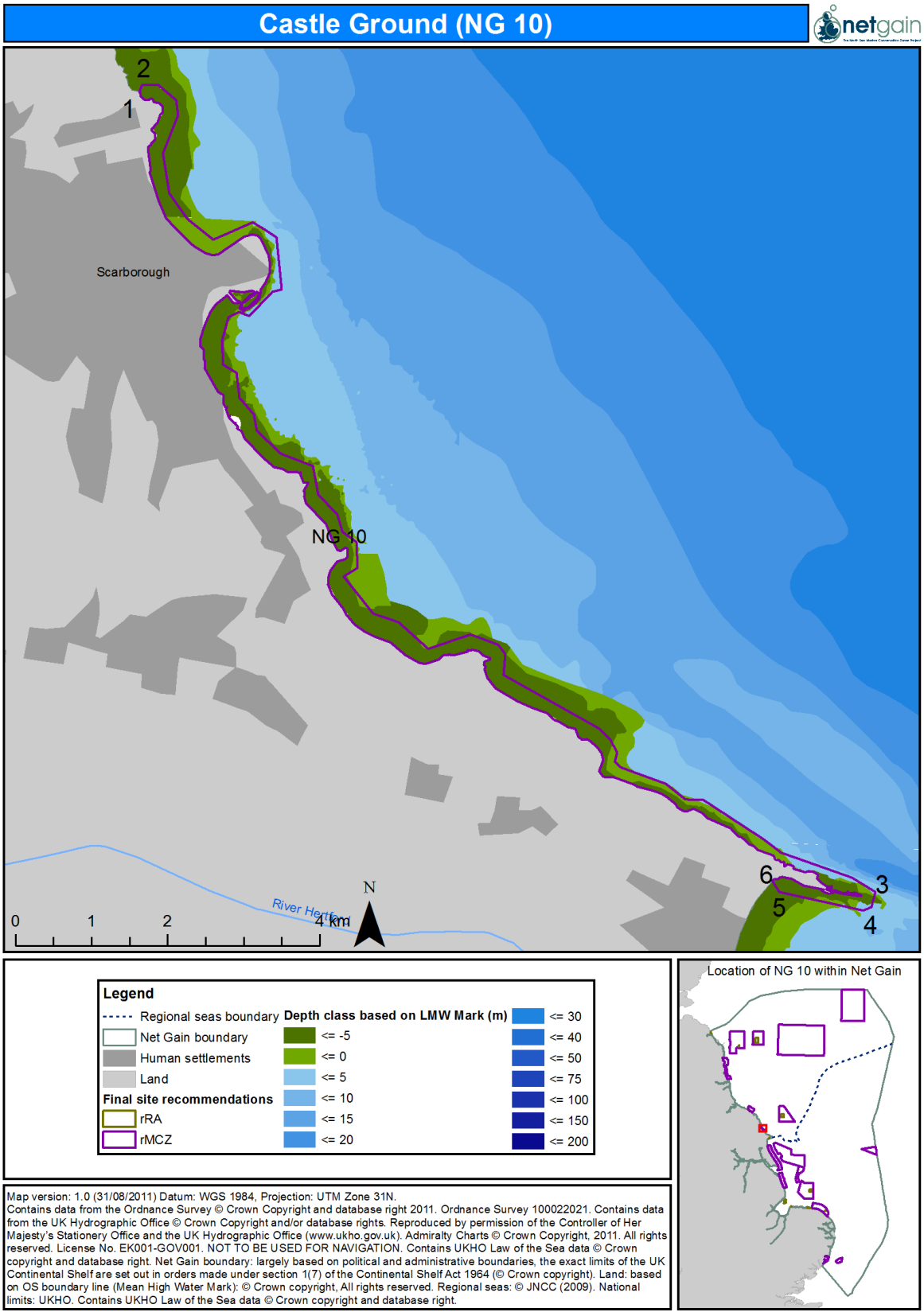


Figure 7.86 Bathymetry of NG 10

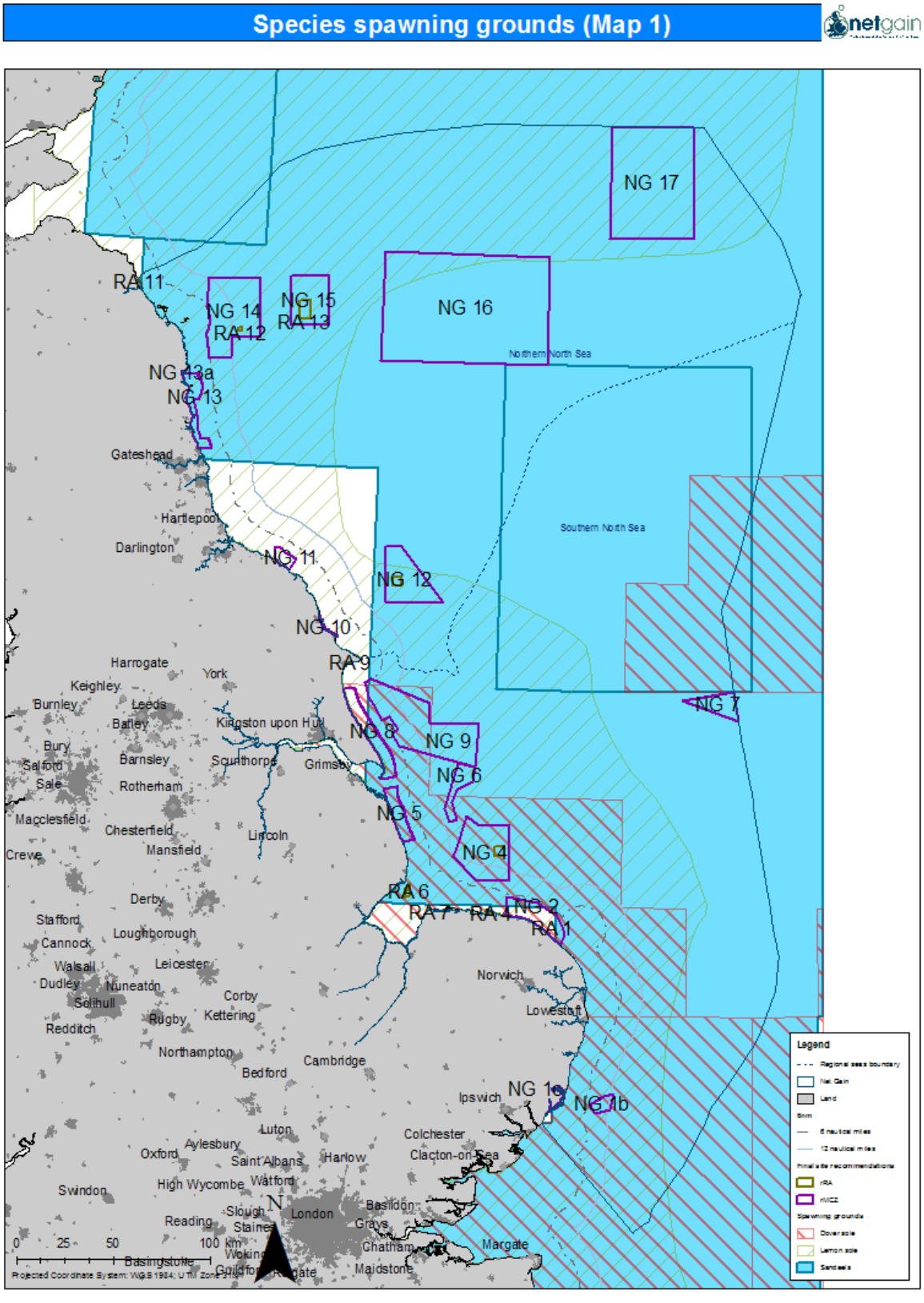


Figure 7.87 Spawning grounds (map 1)

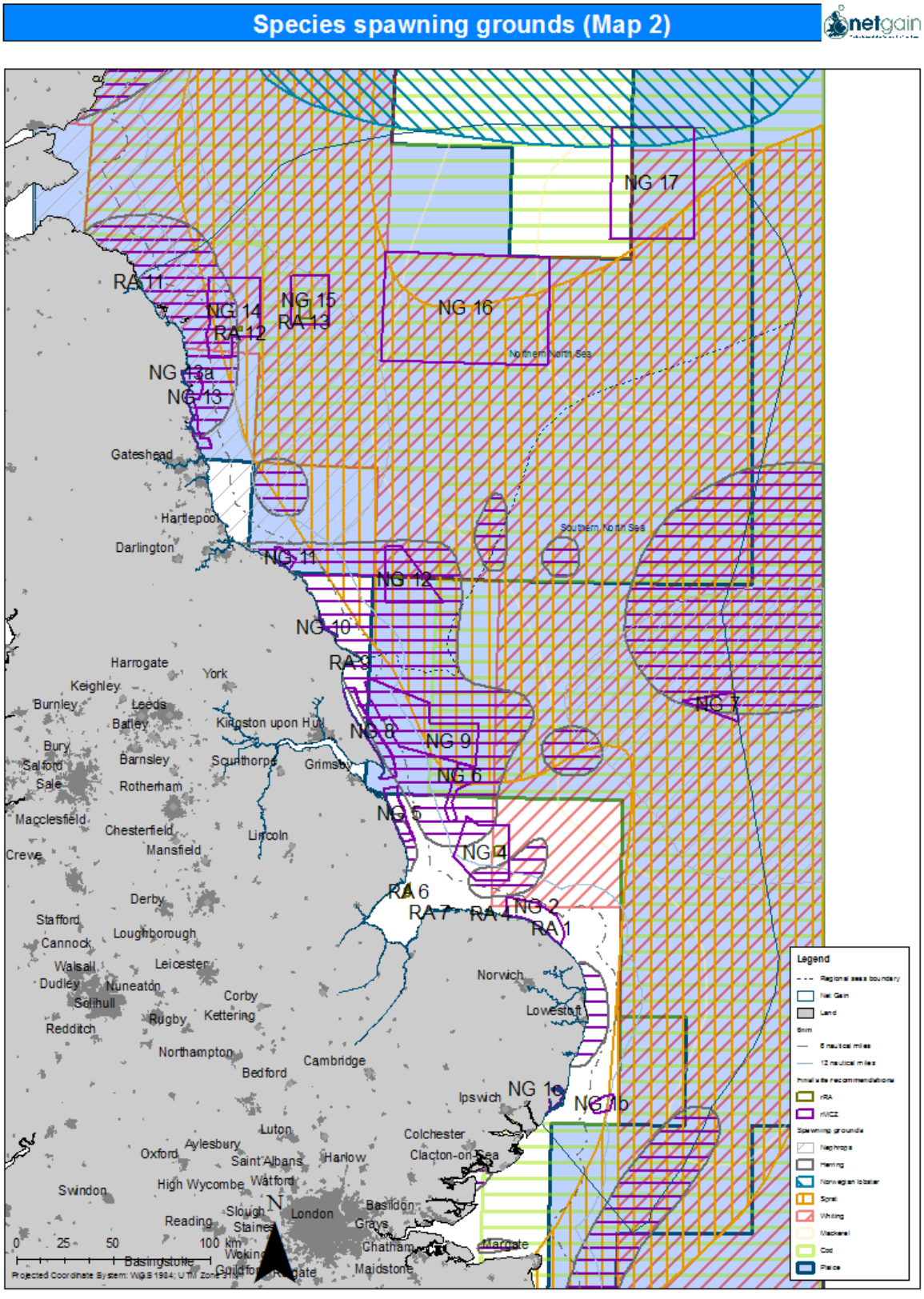


Figure 7.88 Spawning grounds (map 2)

Site boundary

This site was based on the original site NG2.14 from the 2nd iteration and is restricted to the intertidal area down to mean low water mark. Suggestion was made to extend the seaward side boundary to protect foraging seabirds but the Hub decided to leave the boundaries unchanged because of potential conflicts with recreation and tourism activities.

The southern boundary of the site is restricted to the base of Filey Brigg. This would exclude the sandy area to the north end of Filey Bay which is an important beach for tourism and would add little if no overall value to the site in terms of broad-scale habitats, or FOCI habitats and species.

The southern portion of the site around Filey Brigg encompasses a NESFC and ESFJC byelaw which provides a trawling prohibition all year round.

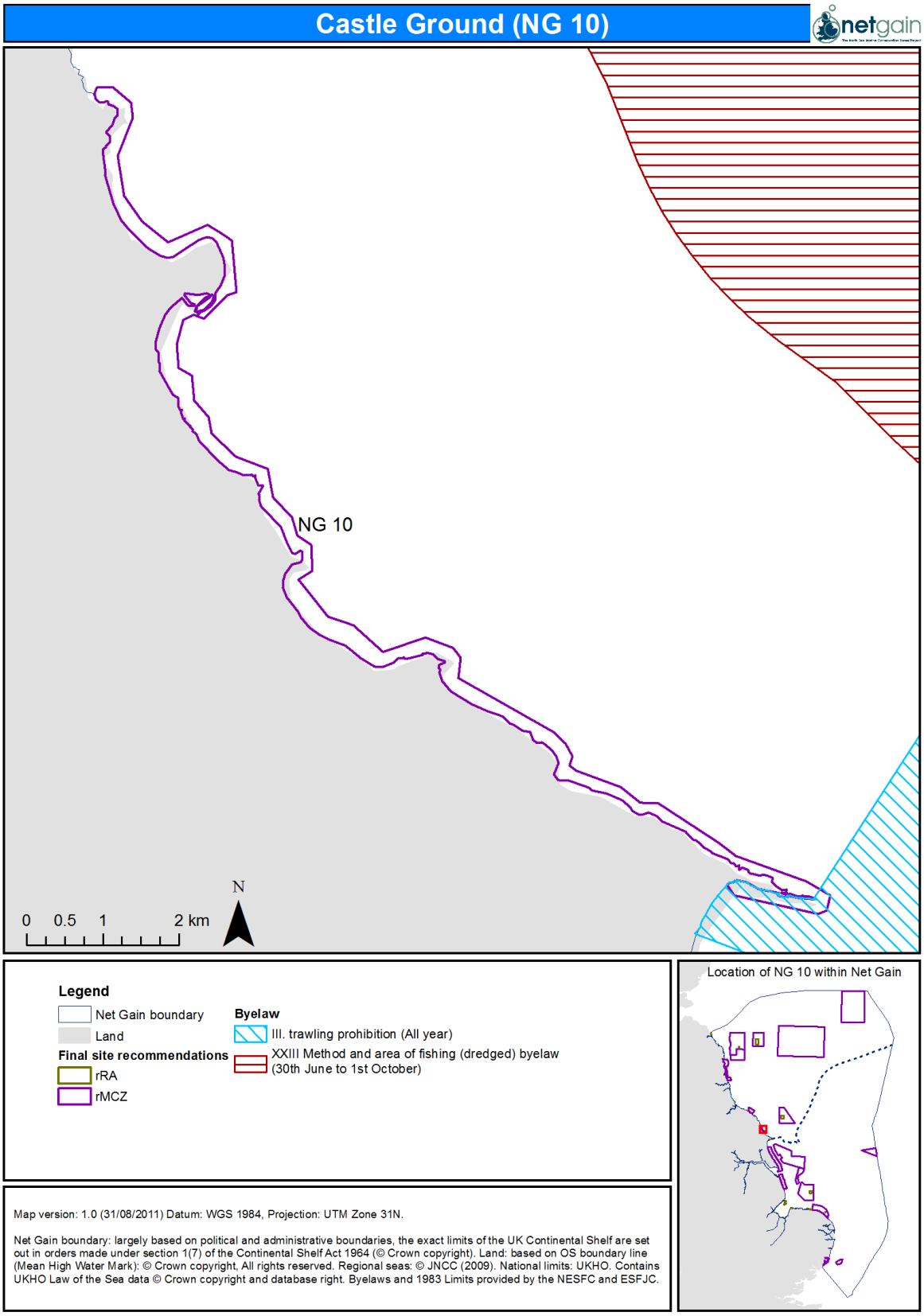


Figure 7.89 NG 10 site boundary with associated fishery management locations

Conservation objectives

Table 7.69 Conservation objectives for site NG 10, A1.1: High energy intertidal rock

Conservation Objective	
1 Maintain/ recover	High energy intertidal rock is representative of rocky seashores exposed to very strong waves and currents. Subject to natural change, maintain the High energy intertidal rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of High energy intertidal rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	High energy intertidal rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L Physical removal (extraction of substratum) — M-H — L

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-H	L
	Salinity changes - local	NS-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Atmospheric climate change	M	L
	Removal of target species (lethal)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Emergence regime changes - local	NS-M	L
	Introduction of microbial pathogens (disease)	NS-M	L
	Siltation rate changes (high)	L	L
	Siltation rate changes (low)	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.70 Conservation objectives for site NG 10, A1.2: Moderate energy intertidal rock

Conservation Objective	
1 Maintain/ recover	Moderate energy intertidal rock is moderately exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, maintain the Moderate energy intertidal rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy intertidal rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy intertidal rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L Physical removal (extraction of substratum) — M-H — L

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Siltation rate changes (high)	L-H	L
	Atmospheric climate change	M	L
	Removal of target species (lethal)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Emergence regime changes - local	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Introduction of microbial pathogens (disease)	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-M	L
	Water flow (tidal current) changes - local	NS-M	L
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
	Temperature changes - local	L	L
	Salinity changes - local	NS-L	L
	Siltation rate changes (low)	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.71 Conservation objectives for site NG 10, A1.3: Low energy intertidal rock

Conservation Objective	
1 Maintain/ recover	Low energy intertidal rock sheltered rocky and boulder shores found around the British coast where there is shelter form the prevailing south-westerly wind. Subject to natural change, maintain the Low energy intertidal rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Low energy intertidal rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Low energy intertidal rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — M-H — L

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Surface abrasion: damage to seabed surface features	M-H	L
	Temperature changes - local	L-H	L
	Organic enrichment	NS-H	L
	Siltation rate changes (low)	NS-H	L
	Water flow (tidal & ocean current) changes - regional/national	NS-H	L
	Water flow (tidal current) changes - local	NS-H	L
	Wave exposure changes - local	NS-H	L
	Wave exposure changes - regional/national	NS-H	L
	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Removal of target species (lethal)	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Introduction of microbial pathogens (disease)	NS-M	L
	Salinity changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.72 Conservation objectives for site NG 10, A2.1: Intertidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Intertidal coarse sediment is an uncommon broadscale habitat found at a few scattered sites in the British Isles and in north-western Europe. Subject to natural change, maintain the Intertidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Temperature changes - local — L-H — L Atmospheric climate change — M — L Physical change (to another seabed type) — M — L

	Physical removal (extraction of substratum)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	NS-M	L
	Siltation rate changes (high)	L	L
	Siltation rate changes (low)	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.73 Conservation objectives for site NG 10, A2.2: Intertidal sand and muddy sand

Conservation Objective	
1 Maintain/ recover	Intertidal sand and muddy sand are widespread along stretches of open coast around the British Isles whilst muddy sands are usually found in more sheltered areas such as estuaries. Subject to natural change, maintain the Intertidal sand and muddy sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal sand and muddy sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal sand and muddy sand is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Emergence regime changes (sea level) - regional/national	H	L
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L

	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Physical removal (extraction of substratum)	M	L
	Siltation rate changes (high)	M	L
	Siltation rate changes (low)	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Temperature changes - regional/national	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Removal of target species (lethal)	NS-M	L
	Salinity changes - local	L	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L	H
	Surface abrasion: damage to seabed surface features	L	H
	Temperature changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.74 Conservation objectives for site NG 10, A2.3: Intertidal mud

Conservation Objective	
1 Maintain/ recover	Intertidal mud is protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981. It is also a UKBAP Priority Habitat and on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, maintain the Intertidal mud in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal mud in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal mud is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Emergence regime changes (sea level) - regional/national	H	L
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L

	Physical removal (extraction of substratum)	M-H	H
	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Removal of non-target species (lethal)	M	M
	Temperature changes - regional/national	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L-H
	Removal of target species (lethal)	NS-M	L-H
	Salinity changes - local	L	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L	H
	Siltation rate changes (high)	L	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L	H
	Temperature changes - local	L	H
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.75 Conservation objectives for site NG 10, Intertidal underboulder communities

Conservation Objective	
1 Maintain/ recover	Intertidal underboulder communities are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Intertidal under boulder communities in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal under boulder communities in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal under boulder communities is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
Emergence regime changes (sea level) - regional/national	M	L
Introduction or spread of non-indigenous species & translocations (competition)	M	L

	Physical change (to another seabed type)	M	L
	Removal of target species (lethal)	M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Emergence regime changes - local	L	L
	Salinity changes - local	L	L
	Siltation rate changes (low)	L	L
	Temperature changes - local	L	L
	Water flow (tidal current) changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

NG 10, Castle Ground overlaps with the following SSSIs, Filey Brigg, Cayton, Cornelian and South Bays, North Bay to South Toll House Cliff, Gristhorpe Bay and Red Cliff and Iron Scar and Hundale Point to Scalby Ness.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.76 MPAs within or adjacent to NG 10

MPA Type	Site Name	Features Protected
SSSI	Filey Brigg	Not in GAP table Geological Wintering purple sandpiper
SSSI	Cayton, Cornelian and South Bays	Not in GAP table Geological Botantical Invertebrate Wintering purple sandpiper and turnstone
SSSI	North Bay to South Toll House Cliff	Not in GAP table Geological
SSSI	Gristhorpe Bay and Red Cliff	Not in GAP table Geological
SSSI	Iron Scar and Hundale Point to Scalby Ness	Not in GAP table Geological

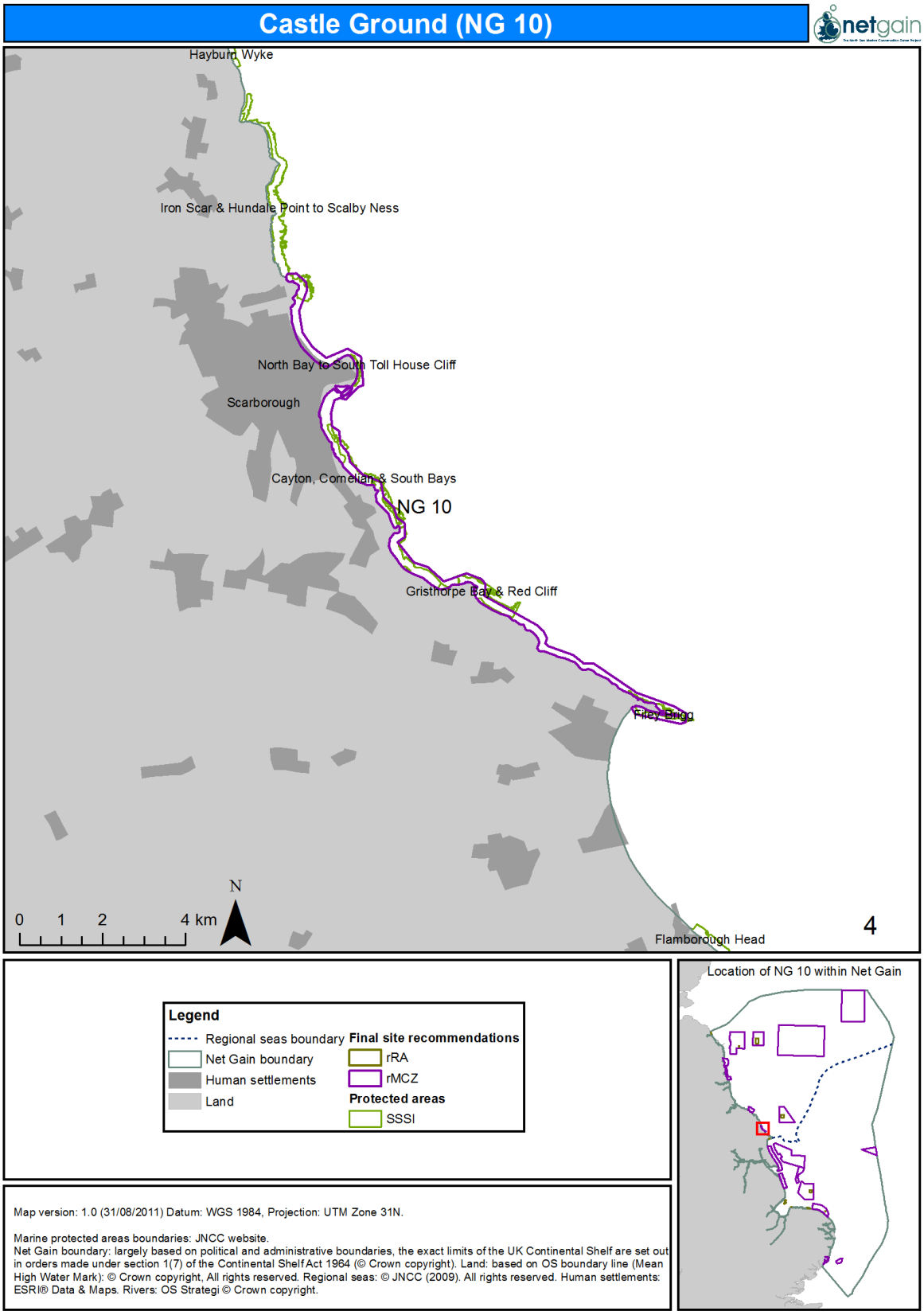


Figure 7.90 MPAs/rMCZs within or adjacent to NG 10

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site had strong support from the group that reviewed it at the Large Group Meeting.

Confidence in the underlying data was high.

The likely level of contention should the site be designated was felt to be low.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- The Crown Estate:- Support
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement
- RSPB:- Strongly support (if given a seaward extension).

Note: A seaward extension to the site to include areas for foraging bird interest was discussed in the run up to the 3rd iteration. There are c.11,500 breeding pairs of four key species along the coastline north of Filey Brigg, and the adjacent sea is important for foraging and rafting. Although there are no known problems facing the birds at present the RSPB and MCS wanted the issue noted to protect the birds from potential future conflicts. The Regional Hub members suggested there would not likely be conflicts with activities but noted this area is very important for tourism and recreational activity. The main season for seabird use of the site is April to late summer which would coincide with the main tourism season. It was also noted that breeding birds may need additional protection, but this would be seasonal and as the birds nest largely on cliff sites it would fall outside of the MCZ designation process which stops at the MHWS tidal limit. The NFFO noted that they cannot see the evidence for designating an MCZ for birds. There is a salmon fishery in this area with T&J nets being operated in the intertidal zone to the South of Filey Brigg (this area is already covered by byelaws and an agreed code of conduct) and there was concern that designation for birds may impact on this fishery.

At subsequent meetings the Regional Hub members decided not to extend the boundaries due to the potential conflicts with recreational activities. Given additional time and exploration of potential management implications it may have been possible to reach a consensus on a seaward extension.

Table 7.77 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Intertidal underboulder communities, Subtidal sands and gravels, Littoral chalk communities	Combination of historical and recent records	Tyler-Walters, et al. 2009
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010
Subtidal sands and gravels, Blue mussel beds, Subtidal chalk	Survey: records	North Sea Wildlife Trusts, 2010
Subtidal sands and gravels, Subtidal chalk	Modelled data	Tyler-Walters, et al. 2009

References

ALLEN, J. H. 2008 *Ecological Assessment of Yorkshire Coast Prohibited Trawling Areas* – Report to North Eastern Sea Fisheries Committee.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

ENGLISH NATURE, 2011. *Saltburn to Bridlington Coastal Natural Area Profile*.

EVANS, P. G. H., ANDERWALD, P. & BAINES, M.E. 2003. *Uk Cetacean Status Review.* Report to English Nature & Countryside Council for Wales.

FISHERIES.no, 2011. *The official Norwegian site: Sandeel*. < http://www.fisheries.no/ecosystems-and-stocks/marine_stocks/fish_stocks/sandeel/ > Accessed 05/08/2011

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 24: Task 2I. Intertidal habitats datalayer (Final). ABP Marine Environmental Research Ltd.

HULL, S. 1995. The Underwater Biology of Filey Brigg: Text of Preliminary Report.

JNCC. (2011). Species Accounts – Species Lists. < http://jncc.defra.gov.uk/page-1419 >Accessed 22/08/11.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

NATIONAL BIODIVERSITY NETWORK, 2011. *Interactive Map*. < http://data.nbn.org.uk/imt/?baselayer= Shaded&bbox=-0.4173731861841973,54.45938910747634,-0.3587508259652057,54.47378793325
569&mode=DESIGNATION&designation=JNCC_COLLATION_OF_TAXON_DESIGNATIONS > Accessed 03/08/2011.

NORTH SEA WILDLIFE TRUSTS. 2010. Broad-scale habitat survey records.

ROWLEY, S. & WILDING, C. 2008. *Ammodytes tobianus. Lesser sand eel. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme* Available at: < http://www.marlin

.ac.uk/speciesinformation.php?speciesID=2480 > Accessed 01/08/2011.Royal Haskoning, (2007). River Tyne to Flamborough Head SMP2: Final Report.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

THE WILDLIFE TRUSTS, RSPB and SEASEARCH, 2010. *Biodiverse Areas within the Net Gain region: A supportive guide to aid stakeholder identification of ecological interest areas that meets aspects of the Ecological Network Guidance.* November, 2010.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.11 Marine Conservation Zone: NG 11, Runswick Bay

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 11, Runswick Bay

Site centre location

54° 33’ 51’’N, 0° 42’ 58’’W
54.564447°, -0.716243°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

67.92km² / 6,792.35ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

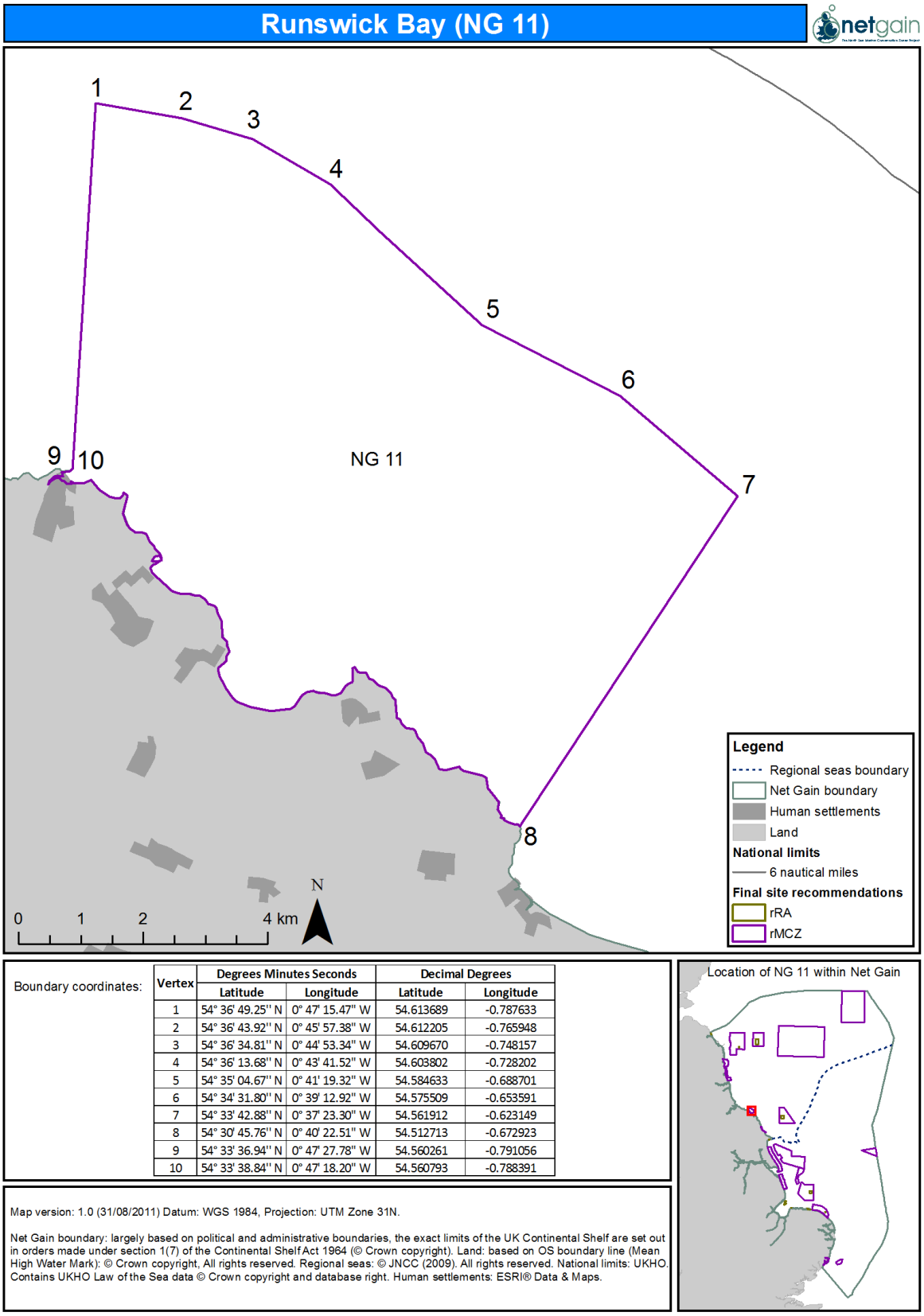
Table 7.78 Features proposed for designation within NG 11, Runswick Bay

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A3.1: High energy infralittoral rock	10.66km²
Broad-scale habitat	A3.2: Moderate energy infralittoral rock	8.59km²
Broad-scale habitat	A4.1: High energy circalittoral rock	0.05km²
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	19.55km²
Broad-scale habitat	A5.1: Subtidal coarse sediment	13.47km²
Broad-scale habitat	A5.2: Subtidal sand	6.86km²
Broad-scale habitat	A5.4: Subtidal mixed sediment	7.80km²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	Ocean quahog (*Artica islandica*)	8 points
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.79 Features within NG 11, Runswick Bay not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A1.2: Moderate energy intertidal rock	Site has not been considered for intertidal features[27]
Broad-scale habitat	A1.3: Low energy intertidal rock	Site has not been considered for intertidal features
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	Site has not been considered for intertidal features[27]
Broad-scale habitat	A2.3: Intertidal mud	Site has not been considered for intertidal features[27]
Broad-scale habitat	A2.4: Intertidal mixed sediments	Site has not been considered for intertidal features[27]
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	The site was considered for subtidal broad-scale habitats only and other features were not put forward for designation[27].
Species of conservation importance	n/a	n/a

[27] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	54° 36' 49.25'' N	0° 47' 15.47'' W	54.613689	-0.787633
2	54° 36' 43.92'' N	0° 45' 57.38'' W	54.612205	-0.765948
3	54° 36' 34.81'' N	0° 44' 53.34'' W	54.609670	-0.748157
4	54° 36' 13.68'' N	0° 43' 41.52'' W	54.603802	-0.728202
5	54° 35' 04.67'' N	0° 41' 19.32'' W	54.584633	-0.688701
6	54° 34' 31.80'' N	0° 39' 12.92'' W	54.575509	-0.653591
7	54° 33' 42.88'' N	0° 37' 23.30'' W	54.561912	-0.623149
8	54° 30' 45.76'' N	0° 40' 22.51'' W	54.512713	-0.672923
9	54° 33' 36.94'' N	0° 47' 27.78'' W	54.560261	-0.791056
10	54° 33' 38.84'' N	0° 47' 18.20'' W	54.560793	-0.788391

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.91 Location and extent of site NG11 (Runswick Bay)

Site summary

NG 11 is a coastal site lying northwest of Whitby in North Yorkshire, in the North East of England. The depth range of the site is 10m above mean low water mark to 30m deep from the information provided by UKHO (Figure 7.95), with the seabed composed of rock and sediment features creating a mosaic of habitats across the site. These habitats support a diverse benthic community (including the ocean quahog, which is recommended for designation), spawning areas for fish species, frequent marine mammal presence and foraging areas for seabirds that nest in the adjacent cliffs. The site boundaries are clipped to a year round no trawl zone, helping to protect the benthic environment within the site.

Detailed site description

NG11 is being recommended for designation for seven broad scale habitat types, A3.2: moderate energy infralittoral rock; A3.1: high energy infralittoral rock; A4.2: moderate energy circalittoral rock; A4.1: high energy circalittoral rock; A5.1: subtidal coarse sediment; A5.4: subtidal mixed sediment and A5.2: subtidal sand. The subtidal sands and gravels habitat of conservation importance and the bivalve ocean quahog (*Arctica islandica*) (a species of conservation importance (SOCI)) are also recommended as features of this site. The site falls within a current no trawl zone which will benefit the site with extra protection.

This site is of particular interest as it contains a matrix of broad scale habitats each supporting diverse and unique communities. High energy infralittoral rock refers to an immersed (intermittent spring tide emersion of sublittoral fringe) rocky habitat with a typical upper boundary at a depth of approximately +1m to 0m which is exposed to high energy wave action or tidal currents (Conner, *et al.* 2003). This is the type of habitat usually found on rocky coastlines. As this habitat is relatively shallow, it is usually dominated by large kelps and smaller red algae, but high energy wave and tidal action can preclude them from settling. Where this occurs the dominating species are usually sponges, sea squirts, sea mats, mussels and barnacles (Natural England, 2011).

Moderate energy infralittoral rock is an immersed (intermittent spring tide emersion of sublittoral fringe) rocky habitat with a typical upper boundary at a depth of approximately +1m to 0m which is exposed to moderate energy wave action or tidal currents (Conner, *et al.* 2003). The exposure to moderate energy wave and tidal action allows the substratum to be dominated by algal species which extend down to the limit of sunlight penetration. The algae in turn provide habitats for small animal species including snails, mussels, urchins, and slugs (Natural England, 2011).

Circalittoral rock is a permanently submerged rocky habitat with a typical upper boundary at a depth of approximately -5m to -20m which is exposed to high energy wave action or tidal currents (Conner, *et al.* 2003). The increasing depths prevent algae from growing, allowing animal communities to dominate. The flora and fauna of this habitat type is influenced by the energy level of the site. Where exposed to strong waves and currents (high energy) the habitat is characterised by sponges, sea firs and corals (Natural England, 2011) which can tolerate the strong water movement and are provided with a steady influx of nutrients. When exposed to moderate energy wave currents or tidal pressure, this habitat can support animal and algal species in shallow waters, whilst in deeper waters with insufficient sunlight for algal growth it supports high densities of animal communities (Natural England, 2011).

Subtidal coarse sediment is formed from coarse sand, gravel, and shingle often found in areas of wave and tidal disturbance as this action prevents the settlement of finer sands and mud (Conner, *et al*. 2003). Due to the unstable nature of this habitat, larger algal species are often precluded and this can provide a suitable habitat for burrowing animals such as bristleworms and amphipods (Natural England, 2001). Surveys in this area have shown this type of habitat to be dominated by polychaetes (e.g. *Lumbrineris gracilic* and *Glycera lapidum*) (Allen, 2008).

Subtidal sand is a habitat formed on open coasts with an abundant supply of sediment from terrestrial sources. It is an important habitat for worms and bivalves, which are themselves important for supporting larger predators higher up the food chain (Natural England, 2011). Surveys of this area have shown that the dominant taxa on sandy habitats include brittlestar (eg. *Amphiura filiformas)* and bivalves (e.g. *Abra prismatica*). Muddier sands within the area are characterised by sea cucumber (e.g. *Leptopentacta elongata*) and *Nemertea* spp (Allen, 2008).

Subtidal mixed sediment is a habitat formed from a combination of muds, gravelly sands, cobbles, or pebbles in or on a sand, gravel or mud seabed (Natural England, 2011). The varied nature of a mixed sediment habitat means that they can support a whole array of different species such as worms, bivalves, starfish, urchins, anemones, sea firs and sea mats (Natural England, 2011).

The ocean quahog (*Arctica islandica*) is a long lived cockle shaped bivalve found to the south and north of NG11 on a range of habitats (moderate energy circalittoral rock, moderate energy infralittoral rock, subtidal mixed sediments, subtidal coarse sediment and subtidal sand). It is predominantly sub-littoral but can also be found at extreme low water ranging from depths of 4m to 482m (Sabatini, *et al.* 2008). They are known to have a variable but slow growth rate, depending on density, temperature and geographic location. Life spans are over 100 years, and same sized individuals may be different ages (Sabatini, *et al*. 2008). The oldest recorded individual was in excess of 450 years (Blyth-Skyrme, 2011, pers. comm.). Density of individuals per 100m² increases from the Southern North Sea where numbers are low, to the Northern North Sea where numbers are high. *A. islandica* are thought to reach sexual maturity between 5 and 7 years, although this may be dependent on locality and growth rates, and the spawning period can vary also depending on location. North Sea cod have been known to prey upon *A. Islandica* (Sabatini, *et al*. 2008).

The waters of NG11 provide suitable spawning areas for herring (*Clupea harengus)* and lemon sole (*Microstomus kitt)*, and nursery areas for sprat (*Sprattus sprattus),* cod (*Gadus morhua),* whiting (*Merlanguis merlangus*) and plaice (*Pleuronectes platessa*) (Coull, *et al*. 1998). There have been recent sightings of harbour porpoises both north (August 2011) and south of NG11 (May 2011) (Sea Watch, 2011) so marine mammals may frequent these waters.

Site NG11 lies adjacent to a 36 mile stretch of coast known as the North Yorkshire and Cleveland Heritage Coast (North York Moors National Park, 2011). This coastline has many different types of habitat, including rock pools, cliffs, caves, sandy beaches and muddy estuaries. The sandstone cliffs adjacent to NG11 are ideal habitats for cliff-nesting birds such as kittiwake, northern fulmar and gannet (English Nature, not dated). The kittiwake for instance has been shown to have a maximum foraging range of approximately 80km (Daunt, *et al.* 2002) which would mean that foraging behaviour would take place in NG11.

There are two Sites of Special Scientific Interest (SSSI) located within NG11, which have both been designated for their geological interest. The first, Runswick Bay SSSI contains internationally important 'geological fossil remains' (Royal Haskoning, 2007) and the second, Staithes-Port Mulgrave SSSI has an internationally significant layer of stratified rocks, exposing the 'geological Pliensbachian-Toarcian stage boundary' (Royal Haskoning, 2007). The National Trust owns land at Runswick Bay and Port Mulgrave and here there is 'no automatic right of access' (Royal Haskoning, 2007). The exposed rocks on the coast of NG11 are from the Lower Jurassic and predominantly made up of shale and sandstone. These rocks are important for stratigraphy and hold many important fish, ammonite and reptile fossils (English Nature, not dated).

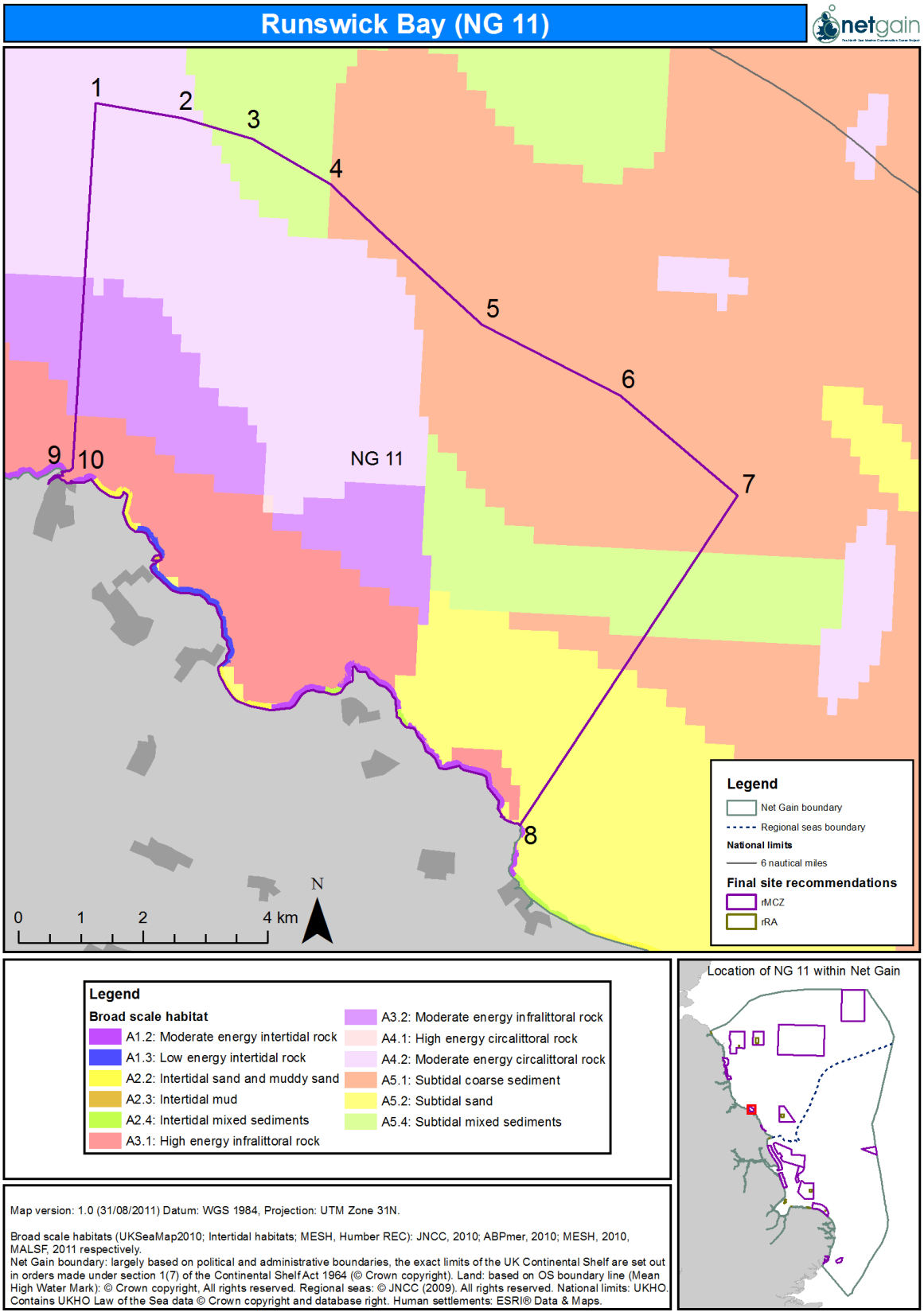


Figure 7.92 Broad-scale habitat present within NG 11

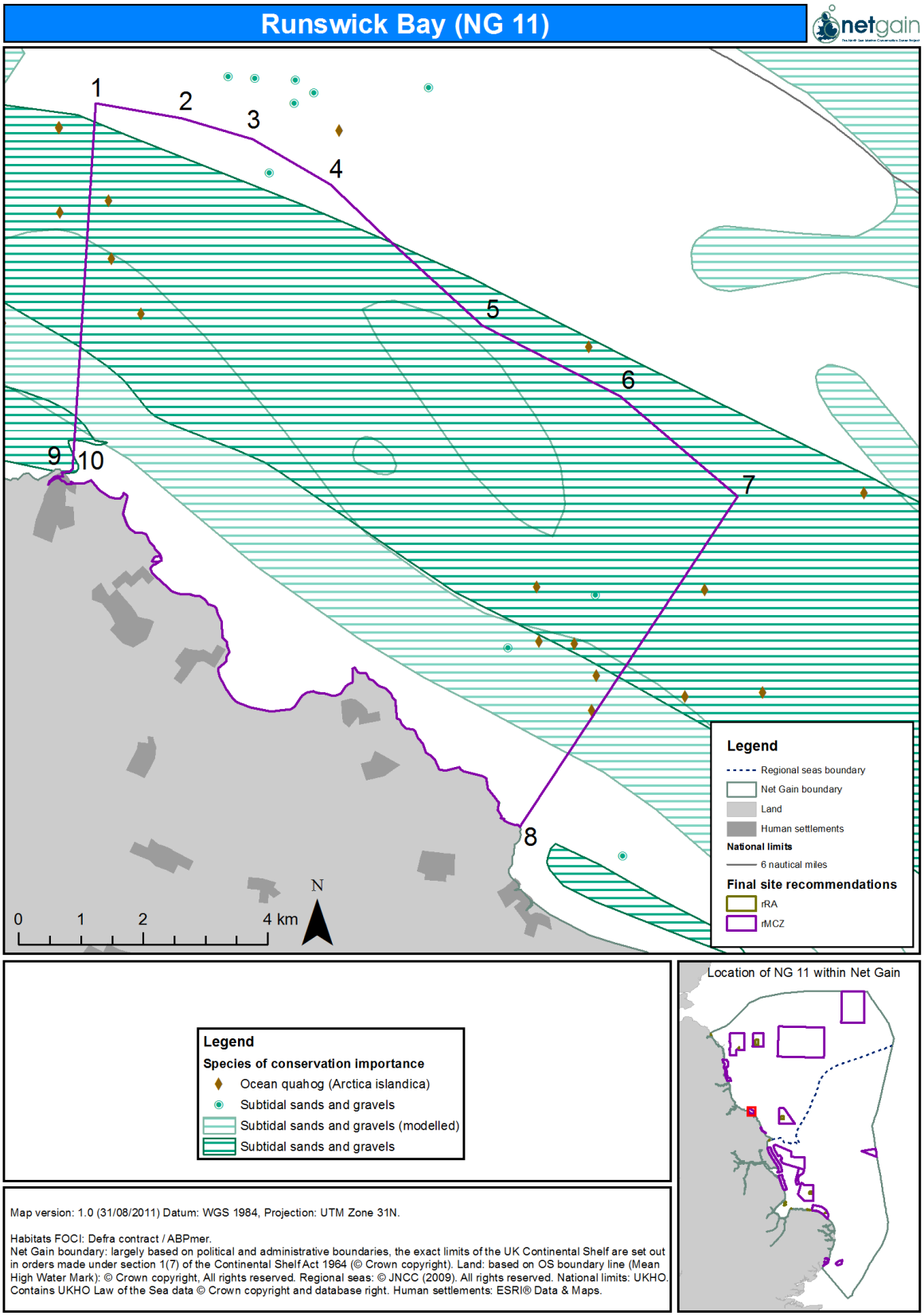


Figure 7.93 FOCI habitats and species present within NG 11

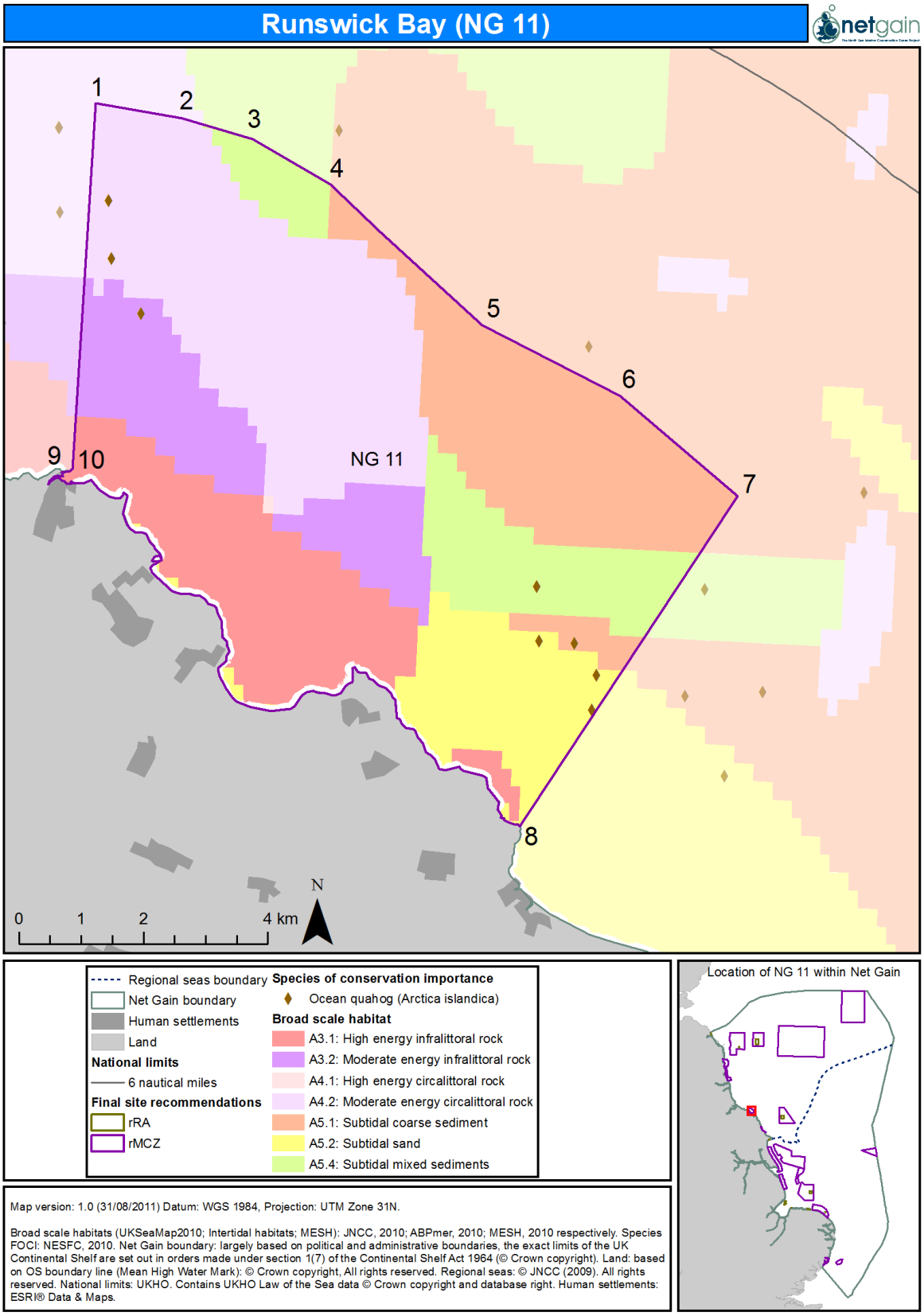


Figure 7.94 Features put forward for recommendation within NG 11

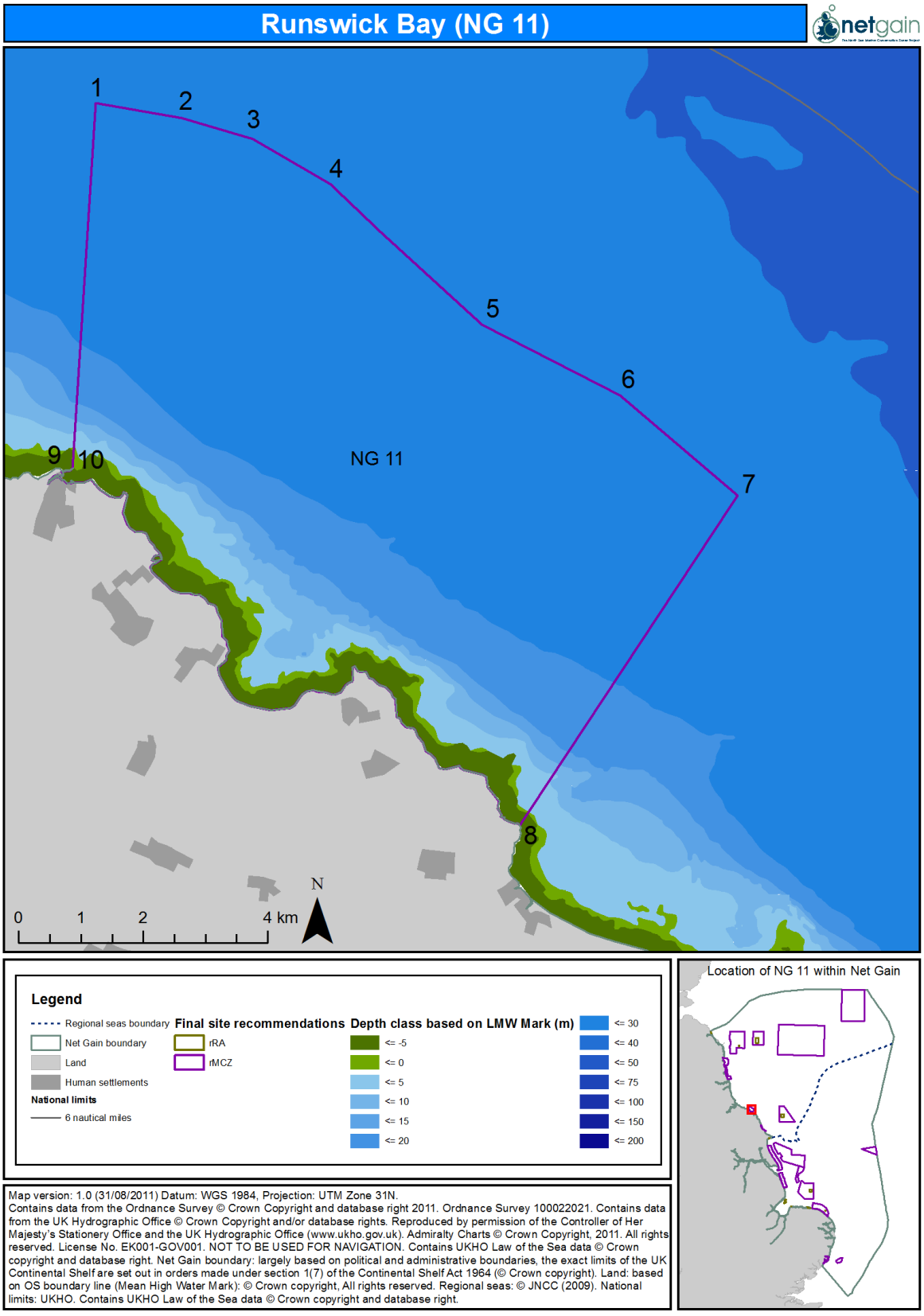


Figure 7.95 Bathymetry of NG 11

Site boundary

The site boundary was based on the original site NG 2.15 from the 2nd iteration. The site originally extended much further north and following discussions within the March 2011 Regional Hub meeting the site boundaries were aligned with the current no trawl zone.

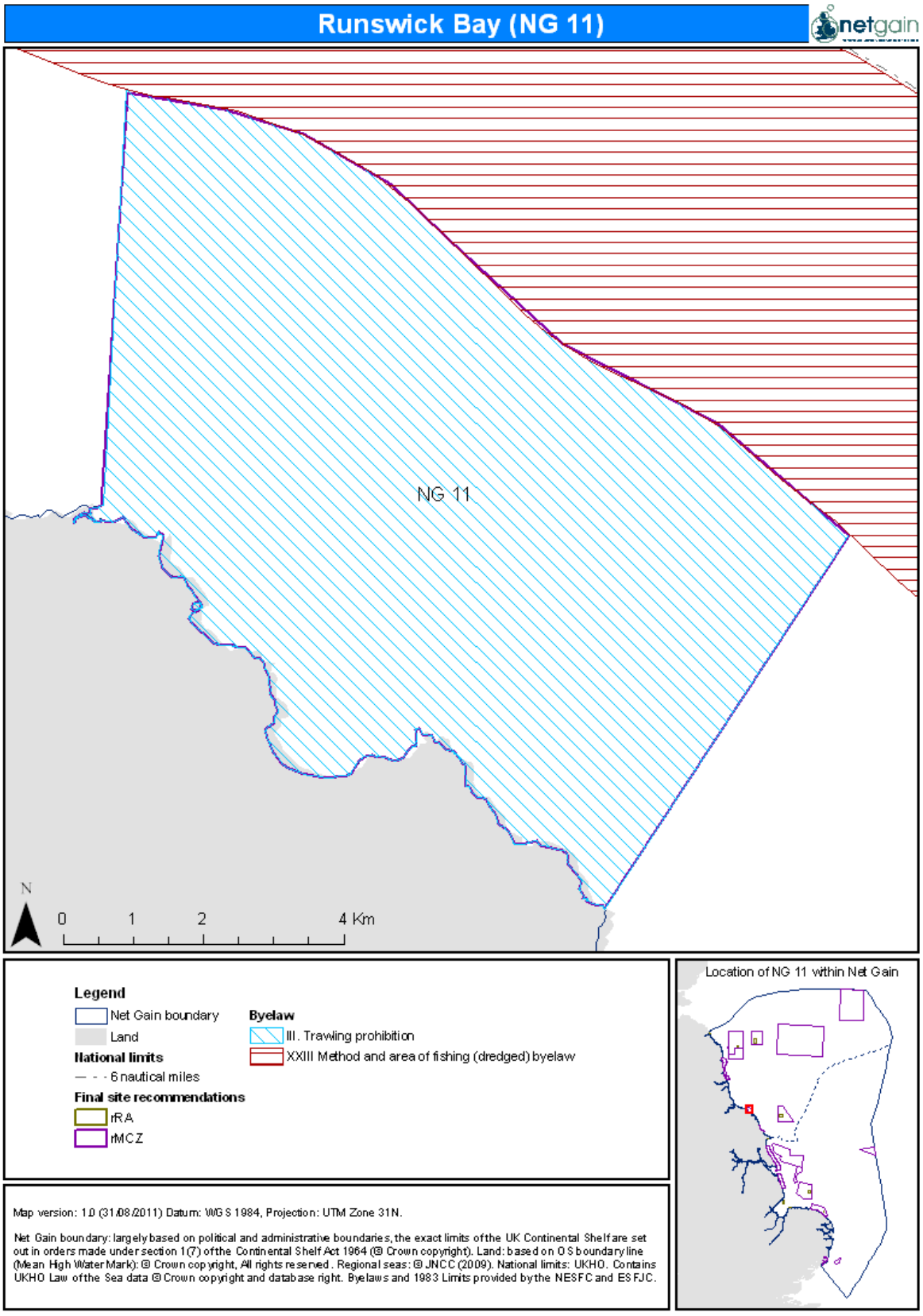


Figure 7.96 NG 11 site boundary with associated fishery management location

Conservation objectives

Table 7.80 Conservation objectives for site NG 11, A3.1: High energy infralittoral rock

Conservation Objective	
1 Maintain/ recover	High energy infralittoral rock is representative of shallow water rock, below the tides exposed to very strong waves and currents. Subject to natural change, maintain the High energy infralittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of High energy infralittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	High energy infralittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — M-H — L

	Physical removal (extraction of substratum)	M	L
	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Water clarity changes	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.81 Conservation objectives for site NG 11, A3.2: Moderate energy infralittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy infralittoral rock is exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, maintain the Moderate energy infralittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy infralittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy infralittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — M-H — L Structural abrasion/penetration: Structural damage to seabed >25mm — M-H — L

	Introduction or spread of non-indigenous species & translocations (competition)	M	L
	Physical change (to another seabed type)	M	L
	Physical removal (extraction of substratum)	M	L
	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Water clarity changes	L-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.82 Conservation objectives for site NG 11, A4.1: High energy circalittoral rock

Conservation Objective	
1 Maintain/ recover	High Energy circalittoral rock is representative of deeper water rock exposed to very strong waves and currents. Subject to natural change, maintain the High energy circalittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of High energy circalittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	High energy circalittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Salinity changes - local — H — L Physical change (to another seabed type) — M-H — L Physical removal (extraction of substratum) — M-H — L

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Siltation rate changes (low)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Surface abrasion: damage to seabed surface features	M-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.83 Conservation objectives for site NG 11, A4.2: Moderate energy circalittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, maintain the Moderate energy circalittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy circalittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy circalittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L Physical removal (extraction of substratum) — M-H — L

	Removal of non-target species (lethal)	M-H	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Salinity changes - local	L-H	L
	Surface abrasion: damage to seabed surface features	L-H	L
	Siltation rate changes (low)	NS-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Removal of target species (lethal)	NS-M	H
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.84 Conservation objectives for site NG 11, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Physical removal (extraction of substratum)	L-H	L
Surface abrasion: damage to seabed surface features	NS-H	L
Physical change (to another seabed type)	M	L

	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.85 Conservation objectives for site NG 11, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Siltation rate changes (high)	H	L
Physical removal (extraction of substratum)	L-H	M

	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.86 Conservation objectives for site NG 11, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal mixed sediments in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Physical removal (extraction of substratum)	H	L
Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	H	L

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.87 Conservation objectives for site NG 11, Ocean quahog (*Artica islandica*)

Conservation Objective	
1 Maintain/ recover	Ocean quahog (*Arctica islandica*) is on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, maintain the Ocean quahog (*Arctica islandica*) in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Species</u>** the • natural range, • habitat extent, • population structure, • population density, • size structure, • natural environmental quality*, and • natural environmental processes* representative of Ocean quahog (*Arctica islandica)* in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Ocean quahog (*Arctica islandica)* is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L

	Physical removal (extraction of substratum)	H	M
	Removal of non-target species (lethal)	H	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	H	H
	Siltation rate changes (high)	H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	H	H
	Temperature changes - local	H	L
	Wave exposure changes - local	M	L
	Water flow (tidal & ocean current) changes - regional/national	L	L
	Water flow (tidal current) changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

NG 11, Runswick Bay, encompasses Runswick Bay and Staithes-Port Mulgrave SSSIs. The site is also a Heritage Coast and also adjoins the North Yorkshire Moors National Park.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.88 MPAs within or adjacent to NG 11

MPA Type	Site Name	Features Protected
SSSI	Runswick Bay	Not in GAP table Geological
SSSI	Staithes-Port Mulgrave	Not in GAP table Geological

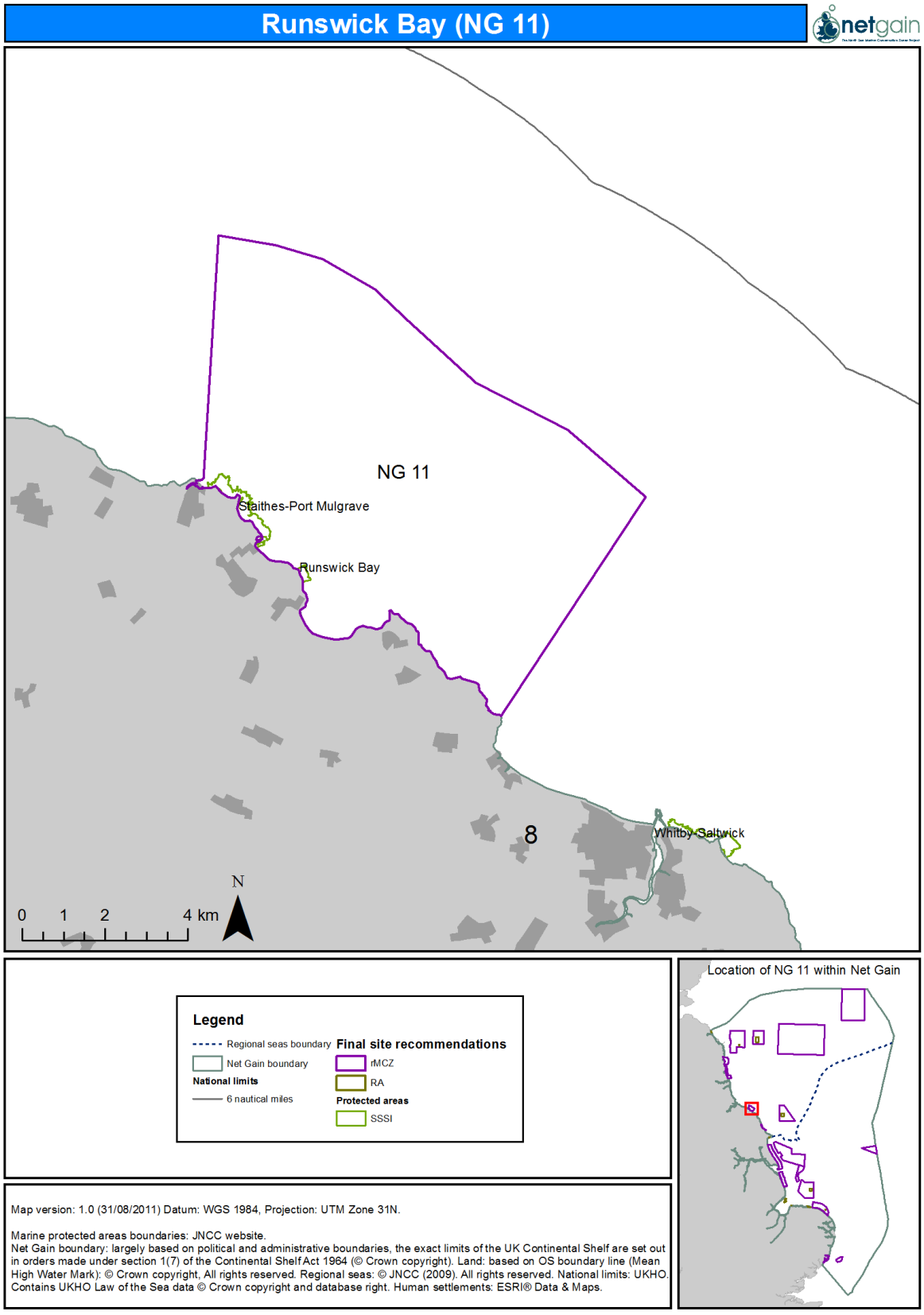


Figure 7.97 MPAs/rMCZs within or adjacent to NG 11

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site enjoyed good support from the stakeholders (one group scoring it '3', the other '4'). It was felt that the site achieved the dual goals – ecological and socio-economic - of the project and was (for the most part) a 'win-win' so long as fishing activities are not stopped.

The confidence in the underlying data was scored as moderate to high. Whilst there was generally not very much confidence in the Broad-scale Habitat data, there was a greater confidence in the underlying data for this particular site, largely due to knowledge of additional surveys that have been undertaken.

Contention over the site was felt likely to be low, although (because of opposition to the existing no-trawl zone) some stakeholders would have preferred the eastern part of site not to be included.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- NFFO - commercial fishing:- Strongly against (important fishing area)
- RSPB:- Support
- The Crown Estate:- Accept – assumption that there will be no additional marine licence requirements on Boulby Potash Mine operations due to rMCZ designation
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.89 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Ocean quahog (*Artica islandica*)	Survey: records	Allen, 2008
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

ALLEN, J.H. 2008. *Ecological Assessment of Yorkshire Coast prohibited Trawling Areas. Report to North Eastern Sea Fisheries Committee*. Institute of Estuarine and Coastal Studies (IECS), University of Hull.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

CONNOR, D.W., ALLEN, J.H., GOLDING, N., LIEBERKNECHT, L.M., NORTHERN, K.O. & REKER, J.B. 2003. *The national marine habitat classification for Britain and Ireland. Version 03.02. Introductory Text*. Joint Nature Conservation Committee, Peterborough.

COULL, K.A., JOHNSTONE, R. & S.I. ROGERS. 1998. *Fisheries Sensitivity Maps in British Waters*. Published and distributed by UKOOA Ltd.

DAUNT, F., BENVENUTI, S., HARRIS, M.P., DALL'ANTONIA, L., ELSTON, D.A. & WANLESS, S. 2002. *Foraging strategies of the black-legged kittiwake Rissa tridactyla at a North Sea colony: evidence for a maximum foraging range*. *Marine Ecology Progress Series*. 245: 239-247.

ENGLISH NATURE, (date unknown). *Saltburn to Bridlington Coastal Natural Area Profile*.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 24: Task 2I. Intertidal habitats datalayer (Final). ABP Marine Environmental Research Ltd.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs*. JNCC report No. 431.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

NATURAL ENGLAND, 2011. *Broad habitats*. < http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/broadhabitats/default.aspx> Accessed 05/08/11.

ROGERS, S. & STOCKS, R. 2001. *North Sea Fish and Fisheries. Technical report produced for Strategic Environmental Assessment*. CEFAS.

SABATINI, M., PIZZOLLA, P. & WILDING, C. 2008. Arctica islandica*. Icelandic cyprine. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme*. Available at: < http://www .marlin.ac.uk/speciesfullreview.php?speciesID=2588 > Accessed 16/08/11.

SEAWATCH, 2011. *Recent Sightings*. Available at: http://www.seawatchfoundation.org.uk/recentsightings.php > Accessed 16/08/11.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.12 Marine Conservation Zone: NG 12, Compass Rose

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 12, Compass Rose (site also contains RA10, Compass Rose rRA)

Site centre location

54° 29’ 31’’N, 0° 15’ 22’’E
54.492005°, 0.256335°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

551.56km² / 55,156.40ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

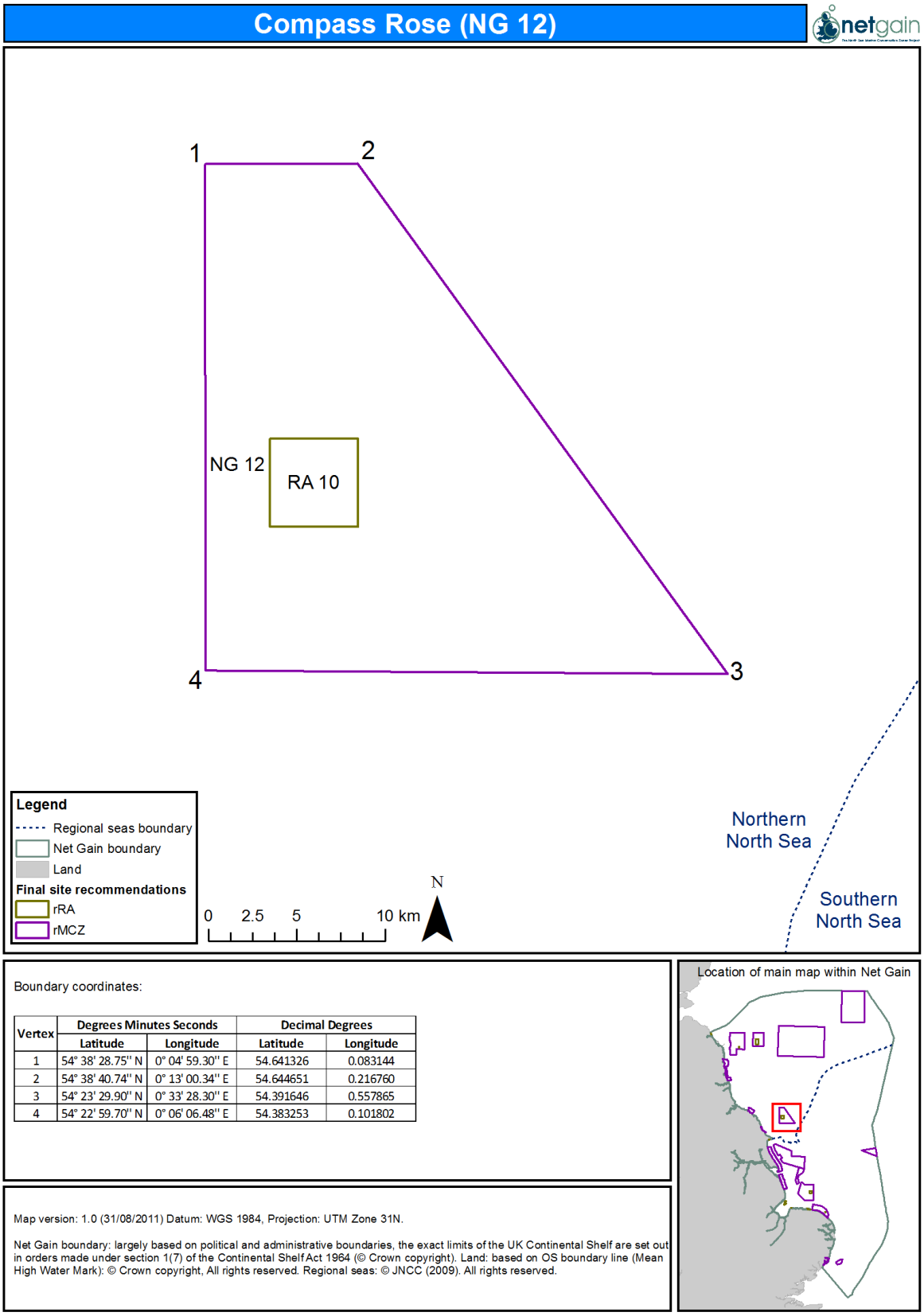
Table 7.90 Features proposed for designation within NG 12, Compass Rose

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	244.88km²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.91 Features within NG 12, Compass Rose not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.1: Subtidal coarse sediment	Habitat was not put forward for designation because the adequacy had been well exceeded in other sites[28]
Broad-scale habitat	A5.2: Subtidal sand	Habitat was not put forward for designation because the adequacy had been well exceeded in other sites[28]
Habitat of conservation importance	Subtidal sands and gravels (modelled)	Habitat was not put forward for designation because the adequacy had been well exceeded in other sites[28]
Species of conservation importance	n/a	n/a

[28] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	54° 38' 28.75'' N	0° 04' 59.30'' E	54.641326	0.083144
2	54° 38' 40.74'' N	0° 13' 00.34'' E	54.644651	0.216760
3	54° 23' 29.90'' N	0° 33' 28.30'' E	54.391646	0.557865
4	54° 22' 59.70'' N	0° 06' 06.48'' E	54.383253	0.101802

Figure 7.98 Location and extent of site NG12 (Compass Rose)

Site summary

The location of NG 12 is approximately 30km offshore from the North Yorkshire coast in the North East of England. The depth range of the site is 50m (Figure 7.102), and the seabed is composed of moderate energy circalittoral rock and subtidal coarse sediment/sand. Within the site there is a fishing area known as Heartbreak ridge which is known to be hard ground, and local knowledge indicates that the seabed may also be covered in large boulders and possibly rocky scars (Rowe, 2011 pers. comm.). The site captures a small portion of the Flamborough Frontal System which is most prevalent during spring/summer/autumn and is defined by temperature gradients of the northern and southern North Sea waters (Jones, *et al*. 2004a). Fish species are known to use the area for spawning and seabirds for foraging.

Detailed site description

NG12 (Compass Rose) is being recommended for designation due to the presence of the broad scale habitat, moderate energy circalittoral rock. The site covers a total surface area of 551.53 km² of which 244.88 km² represents moderate energy circalittoral rock.

Moderate energy circalittoral rock is defined as 'deeper water rock, with some shelter from waves and currents (JNCC, 2011). This habitat supports primarily algal species in shallow waters whilst deeper waters with insufficient sunlight for algal growth support high densities of animal communities. Such communities can include cup coral, sea-fans, anemones, sponges, mussels, worms, starfish, brittle stars and sea urchins (Natural England, 2011).

Within the boundary of NG12 is an area referred to by the local commercial fishermen as Heartbreak ridge which is approximately 2.5 square miles. It is named this due to it being an area which is very hard ground to trawl over as the sea bed is thought to be covered in large boulders and rocky scars (Rowe, 2011 pers. comm.). During the last four to five years, some of the static fishing vessels from Scarborough, Bridlington and Whitby have potted it quite successfully for crab and lobster as the rocky habitat is ideal for these species (Rowe, 2011 pers. comm.).

This site captures a small portion of the Flamborough Frontal System at different times of the year (Figure 7.103; Figure 7.104; Figure 7.105; Figure 7.106). The Flamborough frontal system is defined by the distinct temperature gradient between the waters to the north and south of Flamborough Head (Jones, et al., 2004). This boundary represents the mixing of the warmer waters of the southern North Sea and the cooler waters of the northern North Sea. The upwelling in locations such as this allows nutrients to be transported to the surface from deeper colder waters which in turn creates a site of increased primary biomass production (Hill, et al., 1993) Tidal flows in this region flood southwards and ebb northwards (Jones *et al*. 2004b).

The site contains spawning grounds for plaice during December to March, for herring from August to October, for lemon sole from April to September, for sandeels (*A. marinus*) from November to February, and for sprat from May to August (Fisheries Agency, 1998) (Figure 7.110; Figure 7.111). As well as being a spawning ground this site is also a nursery ground for cod, whiting, lemon sole, sandeel and sprat (Fisheries Agency, 1998)

The European Seabirds at Sea database (ESAS) which surveys the foraging behaviours of seabirds, reports that NG12 is of average importance to seabirds (Figure 7.107; Figure 7.108; Figure 7.109), and species including Atlantic puffin, black-legged kittiwake, common guillemot, northern fulmar, northern gannet and razorbill can be found within the site (RSPB, 2010). Species such as the kittiwake for instance have been shown to have a maximum foraging range of approximately 80km (Daunt, et al. 2002) which would mean that foraging behaviour would take place in NG12.

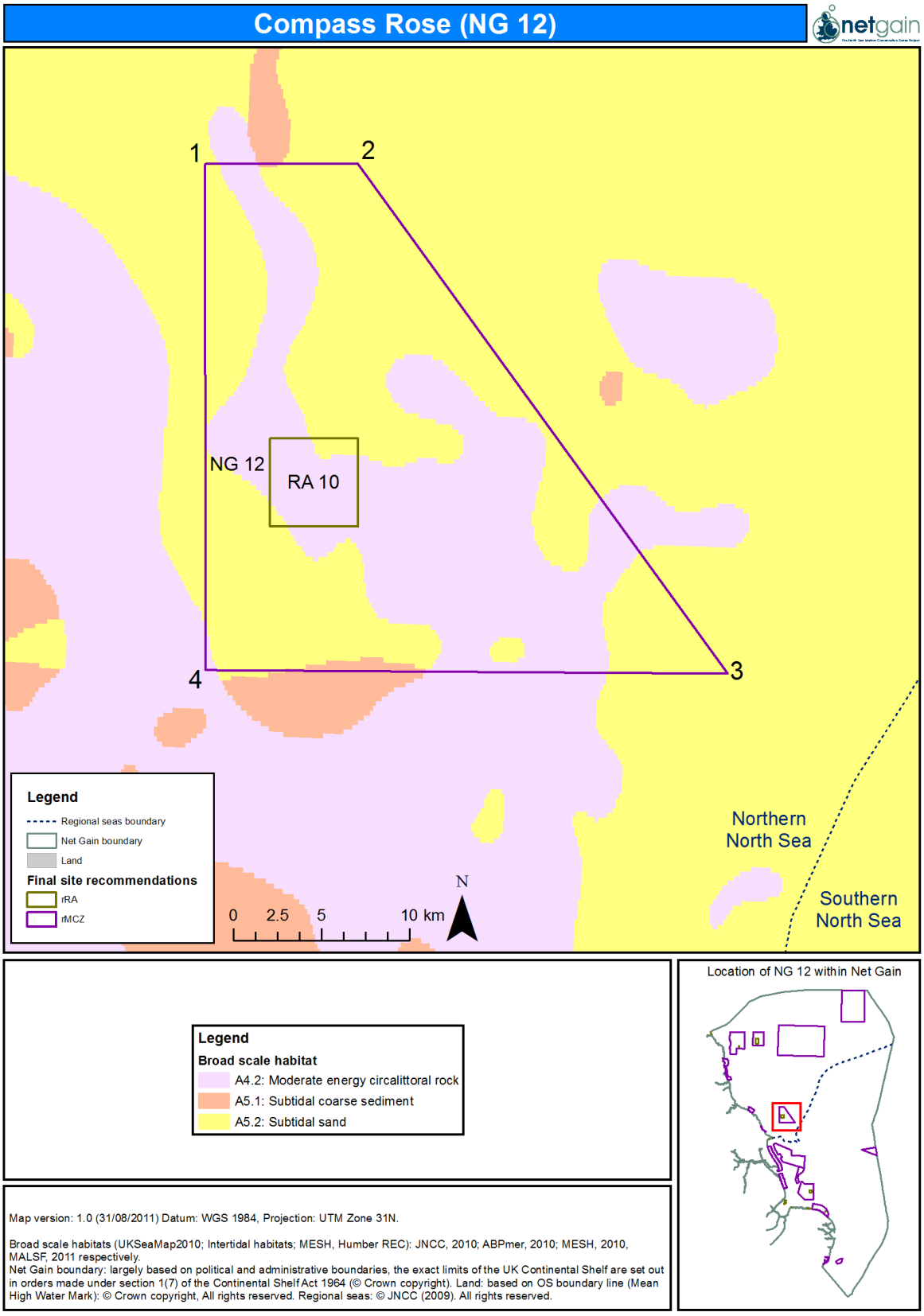


Figure 7.99 Broad-scale habitat present within NG 12

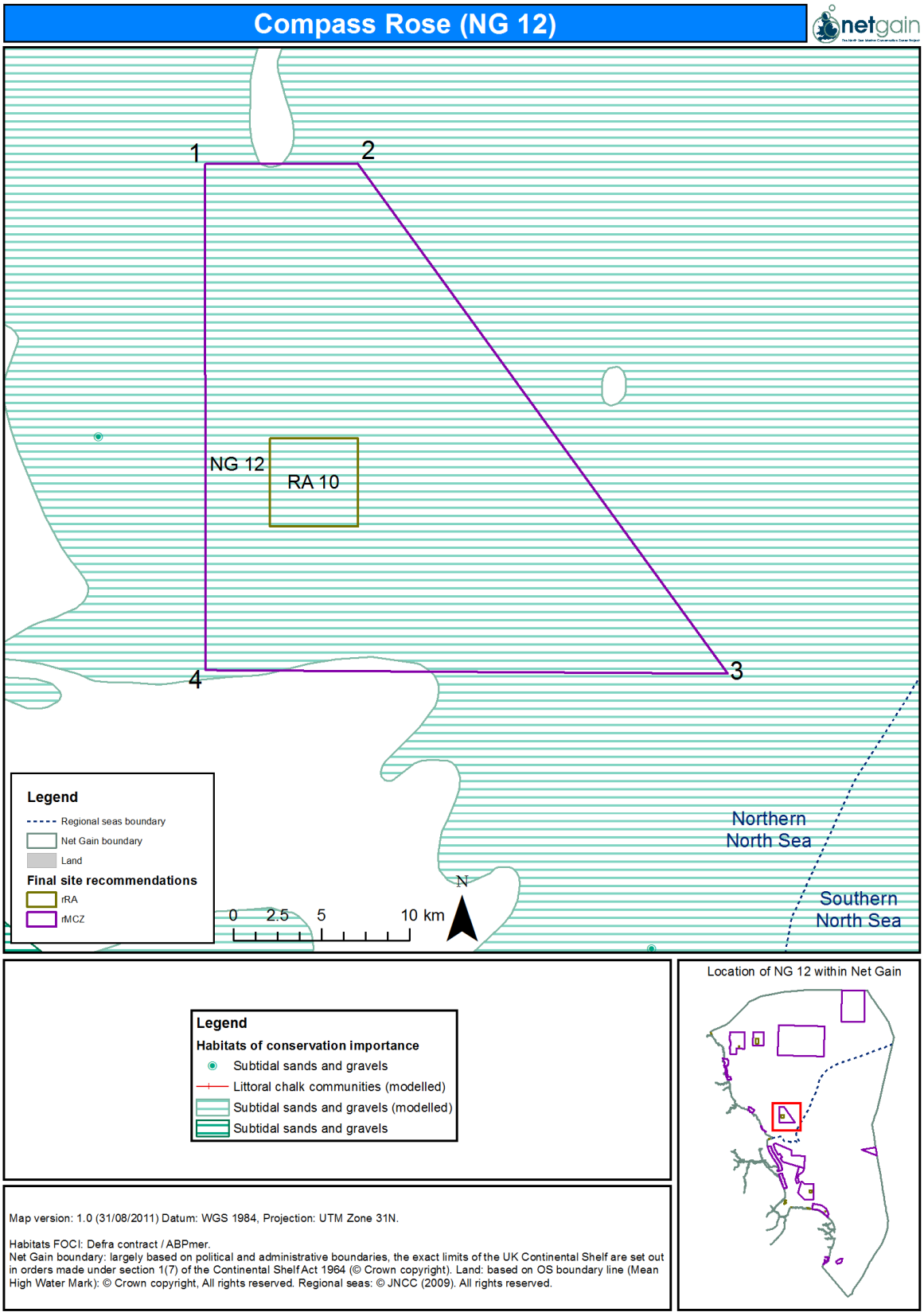


Figure 7.100 FOCI habitat present within NG 12

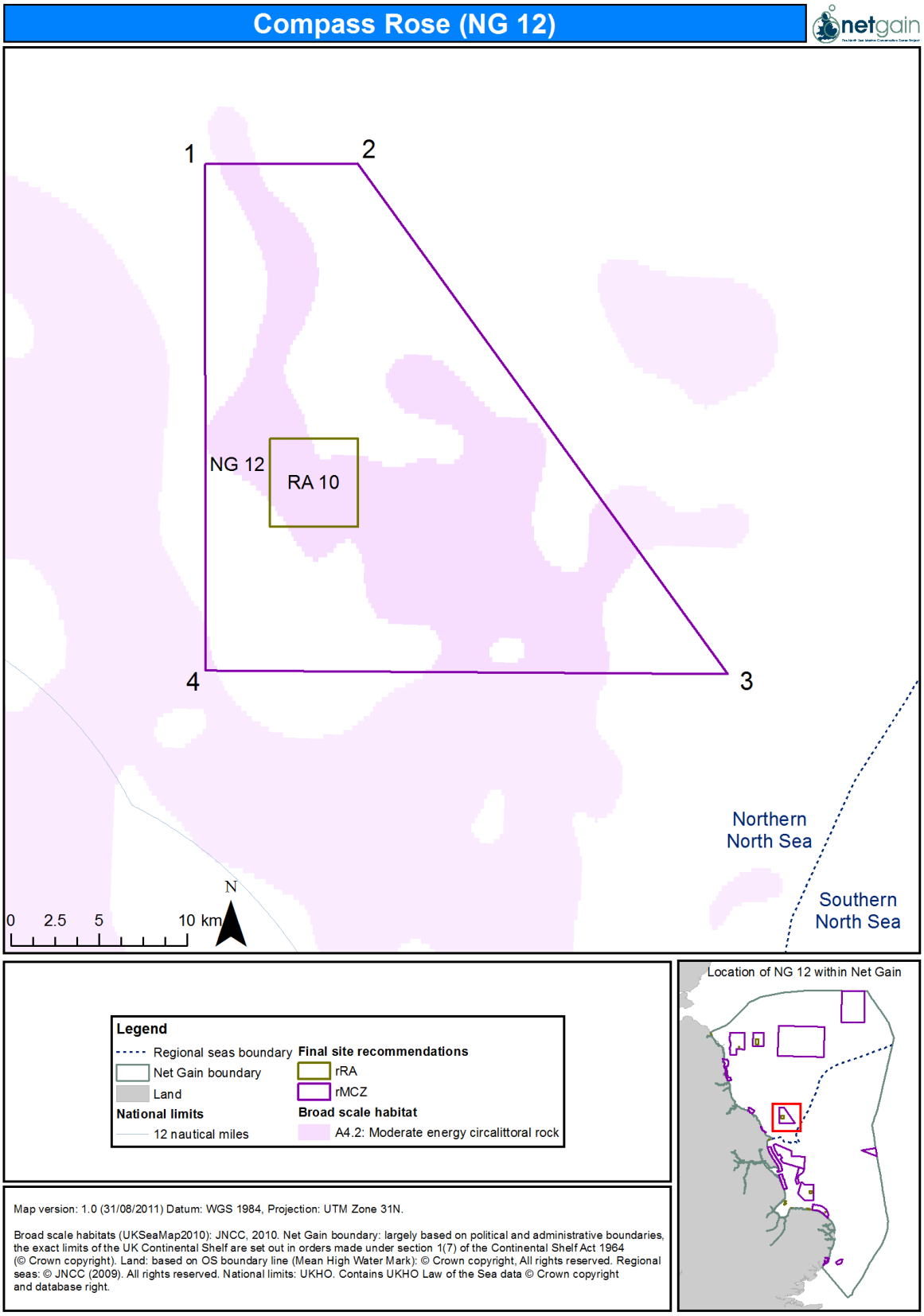


Figure 7.101 Features put forward for recommendation in NG 12

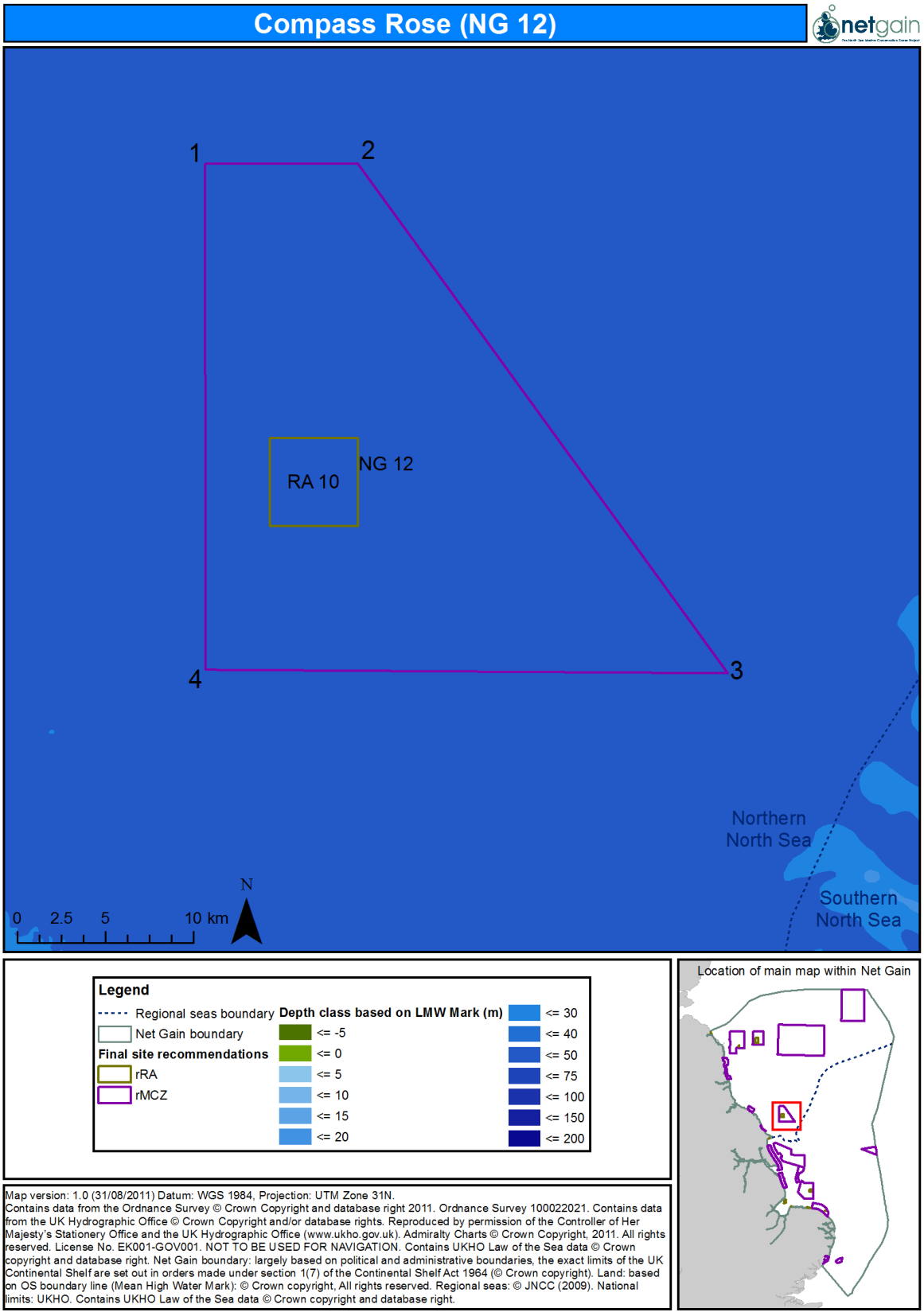


Figure 7.102 Bathymetry of NG 12

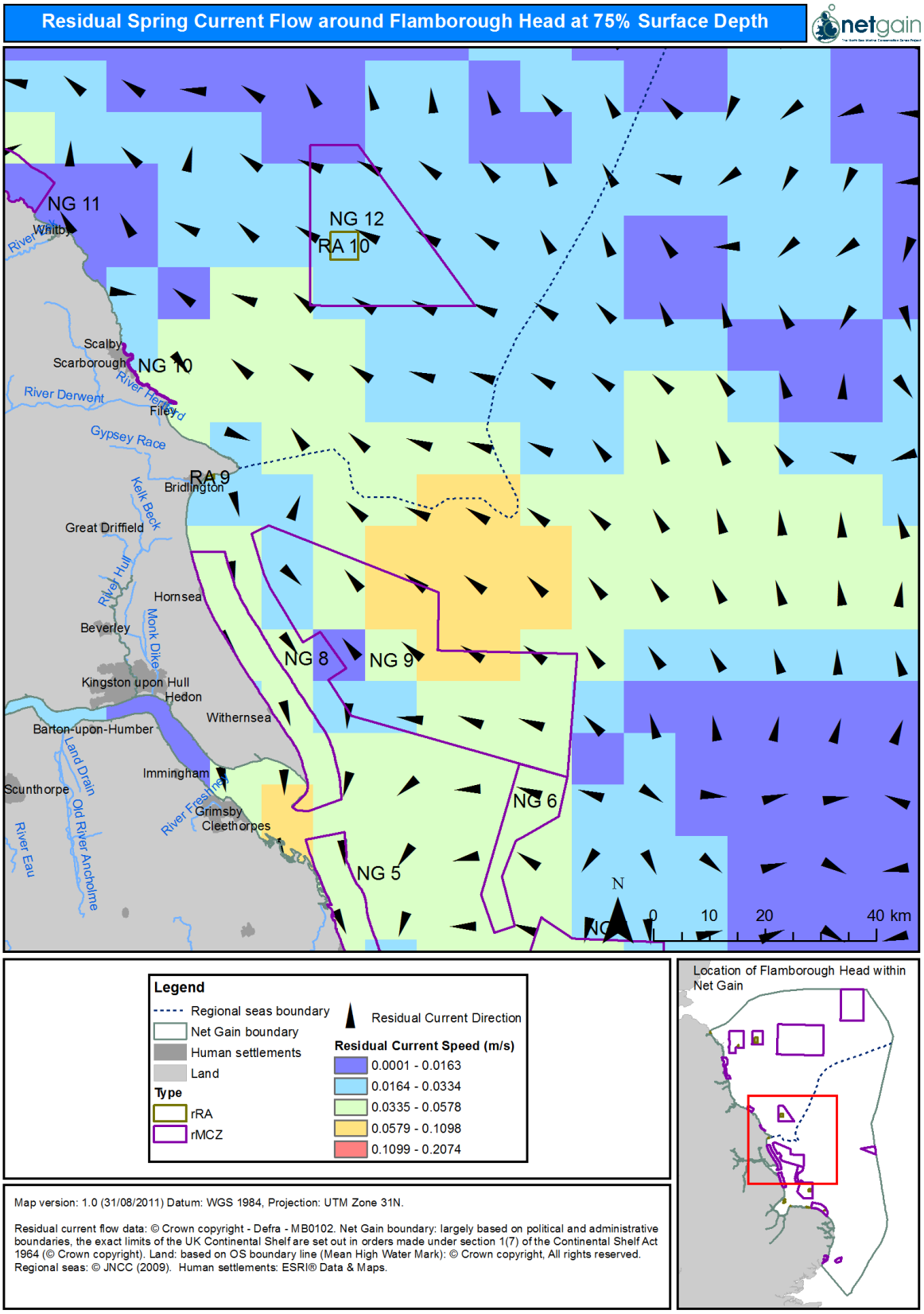


Figure 7.103 Residual spring current flow around Flamborough Head at 75% surface depth

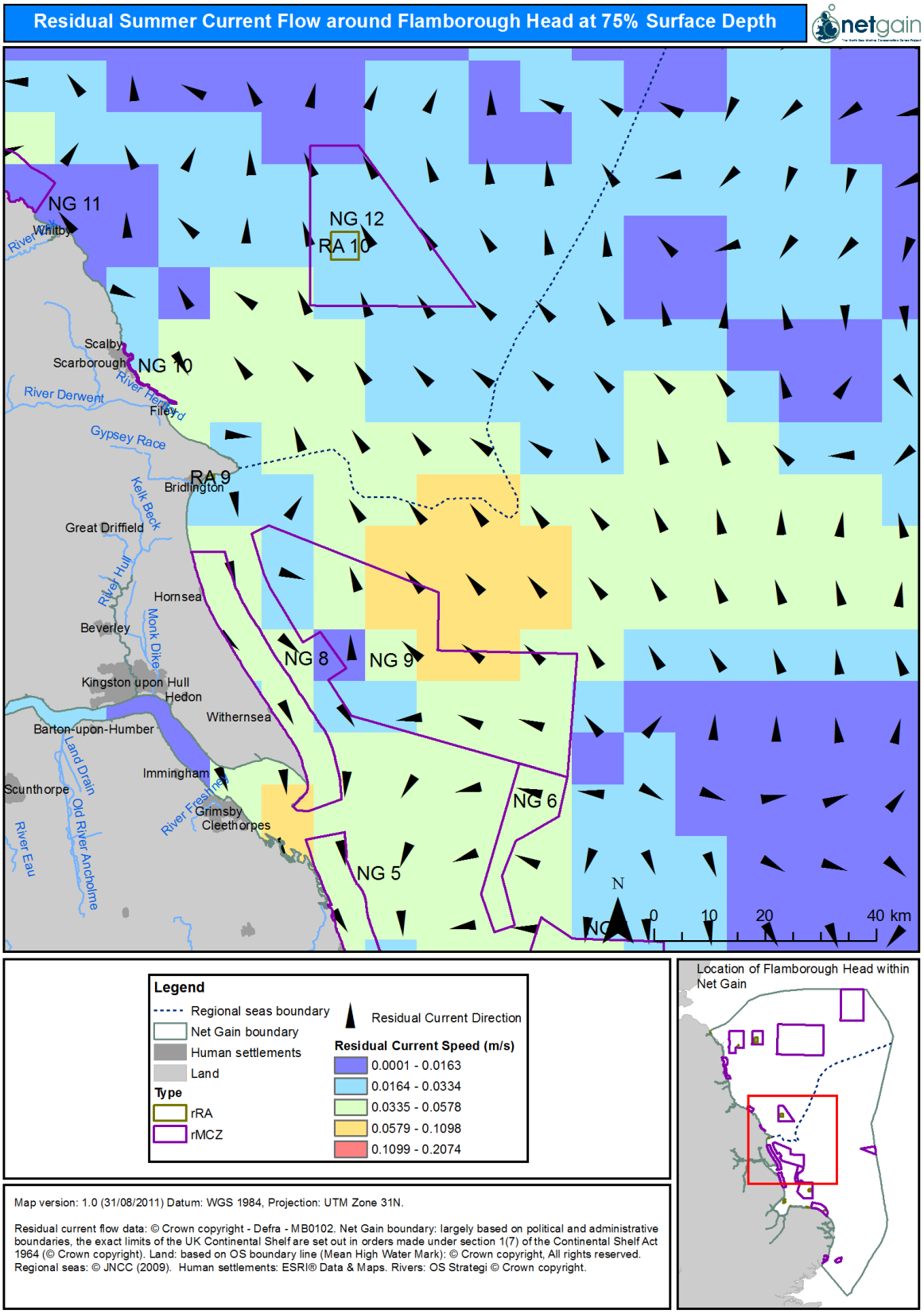


Figure 7.104 Residual summer current flow around Flamborough Head at 75% surface depth

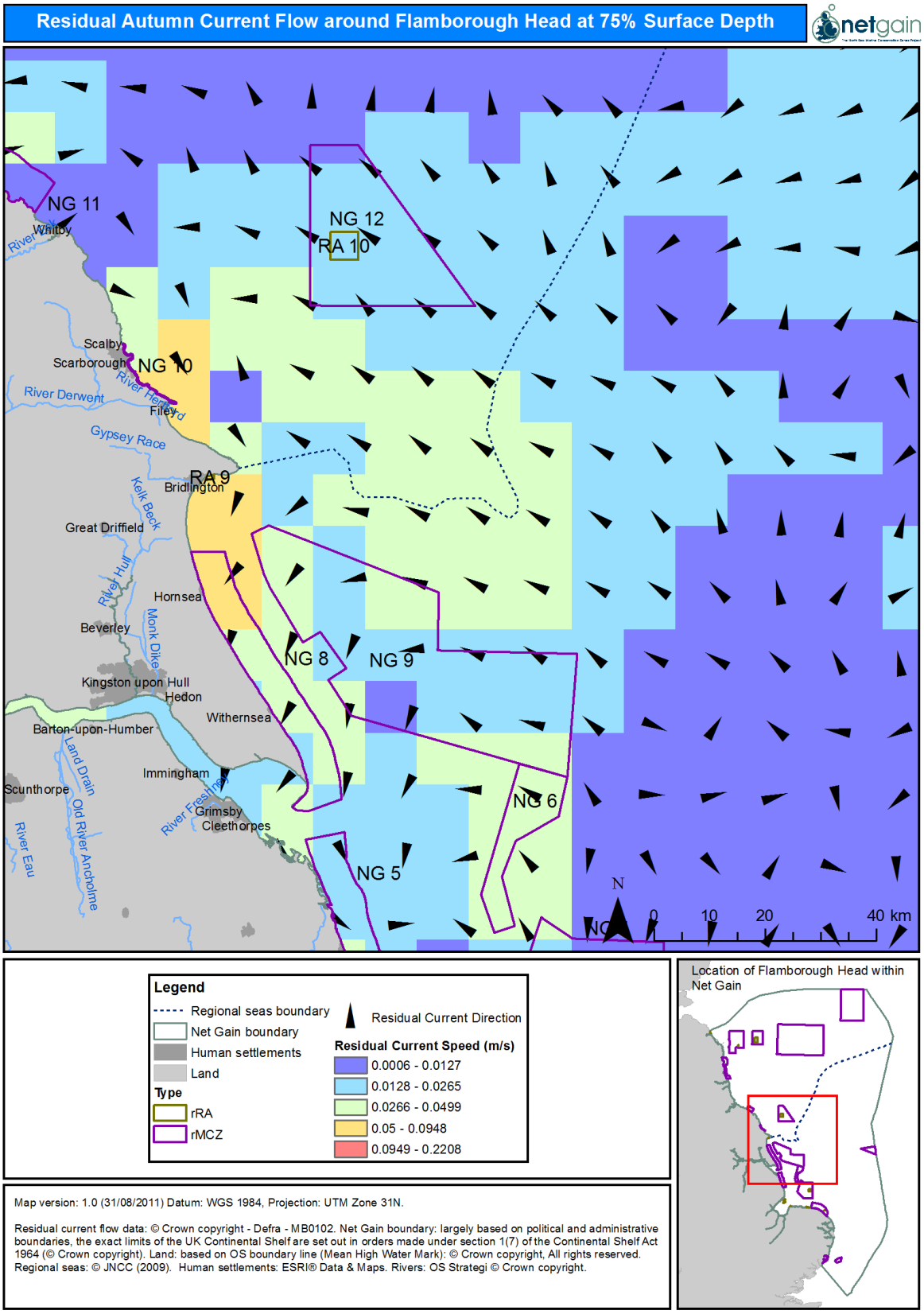


Figure 7.105 Residual autumn current flow around Flamborough Head at 75% surface depth

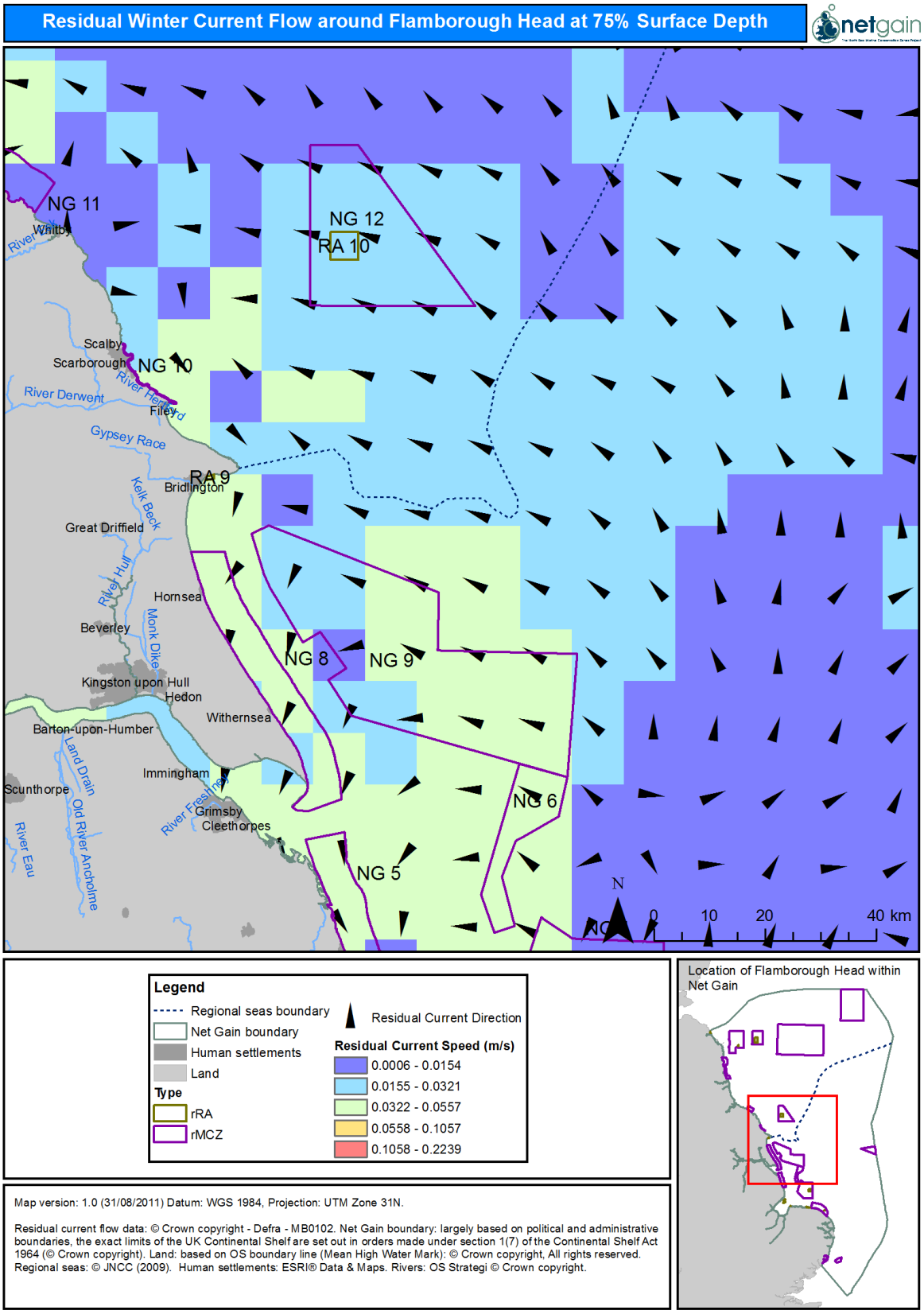


Figure 7.106 Residual winter current flow around Flamborough Heat at 75% surface depth

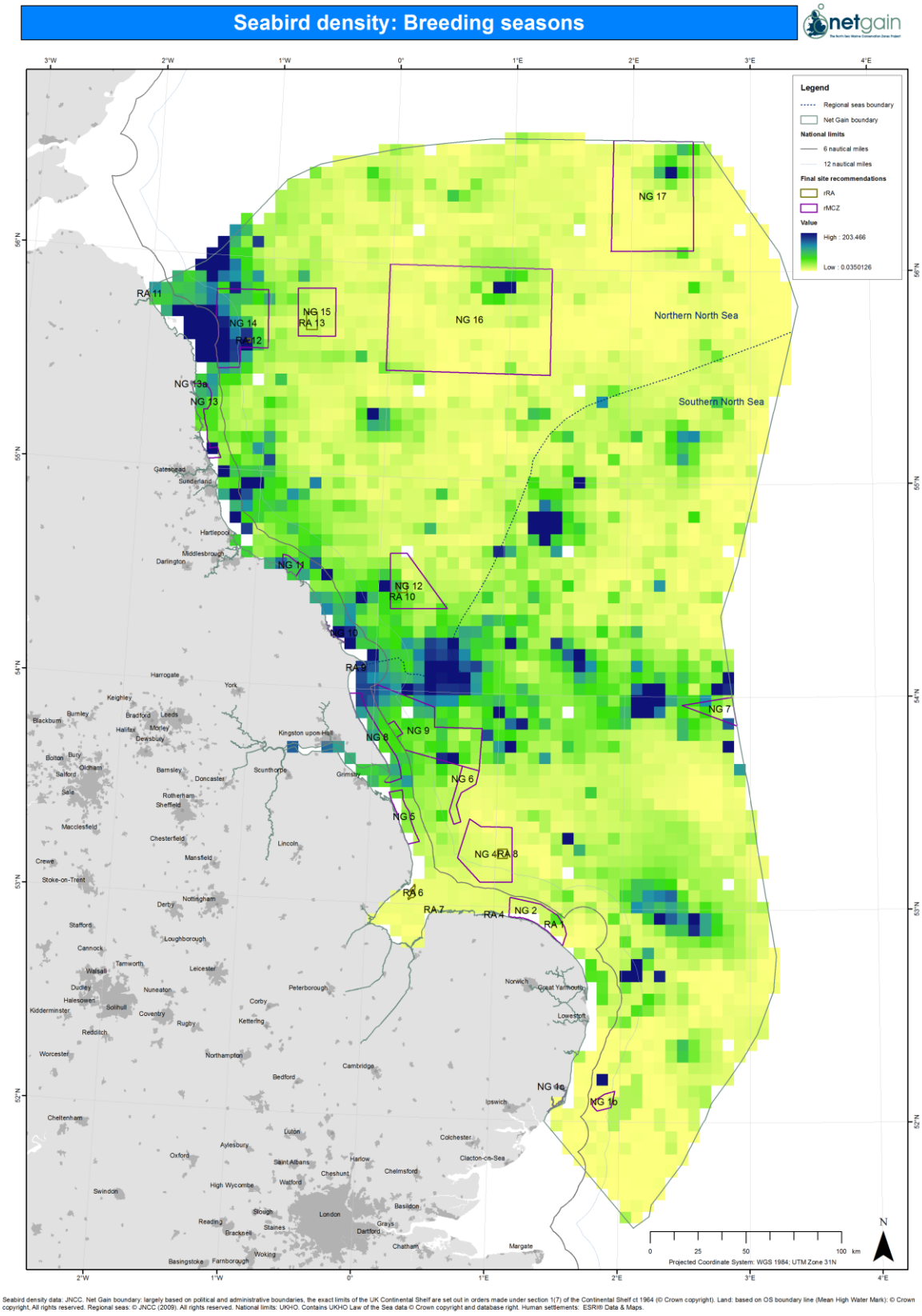
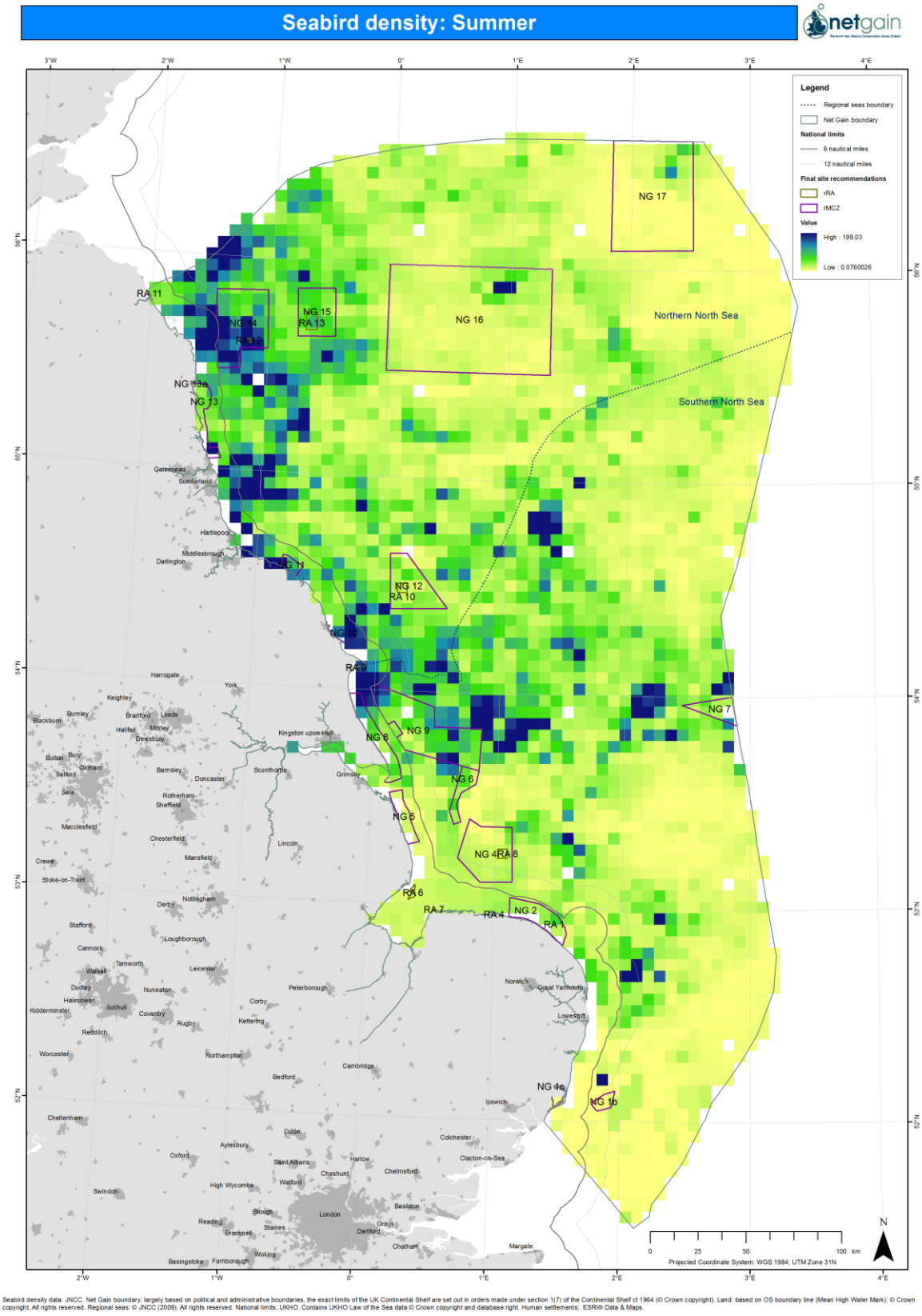


Figure 7.107 ESAS Seabird density: breeding seasons



Seabird density data: JNCC. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.108 ESAS Seabird density: summer

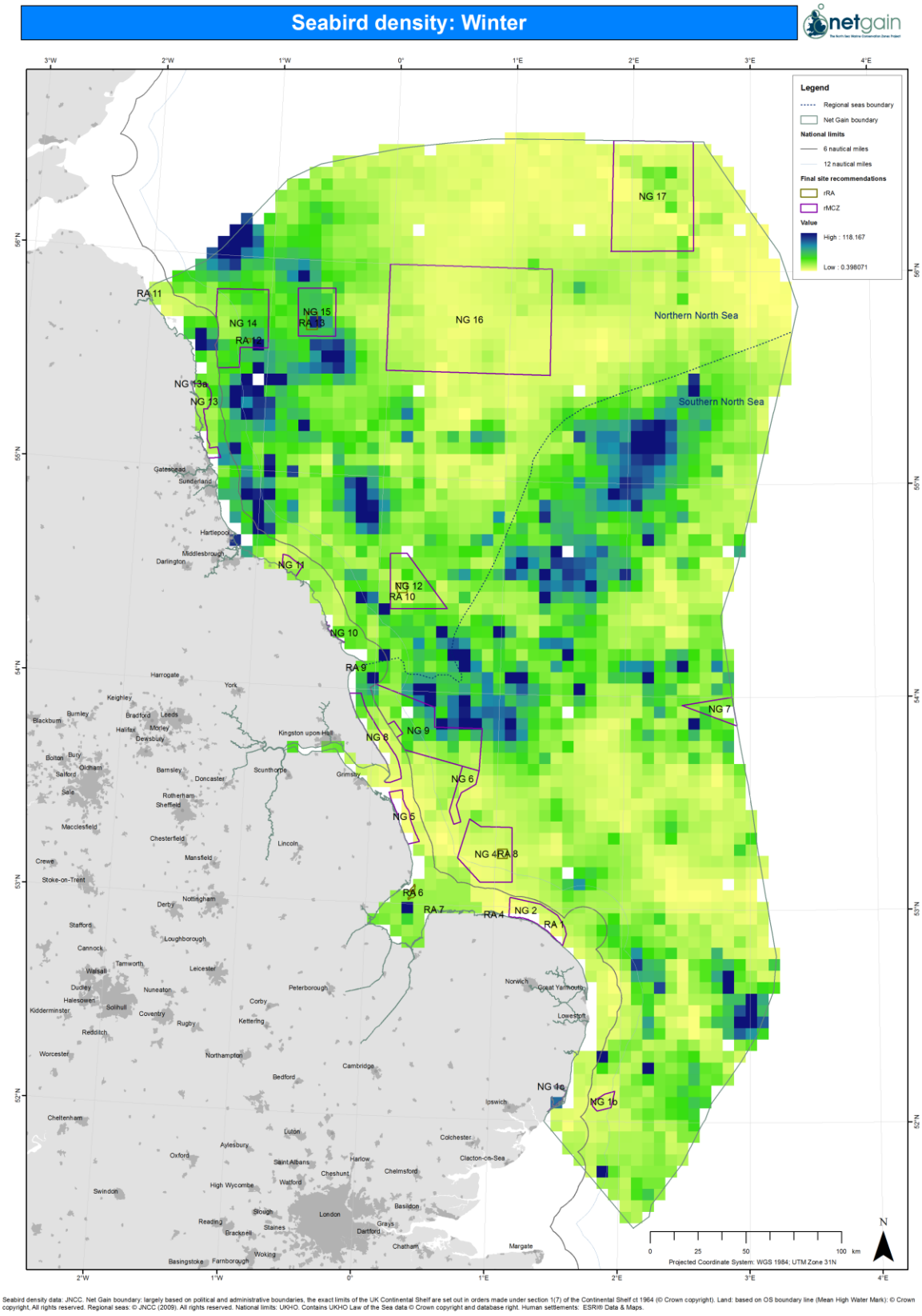
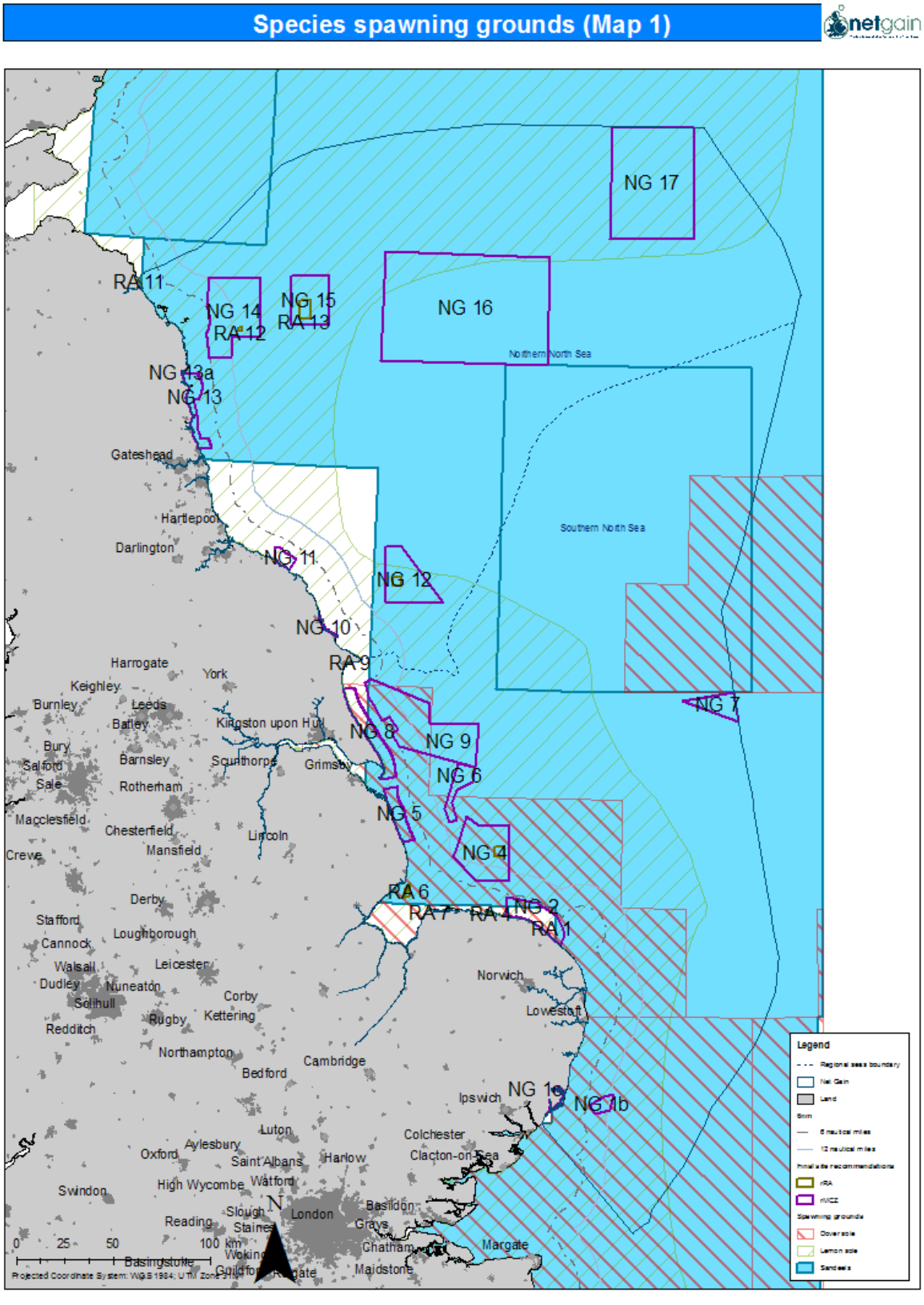
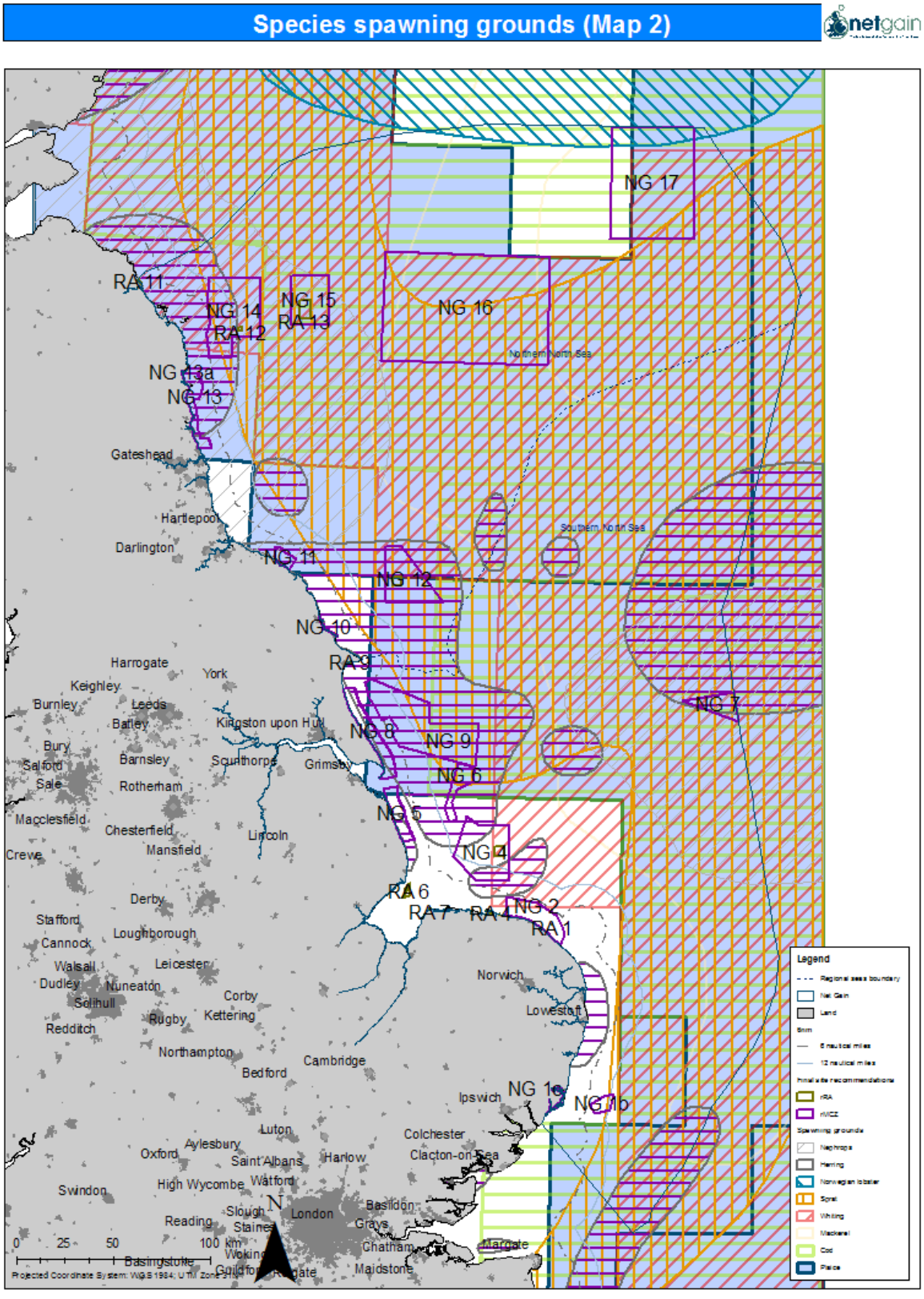


Figure 7.109 ESAS Seabird density: winter



Spawning data: Defra contract ME5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.110 Spawning grounds (Map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.111 Spawning grounds (Map 2)

Site boundary

The offshore site was developed from the original site NG 2.16 from the 2nd iteration. At the time of the 3rd iteration the Regional Hub members suggested altering the western boundary to remove a section as adequacy targets had been met. During March/April Regional Hub meetings the north eastern boundary was altered to remove areas of high fishing intensity, as again adequacy targets were met. The boundary of the site now encompasses the moderate energy circalittoral rock with a buffer around it to allow for uncertainty of the exact extent of the feature.

Conservation objectives

Table 7.92 Conservation objectives for site NG 12, A4.2: Moderate energy circalittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, recover the Moderate energy circalittoral rock to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy circalittoral rock in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy circalittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L

	Physical removal (extraction of substratum)	M-H	L
	Removal of non-target species (lethal)	M-H	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Salinity changes - local	L-H	L
	Surface abrasion: damage to seabed surface features	L-H	L
	Siltation rate changes (low)	NS-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Removal of target species (lethal)	NS-M	H
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

This site does not overlap with any present MPAs. rRA 10, recommended for the protection of moderate energy circalittoral rock, lies within the site boundaries.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site received good support from the two groups that reviewed it at the Large Group meeting (both groups scoring it as '3'), reflecting the consensus achieved at previous Regional Hubs. Within the groups there was a balance of views. Whilst, for example, the French fishing representative was strongly against the site - because the French fleet trawl there - it was recognised that other options for sites for the same (moderate energy circalittoral rock) feature would be likely to be more contentious.

Views on confidence in the underlying data were more polarised with one group scoring it 'L' and the other 'H'. One group commented that they had low confidence in the data, and were not sure if the moderate energy circalittoral rock is where it is said to be. The renewables sector may be undertaking some survey work in the area (in relation to a possible cable route) which may provide additional information. This would be of particular value in supporting the designation of the Reference Area within the site (rRA10).

The expected level of contention was felt to be moderate to high, but would be dependent on the management measures that are ultimately introduced. The NFFO pointed out that any management restrictions at the site would be likely to affect the fishing activities of the international fleets – and particularly highlighted negative implications of the associated recommended Reference Area 10.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- French commercial fishing sector:- Strongly against
- RSPB:- Not against the site but only low level of support
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

The location of this site has undergone much debate during Regional Hubs with respect to adjusting boundaries to include the Flamborough-Helgoland frontal feature. The discussions are summarised below, and are also available in full within previous iteration reports and the Draft Final Recommendations.

Some of the Regional Hub members expressed concern in making late changes to site boundaries, particularly given that consensus had been reached on the current location. It was noted that the current recommended site location included good biodiversity and the available GIS data shows that the Flamborough-Helgoland Front is, in part, included in this area, although the feature moves beyond suggested site boundaries. The NFFO also noted that the Dogger Bank (pSAC) area also captures some of the frontal system, as do sites NG 7 and NG9.

If the site were to be moved further south to accommodate more of the front, there would likely be a higher socio-economic impact, as there is higher fishing activity in the area to the south of NG 12 correlating with the frontal systems. South of the proposed location, there is also less of the moderate energy circalittoral rock habitat present; the very feature for which this site was proposed, and therefore it would be less likely that the adequacy target would be met. It was also noted that stakeholders had less confidence in the available data further south.

Net Gain suggested that there was no consensus within the room to support the site being moved. It was noted that the NGOs requested the site be moved to cover the Flamborough Front area but the balance of the stakeholders present did not support it being shifted southwards. The discussions were concluded with an agreed consensus not to shift the site southwards.

Subsequently The Wildlife Trusts and MCS representatives asked for the following comments to be recorded:

1. The representatives were incredibly unhappy regarding discussions around NG 12:
- They had repeatedly asked the group to consider the Flamborough Front feature to the south of this site;
- Having received SAP advice the group had insufficient opportunity to use it due to lack of wider stakeholder support; and
- This demonstrates the difficulties experienced in incorporating science into this process.
2. All seabed features should have 'recovery' as a conservation objective or no ecological improvement will be noted in condition of the BSH.
3. All seabed features are vulnerable to mobile fishing gear that targets seabed species.

Table 7.93 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010
Residual current flow	Modelled data	Lambkin, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

DAUNT, F., BENVENUTI, S., HARRIS, M.P., DALL'ANTONIA, L., ELSTON, D.A. & WANLESS, S. (2002). *Foraging strategies of the black-legged kittiwake Rissa tridactyla at a North Sea colony: evidence for a maximum foraging range*. *Marine Ecology Progress Series*. 245: 239-247.

FISHERIES AGENCY, (1998). *Fisheries Sensitivity Maps in British Waters*. Edition 1.

HILL, A.E., JAMES, I.D., LINDEN, P.F., MATTHEWS, J.P., PRANDLE, D., SIMPSON, J.H., GMITROWICZ, E.M., SMEED, D.A., LWZA, K.M.M., DURAZO, R., FOX, A.D. & BOWERS, D.G. (1993). *Dynamics of tidal mixing fronts in the North Sea*. Philosophical Transactions: Physical Sciences and Engineering. 343(1669): 431-446.

JONES, L.A., COYLE, M.D., EVANS, D., GILLILAND and, P.M. & MURRAY, A.R. 2004a. *Southern North Sea Marine Natural Area Profile: A contribution to regional planning and management of the seas around England.* Peterborough: English Nature.

JONES, L.A., DAVIES, H., COYLE, M.D., EVANS, D, GILLIAND, P.M., IRVING, R. & MURRAY, A.R. 2004b. *Mid North Sea Marine Natural Area Profile : A contribution to regional planning and management of the seas around England.* Peterborough: English Nature.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs*. JNCC report No. 431.

LAMBKIN, D.O., WAKELIN, S., HOLT, J., BELL, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 9 task 2G. Residual current flow datalayer: Description of approach (Draft).* ABP Marine Environmental Research Ltd.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

RSPB, 2010. *Species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby 2010

NATURAL ENGLAND, (2011). *Broad Habitats: Moderate energy circalittoral rock*. < http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/broadhabitats/moderateenergycircalittoralrock.aspx > Accessed 15/08/2011.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.13 Marine Conservation Zone: NG 13, Coquet to St Mary's

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. Addition of Northumbria Coast SPA to Table 7.110. The ecological descriptions have been updated to reflect RSPB feedback on the IA. No changes have been made to recommendations or boundaries.

Site name

NG 13, Coquet to St Mary's

Site centre location

55° 14' 18''N, 1° 29' 31''W
55.238470°, -1.492302°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

198.75km² / 19,874.56ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

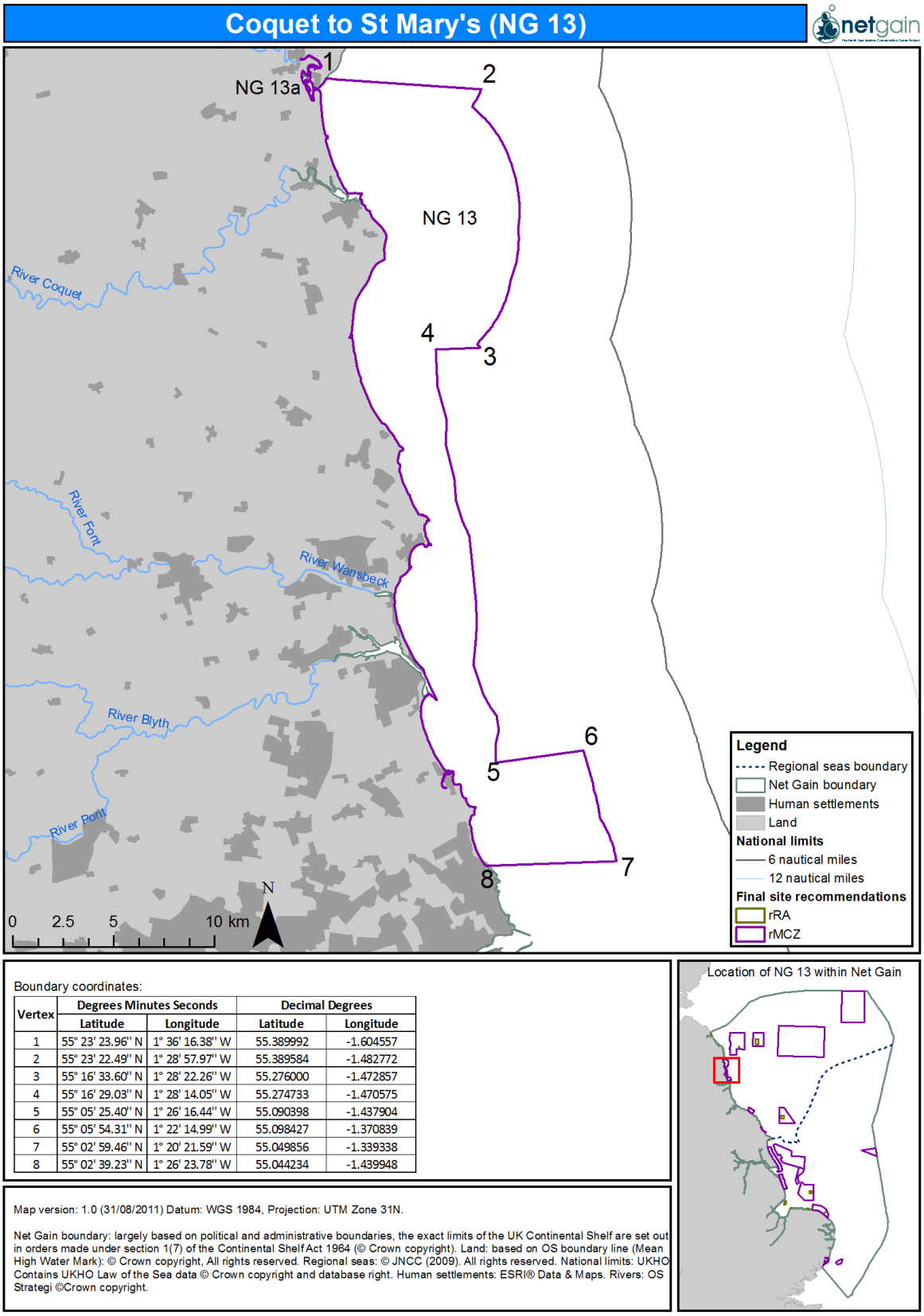
Table 7.94 Features proposed for designation within NG 13, Coquet to St Mary's

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A1.2: Moderate energy intertidal rock	0.33km²
Broad-scale habitat	A1.3: Low energy intertidal rock	0.05km²
Broad-scale habitat	A2.1: Intertidal coarse sediments	0.15km²
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	0.03km²
Broad-scale habitat	A2.3: Intertidal mud	0.03km²
Broad-scale habitat	A2.4: Intertidal mixed sediments	0.29km²
Broad-scale habitat	A3.1: High energy infralittoral rock	73.39km²
Broad-scale habitat	A3.2: Moderate energy infralittoral rock	48.33km²
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	69.42km²
Broad-scale habitat	A5.1: Subtidal coarse sediment	1.00km²
Broad-scale habitat	A5.2: Subtidal sand	0.13km²
Broad-scale habitat	A5.3: Subtidal mud	0.16km²
Broad-scale habitat	A5.4: Subtidal mixed sediment	2.58km²
Habitat of conservation importance	Intertidal underboulder communities	6 points
Species of conservation importance	n/a	n/a

Geological feature	n/a	n/a

Table 7.95 Features within NG 13, Coquet – St Marys not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	n/a	n/a
Habitat of conservation importance	Sheltered muddy gravels, Sheltered muddy gravels (modelled)	Uncertainty in data, as this is a feature that is more likely to be associated with estuaries and NG 13a.
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	Feature not proposed for inclusion due to targets having been met elsewhere in the project area.
Habitat of conservation importance	Estuarine rocky habitat	Uncertainty in data, as this is a feature that is more likely to be associated with estuaries and NG 13a.
Species of conservation importance	Ocean quahog (*Artica islandica*)	Feature has not been put forward for recommendation because of its potential association with manmade structures.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 23' 23.96" N	1° 36' 16.38" W	55.389992	-1.604557
2	55° 23' 22.49" N	1° 28' 57.97" W	55.389584	-1.482772
3	55° 16' 33.60" N	1° 28' 22.26" W	55.276000	-1.472857
4	55° 16' 29.03" N	1° 28' 14.05" W	55.274733	-1.470575
5	55° 05' 25.40" N	1° 26' 16.44" W	55.090398	-1.437904
6	55° 05' 54.31" N	1° 22' 14.99" W	55.098427	-1.370839
7	55° 02' 59.46" N	1° 20' 21.59" W	55.049856	-1.339338
8	55° 02' 39.23" N	1° 26' 23.78" W	55.044234	-1.439948

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.112 Location and extent of site NG13 (Coquet To St Mary's Zone)

Site summary

NG 13 is a coastal site located off Blyth, in Northumberland in the North East of England and includes Coquet and St Mary's Islands. The depth range of the site is between 10m above mean low water mark and 30m deep (Figure 7.116). The seabed represents a mosaic of intertidal and subtidal rock and sediment features, including intertidal underboulder communities and estuarine rocky habitats of conservation importance. St Mary's Island is an existing voluntary marine reserve to protect the presence of rocky reef, large numbers of edible and shore crabs and lobsters (The Wildlife Trusts, RSPB and Seasearch, 2010). Coquet Island has international importance for breeding seabirds during late March until mid-September, as well as being a foraging location for other birds throughout the year. Observations and sightings of marine mammals within the site include harbour porpoise, white beaked dolphin, grey seals, minke, orca and humpback whales. Coquet Island in recent years has been a haul out for seals and pups have been raised here.

Detailed site description

NG13 mostly consists of rocky habitat, of which three broad-scale habitat types are prominent, high energy infralittoral rock, moderate energy infralittoral rock and moderate energy circalittoral rock. These are interspersed with areas of intertidal mixed sediments and subtidal mixed sediments. It has also been recommeded for the diverse underboulder communities present along the shore (Foster-Smith, 2000), a UK Biodiversity Action Plan priority habitat (Maddock, 2008). Hard rock cliffs are a feature in this area with many of the headlands fronted by rocky shore platforms. Coquet Island and the area around St. Mary's Island is also included within NG 13. The area contains a number of estuary mouths which support sediment influenced communities (Foster-Smith, 2000).

Within this site there are a total of nine Sites of Special Scientific Interest (SSSI) including the Northumberland shore SSSI and Cresswell and Newbiggin Shore SSSI, these have been designated for their geological importance and also support internationally important numbers of birds. There are a number of SSSIs in the area which are notified for features such as coal measures, sedimentary features and volcanic glacial till (Natural England, 2011). A sublittoral ridge of limestone known locally as the Trink occurs offshore at Blyth. It is partly covered by gravels, cobbles and some boulders and has been found to support a number of rare species including the sea spider (*Copidognathus reticulatusl*) (English Nature, 1998).The northern boundary of NG 13 aligns with the southern boundary of the Berwickshire and North Northumberland Coast European Marine Site, this site is designated as a Special Area of Conservation (SAC). The site contains a diversity of marine and coastal habitats and species for which it is designated for its national and international importance.

The Northumberland Shore as a whole is used by a wide variety of shorebirds in winter, including curlew, oystercatcher, dunlin, knot, purple sandpiper, bar-tailed godwit and lapwing. Within NG13, the Northumbria Coast SPA and Coquet Island SPA and RSPB reserve are important sites for terns (roseate, Arctic and common), puffin, eider, fulmar, kittiwake and gulls (herring, lesser black-backed and black-headed). Coquet Island SPA and SSSI is a breeding site for over 3000 pairs of breeding black-backed gulls, and is also used by breeding sandwich terns (RSPB 2012, pers. comm.). Several species occur at nationally important levels greater than 1% of the British breeding population. For example, Coquet Island contains approximately 90% of the UK breeding population of roseate terns, which is a protected Annex 1 species under the European Bird Directive 2009, as well as a UK BAP species (Maddock, 2008). Protecting the important foraging grounds in coastal waters around these SPAs could enhance the protection afforded to the birds.

Coquet Island is a haul out area for grey seals (*Halichoerus grypusi)*, with the first pup being raised on the island during 2010 – 2011 season. The UK supports approximately 33% of the world population of grey seals and 95% of the European population. The Northumbrian coast is identified as a particularly important area for breeding populations (McConnell, 1999; Thompson, 2010). The grey seal on the East Coast of the UK has in the past bred almost exclusively on the Farne Islands, however, the Farne Islands may have reached capacity which may explain why Coquet is now being

used for breeding (Thompson, 2010). The grey seal requires particular conditions of very low disturbance and protecting the waters around Coquet would afford these conditions. The grey seal is afforded conservation protection under the EC Habitats Directive, Annex II and Annex V and is named in the Northumberland Biodiversity Action Plan (Cranson, 2008).

St Marys Island is currently an existing voluntary marine reserve to protect the presence of the rocky reef structures which provide habitat for large numbers of edible and shore crabs as well as some lobsters. The island itself is nationally important and is popular with walkers and wildlife watchers due to close proximity to urban areas (The Wildlife Trusts, RSPB and Seasearch, 2010).

Numerous cetacean species including white beaked dolphin *(Lagenorhynchus albirostrisI),* harbour porpoise (*Phocoena phocoena*), orca (*Orcinus orca*), minke (*Balaenoptera acutorostrata*) and humpback whales (*Megaptera novaeanglia*) (Bereton, 2010; Evans, 2003, Seawatch) have been sighted in the area. These are all Marine Biodiversity Action Plan (MBAP) species in the UK with harbour porpoise listed in Annex II of the EU Habitats Directive as species whose conservation requires the designation of Special Areas of Conservation.

NG 13 lies within close proximity (approximately 1km south of the site) to Newcastle University's Dove marine laboratory of which the shoreline in proximity to the lab is regularly surveyed.

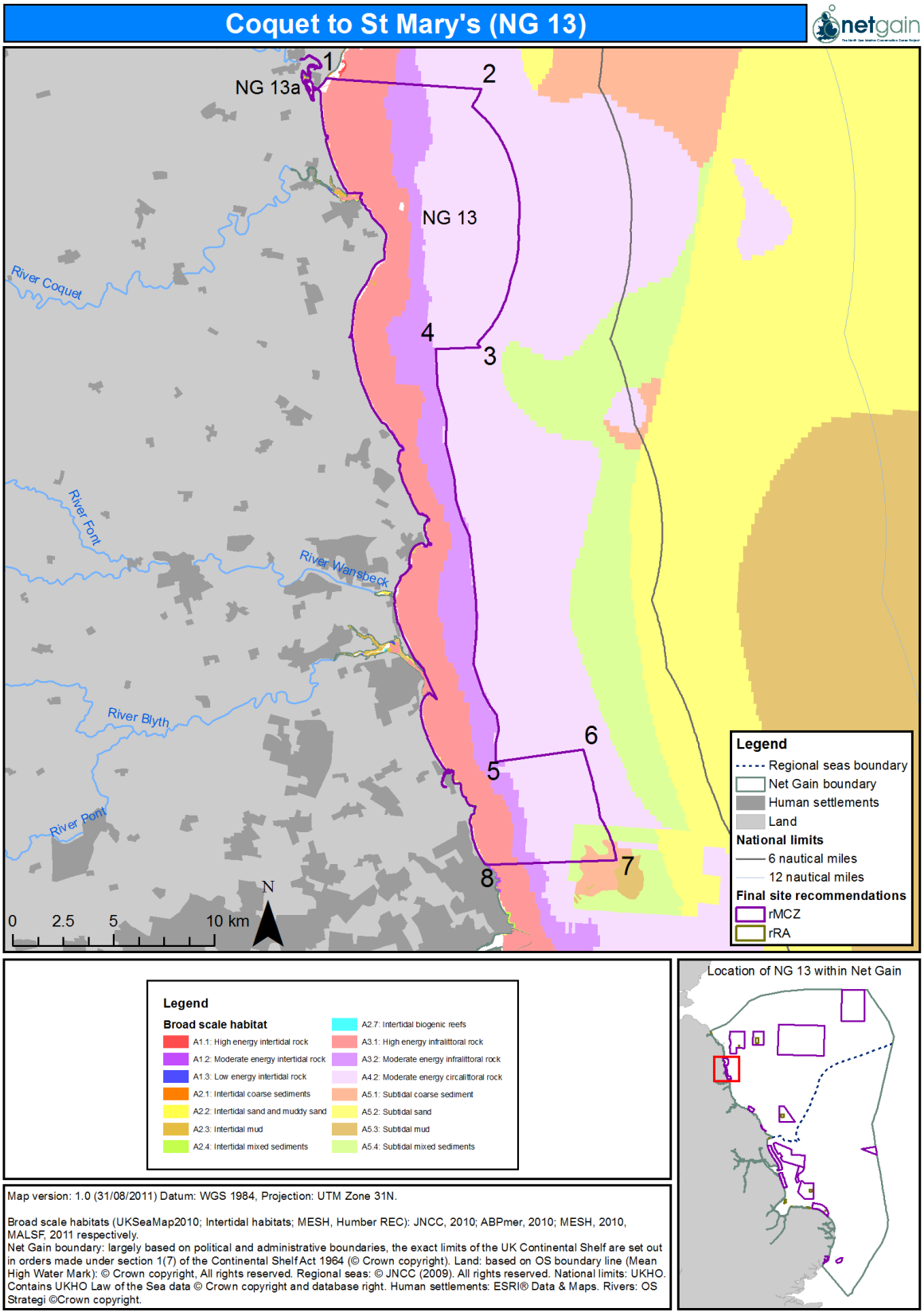


Figure 7.113 Broad-scale habitat present within NG 13

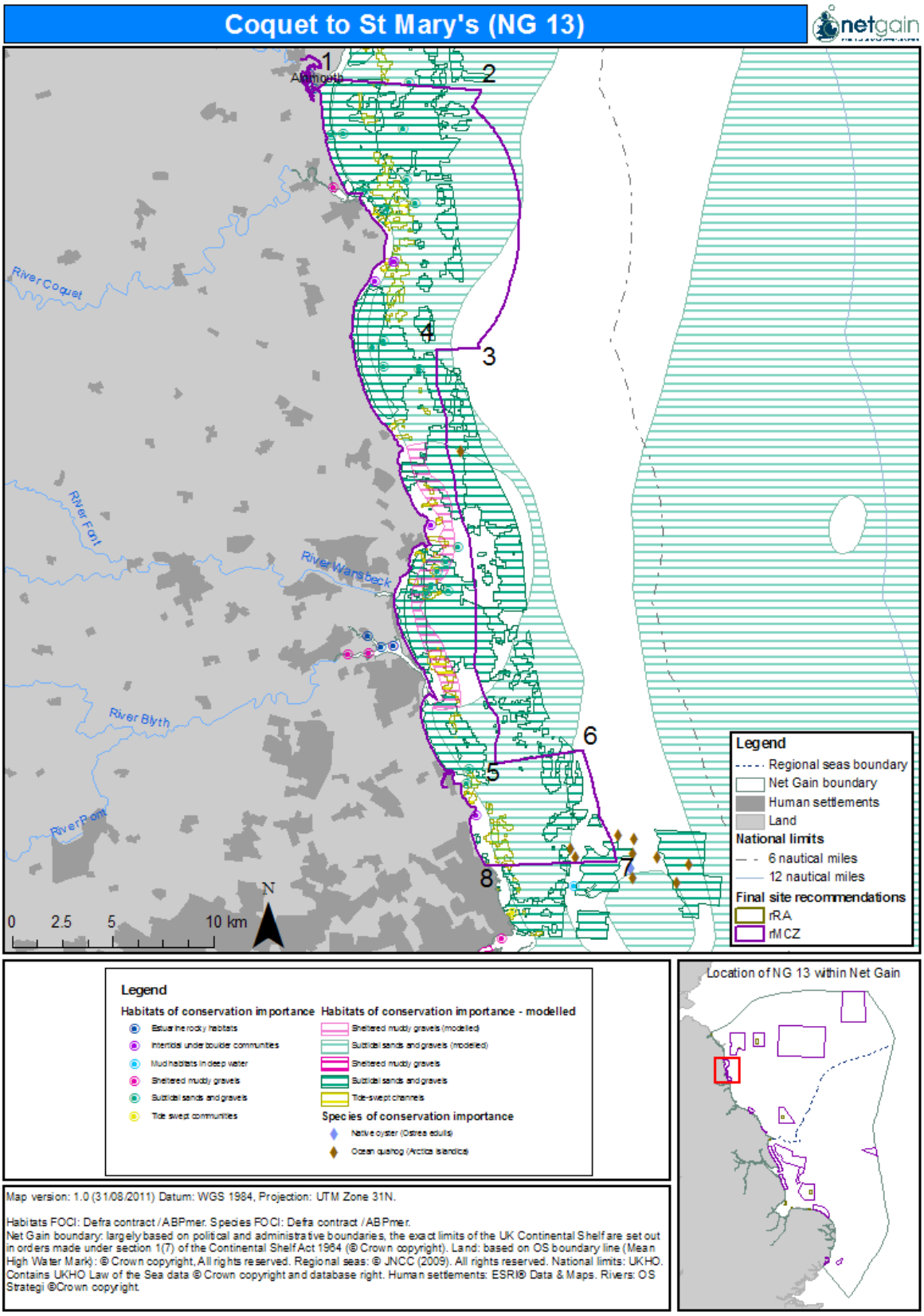


Figure 7.114 FOCI habitats and species present within NG 13

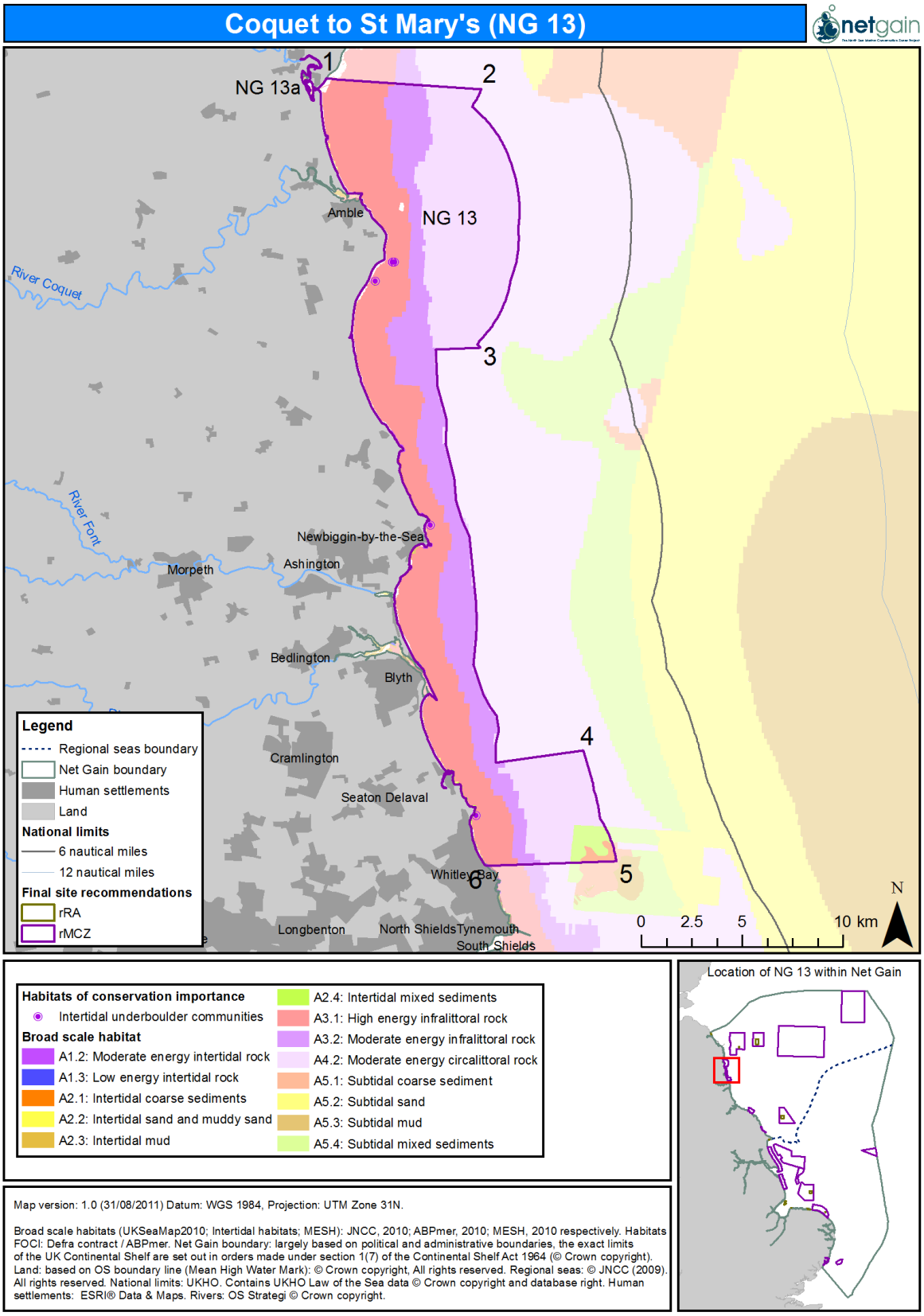


Figure 7.115 Features put forward for recommendation in NG 13

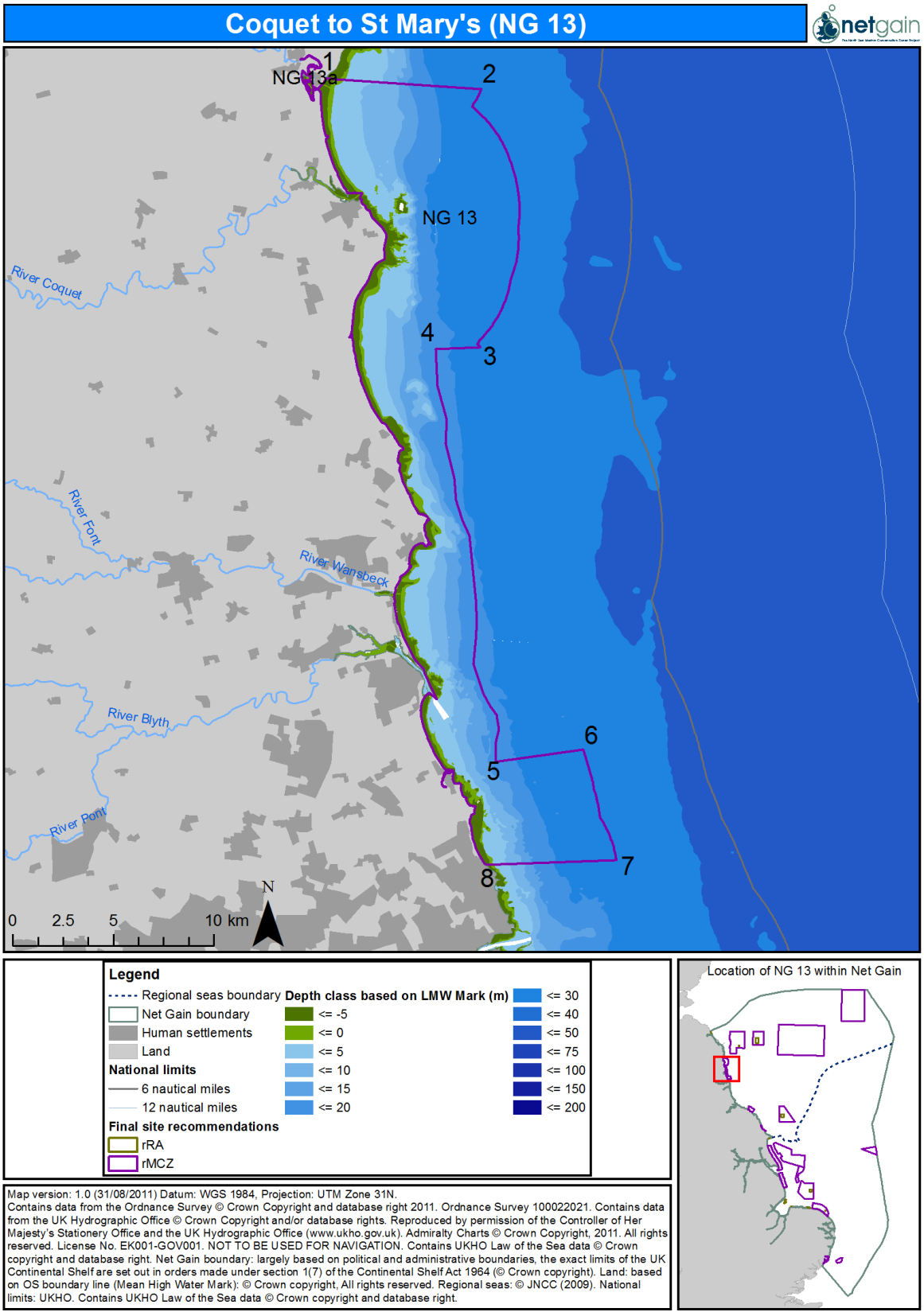


Figure 7.116 Bathymetry of NG 13

Site boundary

This coastal site was based on the original site NG2.19 from the 2nd iteration. Following a review of broad-scale habitat adequacy targets the Hub agreed to remove an area of moderate energy circalittoral rock from the central portion of the site. This was an area the Hub suggested was heavily fished by a range of gear types. The resulting boundaries included areas around islands within the northern and southern limits of the site (Coquet Island and St Mary's Island respectively), and retained areas that are important for birds (especially around the Coquet Island-which the RSPB suggested is an important tern foraging ground).

Following the completion of the vulnerability assessment the decision was made by the group to move the boundary of NG 13, into the mouth of the Aln Estuary (so as to abut with NG 13a). This was done to ensure that all commercial fishing activities were included in NG 13 alone, to allow ease for management if required.

The entire NG13 site overlaps with a seasonal CEFAS fisheries management that prevents the retention of sprat to help protect the herring in two periods, 1st January to 31st March and 1st October to 31 October.

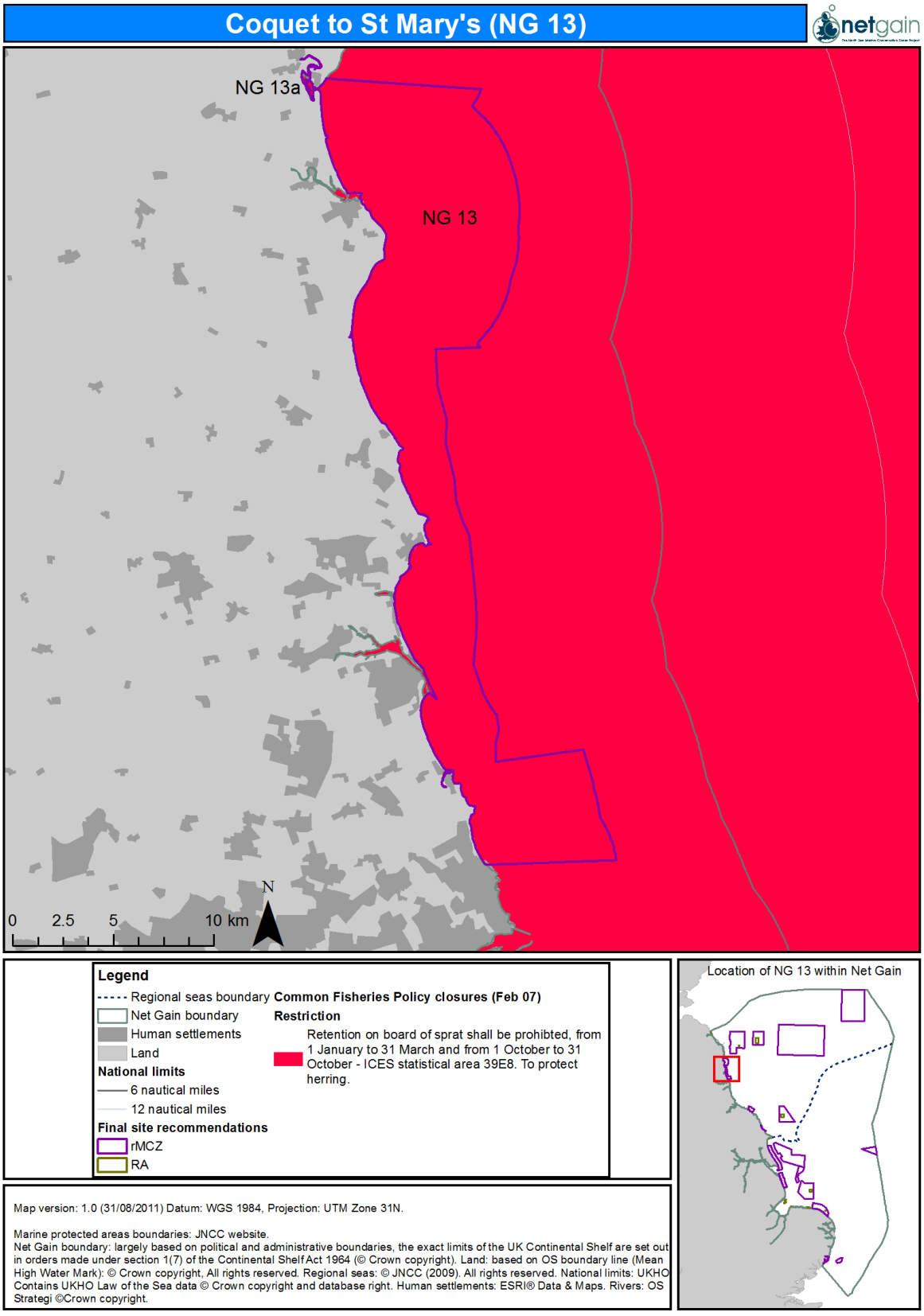


Figure 7.117 NG 13 site boundary with associated fishery management locations

Conservation objectives

Table 7.96 Conservation objectives for site NG 13, A1.2: Moderate energy intertidal rock

Conservation Objective	
1 Maintain/ recover	Moderate energy intertidal rock is moderately exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, maintain the Moderate energy intertidal rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy intertidal rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy intertidal rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L

	Physical removal (extraction of substratum)	M-H	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Siltation rate changes (high)	L-H	L
	Atmospheric climate change	M	L
	Removal of target species (lethal)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Emergence regime changes - local	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Introduction of microbial pathogens (disease)	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-M	L
	Water flow (tidal current) changes - local	NS-M	L
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
	Temperature changes - local	L	L
	Salinity changes - local	NS-L	L
	Siltation rate changes (low)	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.97 Conservation objectives for site NG 13, A1.3: Low energy intertidal rock

Conservation Objective	
1 Maintain/ recover	Low energy intertidal rock sheltered rocky and boulder shores found around the British coast where there is shelter form the prevailing south-westerly wind. Subject to natural change, maintain the Low energy intertidal rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Low energy intertidal rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Low energy intertidal rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — M-H — L

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Surface abrasion: damage to seabed surface features	M-H	L
	Temperature changes - local	L-H	L
	Organic enrichment	NS-H	L
	Siltation rate changes (low)	NS-H	L
	Water flow (tidal & ocean current) changes - regional/national	NS-H	L
	Water flow (tidal current) changes - local	NS-H	L
	Wave exposure changes - local	NS-H	L
	Wave exposure changes - regional/national	NS-H	L
	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Removal of target species (lethal)	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Introduction of microbial pathogens (disease)	NS-M	L
	Salinity changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.98 Conservation objectives for site NG 13, A2.1: Intertidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Intertidal coarse sediment is an uncommon broadscale habitat found at a few scattered sites in the British Isles and in north-western Europe. Subject to natural change, maintain the Intertidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Temperature changes - local — L-H — L Atmospheric climate change — M — L Physical change (to another seabed type) — M — L

	Physical removal (extraction of substratum)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	NS-M	L
	Siltation rate changes (high)	L	L
	Siltation rate changes (low)	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.99 Conservation objectives for site NG 13, A2.2: Intertidal sand and muddy sand

Conservation Objective	
1 Maintain/ recover	Intertidal sand and muddy sand are widespread along stretches of open coast around the British Isles whilst muddy sands are usually found in more sheltered areas such as estuaries. Subject to natural change, maintain the Intertidal sand and muddy sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal sand and muddy sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal sand and muddy sand is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Emergence regime changes (sea level) - regional/national — H — L Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L

	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Physical removal (extraction of substratum)	M	L
	Siltation rate changes (high)	M	L
	Siltation rate changes (low)	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Temperature changes - regional/national	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Removal of target species (lethal)	NS-M	L
	Salinity changes - local	L	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L	H
	Surface abrasion: damage to seabed surface features	L	H
	Temperature changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.100 Conservation objectives for site NG 13, A2.3: Intertidal mud

Conservation Objective	
1 Maintain/ recover	Intertidal mud is protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981. It is also a UKBAP Priority Habitat and on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, maintain the Intertidal mud in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal mud in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal mud is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Emergence regime changes (sea level) - regional/national	H	L
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L

	Physical removal (extraction of substratum)	M-H	H
	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Removal of non-target species (lethal)	M	M
	Temperature changes - regional/national	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L-H
	Removal of target species (lethal)	NS-M	L-H
	Salinity changes - local	L	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L	H
	Siltation rate changes (high)	L	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L	H
	Temperature changes - local	L	H
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.101 Conservation objectives for site NG 13, A2.4: Intertidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Intertidal mixed sediment is an uncommon broad habitat found at a few scattered sites in the British Isles in the south-west and northeast of England, East Anglia, west Wales and north-western Europe. Subject to natural change, maintain the Intertidal mixed sediments in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal mixed sediments in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal mixed sediments is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — L Siltation rate changes (high) — H — L

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Atmospheric climate change	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	M	L
	Physical change (to another seabed type)	M	L
	Removal of non-target species (lethal)	M	L
	Siltation rate changes (low)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Water clarity changes	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Removal of target species (lethal)	L-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.102 Conservation objectives for site NG 13, A3.1: High energy infralittoral rock

Conservation Objective	
1 Maintain/ recover	High energy infralittoral rock is representative of shallow water rock, below the tides exposed to very strong waves and currents. Subject to natural change, maintain the High energy infralittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of High energy infralittoral rock in the biogeographic region are maintained, such that the features makes its contribution to the network.
Advice on operations	
3 Pressures	High energy infralittoral rock is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Siltation rate changes (high)	M-H	L
Physical removal (extraction of substratum)	M	L

	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Water clarity changes	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.103 Conservation objectives for site NG 13, A3.2: Moderate energy infralittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy infralittoral rock is exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, maintain the Moderate energy infralittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy infralittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy infralittoral rock is sensitive to the pressures listed below.

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Siltation rate changes (high)	M-H	L
Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L

	Introduction or spread of non-indigenous species & translocations (competition)	M	L
	Physical change (to another seabed type)	M	L
	Physical removal (extraction of substratum)	M	L
	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Water clarity changes	L-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.104 Conservation objectives for site NG 13, A4.2: Moderate energy circalittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, maintain the Moderate energy circalittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy circalittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy circalittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L Physical removal (extraction of substratum) — M-H — L

	Removal of non-target species (lethal)	M-H	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Salinity changes - local	L-H	L
	Surface abrasion: damage to seabed surface features	L-H	L
	Siltation rate changes (low)	NS-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Removal of target species (lethal)	NS-M	H
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.105 Conservation objectives for site NG 13, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — L-H — L Surface abrasion: damage to seabed surface features — NS-H — L Physical change (to another seabed type) — M — L

	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.106 Conservation objectives for site NG 13, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Siltation rate changes (high)	H	L
Physical removal (extraction of substratum)	L-H	M

	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.107 Conservation objectives for site NG 13, A5.3: Subtidal mud

Conservation Objective	
1 Maintain/ recover	Subtidal mud is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal mud in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mud in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mud is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Organic enrichment	NS-H	L
Physical change (to another seabed type)	M	L
Physical removal (extraction of substratum)	M	L

	Removal of non-target species (lethal)	M	L-H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Siltation rate changes (high)	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Surface abrasion: damage to seabed surface features	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of target species (lethal)	NS-M	L-H
	Siltation rate changes (low)	NS-L	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.108 Conservation objectives for site NG 13, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal mixed sediments in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures: **Pressure** / **Sensitivity** / **Confidence** Physical change (to another seabed type) / H / L Physical loss (to land or freshwater habitat) / H / L Physical removal (extraction of substratum) / H / L Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm / H / L

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.109 Conservation objectives for site NG 13, Intertidal underboulder communities

Conservation Objective	
1 Maintain/ recover	Intertidal underboulder communities are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Intertidal under boulder communities in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal under boulder communities in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal under boulder communities is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
Emergence regime changes (sea level) - regional/national	M	L
Introduction or spread of non-indigenous species & translocations (competition)	M	L

	Physical change (to another seabed type)	M	L
	Removal of target species (lethal)	M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Emergence regime changes - local	L	L
	Salinity changes - local	L	L
	Siltation rate changes (low)	L	L
	Temperature changes - local	L	L
	Water flow (tidal current) changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

Site NG 13, Coquet to St Mary's borders site NG 13a, Aln Estuary at the mouth of the estuary. The northern border of the site is aligned with the Berwickshire and North Northumberland Coast SAC, and the site includes a substantial list of MPAs that include the Northumbria Coast SPA, Coquet Island SPA and SSSI, Alnmouth Saltmarsh and Dunes, Cresswell and Newbiggin Shores, Cresswell Ponds, Hadston Links, Low Hauxley Shore, Northumberland Shore, Tynemouth to Seaton Sluice and Warkworth Dunes and Saltmarsh.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.110 MPAs within or adjacent to NG 13

MPA Type	Site Name	Features Protected
SAC	Berwickshire and North Northumberland Coast	A1.2: Moderate energy intertidal rock A1.3: Low energy intertidal rock A2.4: Intertidal mixed sediments A2.7: Intertidal biogenic reefs A5.3: Subtidal mud Blue mussel beds Intertidal underboulder communities Intertidal sediments dominated by aquatic angiosperms Seagrass beds
SPA	Northumbria Coast	Not in GAP table Breeding and wintering bird species
SPA	Coquet Island	Not in GAP table Breeding bird species
SSSI	Alnmouth Saltmarsh and Dunes	A2.5: Coastal saltmarshes and saline reedbeds Coastal saltmarsh
SSSI	Coquet Island	Not in GAP table Botanical Breeding bird species (including eider, arctic tern, common tern, sandwich tern, roseate tern and black headed gulls)
SSSI	Cresswell and Newbiggin Shores	Not in GAP table Geological
SSSI	Cresswell Ponds	A3.3: Low energy infralittoral rock Saline lagoons
SSSI	Hadston Links	Not in GAP table Coastal dunes and associated botanical communities
SSSI	Low Hauxley Shore	Not in GAP table Geological
SSSI	Northumberland Shore	A2.2: Intertidal sand and muddy sand
SSSI	Tynemouth to Seaton Sluice	Not in GAP table Geological Wintering purple sandpiper, turnstone and sanderling Locally important numbers of golden plover, ringed plover and knot
SSSI	Warkworth Dunes and Saltmarsh	A2.5: Coastal saltmarshes and saline reedbeds Coastal saltmarsh

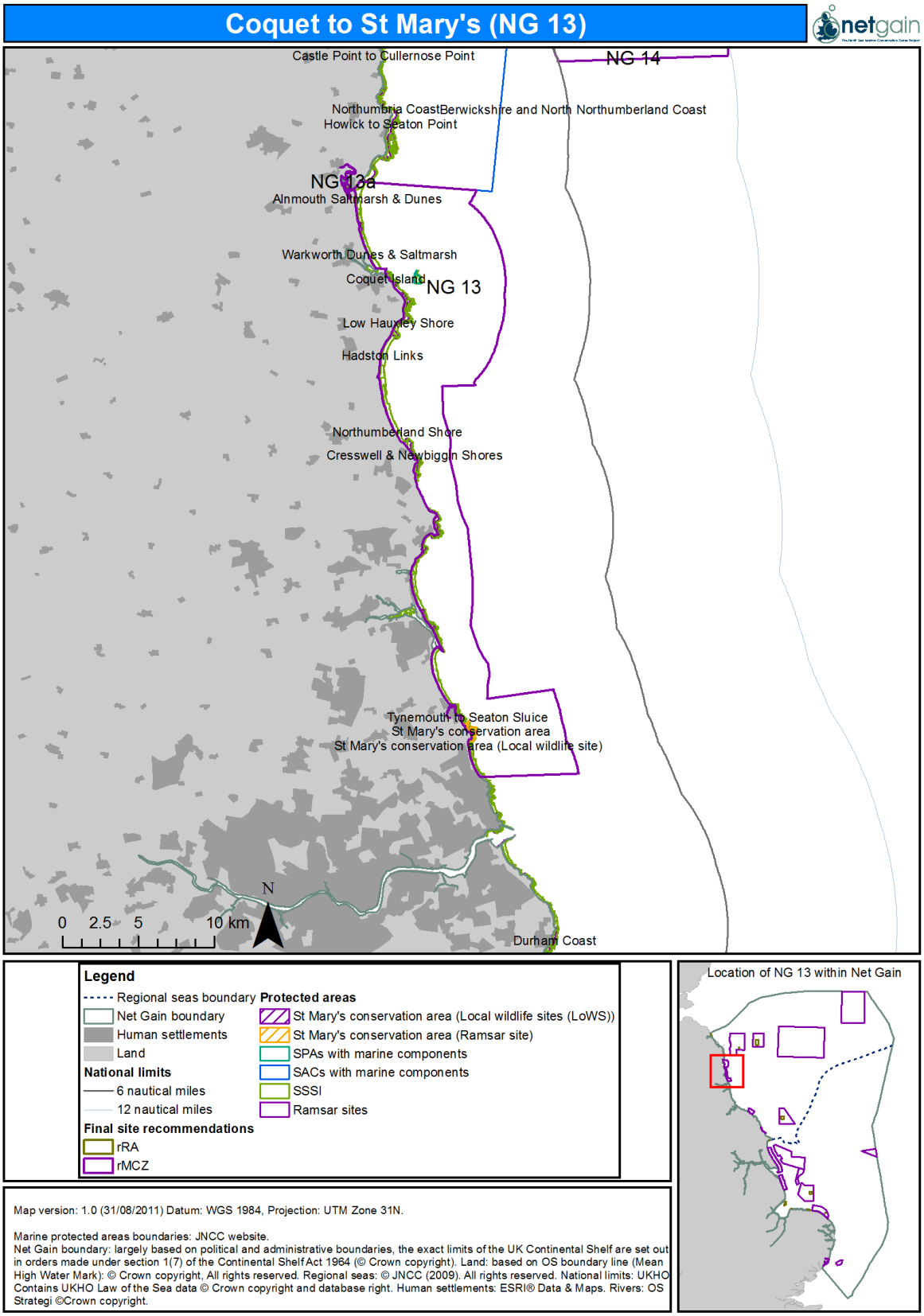


Figure 7.118 MPAs/rMCZs within or adjacent to NG 13

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

Support for this site was good (both groups scoring it as '3') but this was on the assumption that management measures now and in the future would relate to the Conservation Objective remaining as maintain. The area was recognised as having a high socio-economic importance in relation to recreational users (including recreational boating, angling, tourism and diving) as well as to commercial fishing.

There was a high level of confidence in the underlying data for the site, one group suggesting that the original site identification had been based on sound current data.

Contention was scored as 'L' by one group and 'H' for the other. In terms of specific concerns, NAREC cabling may be an issue whilst, on a wider scale, fishermen feel that the area covers the whole of their coastal area and is potentially prejudicial to their activities. It was pointed out that contention is likely to increase if management measures change over time.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- Northumberland IFCA:- Neutral – currently managed satisfactorily but fishing community not happy with potential implications
- RSPB:- Strongly support
- The Crown Estate:- Accept – assumption that there will be no additional EIA requirements on renewables projects due to rMCZ designation
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.111 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Common maerl (*Phymatolithon calcareum*), Ocean quahog (*Artica islandica*)	Combination of historical and recent records	Seeley, et al. 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Intertidal underboulder communities, Sheltered muddy gravels, Subtidal sands and gravels, Tide swept channels, Estuarine rocky habitat	Combination of historical and recent records	Tyler-Walters, et al. 2009
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010
Ross worm (*Sabellaria spinulosa*) occurrences	Survey: records	Holt, 1994
Sheltered muddy gravels, Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

BERETON, T. MACLEOD, C. KITCHING, M. TAIT, A. STEEL, D. QUIGLEY, M. SCOTT, C. 2010. *Importance of the Farne Deeps and surrounding waters off the Northumberland coast for White-beaked Dolphin and other cetaceans and seabirds of Conservation Concern*. Natural England

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

CONNOR, D. ALLEN, J. GOLDING, N. HOWELL, K. LIEBERKNECHT, NORTHEN, K. REKER, J 2004. The Marine Habitat Classification for Britain and Ireland Version 04.05 JNCC, Peterborough ISBN 1 861 07561 8 (internet version)

CRANSON, A. WALTON, J. 2008. *Grey Seal (Halichoerus grypus) Species Action Plan*. Northumberland Biodiversity Action Plan.

EVANS, P. ANDERWALD, P. BAINES, M. 2003. *UK CETACEAN STATUS REVIEW. Sea Watch Foundation*.

ENGLISH NATURE, 1998. *Eastern Scottish Border to North Bank of the River Tyne Maritime Natural Area Profile*

FOSTER-SMITH, J. 2004 *The Marine Fauna and Flora of the Cullercoats District: Marine Species* Records for the Northeast Coast of England

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 24: Task 2I. Intertidal habitats datalayer (Final). ABP Marine Environmental Research Ltd.
JNCC, 2011a SPA Description. http://jncc.defra.gov.uk/page-1997. Accessed 21/08/2011

JNCC, 2011b SPA Description. http://jncc.defra.gov.uk/page-1991. accessed 21/08/2011

HOLT, R.H.F. 1994. *Marine biological survey of Eyemouth (Berwickshire) to Alnmouth (Northumberland)*. Joint Nature Conservation Committee Report, No. 157. (Marine Nature Conservation Review Report, No. MNCR/SR/24.).

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

MC CONNELL, B. J., FEDAK, M. A., LOVELL, P. & HAMMOND. P. S. 1999. *Movements and foraging areas of grey seals in the North Sea*. Journal of Applied Ecology, 36, 573-590

NATURAL ENGLAND, 2011. *Nature on the map*. Available at: http://www.natureonthemap.naturalengland.org.uk/ accessed 21/08/2011

SEAWATCH EASTERN ENGLAND, 2011. *CETACEANS OF EASTERN ENGLAND* available at: http://www.seawatchfoundation.org.uk/docs/EasternEngland.pdf. accessed 22/08/2011

SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P., ADAMS, L. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 14: Task 2B - Mapping of species with limited mobility (Benthic Species). ABP Marine Environmental Research Ltd.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

THE WILDLIFE TRUSTS, RSPB and SEASEARCH, 2010. *Biodiverse Areas within the Net Gain region: A supportive guide to aid stakeholder identification of ecological interest areas that meet aspects of the Ecological Network Guidance.* November, 2010.

THOMPSON, D. and DUCK, C. 2010 *Berwickshire and North Northumberland Coast European Marine Site: grey seal population status.* Report to Natural England

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.14 Marine Conservation Zone: NG 13a, Aln Estuary

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. Addition of Berwickshire and North Northumberland Coast SAC and Northumbria Coast SPA to Table 7.120. No changes have been made to recommendations or boundaries.

Site name

NG13a, Aln Estuary

Site centre location

55° 23’ 19’’N, 1° 37’ 03’’W
55.388717°, -1.617815°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

0.44km² / 44ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

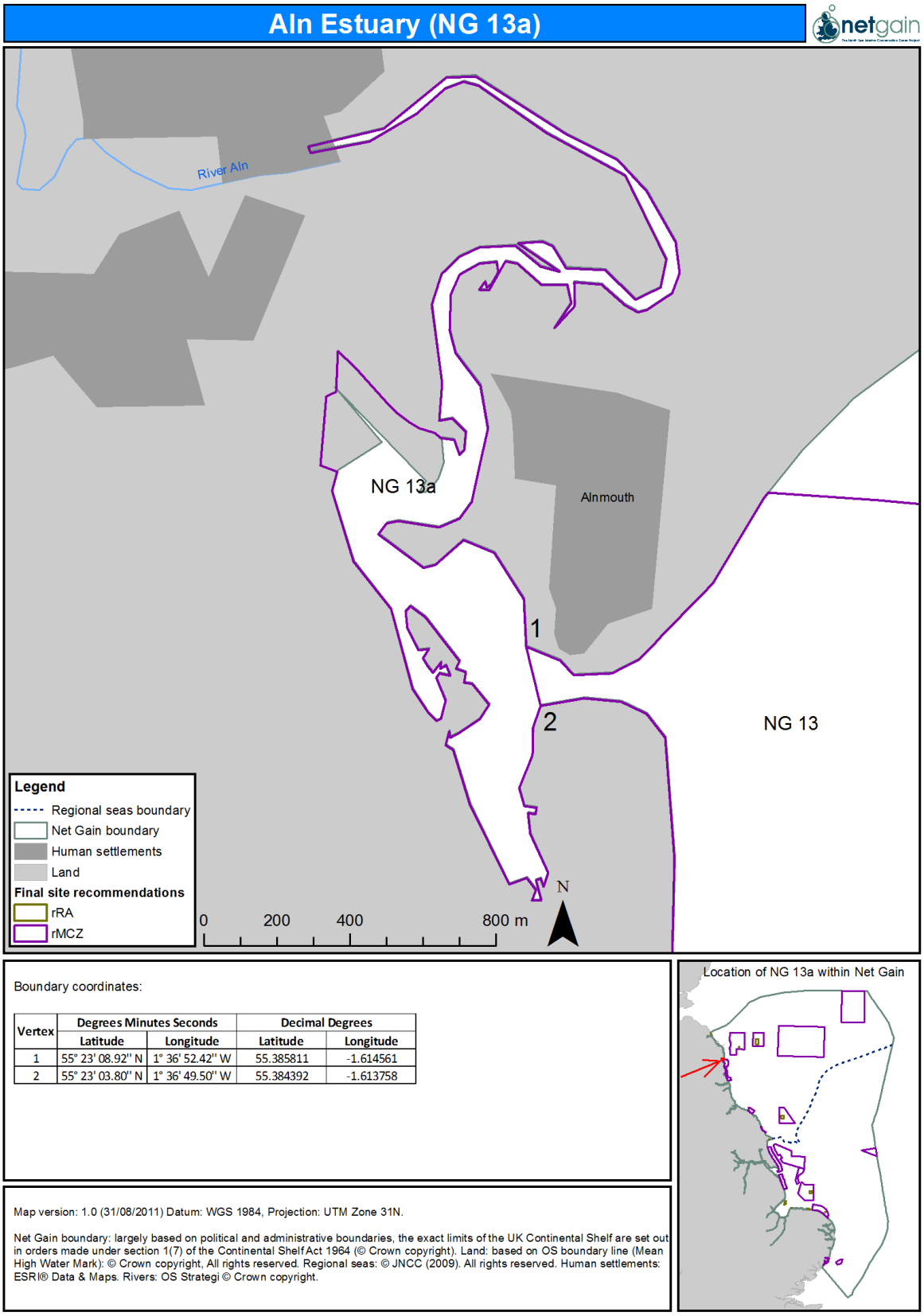
Table 7.112 Features proposed for designation within NG13a, Aln Estuary

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A2.3: Intertidal mud	0.10km²
Broad-scale habitat	A2.5: Coastal saltmarshes and saline reed beds	0.10km²
Broad-scale habitat	A3.1 High energy infralittoral rock	0.03km²
Habitat of conservation importance	Estuarine rocky habitat	2 points
Habitat of conservation importance	Sheltered muddy gravels	1 point
Habitat of conservation importance	Subtidal sands and gravels	0.12km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.113 Features within NG 13a, Aln Estuary not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A5.2: Subtidal sand	The site was put forward for estuarine features[29]
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a

[29] Discussions held during the July, 2011 LGM suggested that these features could be considered for designation in subsequent stages of the MCZ consultation process on the basis that their inclusion would not materially alter the management requirements for the site. For the purposes of Net Gain's final recommendations these features have not been put forward for designation and have not been the subject of a vulnerability assessment.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 23' 08.92" N	1° 36' 52.42" W	55.385811	-1.614561
2	55° 23' 03.80" N	1° 36' 49.50" W	55.384392	-1.613758

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.119 Location and extent of site NG 13a, Aln Estuary

Site summary

NG 13a encompasses the Aln Estuary which is located in Northumberland on the North East coast of England. The depth range from the data provide by UKOA suggests that the site is entirely intertidal with a maximum depth of 0m at the lowest of low tides (Figure 7.123). The site has been developed to protect estuarine and saltmarsh habitats which provide areas for spawning, nurseries for juveniles and habitat for benthic species. The site supports other marine/estuarine vegetation including seagrass, and the intertidal flats provide foraging areas for seabirds feeding on small invertebrates and worms. Of particular interest to the site is the current managed realignment strategy that is being carried out by the Environment Agency creating new saltmarsh habitat. The boundaries of NG 13a account for this, and include a field that has been flooded to establish saltmarsh habitat.

Detailed site description

The part of the Aln Estuary that has been recommended for designation is predominantly coastal saltmarsh and saline reedbed, sheltered muddy gravels and estuarine rocky habitats all of which are designated UK BAP priority habitats (Maddock, 2008). In addition to this the site is also put forward for intertidal mud, high energy infralittoral rock and subtidal sands and gravels.

The site aligns with the existing European Marine Site at the river mouth where there is also an existing SSSI (Alnmouth Saltmarsh and Dunes SSSI). This site will protect further saltmarsh habitat that falls outside the existing designations. Birds that have been identified in the area include roosting gulls, dunlin and other waders including redshank, curlew and snipe. The estuary is also identified by stakeholders as a roost site for widgeon (*Anas Penelope*).

Saltmarshes occur on the muddy shores of sheltered estuaries and inlets and provide a link between land and sea. They support a specialist community of halophytic plants that are adapted to the salty conditions. Saltmarshes are able to trap and stabilise sediments and as such they form a natural coastal defence. It is for this reason that the Environment Agency has created a further area of saltmarsh within NG 13a as part of the '4shore' or intertidal recharge project undertaken nationally by the Environment Agency. A field within the site was deliberately flooded in order to promote the creation of saltmarsh along with all the associated benefits of coastal defence and wildlife habitat. Saltmarsh is an important haven for wading birds and wildfowl when the tide covers the mudflats upon which they feed. Saltmarshes also provide an important habitat for many invertebrates, themselves a food source to many species of birds as well as providing grazing opportunities to species such as Widgeon (*Anas Penelope*). Reedbeds are also important for birds providing food and shelter (Maddock, 2008) and may also be present within the site.

It is estimated that, at the mean high water line, 24% of the English coastline is saltmarsh habitat (Maddock, 2008). Saltmarshes and reedbeds are susceptible to land reclamation and drainage for activities such as agriculture. They may be 'squeezed out' when their retreat inland by rising sea levels is stopped by the presence of infrastructure such as hard coastal defences. Other risks include damage from grazing, encroachment of other terrestrial plants such as grasses and changes to water quality. This emphasizes the need to protect these habitats where it is possible (Maddock, 2008; Connor, 2004).

Estuarine rocky habitats make up a very small percentage of most estuary habitats however they contribute greatly to the biodiversity within it. It is a comparatively uncommon feature of estuaries and there are only a small number of examples of this habitat on the eastern coast of the UK with most to be found in western and northern parts of the UK. Due to differing conditions to rocky shore habitats found on the open coast, such as low wave energy, strong tidal effects, freshwater inflow and mobile sediments, biological communities found in estuarine habitats can be unique (Maddock, 2008).

Estuaries are important fish nursery grounds (Elliot, 2002). It has been demonstrated that marine fish use these habitats as nursery grounds. It therefore follows that to protect marine fish species in

open water only, misses out a major part of their lifecycle, and to do so may only meet with limited success. Although this site is recommended for its saltmarsh, reedbed and estuarine rocky habitat these habitats create a protected area within the estuary which may enhance marine fish populations by providing protection for spawning and nursery areas (Elliot, 2002; Colclough, 2010).

The inner part of the Aln estuary at Coquet supports both sprat (*Sprattus sprattus*) and flounder (*Platichthys flesus*) nurseries, Migratory species including juvenile plaice (*Pleuronectes platessa*), juvenile flounder (*Platichthys flesus*), juvenile brown trout (*Salmo trutta*) and juvenile Atlantic salmon (*Salmo salar*) have been found close to the estuary mouth as are European eel and sandeel (*Ammodytes tobianus).* it is therefore possible that the Aln Estuary is a nursery area that provides food for the wider ecosystem including fish, birds and cetaceans.

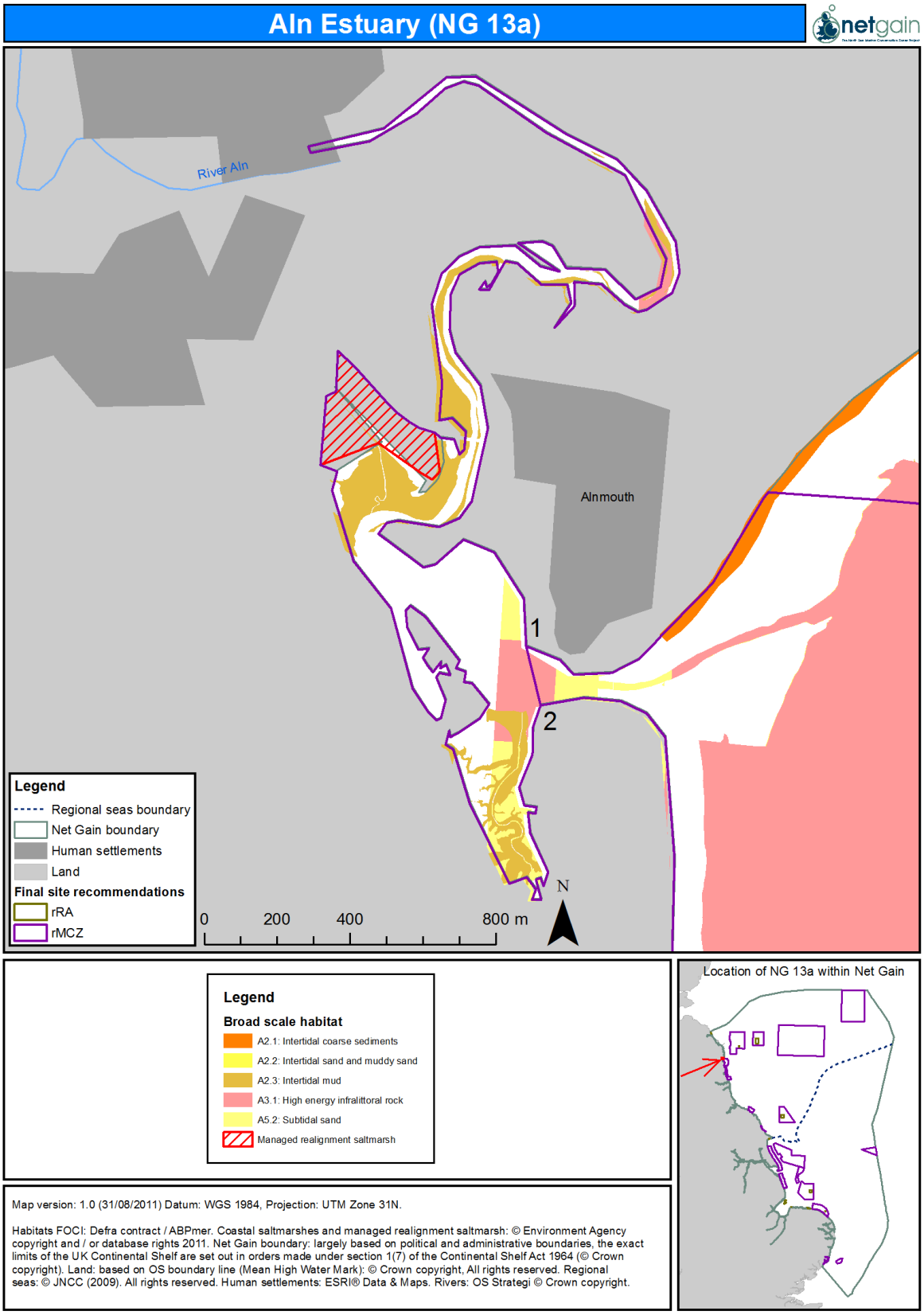


Figure 7.120 Broad-scale habitat present within NG 13a

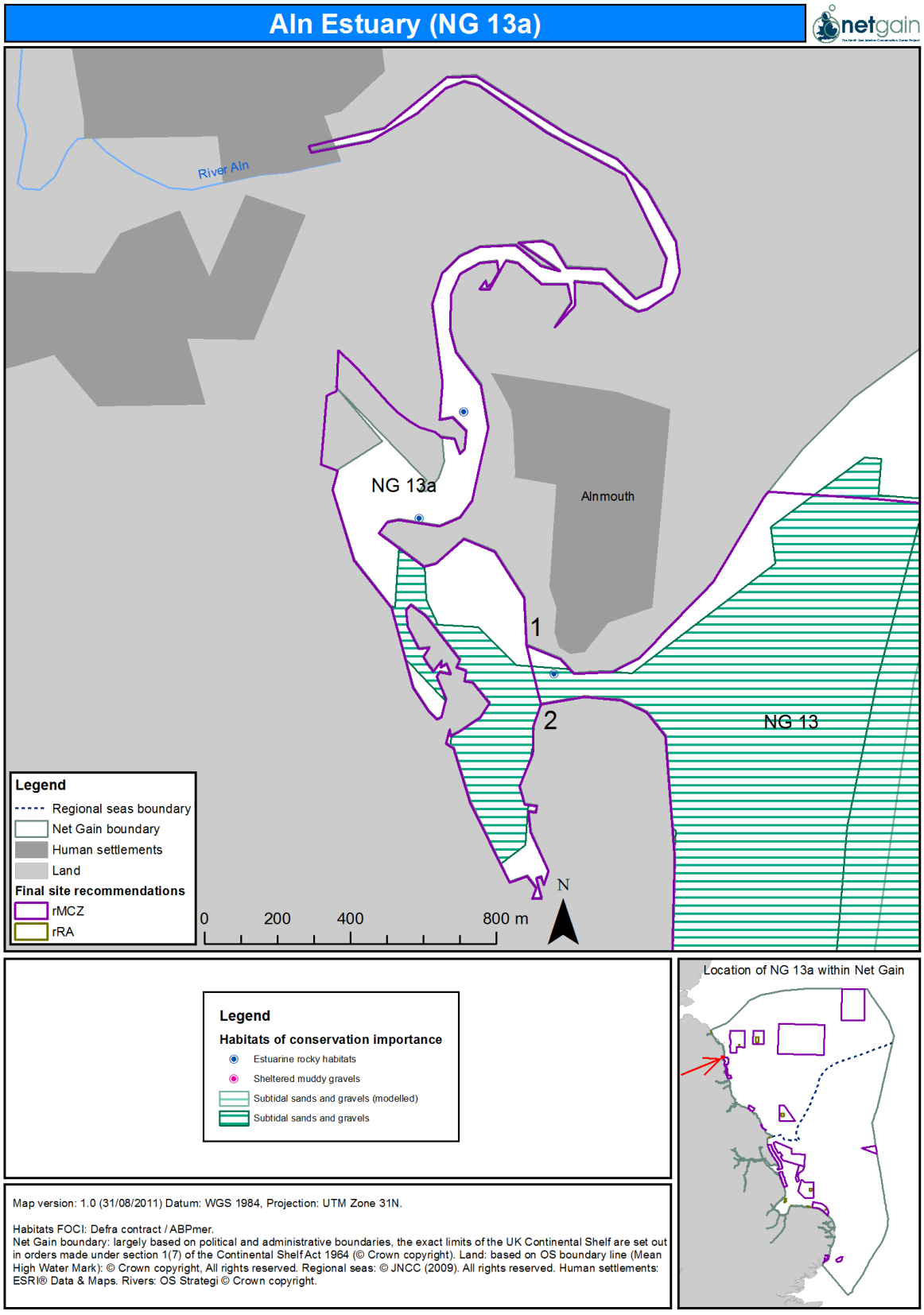


Figure 7.121 FOCI habitats and species present within NG 13a

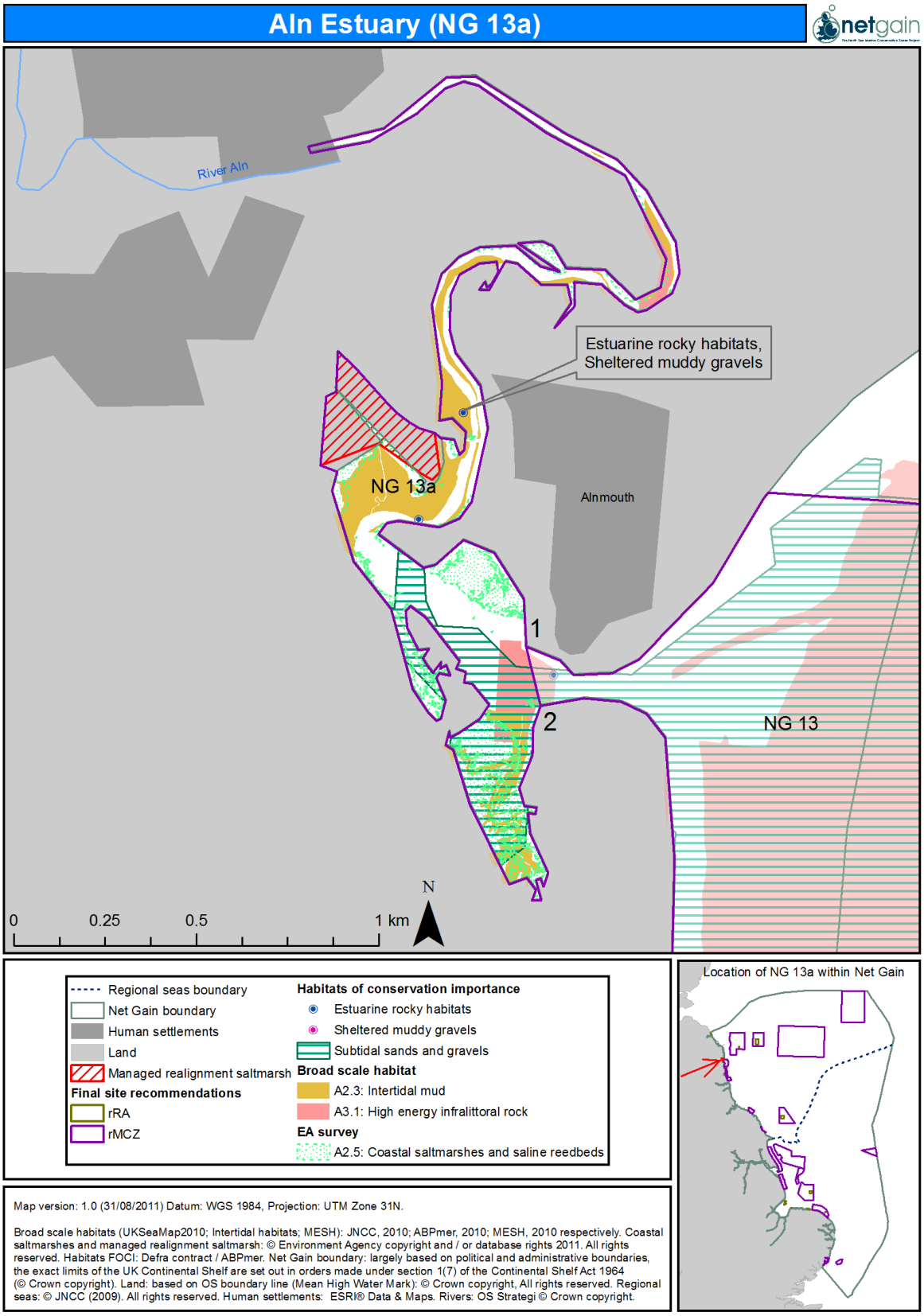


Figure 7.122 Features put forward for recommendation in NG 13a

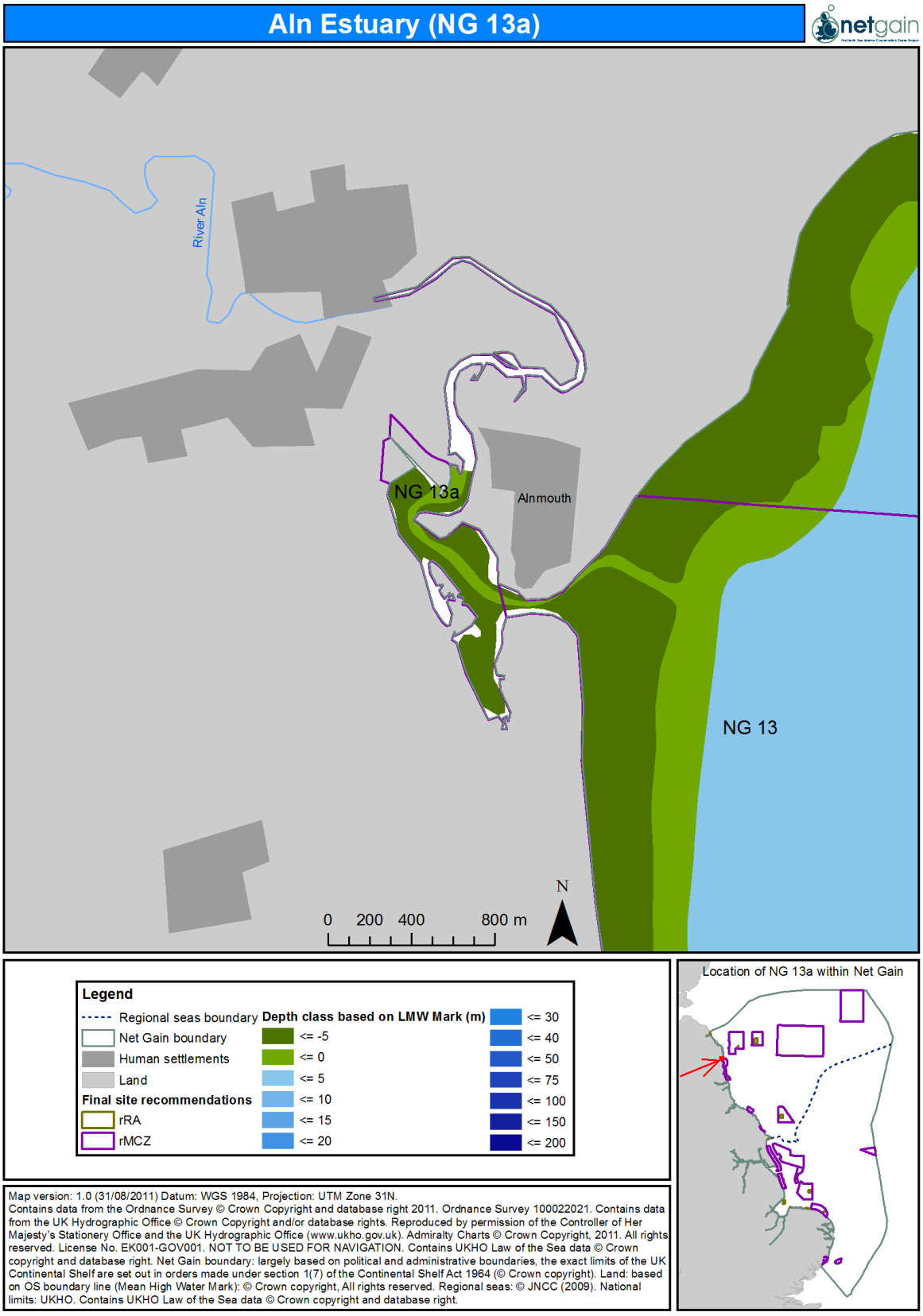


Figure 7.123 Bathymetry of NG 13a

Site boundary

The boundary of this site was developed to include the Net Gain boundary of the Aln Estuary, and also the field that was flooded for managed re-alignment to create saltmarsh habitat. The adjoining boundary of the site with NG 13 was altered during the May 2011 Regional Hub meeting to remove all commercial fishing activity from site NG 13a, in effect restricting the need for potential fisheries management to NG 13 only.

The entire NG 13a site has a seasonal CEFAS fisheries management that prevents the retention of sprat to help protect the herring in two periods, 1st January to 31st March and 1st October to 31 October.

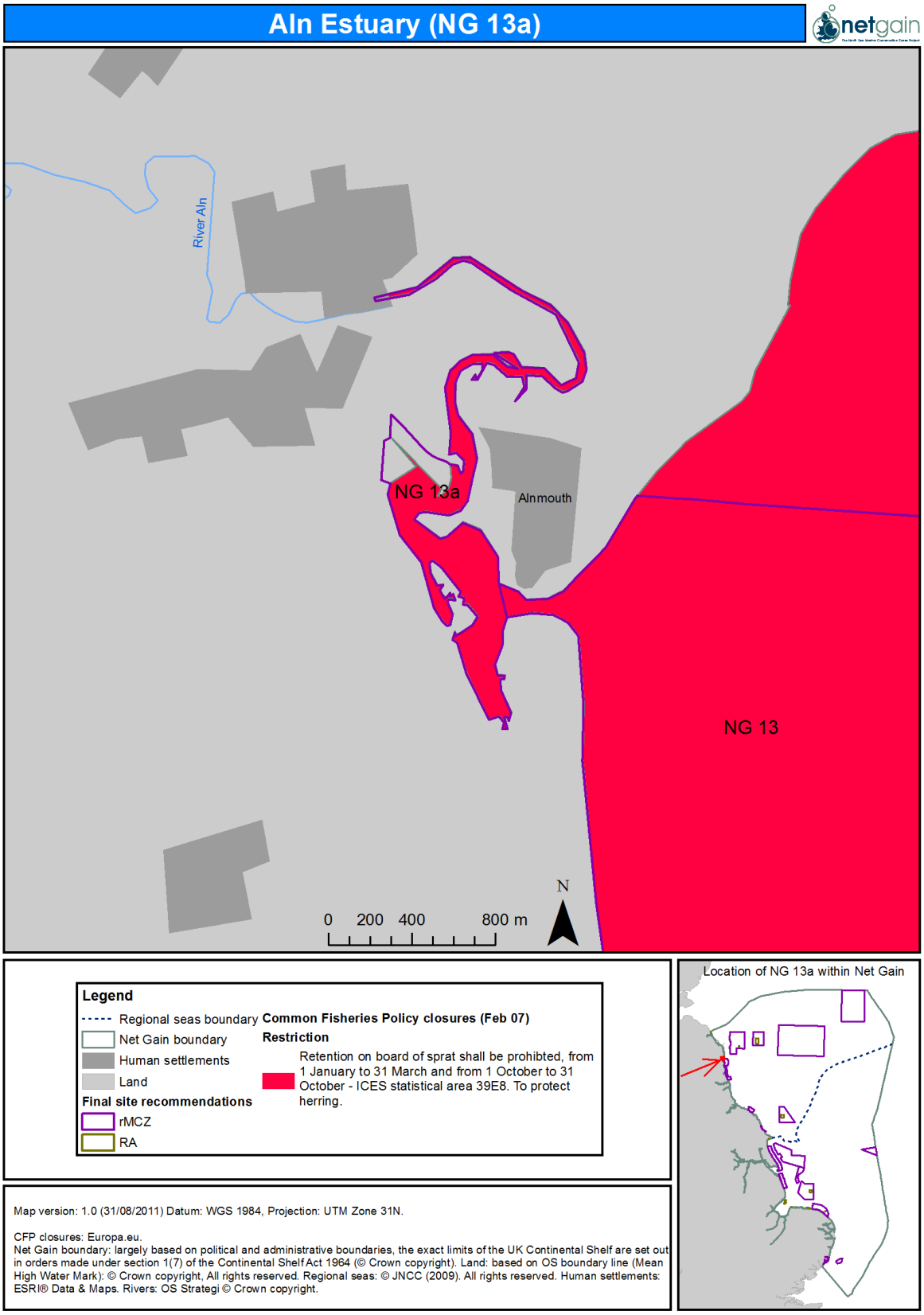


Figure 7.124 NG 13a site boundary with associated fishery management locations

Conservation objectives

Table 7.114 Conservation objectives for site NG 13a, A2.3: Intertidal mud

Conservation Objective	
1 Maintain/ recover	Intertidal mud is protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981. It is also a UKBAP Priority Habitat and on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, maintain the Intertidal mud in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** The • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Intertidal mud in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Intertidal mud is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Emergence regime changes (sea level) - regional/national	H	L
Physical change (to another seabed type)	H	L

	Physical loss (to land or freshwater habitat)	H	L
	Physical removal (extraction of substratum)	M-H	H
	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Removal of non-target species (lethal)	M	M
	Temperature changes - regional/national	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L-H
	Removal of target species (lethal)	NS-M	L-H
	Salinity changes - local	L	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L	H
	Siltation rate changes (high)	L	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L	H
	Temperature changes - local	L	H
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.115 Conservation objectives for site NG 13a, A2.5: Coastal saltmarshes and saline reedbeds

Conservation Objective	
1 Maintain/ recover	Coastal saltmarsh and saline reedbeds are protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981, and a UKBAP Priority Habitat. Subject to natural change, maintain the Coastal saltmarshes and saline reedbeds in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Coastal saltmarshes and saline reedbeds in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Coastal saltmarshes and saline reedbeds is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — H Physical removal (extraction of substratum) — H — H

	Atmospheric climate change	M	L
	Emergence regime changes - local	M	L
	Emergence regime changes (sea level) - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	M
	Siltation rate changes (high)	M	M
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	M
	Surface abrasion: damage to seabed surface features	M	M
	Temperature changes - regional/national	M	L
	Water flow (tidal current) changes - local	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
	Removal of target species (lethal)	L	M
	Siltation rate changes (low)	L	M
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.116 Conservation objectives for site NG 13a, A3.1: High energy infralittoral rock

Conservation Objective	
1 Maintain/ recover	High energy infralittoral rock is representative of shallow water rock, below the tides exposed to very strong waves and currents. Subject to natural change, maintain the High energy infralittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of High energy infralittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	High energy infralittoral rock is sensitive to the pressures listed below:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Siltation rate changes (high)	M-H	L
Physical removal (extraction of substratum)	M	L

	Removal of non-target species (lethal)	M	L
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Water clarity changes	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.117 Conservation objectives for site NG 13a, Estuarine rocky habitats

Conservation Objective	
1 Maintain/ recover	Estuarine rocky habitats are on the UK List of Priority Species and Habitats (UK BAP).Subject to natural change, maintain the Estuarine rocky habitats in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Estuarine rocky habitats in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Estuarine rocky habitats is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Emergence regime changes (sea level) - regional/national — H — L Introduction or spread of non-indigenous species & translocations (competition) — H — L Physical loss (to land or freshwater habitat) — H — L Atmospheric climate change — M — L

	Emergence regime changes - local	M	L
	Introduction of microbial pathogens (disease)	M	L
	Physical change (to another seabed type)	M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Temperature changes - regional/national	M	L
	Removal of target species (lethal)	L	L
	Salinity changes - local	L	L
	Siltation rate changes (high)	L	L
	Temperature changes - local	L	M
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.118 Conservation objectives for site NG 13a, Sheltered muddy gravels

Conservation Objective	
1 Maintain/ recover	Sheltered muddy gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Sheltered muddy gravels in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Sheltered muddy gravels in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Sheltered muddy gravels is sensitive to the pressures listed below: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — L Siltation rate changes (high) — H — M Atmospheric climate change — M — L

	Introduction or spread of non-indigenous species & translocations (competition)	M	L
	Physical change (to another seabed type)	M	L
	Removal of non-target species (lethal)	M	M
	Removal of target species (lethal)	M	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	M
	Siltation rate changes (low)	M	M
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	M
	Surface abrasion: damage to seabed surface features	M	M
	Temperature changes - regional/national	M	L
	Water clarity changes	M	L
	Wave exposure changes - local	M	L
	Wave exposure changes - regional/national	M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.119 Conservation objectives for site NG 13a, Subtidal sands and gravels

Conservation Objective	
1 Maintain/ recover	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the subtidal sands and gravels to favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sands and gravels is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Surface abrasion: damage to seabed surface features — NS-H — M-H Physical change (to another seabed type) — M — H Physical removal (extraction of substratum) — M — H

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	M-H
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L-M
	Removal of target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	M-H
	Siltation rate changes (low)	NS-M	M-H
	Salinity changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

The site overlaps with the Northumberland Shore, and Alnmouth Saltmarsh and Dunes SSSIs, and borders with the boundaries of NG 13. The site is also within close proximity of the Berwickshire and North Northumberland Coast SAC and Northumbria Coast SPA.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.120 MPAs within or adjacent to NG 13a

MPA Type	Site Name	Features Protected
SSSI	Alnmouth Saltmarsh and Dunes	A2.5: Coastal saltmarshes and saline reedbeds Coastal saltmarsh
SSSI	Northumberland Shore	A2.2: Intertidal sand and muddy sand
SAC	Berwickshire and North Northumberland Coast	A1.2: Moderate energy intertidal rock A1.3: Low energy intertidal rock A2.4: Intertidal mixed sediments A2.7: Intertidal biogenic reefs A5.3: Subtidal mud Blue mussel beds Intertidal underboulder communities Intertidal sediments dominated by aquatic angiosperms Seagrass beds
SPA	Northumbria Coast	Not in GAP table Breeding and wintering bird species

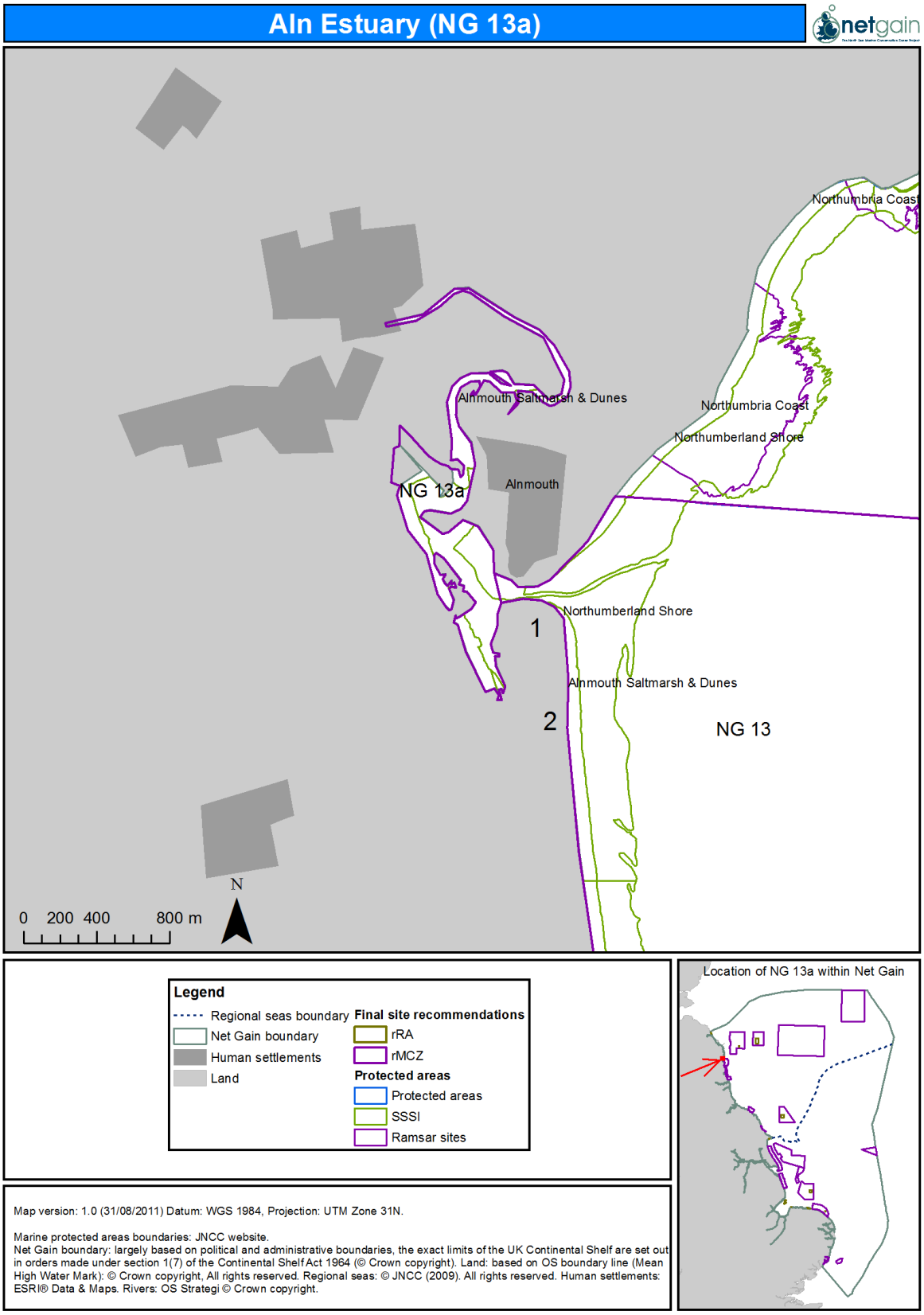


Figure 7.125 MPAs/rMCZs within or adjacent to NG 13a

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

Consensus support for the site was high, with both groups strongly in support of the site, reflecting the consensus achieved in earlier Regional Hubs. It was suggested that the views of recreational sea anglers should be gathered to fully inform opinion on the site.

Whilst the confidence in the underlying data was high, it was suggested that some of the data could be more recent, and stakeholders recommended a resurvey of the area. The sand in the site, which is known to be present, is not mapped.

Overall, the site contention was felt to be low. As proposed, the site 'ticks all the boxes'.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- Northumberland IFCA:- Neutral – currently managed satisfactorily but fishing community not happy with potential implications
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.121 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Broad-scale habitat: A2.5: Coastal saltmarshes and saline reedbeds	Survey	© Environment Agency, 2011
Estuarine rocky habitat, Sheltered muddy gravels, Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009

References

COLCOUGH, S. SCAR, T. 2010 *Marine Juvenile Fish in Estuaries*. Environment Agency

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

CONNOR, D. ALLEN, J. GOLDING, N. HOWELL, K. LIEBERKNECHT, NORTHEN, K. REKER, J 2004. The Marine Habitat Classification for Britain and Ireland Version 04.05 JNCC, Peterborough ISBN 1 861 07561 8 (internet version)

ELLIOTT, M. HEMINGWAY, K. 2002. *Fishes in Estuaries*. Blackwell Science. Oxford.

ENVIRONMENT AGENCY. 2011. *Saltmarsh Extents – AfA137. Polygon data layer showing the extent of Saltmarsh in Coastal and Transitional waters for use by both Flood and Coastal Risk Management and the implementation of Water Framework Directive.* © Environment Agency copyright and / or database rights 2011. All rights reserved.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 24: Task 2I. Intertidal habitats datalayer (Final). ABP Marine Environmental Research Ltd.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5*). JNCC.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.15 Marine Conservation Zone: NG 14, Farnes East

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. The ecological description has been updated to reflect RSPB feedback on the IA. No changes have been made to recommendations or boundaries.

Site name

NG 14, Farnes East (site also contains, rRA 12, Farnes Clay)

Site centre location

55° 41’ 02’’N, 1° 14’ 29’’W
55.684119°, -1.241648°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

944.92km² / 94,492.14ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

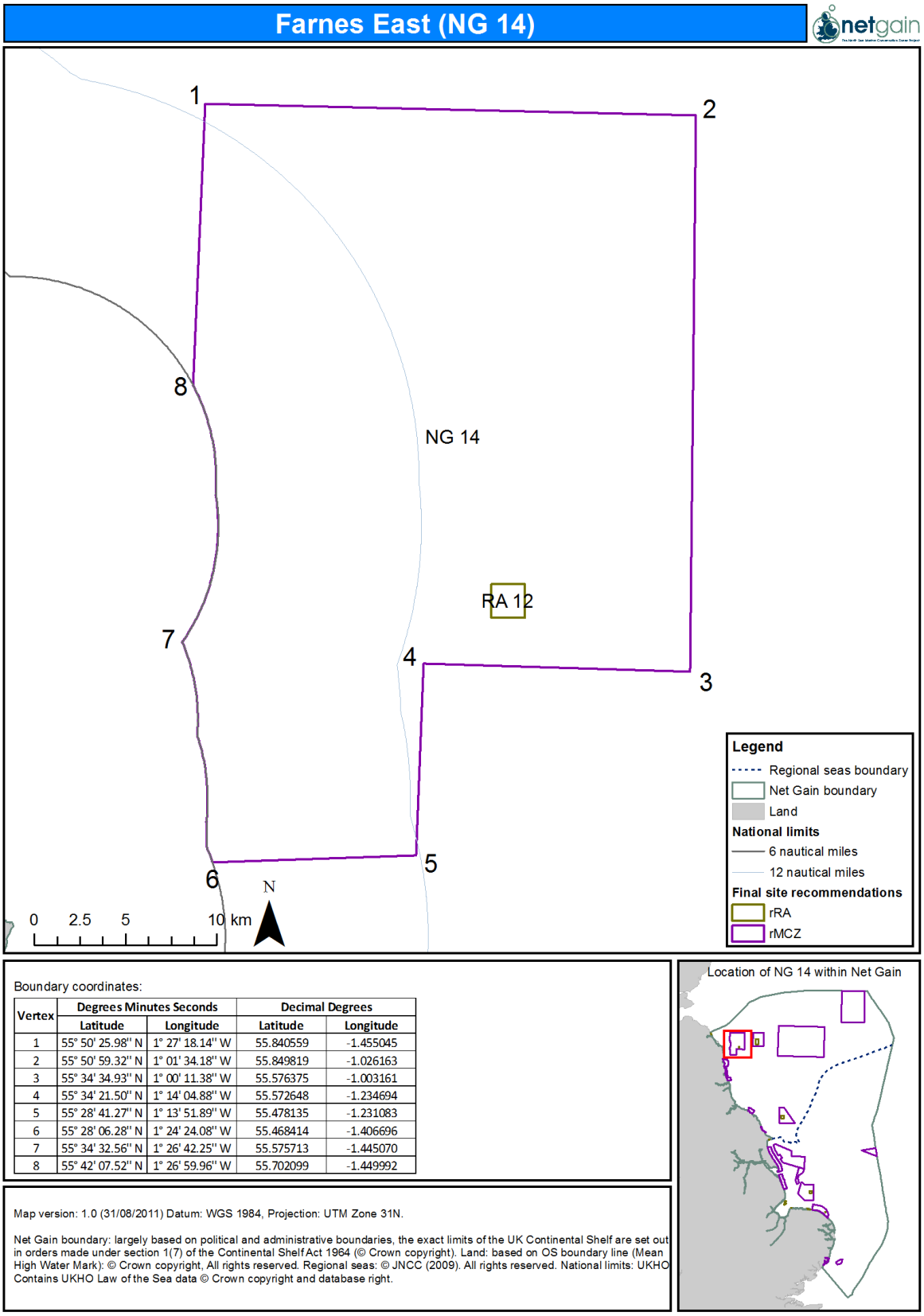
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.122 Features proposed for designation within NG 14, Farnes East

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	517.59km²
Broad-scale habitat	A5.1: Subtidal coarse sediment	247.32km²
Broad-scale habitat	A5.2: Subtidal sand	177.59km²
Broad-scale habitat	A5.3: Subtidal mud	13.22km²
Broad-scale habitat	A5.4: Subtidal mixed sediment	3.31km²
Habitat of conservation importance	Peat and clay exposures	4.05km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.123 Features within NG 14, Farnes East not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	n/a	n/a
Habitat of conservation importance	Subtidal sands and gravels (modelled)	This habitat was not included within the site because adequacy targets were met elsewhere
Species of conservation importance	n/a	n/a



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 50' 25.98'' N	1° 27' 18.14'' W	55.840559	-1.455045
2	55° 50' 59.32'' N	1° 01' 34.18'' W	55.849819	-1.026163
3	55° 34' 34.93'' N	1° 00' 11.38'' W	55.576375	-1.003161
4	55° 34' 21.50'' N	1° 14' 04.88'' W	55.572648	-1.234694
5	55° 28' 41.27'' N	1° 13' 51.89'' W	55.478135	-1.231083
6	55° 28' 06.28'' N	1° 24' 24.08'' W	55.468414	-1.406696
7	55° 34' 32.56'' N	1° 26' 42.25'' W	55.575713	-1.445070
8	55° 42' 07.52'' N	1° 26' 59.96'' W	55.702099	-1.449992

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.126 Location and extent of site NG14 (Farnes East)

Site summary

NG 14 is located approximately 11 km off the Berwickshire region of the Northumberland coast in the North East of England. The depth range of the site is 30-100m (Figure 7.130) with a seabed habitat of rock, coarse/mixed sediment, sand and mud. The subtidal mud in the south eastern portion of the site has high commercial importance as it is the habitat for Nephrops. Other species such as red/blond sea pens are also associated with this habitat. The depth of the glacial feature in the site suggests that it could be a good area for breeding white beaked dolphins, and other marine mammals have also been sighted in the area. It is a site that is important for wintering birds such as auks, guillemots and razor bills, and is a majorly important foraging site for breeding birds from the Farne Islands which are in close proximity to the site.

Detailed site description

NG 14 consists predominantly of areas of circalittoral rock along with areas of subtidal course sediment, mud, sand and mixed sediment. The habitat FOCI subtidal sands and gravels present is present but not recommended for designation. The circalittoral rock habitat for which this site is being proposed usually occurs on exposed to moderately wave-exposed circalittoral bedrock and boulders. In deeper examples of this habitat where there is insufficient light for algal growth, animal communities may prevail such as, cup coral, sea-fans, and anemones as well as mobile animals such as starfish, brittlestars, and sea urchins (Connor, 2004).

Peat and clay exposures present within the site have been recommended for designation. Seabeds formed of exposed peat or clay are uncommon and as a result of taking millions of years to develop are irreplaceable. Therefore special care should be taken to preserve these fragile habitats (Maddock, 2008).

NG 14 contains a small part of the glacial feature Farne Deeps, a trench that contains the deepest sea water in the region and is an area of high pelagic productivity (Bereton, 2010; The Wildlife Trusts, 2010). There is also a small area of deep water mud found in a transitional area from the circalittoral rock to the edge of the Farne Deeps. The deep area of mud within this site is an important fishing ground for Nephrops (*Nephrops norvegicus*). The largest Nephrops fisheries are located in British and Irish waters, where there are an estimated 15 spatially discrete Nephrops stocks. The Farne Deeps is considered typical of this sort of fishery and supports around 70 local trawlers (Revill, 2006). Nephrop fisheries occur in undisturbed muddy seabed sediments usually with more than 40 percent silt and clay (Bell, 2006). Due to the calmer nature of these deeper areas, deep water sediments can support some of the richest marine life communities. With burrowing mega fauna proliferating, a variety of worms, sea snails and paired-shelled bivalves increase. Sea pens are also present in this area with *Virgularia mirabilis* and *Pennatula phosphorea* present (Foster-Smith, 2000). Sea pens are particularly vulnerable to the type of trawls used in Nephrop fisheries.

White-Beaked Dolphin (*Lagenorhynchus albirostris*) have been sighted in the area; local knowledge suggests that the deep area of the glacial feature of Farne Deeps adjacent to NG 14 could be an important breeding area although there is yet no firm evidence of this (Bereton, 2010). Numerous other cetacean species including orca (*Orcinus orca*), harbour porpoise (*Phocoena phocoena*), minke whale (*Balaenoptera acutorostrata*) and humpback whale (*Megaptera novaeanglia*) (Bereton, 2010; Evans, 2003, Seawatch) have been sighted in the area. All of which are Marine Biodiversity Action Plan (MBAP) species in the UK with harbour porpoise listed in Annex II of the EU Habitats Directive as species whose conservation requires the designation of Special Areas of Conservation.

The site is in close proximity to the Berwickshire and North Northumberland Coast European Marine Site which includes the Farne Islands where grey seals (*Halichoerus grypus*) are known to breed. This is a significant proportion of the UK breeding population, with the UK supporting approximately 95% of the European population (Thompson, 2010). The grey seal is afforded conservation protection

under the EC Habitats Directive, Annex II and Annex V and is named in the Northumberland Biodiversity Action Plan (Cranson, 2008). Grey seals usually spend 2-3 days at a time foraging at sea before returning to the same spot. It is thought that the area within and around NG 14 with its high pelagic diversity is an important feeding and foraging ground for the seals of the Farne Islands with numerous sightings made (Thompson, 2010).

NG 14 is noted as having the highest number of wintering birds of the Net Gain proposed sites (Kober, 2010) and is important for breeding colonies of guillemot (*Uria aalge*), razorbill (*Alca torda*), and puffin (*Fratercula arctica*). It is an important feeding ground for the birds present on the Farne Islands in internationally important numbers including puffin, guillemot, razorbills, Arctic tern, shag, cormorant, fulmar and kittiwake (Kober 2010).

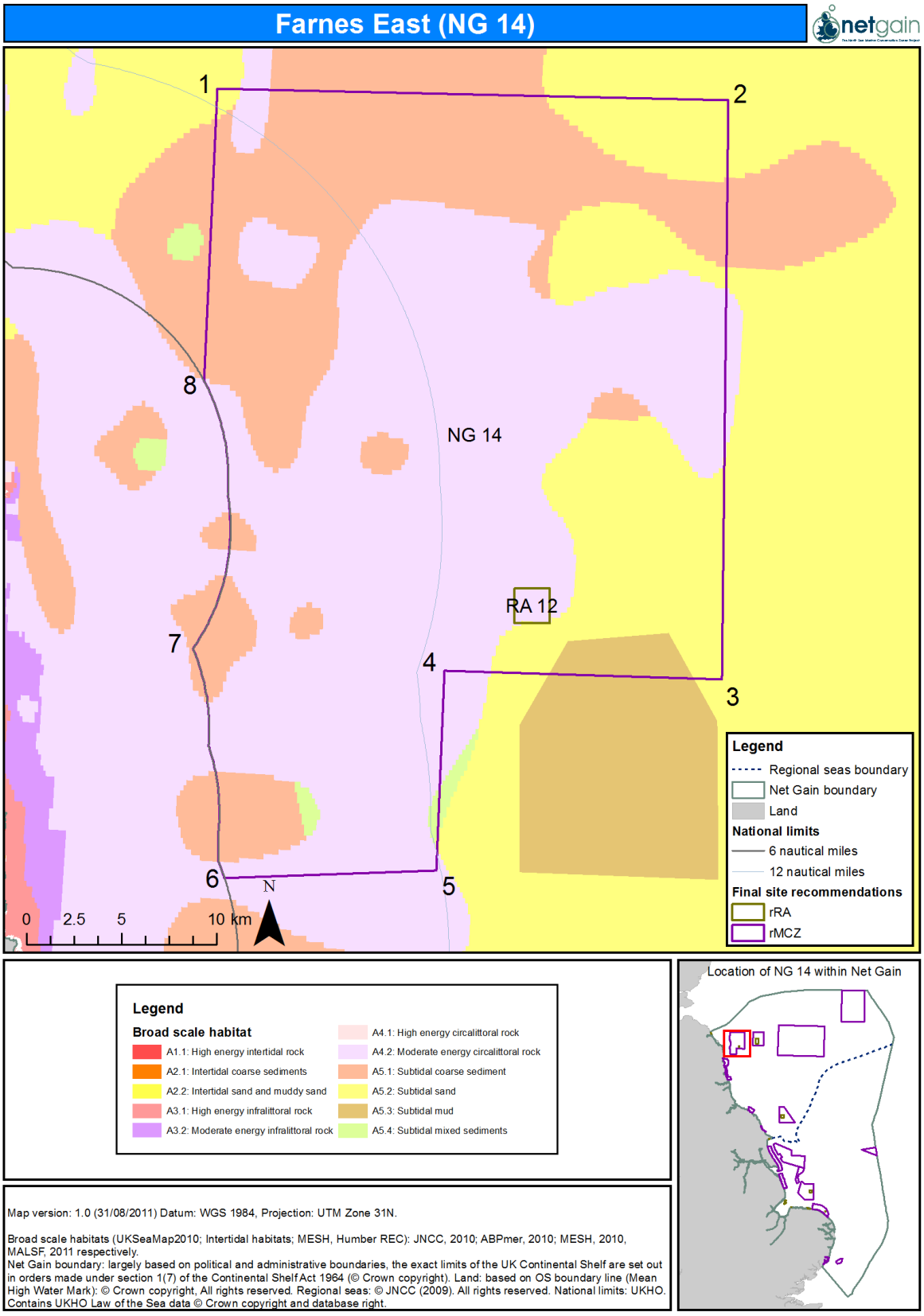


Figure 7.127 Broad-scale habitat present within NG 14

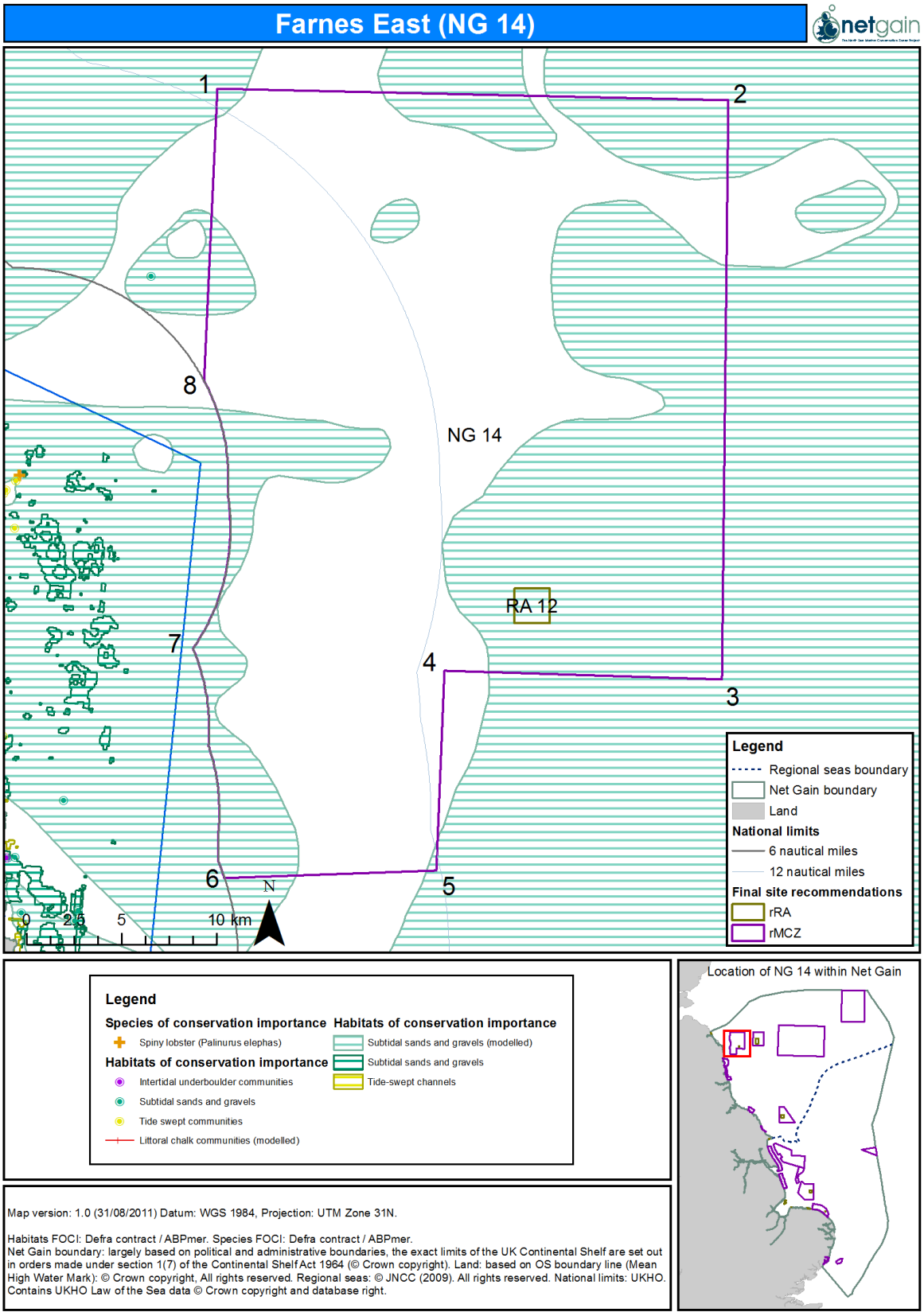


Figure 7.128 FOCI habitat present within NG 14

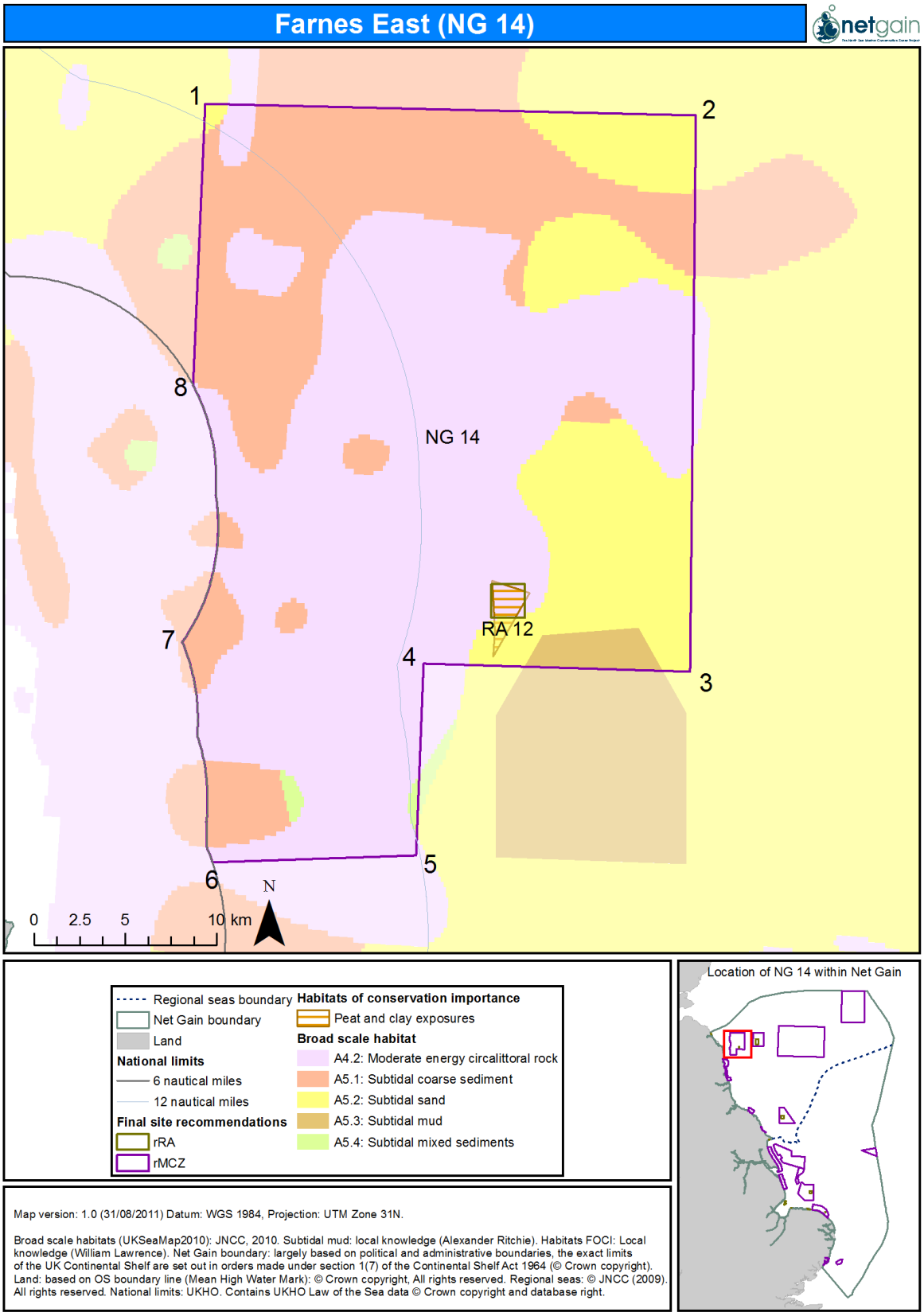


Figure 7.129 Features put forward for recommendation in NG 14

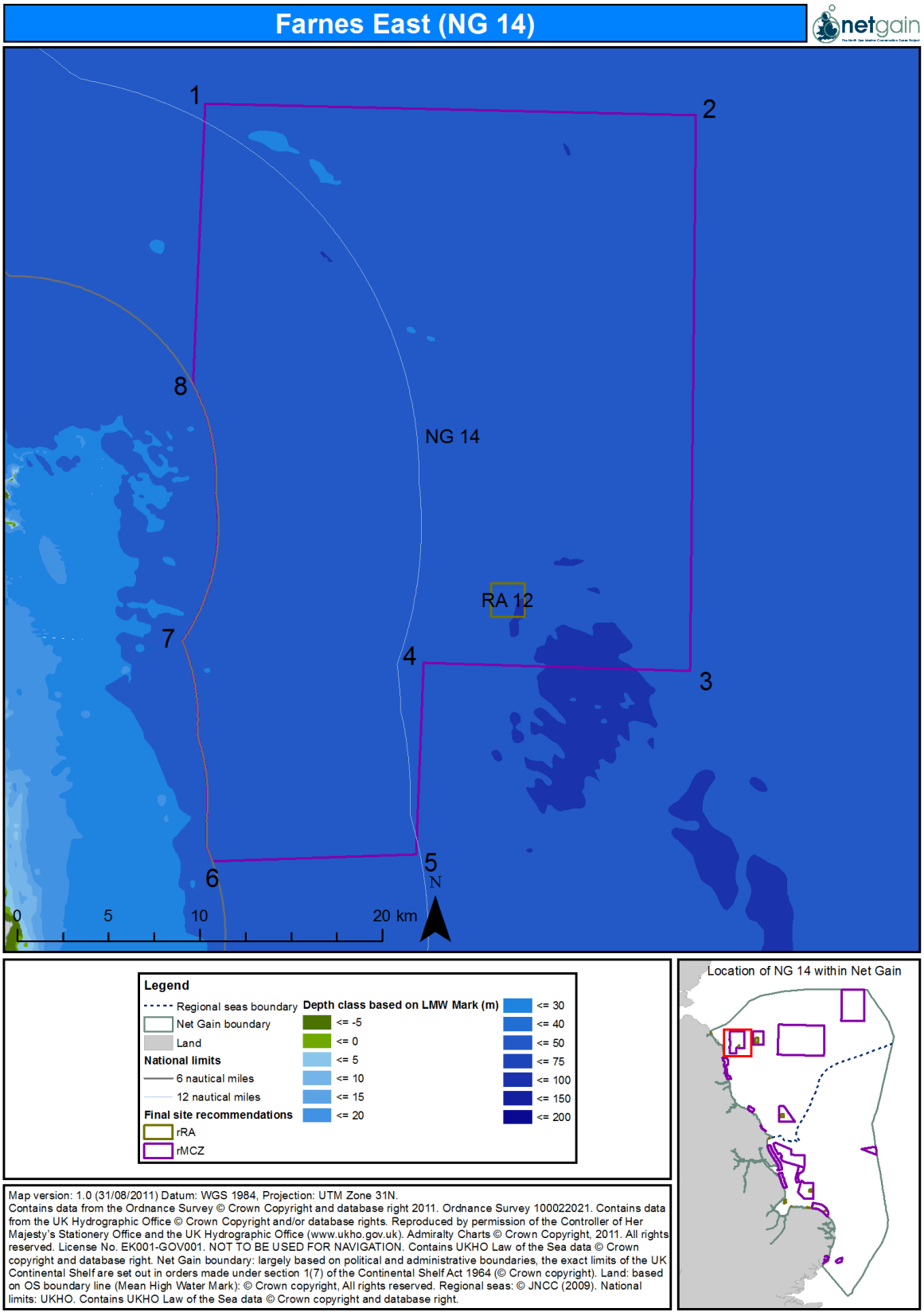


Figure 7.130 Bathymetry of NG 14

Site boundary

The site boundary of NG 14, Farnes East was based on the original site NG 2.20 from the 2nd iteration. Following concerns from the RSG about the impacts of the site, the site was reduced in size, whilst retaining basic ecological value, helping to limit any potential socio-economic impacts. The site has two seasonal CEFAS restrictions which prevent the retention of sprat from January 1st to March 31st and from October 1st to October 31st (ICES statistical area 39E8) to protect herring and of the retention of herring from August 15th until September 15th between the 6-12nm limits.

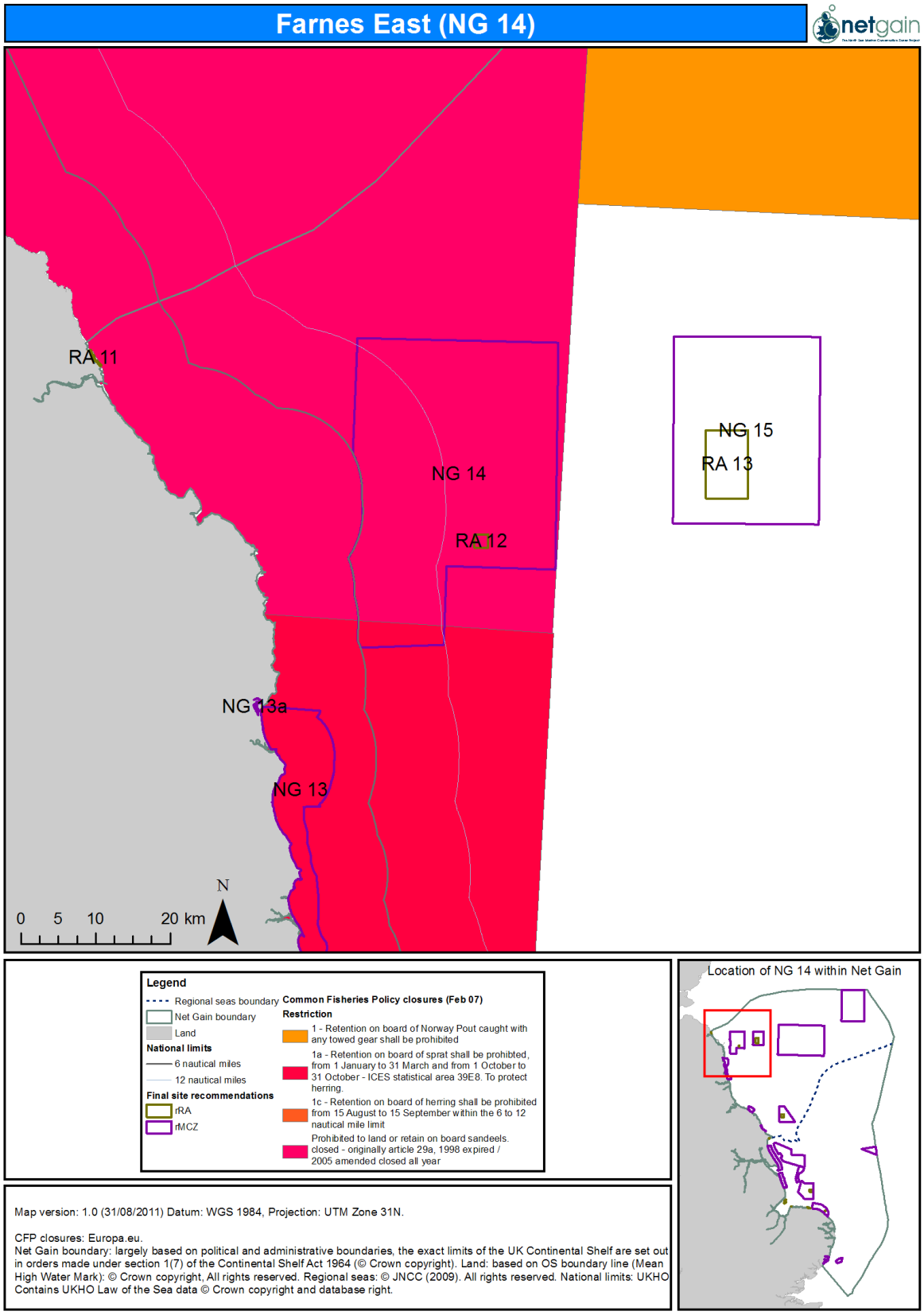


Figure 7.131 NG 14 site boundary with associated fishery management locations

Conservation objectives

Table 7.124 Conservation objectives for site NG 14, A4.2: Moderate energy circalittoral rock

Conservation Objective	
1 Maintain/ recover	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, maintain the Moderate energy circalittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy circalittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Moderate energy circalittoral rock is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical change (to another seabed type) — M-H — L

	Physical removal (extraction of substratum)	M-H	L
	Removal of non-target species (lethal)	M-H	M
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M-H	L
	Siltation rate changes (high)	M-H	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M-H	L
	Salinity changes - local	L-H	L
	Surface abrasion: damage to seabed surface features	L-H	L
	Siltation rate changes (low)	NS-H	L
	Temperature changes - local	NS-H	L
	Water clarity changes	NS-H	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	L
	Removal of target species (lethal)	NS-M	H
	Wave exposure changes - local	NS-M	L
	Wave exposure changes - regional/national	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.125 Conservation objectives for site NG 14, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — L-H — L Surface abrasion: damage to seabed surface features — NS-H — L Physical change (to another seabed type) — M — L

	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.126 Conservation objectives for site NG 14, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Siltation rate changes (high) — H — L Physical removal (extraction of substratum) — L-H — M

	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.127 Conservation objectives for site NG 14, A5.3: Subtidal mud

Conservation Objective	
1 Maintain/ recover	Subtidal mud is widespread around the British Isles and mainland Europe. Subject to natural change, recover the Subtidal mud to favourable condition by 2020, and maintain thereafter, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mud in the biogeographic region are recovered, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mud is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Organic enrichment — NS-H — L Physical change (to another seabed type) — M — L Physical removal (extraction of substratum) — M — L

	Removal of non-target species (lethal)	M	L-H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Siltation rate changes (high)	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Surface abrasion: damage to seabed surface features	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of target species (lethal)	NS-M	L-H
	Siltation rate changes (low)	NS-L	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.128 Conservation objectives for site NG 14, A5.4: Subtidal mixed sediments

Conservation Objective	
1 Maintain/ recover	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal mixed sediments in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal mixed sediments in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal mixed sediments is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Physical removal (extraction of substratum)	H	L
Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	H	L

	Structural abrasion/penetration: Structural damage to seabed >25mm	H	L
	Introduction of microbial pathogens (disease)	NS-H	L
	Salinity changes - local	NS-H	L
	Removal of non-target species (lethal)	M	M
	Siltation rate changes (high)	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - local	M	L
	Temperature changes - regional/national	M	L
	Introduction or spread of non-indigenous species & translocations (competition)	L-M	M
	Water clarity changes	NS-M	L
	Removal of target species (lethal)	L	M
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.129 Conservation objectives for site NG 14, Peat and clay exposures

Conservation Objective	
1 Maintain/ recover	Peat and clay exposures are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Peat and clay exposures in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Peat and clay exposures in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Peat and clay exposures is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Emergence regime changes (sea level) - regional/national — H — L Physical change (to another seabed type) — H — H Physical loss (to land or freshwater habitat) — H — H Atmospheric climate change — M — L

	Temperature changes - regional/national	M	L
	Emergence regime changes - local	L	L
	Physical removal (extraction of substratum)	L	M
	Removal of non-target species (lethal)	L	L
	Siltation rate changes (high)	L	M
	Structural abrasion/penetration: Structural damage to seabed >25mm	L	M
	Wave exposure changes - local	L	L
	Wave exposure changes - regional/national	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 12 recommended to protect peat and clay exposures, lies within NG 14. The site lies adjacent (approximately 500m at the closest section) to the Berwickshire and North Northumberland Coast SAC.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.130 MPAs within or adjacent to NG 14

MPA Type	Site Name	Features Protected
SAC	Berwickshire and North Northumberland Coast	A1.2: Moderate energy intertidal rock A1.3: Low energy intertidal rock A2.4: Intertidal mixed sediments A2.7: Intertidal biogenic reefs A5.3: Subtidal mud Blue mussel beds Intertidal underboulder communities Intertidal sediments dominated by aquatic angiosperms Seagrass beds

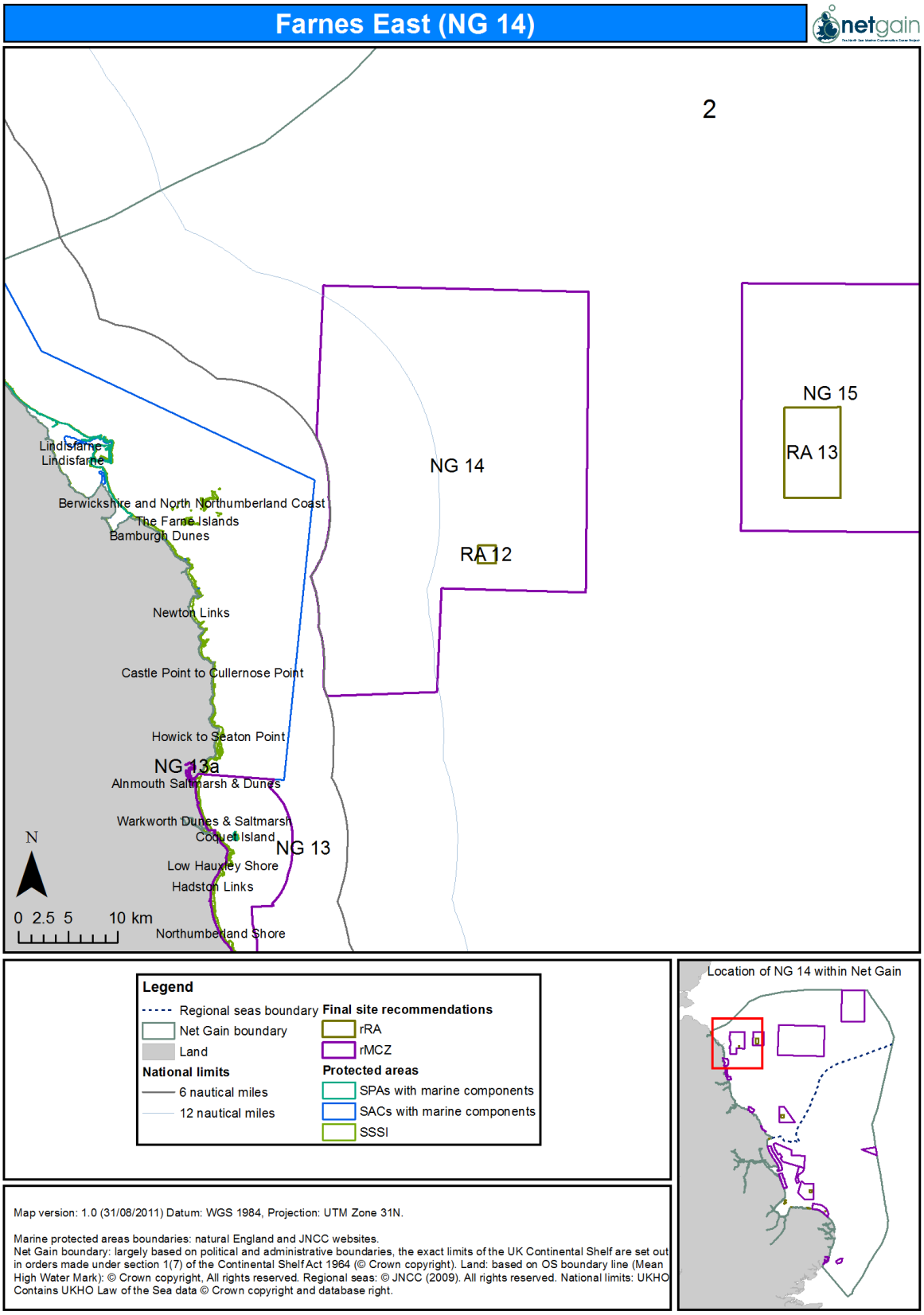


Figure 7.132 MPAs/rMCZs within or adjacent to NG 14

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The consensus was divided on this site, with one group scoring it as '3' and the other as '1'. Representatives from the commercial fishing sector recorded that they do not really support the site, especially the inclusion of subtidal sand as a feature.

Confidence in the underlying data was only low to moderate. It was suggested that the original data layers supplied to the project were inaccurate; these data layers were amended by local knowledge. This was especially pertinent in the identification of the areas of subtidal mud and clay exposures in the site which were not indicated by the broad-scale habitat data but rather from local knowledge.

There was a split in views over the likely level of contention associated with the site, with one group suggesting it would be low (given the proviso that most of the Conservation Objectives - currently set to maintain - remain unaltered), whilst the other group suggested the site would be highly contentious due to restrictions on commercial fishing.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- RSPB:- Strongly support
- The Crown Estate:- Support
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.131 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat: A5.3: Subtidal mud	Local knowledge	Ritchie, A. 2010.
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Peat and clay exposures	Local knowledge	Lawrence, W. 2011.
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

BELL, M. REDANT, F. TUCK, I 2006. "*Nephrops Species*". In Bruce F. Phillips. Lobsters: Biology, Management, Aquaculture and Fisheries. Wiley-Blackwell. pp. 412–461

BERETON, T. MACLEOD, C. KITCHING, M. TAIT, A. STEEL, D. QUIGLEY, M. SCOTT, C. 2010. *Importance of the Farne Deeps and surrounding waters off the Northumberland coast for White-beaked Dolphin and other cetaceans and seabirds of Conservation Concern.* Natural England

CONNOR, D. ALLEN, J. GOLDING, N. HOWELL, K. LIEBERKNECHT, NORTHEN, K. REKER, J 2004. The Marine Habitat Classification for Britain and Ireland Version 04.05 JNCC, Peterborough ISBN 1 861 07561 8 (internet version)

CRANSON, A. WALTON, J. 2008. *Grey Seal (Halichoerus grypus) Species Action Plan*. Northumberland Biodiversity Action Plan.

EVANS, P. ANDERWALD, P. BAINES, M. 2003. *UK CETACEAN STATUS REVIEW*. Sea Watch Foundation.

FOSTER-SMITH, J. 2004. *The Marine Fauna and Flora of the Cullercoats District: Marine Species* Records for the Northeast Coast of England

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

LAWRENCE, W. 2011. *Peat and clay exposures local knowledge.*

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

MC CONNELL, B. J., FEDAK, M. A., LOVELL, P. & HAMMOND, P. S. 1999 *Movements and foraging areas of grey seals in the North Sea*. Journal of Applied Ecology, 36, 573-590

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

REVILL, A., DUNLIN, G., Holst, R. 2006. Selective properties of the cutaway trawl and several other commercial trawls used in the Farne Deeps North Sea Nephrops fishery Fisheries Research, 81 (2-3), pp. 268-275

RITCHIE, A. 2010. *Broad-scale habitat: A5.3: Subtidal mud local knowledge*.

SEAWATCH EASTERN ENGLAND, 2011. *CETACEANS OF EASTERN ENGLAND* http://www.seawatchfoundation.org.uk/docs/EasternEngland.pdf. accessed 22/08/2011

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

THOMPSON, D. and DUCK, C. 2010 *Berwickshire and North Northumberland Coast European Marine Site: grey seal population status*. Report to Natural England.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.16 Marine Conservation Zone: NG 15, Rock Unique

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 15, Rock Unique (site also contains rRA 13, Rock Unique RA)

Site centre location

55° 45’ 25’’N, 0° 36’ 48’’W
55.757096°, -0.6131441°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

492.07km² / 49,207.42ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

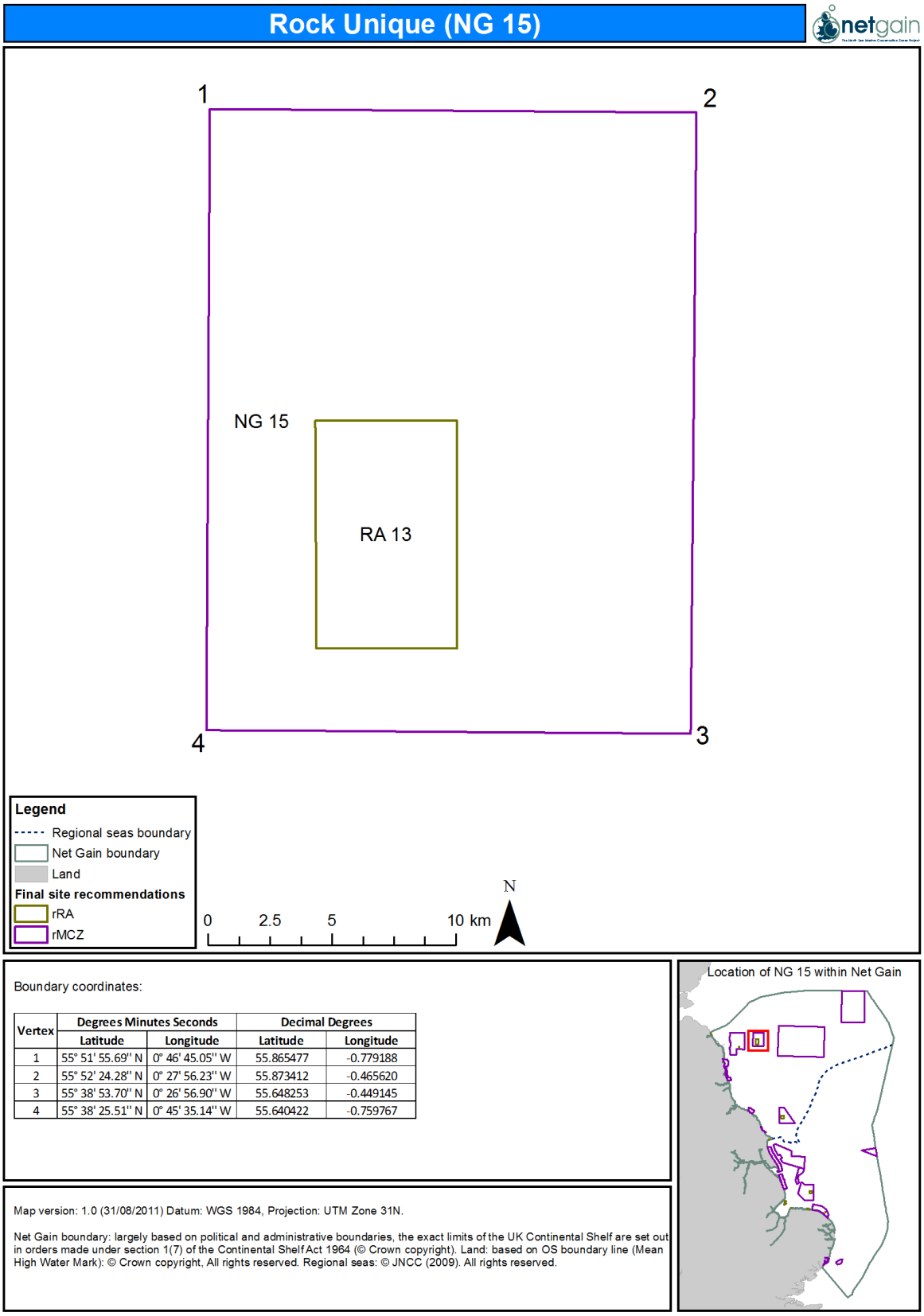
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.132 Features proposed for designation within NG 15, Rock Unique

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.3: Low energy circalittoral rock	20.34km²
Broad-scale habitat	A5.1: Subtidal coarse sediment	161.26km²
Broad-scale habitat	A5.2 Subtidal sand	309.22km²
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	1 point 322.68km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.133 Features within NG 15, Rock Unique not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	During regional hub meetings the group could not clearly identify the area (s) of moderate energy circalittoral rock that were indicated as being present within the site and therefore did not feel comfortable in designating for this feature.
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 51' 55.69'' N	0° 46' 45.05'' W	55.865477	-0.779188
2	55° 52' 24.28'' N	0° 27' 56.23'' W	55.873412	-0.465620
3	55° 38' 53.70'' N	0° 26' 56.90'' W	55.648253	-0.449145
4	55° 38' 25.51'' N	0° 45' 35.14'' W	55.640422	-0.759767

Figure 7.133 Location and extent of site NG15 (Rock Unique)

Site summary

NG 15 is located approximately 55km offshore from the Berwickshire region of the North Northumberland coast and 15km east from NG 14 in the North East of England. The depth range of the site is 50m (Figure 7.137) with a seabed composed of circalittoral rock, subtidal coarse sediment, subtidal sand and subtidal sand and gravels. Parts of the site support high densities of winter foraging birds, and moderate densities during the summer, species that use the site include guillemot, kittiwake and puffin. Sightings of marine mammals within this area occur throughout the year and include white-beaked dolphin, harbour porpoise and minke and humpback whales.

Detailed site description

NG 15 is predominantly subtidal sand with areas of subtidal course sediment and low energy circalittoral rock, with subtidal sands and gravels identified as habitats of conservation importance. The site contains the only example of low energy circalittoral rock in the Net Gain project area. This habitat is extremely rare around the UK, with a few examples being found in the Scottish lochs and a few isolated sites around the south-west of England and the west coast of Ireland (Connor, 2004).

Due to the low energy associated with this rocky habitat and the depth at which it occurs, a unique animal community is able to persist. With areas too deep for algae to obtain the light they need to grow, animal communities of sea squirts (*Ciona intestinalis, Ascidia mentula*), dead man's fingers and plumose anemones are able to proliferate as well as peacock worms, bristleworms, squat lobsters, hermit crabs and a number of species of urchin (Connor, 2004).

Subtidal sands and gravels habitat FOCI are identified as a priority habitat in the UK Biodiversity Action Plan (UK BAP) (Maddock, 2008). Coarse sediment habitats are characterised by polychaete worms, mobile crustacea, for example squat lobster, bivalve molluscs and a number of species of sea cucumber (Connor, 2004). Sandy seabeds further offshore are not usually disturbed by waves and tides in the same way that inshore areas are and so are able to support polychaete worms, bivalve molluscs and amphipod crustacea within them (Connor, 2004).

Cetacean sightings for this area include year round sightings of white-beaked dolphin (*Lagenorhynchus albirostris*), along with harbour porpoise (*Phocoena phocoen*), minke whale (*Balaenoptera acutorostrata*) and humpback whale (*Megaptera novaeanglia*) (Bereton, 2010; Evans, 2003). All of which are Marine Biodiversity Action Plan (MBAP) species in the UK. Harbour porpoise is listed in Annex II of the EU Habitats Directive as a species whose conservation requires the designation of Special Areas of Conservation. Sightings in the area coupled with known foraging distances of grey seal suggest that this site could be used by the grey seal population present on the Farne Islands (Thompson, 2010) The grey seal is afforded conservation protection under the EC Habitats Directive, Annex II and Annex V and is named in the Northumberland Biodiversity Action Plan (Cranson, 2008).

There are areas of NG15 which are fished for pelagic species (The Wildlife Trusts, 2010) and the site is important for seabirds including guillemot *(Uria aalge*), kittiwake (*Rissa tridactyla)* and puffin (*Fratercula arctica*) (Kober, 2010). Foraging ranges of these birds suggest that these could be birds from the Farne Islands using this area for feeding.

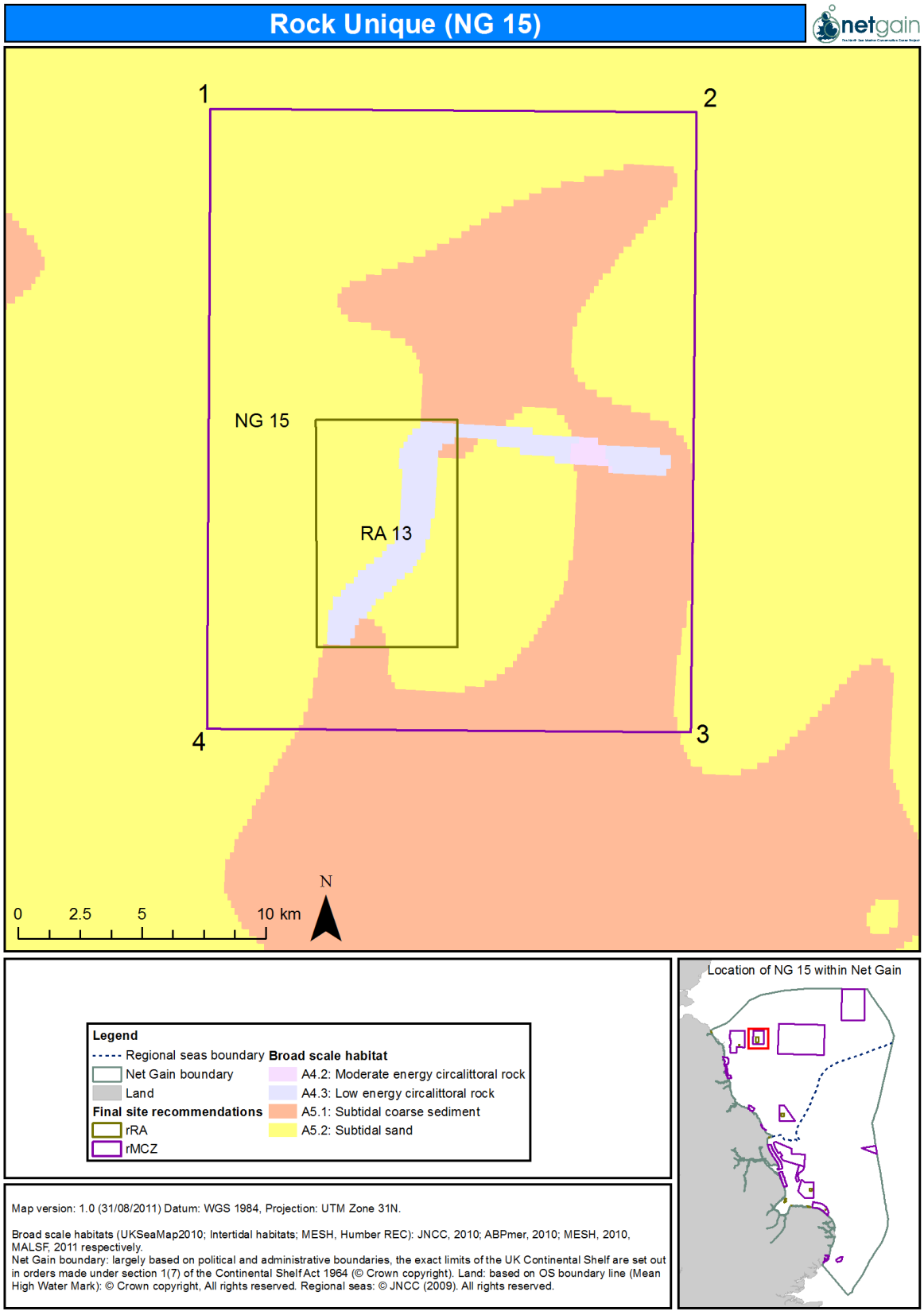


Figure 7.134 Broad-scale habitat present within NG 15

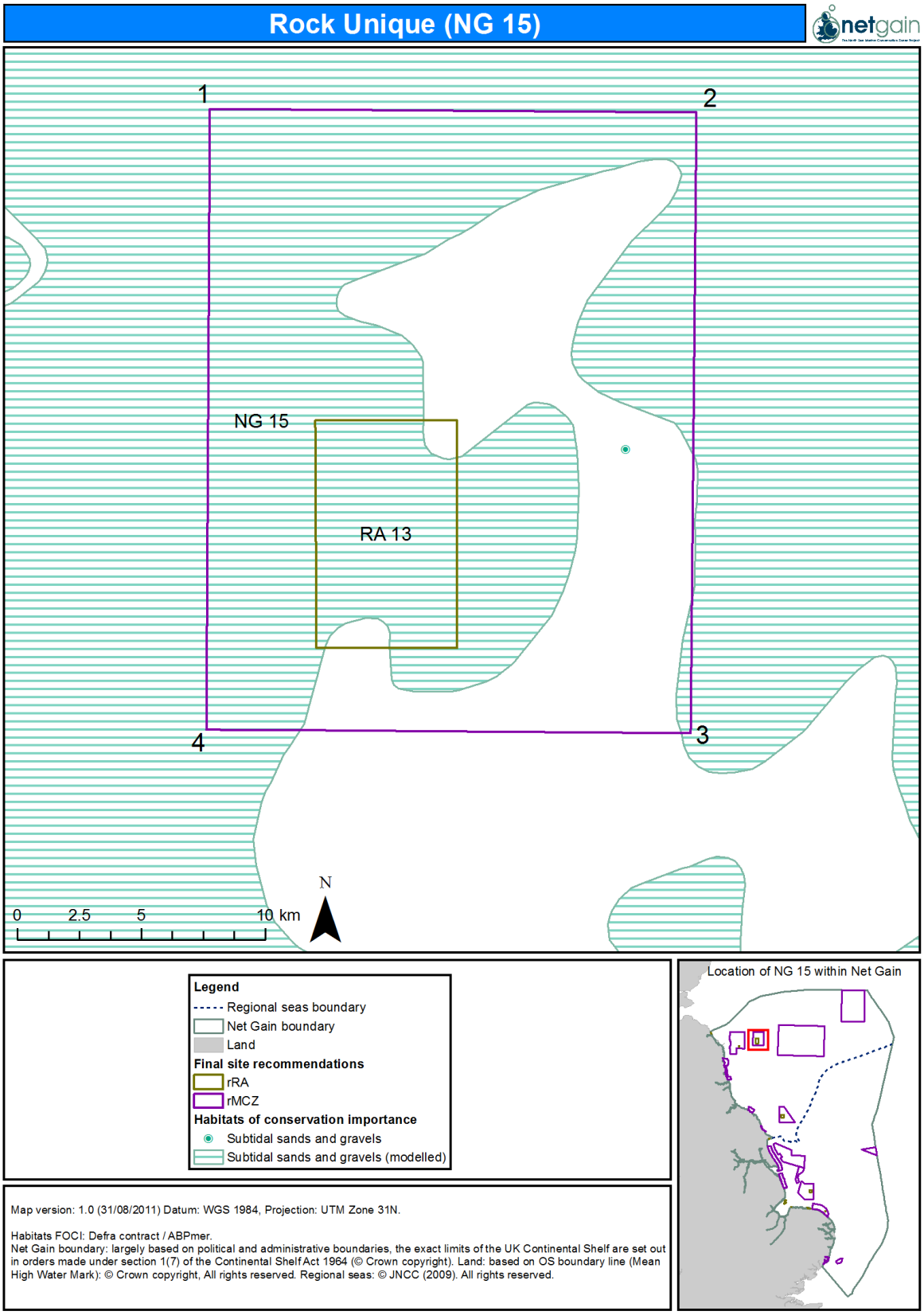


Figure 7.135 FOCI habitat present within NG 15

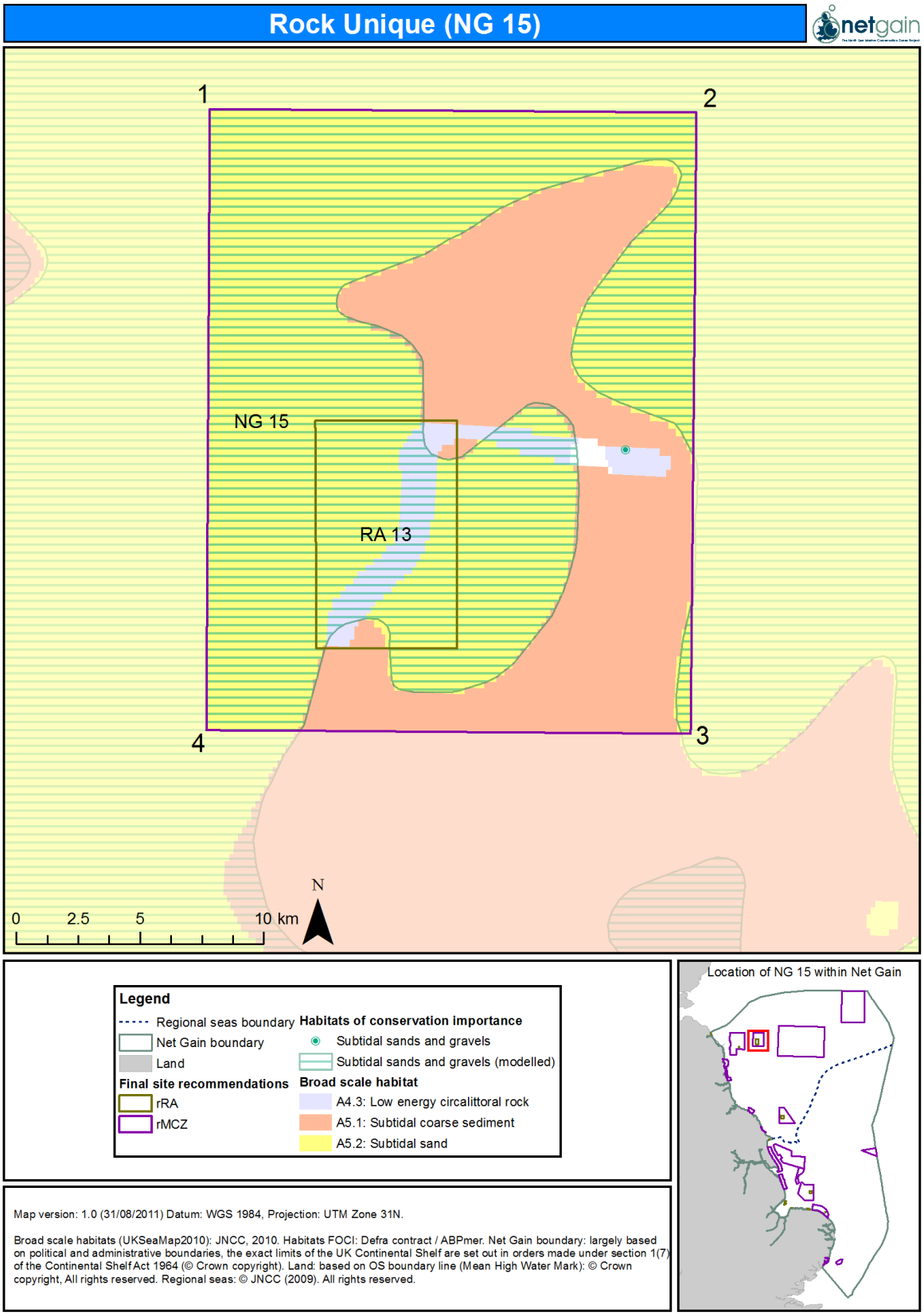


Figure 7.136 Features put forward for recommendation in NG 15

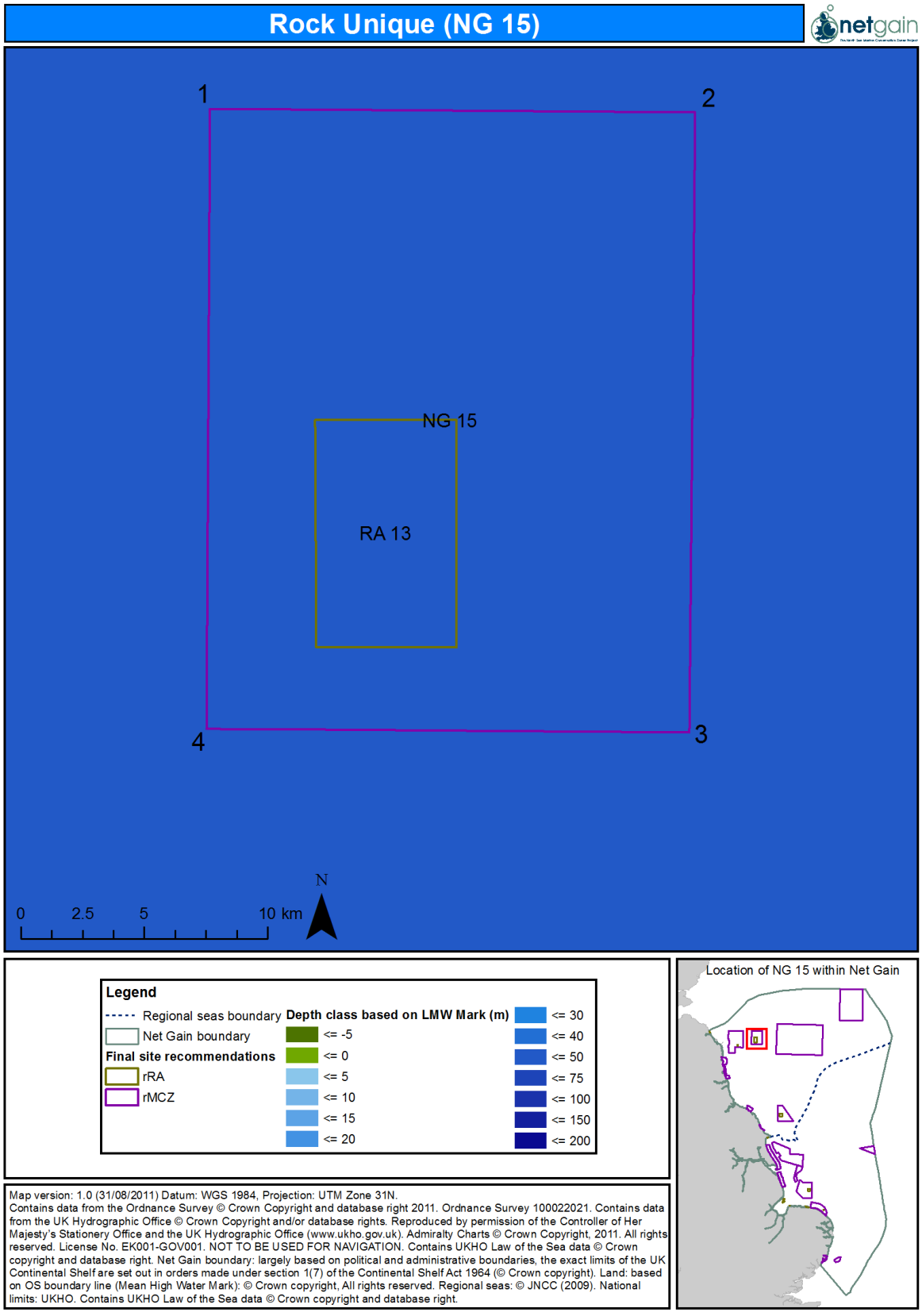


Figure 7.137 Bathymetry of NG 15

Site boundary

The boundary of NG 15 originated from NG 2.21 in the 2nd iteration, and has not changed since the development of the site. The boundaries were put forward to protect the only example of low energy circalittoral rock within the Net Gain region and to allow for substantial areas of the broad-scale habitats subtidal coarse sediment and subtidal sand to assist with adequacy targets. There was a gap left between NG 14 and NG15 to allow for nomadic scalloping, which was agreed to ease the pressure of fishing within the area while maintaining ecological benefits of the site.

Conservation objectives

Table 7.134 Conservation objectives for site NG 15, A4.3: Low energy circalittoral rock

Conservation Objective	
1 Maintain/ recover	Low energy circalittoral rock is extremely rare around the UK apart from the Scottish lochs. There are a few isolated sites around the south-west of England and the west coast of Ireland. Subject to natural change, maintain the Low energy circalittoral rock in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Low energy circalittoral rock in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Low energy circalittoral rock is sensitive to the pressures listed below: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Removal of non-target species (lethal) — L-H — L

	Physical change (to another seabed type)	M	L
	Physical removal (extraction of substratum)	M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	M	L
	Siltation rate changes (high)	M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	M	L
	Surface abrasion: damage to seabed surface features	M	L
	Temperature changes - regional/national	M	L
	Water clarity changes	M	L
	Salinity changes - local	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Siltation rate changes (low)	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
	Wave exposure changes - local	NS-L	L
	Wave exposure changes - regional/national	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.135 Conservation objectives for site NG 15, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures listed below:

Pressure	**Sensitivity**	**Confidence**
Physical change (to another seabed type)	H	L
Physical loss (to land or freshwater habitat)	H	L
Siltation rate changes (high)	H	L
Physical removal (extraction of substratum)	L-H	M

	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.136 Conservation objectives for site NG 15, Subtidal sands and gravels (modelled)

Conservation Objective	
1 Maintain/ recover	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Subtidal sands and gravels in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sands and gravels in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sands and gravel is sensitive to the pressures:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Surface abrasion: damage to seabed surface features	NS-H	M-H
Physical change (to another seabed type)	M	H
Physical removal (extraction of substratum)	M	H

	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	M-H
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L-M
	Removal of target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	M-H
	Siltation rate changes (low)	NS-M	M-H
	Salinity changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.137 Conservation objectives for site NG 15, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures listed below:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Physical removal (extraction of substratum)	L-H	L
Surface abrasion: damage to seabed surface features	NS-H	L
Physical change (to another seabed type)	M	L

	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

NG 15, does not fall within any current MPAs, and is approximately 15km from NG 14 and 28km from NG 16. rRA 13, falls within the site, recommended for protection of the low energy circalittoral rock.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The consensus view for this site was one of 'support' (scoring '3'), reflecting previous Regional Hub agreement.

The confidence in the underlying data leading to the sites' identification and subsequent recommendation was moderate to high.

The level of contention should the site be designated was felt to be low.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- Northumberland IFCA:- Support
- The Crown Estate:- Support
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.138 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

CONNOR, D. ALLEN, J. GOLDING, N. HOWELL, K. LIEBERKNECHT, NORTHEN, K. REKER, J 2004. *The Marine Habitat Classification for Britain and Ireland Version 04.05* JNCC, Peterborough ISBN 1 861 07561 8 (internet version)

CRANSON, A. WALTON, J. 2008. *Grey Seal (Halichoerus grypus) Species Action Plan*. Northumberland Biodiversity Action Plan.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

McBREEN, F. 2010*. UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC

THE WILDLIFE TRUSTS. 2010. Areas of additional pelagic ecological importance (APEI) data layer.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009*. Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.17 Marine Conservation Zone: NG 16, Swallow Sand

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 16, Swallow Sand

Site centre location

55° 45’ 00’’N, 0° 39’ 41’’E
55.750137°, 0.661507°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

4,746.12km² / 474,611.91ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

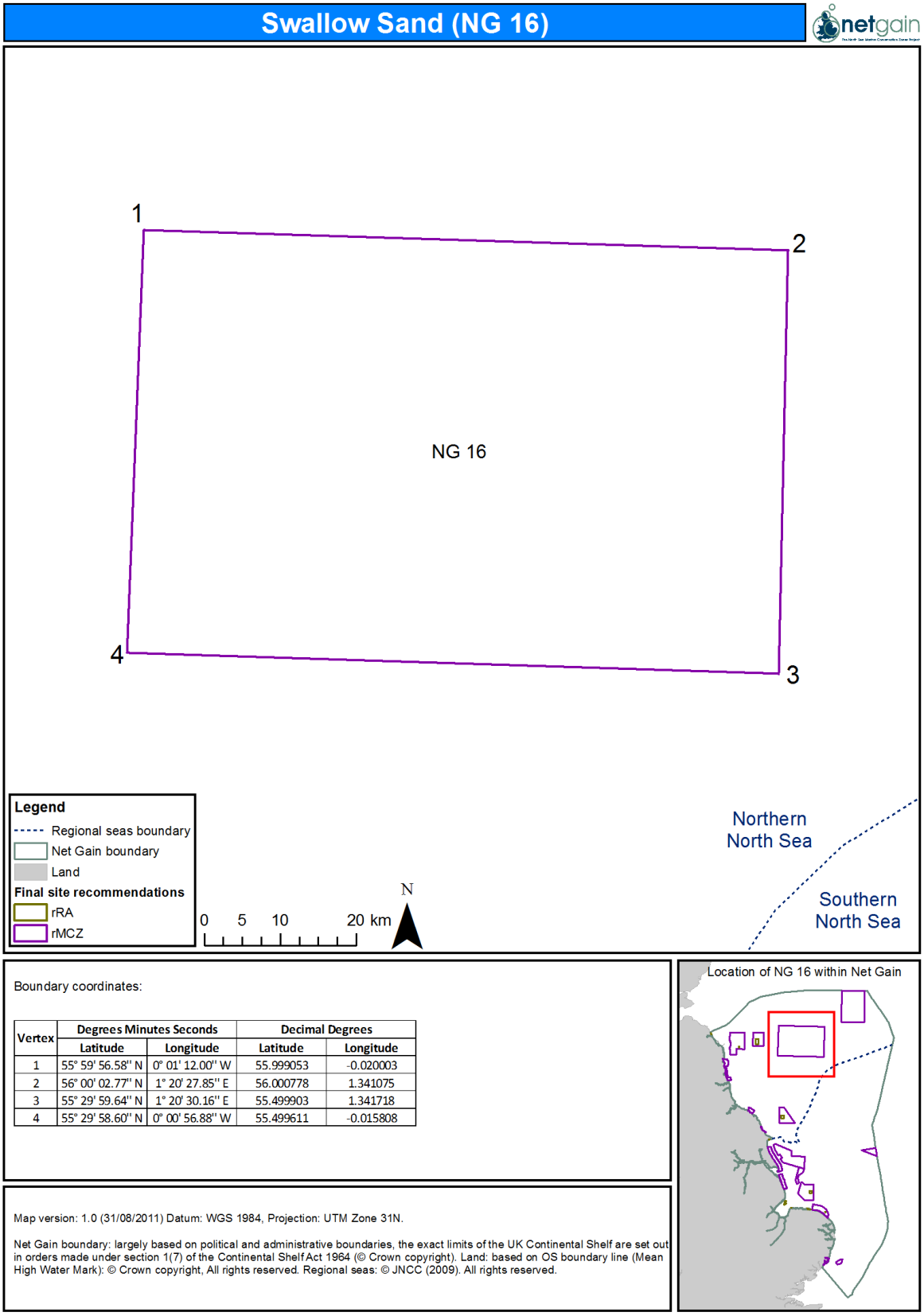
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.139 Features proposed for designation within NG 16, Swallow Sand

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.1: Subtidal coarse sediment	293.26 km²
Broad-scale habitat	A5.2: Subtidal sand	4,451.67 km²
Habitat of conservation importance	Subtidal sands and gravels, Subtidal sands and gravels (modelled)	3 points 4, 496.92km²
Species of conservation importance	n/a	n/a
Geological feature	North Sea glacial tunnel valleys (Swallow hole)	18.44 km²
Other feature	n/a	n/a

Table 7.140 Features within NG 16, Swallow Sand not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	n/a	n/a
Habitat of conservation importance	n/a	n/a
Species of conservation importance	Ocean quahog (*Artica islandica*)	Feature not put for recommendation because of its potential association with manmade structures.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 59' 56.58" N	0° 01' 12.00" W	55.999053	-0.020003
2	56° 00' 02.77" N	1° 20' 27.85" E	56.000778	1.341075
3	55° 29' 59.64" N	1° 20' 30.16" E	55.499903	1.341718
4	55° 29' 58.60" N	0° 00' 56.88" W	55.499611	-0.015808

Figure 7.138 Location and extent of site NG16 (Swallow Sand)

Site summary

NG 16 is located approximately 99km offshore from the Berwickshire region of the Northumberland coast in the North East of England. The depth range of the site is 50-150m (Figure 7.142) and the seabed is composed of subtidal coarse sediment, sand and sand and gravels. The site includes the geological feature Swallow Hole, an example of North Sea post glacial tunnel valley. The north east portion of the site is important for summer foraging of seabirds.

Detailed site description

NG16 is the largest MCZ proposed in the network and has been recommended as a representative example of A5.1 subtidal coarse sediment and A5.2 subtidal sand broad-scale habitats and the 'subtidal sands and gravels' habitat of conservation importance. The site also contains the Swallow Hole geological feature, which is an example of a North Sea post glacial tunnel valley.

The site occurs in the Mid North Sea region where the offshore seabed consists predominantly of sand with some gravelly sand and muddy patches (Natural England, 2004; Wingfield, 1983). This area is deeper than the Southern North Sea area, and the seabed is likely to be subject to lower tidal stress (Bolam et al., 2010) meaning that the sediment in this area may be more stable, so intuitively it is less likely that large areas of the underlying bedrock, glacial drift or mud would become exposed.

Gravel habitats found in offshore deeper waters (>30m) subject to low tidal stress may constitute relatively stable habitats in this area supporting a diverse range of marine flora and fauna. Subtidal coarse sediments such as these are likely to include communities of anenomes, polychaete worms (eg. *Pisione remota, Glycera lapidum*), bivalve molluscs (eg *Spisula elliptica*), sea urchins (e.g. *Echinocyamus pusillus*) and both mobile and sessile epifauna (Jones et al., 2004; Heip et al., 1992).

The sands and gravels in the North Sea tend to be formed by rock material rather than shell (as is the case on the west coast of England) (Jones, et al. 2004) and the flora and fauna associated with these habitats are influenced by environmental pressures. Sand and gravel habitats in the North Sea are often characterised by the presence of Venus bivalve communities (Kingston and Rachor 1982). Although in this area gravel covers relatively large areas of the seabed, in many areas there is only a relatively thin layer of sediment covering the underlying bedrock, glacial drift or mud.

Fine compacted sands in offshore areas exposed to moderate wave action and weak tidal streams are likely to be characterised by the thin shelled bivalve mollusc *Fabulina fabula* (Natural England 2004), other species found on this habitat type in the North Sea include polychaetes (eg *Aricidea min*uta), sand hopper (*Bathyporeia elegans*) and bristle worm (*Ophelia borealis*) (Heip et al. 1992).

Swallow Hole is a post glacial tunnel valley believed to relate to the Devensian/Weichselian glaciations (Ehlers and Wingfield 1991). Muddier habitats tend to occur in areas which have relative shelter from wave and tidal pressure, such as deeps. Polychaetes, brittle stars and bivalve molluscs often dominate this muddier sediment type.

From ESAS data that Net Gain holds, there is indication that the north eastern portion of the site is an important area for summer foraging birds (Figure 7.143), such as Atlantic puffin (*Fratercula arctica*), black kittiwake (*Rissa tridactyla*), common guillemot (*Uria aalge*), northern fulmar (*Fulmarus glaciali*) and northern gannet (*Morus bassanus*) (RSPB, 2010).

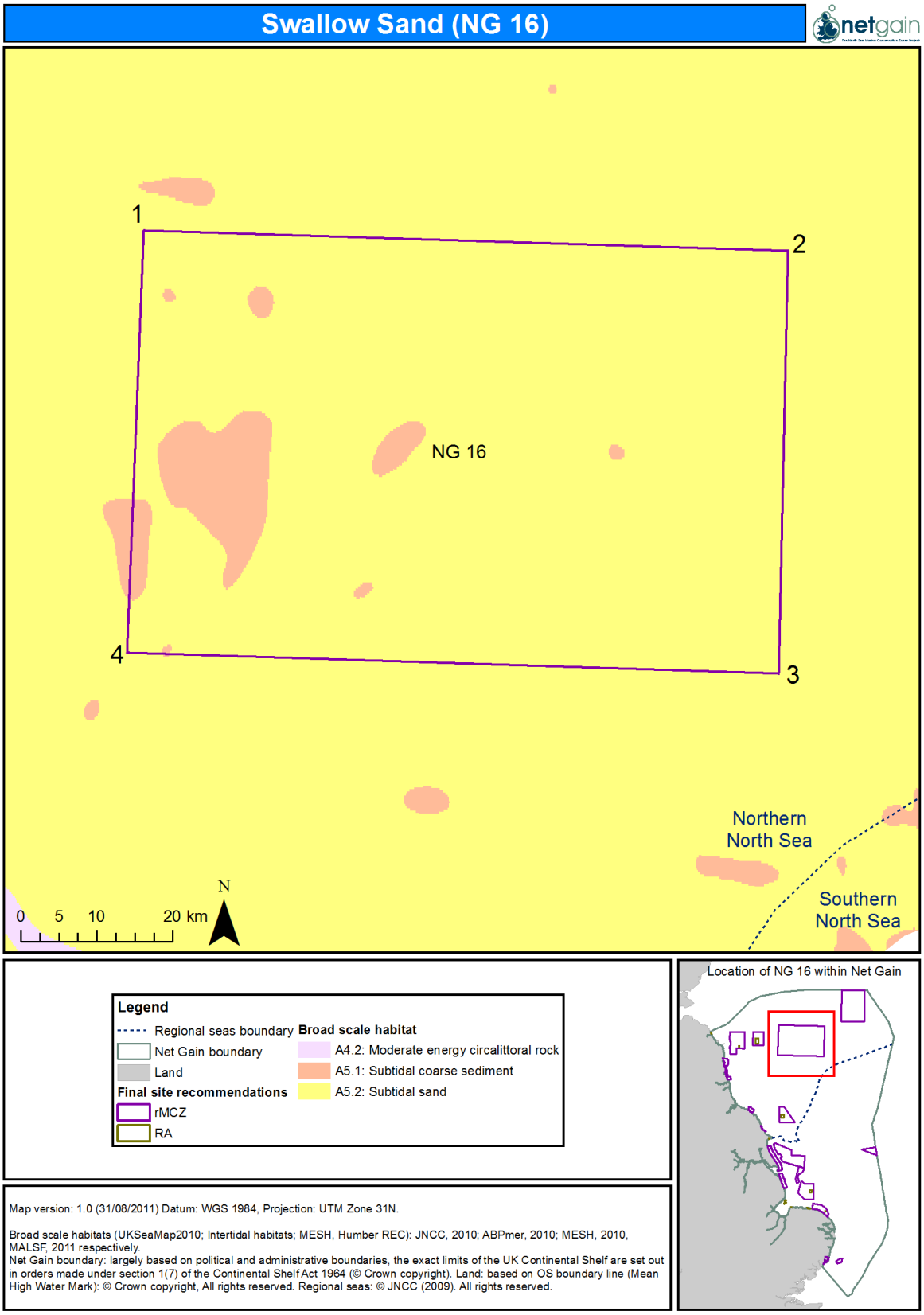


Figure 7.139 Broad-scale-habitat present within NG 16

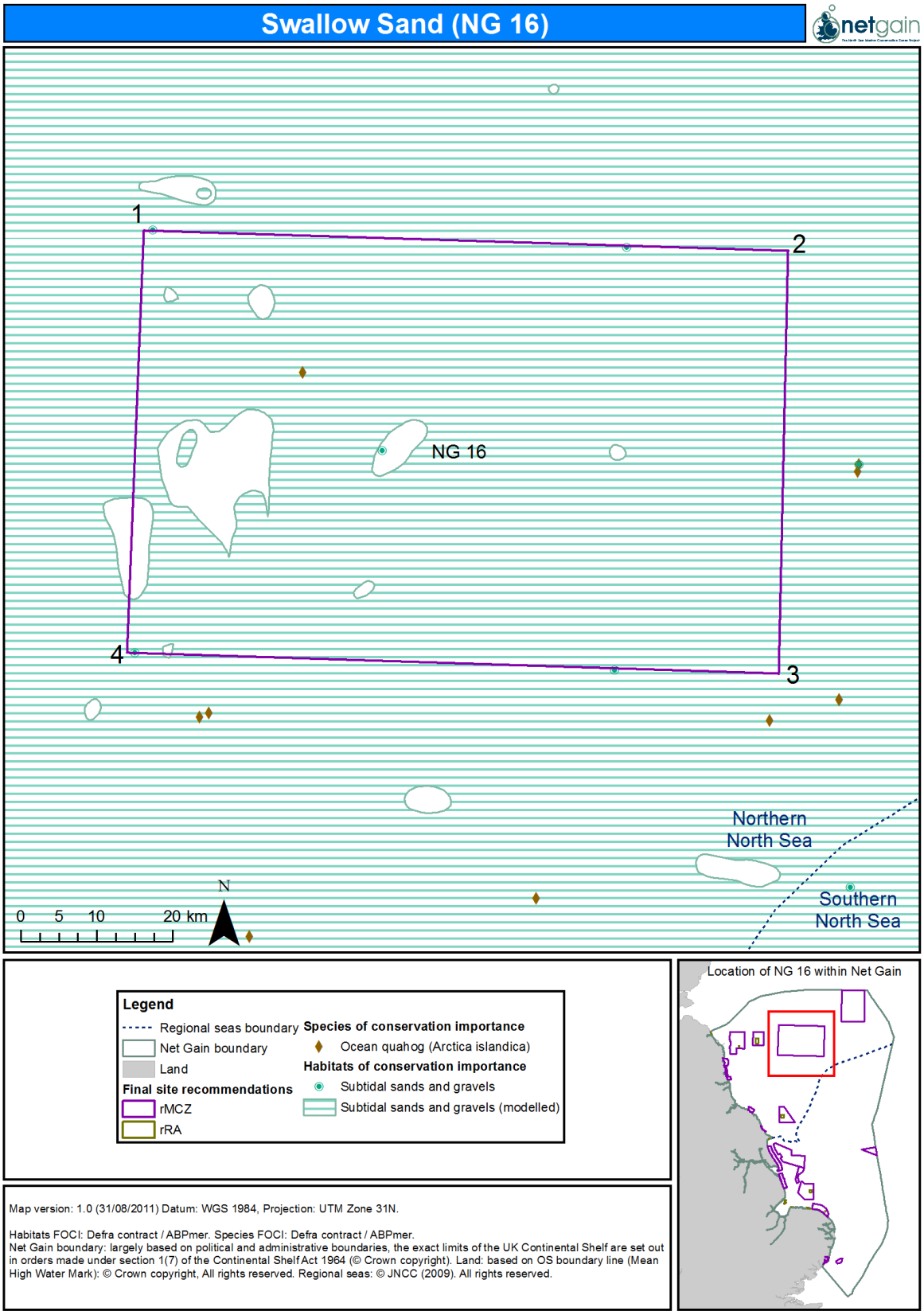


Figure 7.140 FOCI habitat and species within NG 16

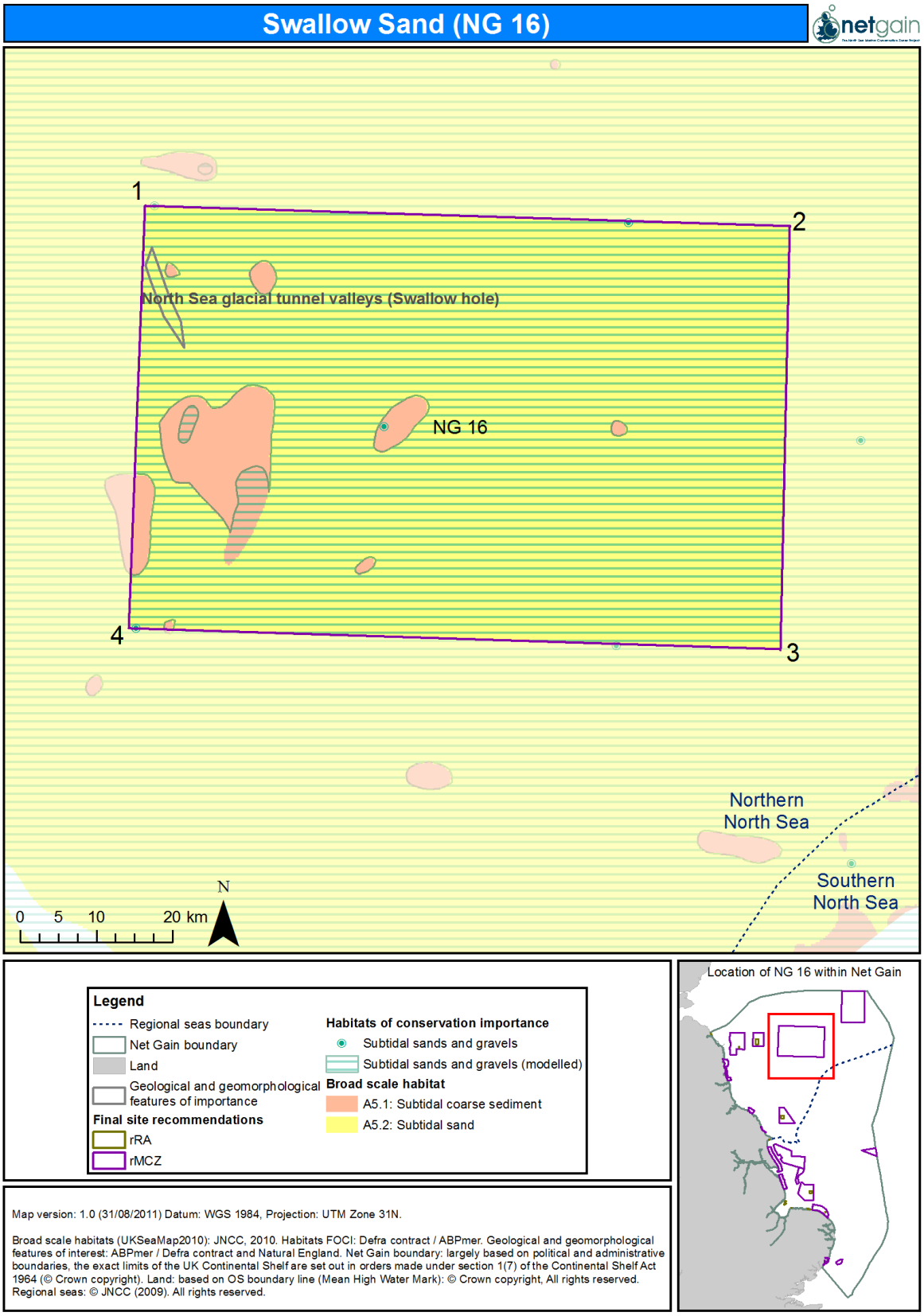


Figure 7.141 Features put forward for recommendation in NG 16

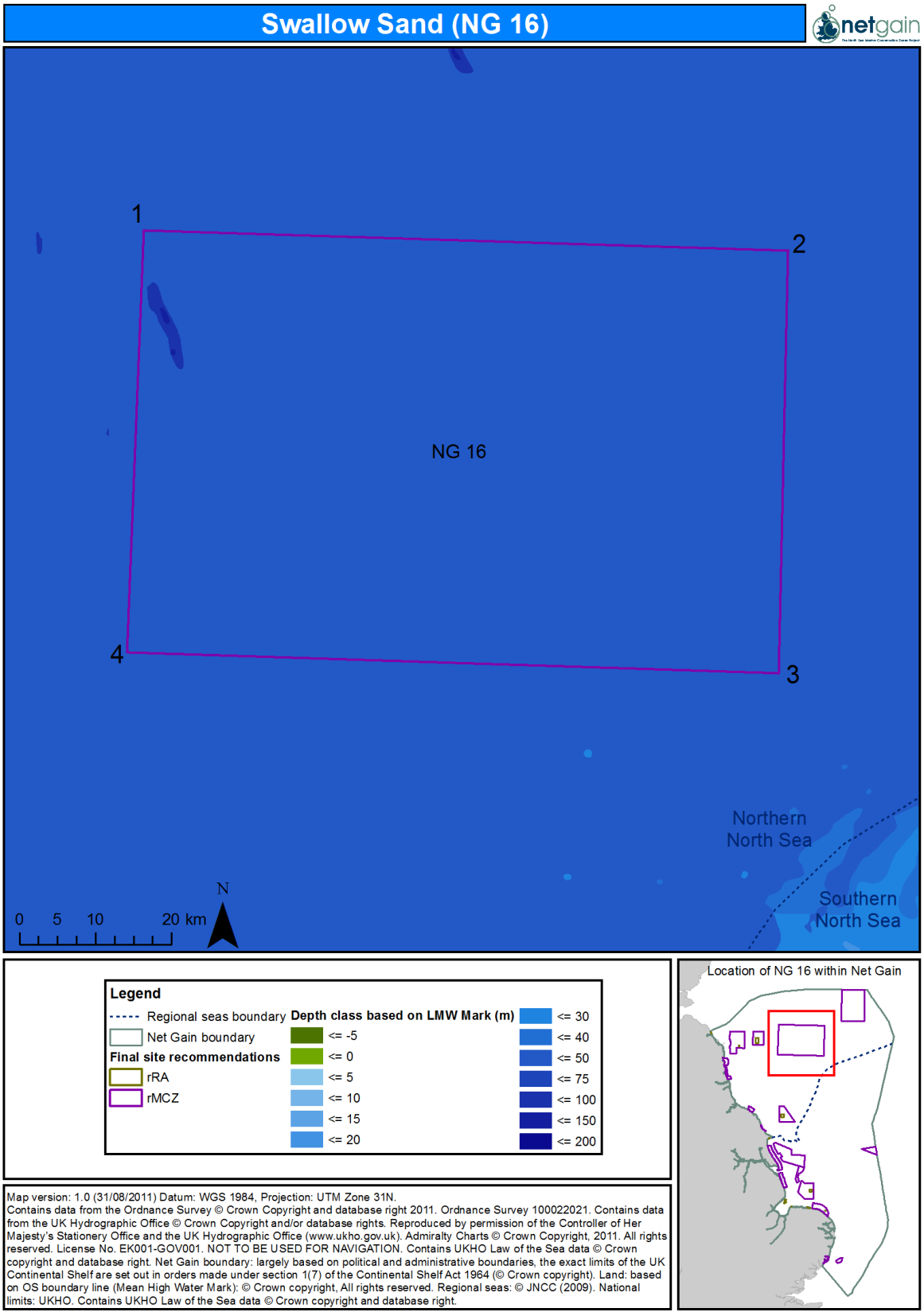


Figure 7.142 Bathymetry of NG 16

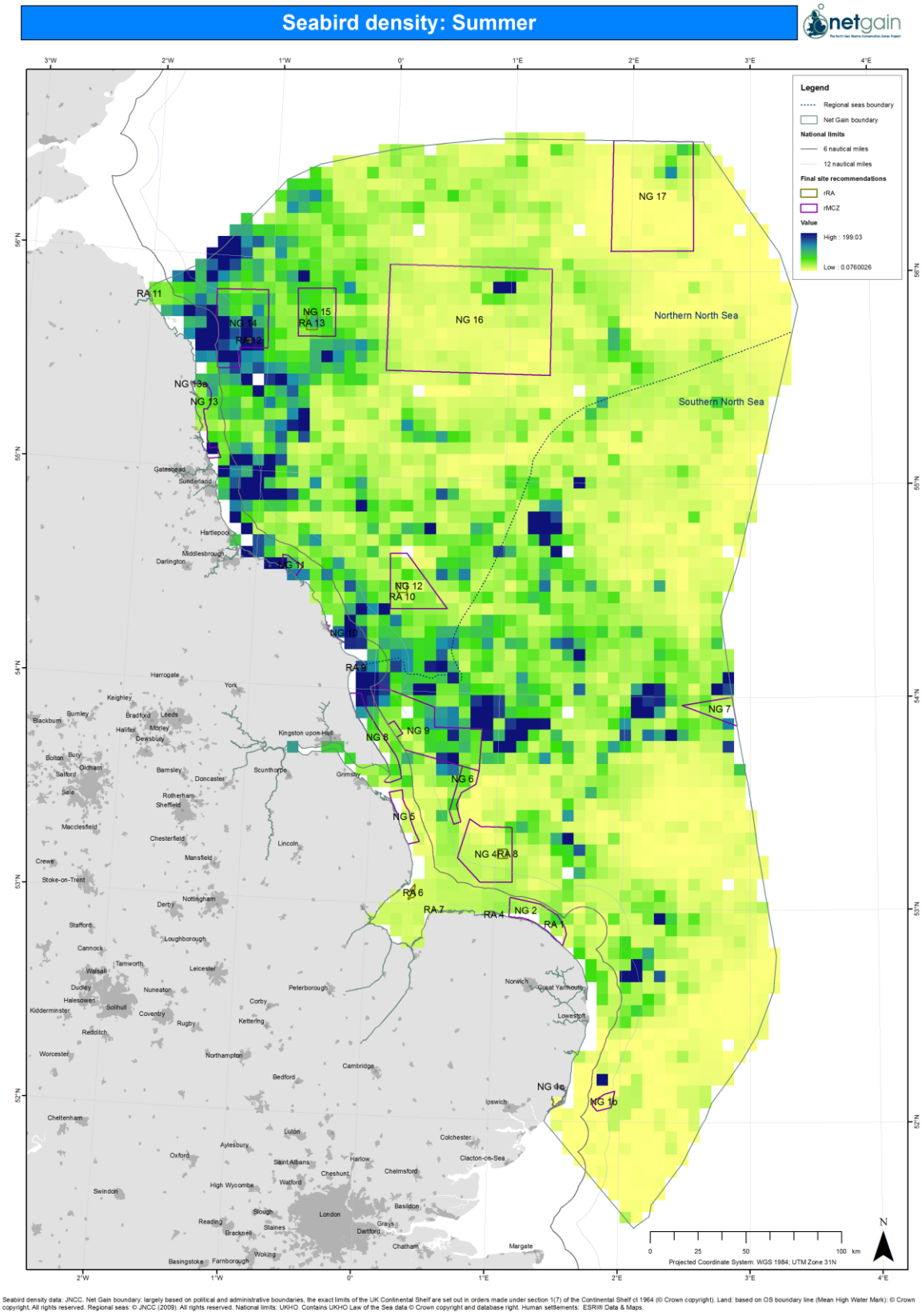


Figure 7.143 Seabird density: summer

Site boundary

This site was derived from the original site NG 2.22 recommended in the 2nd iteration, to help satisfy the adequacy targets for subtidal sand. The original site provided over 15,500km² of subtidal sand, of which more than 7,000km² fell within the Dogger Bank pSAC. Following the receipt of the Gap Analysis provided by JNCC and Natural England, it was understood that the contributions made by Dogger Bank pSAC designation were to be included in adequacy targets. The inclusion of subtidal sand in the pSAC meant that across Net Gain the overall MPA network (including the dMCZs outlined in the 2nd iteration) exceeded the adequacy target for subtidal sand by c.7,250km².

As a result of this the group decided that a significant reduction in size of the original site was acceptable and the site was reduced by 5,000km² to form NG 16, Swallow Sand and NG 17, Fulmar (previously Ekofisk). The boundaries for NG 16, Swallow Sand was guided using information on fishing intensity from international fishing fleets, and infrastructure present on the seabed. During the May Hub meetings the decision was made to reduce the eastern boundary by 10km to allow for a corridor between the two sites in an area that is heavily fished. Discussions were had over whether to remove the Swallow Hole feature as it is a heavily fished area, and the decision was made to leave it included within the site.

Conservation objectives

Table 7.141 Conservation objectives for site NG 16, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressure:

Pressure	**Sensitivity**	**Confidence**
Physical loss (to land or freshwater habitat)	H	L
Physical removal (extraction of substratum)	L-H	L
Surface abrasion: damage to seabed surface features	NS-H	L

	Physical change (to another seabed type)	M	L
	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.142 Conservation objectives for site NG 16, A5.2: Subtidal sand

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain[30] the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures: **Pressure** **Sensitivity** **Confidence**

[30] JNCC adopts a precautionary approach and advises a recover draft CO for Site NG16 subtidal sand due to the low to moderate vulnerability of the feature to the relevant pressures associated with benthic trawling. Whilst JNCC's comments are duly noted, the position that was developed with the RSG (subtidal sand and gravels conservation objective set to maintain) has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub has therefore been maintained.

	Physical change (to another seabed type)	H	L
	Physical loss (to land or freshwater habitat)	H	L
	Siltation rate changes (high)	H	L
	Physical removal (extraction of substratum)	L-H	M
	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.143 Conservation objectives for site NG 16, Subtidal sands and gravels[31]

Conservation Objective	
1 Maintain/ recover	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP).Subject to natural change, maintain the Subtidal sands and gravels in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sands and gravels in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sands and gravels is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L

[31] Feedback received from JNCC suggested that a precautionary approach be taking for subtidal sand and gravels and the conservation objective set to "recover" due to the low to high vulnerability of the feature to the relevant pressures associated with benthic trawling. Whilst JNCC's comments are duly noted, the position that was developed with the RSG (subtidal sand and gravels conservation objective set to maintain) has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub has therefore been maintained.

	Surface abrasion: damage to seabed surface features	NS-H	M-H
	Physical change (to another seabed type)	M	H
	Physical removal (extraction of substratum)	M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	M-H
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L-M
	Removal of target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	M-H
	Siltation rate changes (low)	NS-M	M-H
	Salinity changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.144 Conservation objectives for site NG 16, North Sea glacial tunnel valleys (Swallow Hole) geological feature

Conservation Objective	
1 Maintain/ recover	Swallow Hole is a glacial tunnel valley with sensitivities to pressures such as aggregate extraction and platform extraction construction. This geological feature is believed to be in good condition currently. Subject to natural change, maintain the North Sea glacial tunnel valleys (Swallow Hole) geological feature in favourable condition, such that:
2 Attributes and parameters (indicated by *) of feature	**Geological/ Geomorphological** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the North Sea glacial tunnel valleys (Swallow Hole) geological feature in the biogeographic region is maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	North Sea glacial tunnel valleys (Swallow Hole) geological feature is sensitive to the pressures: Guidance for the pressures that the feature is sensitive to have not been provided to the Net Gain regional project.

Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the MCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

No other MPAs fall within site NG 16. Neighbouring sites include NG 17, 33km away and the Dogger Bank pSAC approximately 40km away.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

Support for the site was split, with one group recording that they 'support' the site, the other recording that they were 'strongly against'. The first of these views was given subject to clarification on Conservation Objectives. The group that recorded themselves as being 'strongly against' the site gave their low score due to the commercial fishing sectors' opposition to the inclusion of the Swallow Hole feature within the site boundary, noting that the commercial fishing sector would support the site if there were to be no additional management measures introduced in and around the Swallow Hole feature.

Confidence in the underlying data was low to moderate. No background knowledge was supplied to sit alongside, or to support, data which was mostly modelled. It is paramount that there is more research into the main geological feature at the site (Swallow Hole) and its resilience to a range of pressures (and hence activities). Recent JNCC advice to the Project on management measures refers to biological recovery which is not relevant to the geological feature. Whilst the confidence on data relating to the geological feature itself is high, the data on the broad-scale habitats at the site was felt to be 'questionable'.

The site was felt to be potentially highly contentious. However, these views are linked to comments (above) on the future management of the Swallow Hole feature, and whether fishing activity is deemed to be damaging in this heavily fished area. Also, any restrictions would have the effect of potentially displacing activity to other sites. It was noted that it is the Swallow Hole feature that is central to views regarding the site's contention.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- NFFO - commercial fishing:- Strongly against (important fishing area)
- Northumberland IFCA:- Support
- The Crown Estate:- Support
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.145 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Geological and geomorphological features of interest	Survey	Brooks, et a; 2009
Ocean quahog (*Artica islandica*)	Combination of historical and recent records	Seeley, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

BROOKS, A.J., ROBERTS, H., KENYON, N.H. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 8: *Task 2A - Mapping of Geological and Geomorphological Features*. ABP Marine Environmental Research Ltd.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

RSPB, 2010. *RSPB species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby 2010

SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P., ADAMS, L. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 14: Task 2B - Mapping of species with limited mobility (Benthic Species). ABP Marine Environmental Research Ltd.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.18 Marine Conservation Zone: NG 17, Fulmar

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

NG 17, Fulmar

Site centre location

56° 21' 01''N, 2° 10' 34''E
56.350475°, 2.176181°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

2,437.12km² / 243,712.23ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

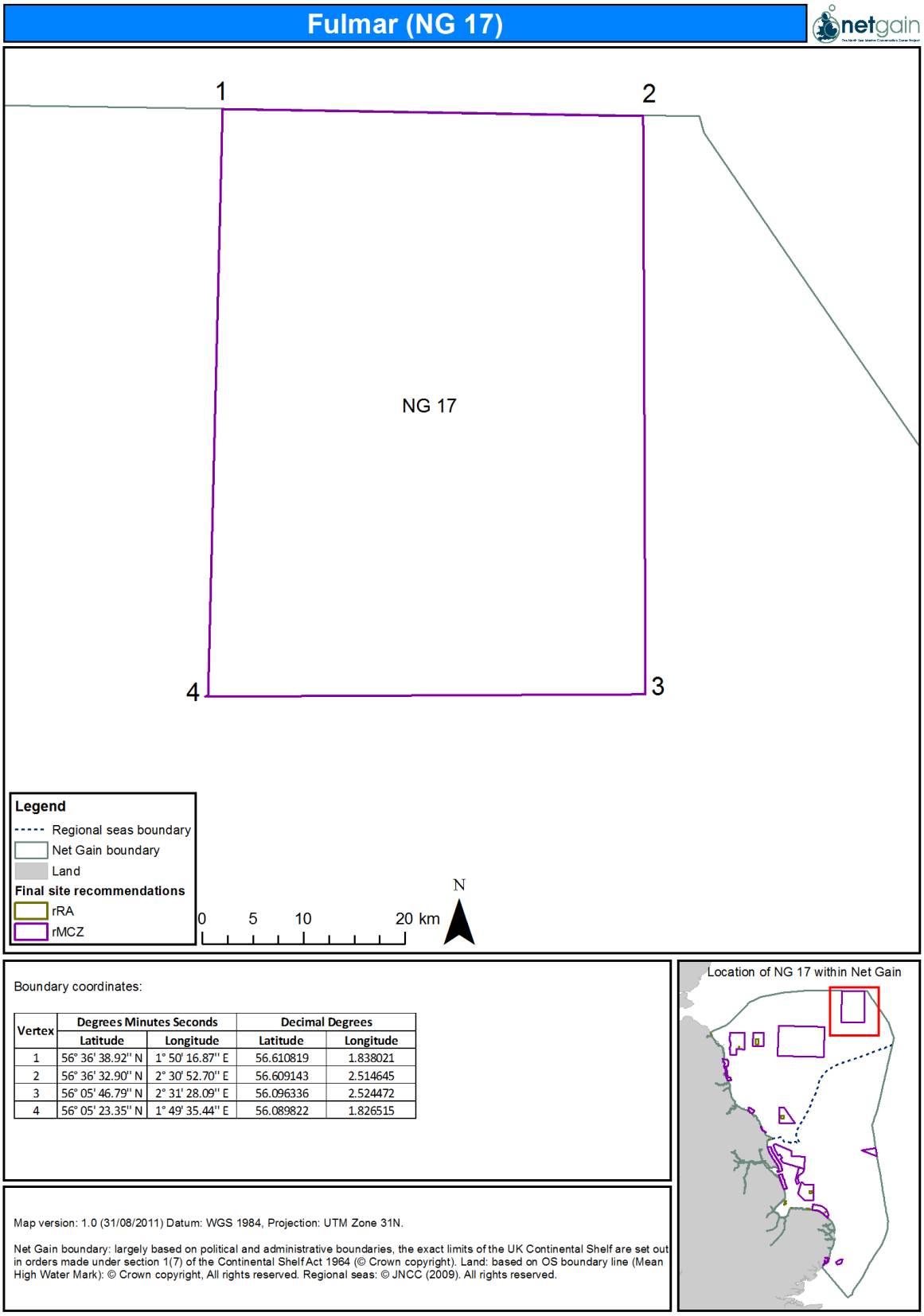
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.146 Features proposed for designation within NG 17, Fulmar

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.1: Subtidal coarse sediment	45.32km²
Broad-scale habitat	A5.2: Subtidal sand	2, 389.91km²
Habitat of conservation importance	Subtidal sands and gravels (modelled)	2, 402.31km²
Species of conservation importance	Ocean quahog (*Arctica islandica*)	48 points
Geological feature	n/a	n/a
Other feature	n/a	n/a

Table 7.147 Features within NG 17, Fulmar not proposed for designation

Feature type	Feature name	Reason that feature has not been proposed for designation
Broad-scale habitat	n/a	n/a
Habitat of conservation importance	n/a	n/a
Species of conservation importance	Amphipod shrimp (*Gitanopsis bispinosa*)	Following SAP advice, feature not considered because only a single historic record available from 1992. Advice from JNCC to not assess this feature as it is unlikely to go forward as a designated feature. Refer to 2.8.2 of SAP feedback report.
Species of conservation importance	Native oyster (*Ostrea edulis*)	SAP advice was to ignore this as a feature because only records available are those associated with platform and man-made structures
Species of conservation importance	Undulate ray (*Raja undulate*)	This feature was not put forward for recommendation due to its high mobility and limited confidence in the data



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	56° 36' 38.92'' N	1° 50' 16.87'' E	56.610819	1.838021
2	56° 36' 32.90'' N	2° 30' 52.70'' E	56.609143	2.514645
3	56° 05' 46.79'' N	2° 31' 28.09'' E	56.096336	2.524472
4	56° 05' 23.35'' N	1° 49' 35.44'' E	56.089822	1.826515

Figure 7.144 Location and extent of site NG17 (Fulmar)

Site summary

NG 17 is located approximately 224km offshore of the Northumberland coast in the North East of England. The depths in the site range from 50-100m (Figure 7.148) and the seabed is composed of two broad-scale habitats, subtidal coarse sediment and subtidal sand, as well as the habitat FOCI subtidal sands and gravels. Three species FOCI are present in the site, amphipod shrimp (*Gitanopsis bispinosa*), ocean quahog (*Artica islandica*) and the native oyster (*Ostrea edulis*). The site also supports foraging seabirds, fulmar and northern gannet (RSPB, 2010).

Detailed site description

NG17 has been recommended as a representative example of A5.1 subtidal coarse sediment and A5.2 subtidal sand broad-scale habitats; the 'subtidal sands and gravels' habitat of conservation importance and ocean quahog which are a species of conservation importance.

This site occurs in the Mid North Sea region where the subtidal substrate frequently occurs as a thin layer of sediment covering the underlying bedrock, glacial drift or mud. The offshore seabed in this area consists predominantly of sand with some gravelly sand and muddy patches (Jones, et al., 2004; Wingfield, 1983) and is deeper than the Southern North Sea area, and is therefore likely to be subject to lower tidal stress (Bolam, et al., 2010).

The sand and gravel habitats in the North Sea are often characterised by Venus bivalve communities (Kingston and Rachor, 1982). Fine compacted sands in offshore areas exposed to moderate wave action and weak tidal streams are characterised by the thin shelled bivalve mollusc *Fabulina fabula* (Natural England, 2004). Communities found on this habitat type in the North Sea include polychaetes (e.g. *Aricidea min*uta), sand hopper (*Bathyporeia elegans*) and bristle worm (*Ophelia borealis*) (Heip, et al. 1992).

Gravel habitats found offshore in deeper waters (>30m) subject to low tidal stress may constitute relatively stable habitats in this area supporting a diverse range of marine flora and fauna. Subtidal coarse sediment areas and subtidal sands and gravels are likely to include communities with epifauna and infauna such as bivalve molluscs (eg *Spisula elliptica*), sea urchins (e.g. *Echinocyamus pusillus*), polychaete worms (eg. *Pisione remota, Glycera lapidum*) and anenomes (Jones, et al. 2004; Heip, et al. 1992).

The ocean quahog or Icelandic cyprine (*Arctica islandica*) is a long lived cockle shaped bivalve found throughout NG17. It is predominantly sub-littoral but can also be found at extreme low water ranging from depths of 4m to 482m predominantly on firm subtidal sediments, buried in fine to course grained sand and muddy sand (Sabatini, et al. 2008). The growth rate of these species tends to be slow, but can vary dependent on environmental conditions. *A. islandica* are thought to reach sexual maturity between 5 and 7 years, although this may be dependent on locality and growth rates, and the spawning period can vary also depending on location. North Sea cod have been known to prey upon *A. Islandica* (Sabatini, et al. 2008).

ESAS data provided to Net Gain, and confirmed by RSPB (2010) suggests the presence of seabird species within NG 17 (Figure 7.149; Figure 7.150; Figure 7.151), and the site is included on foraging range maps for fulmar (*Fulmarus* glaciali) and northern gannet (*Morus bassanus*).

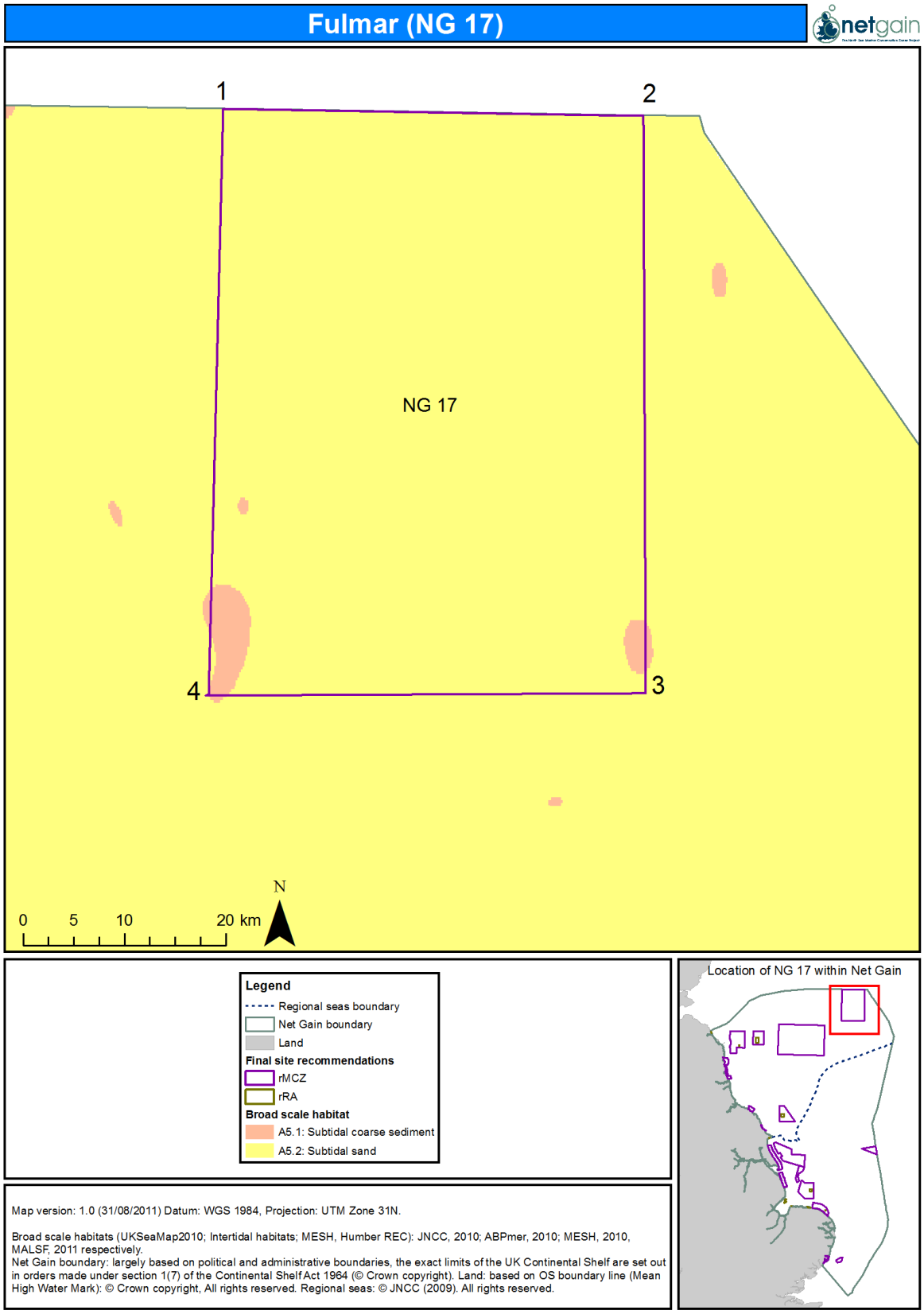


Figure 7.145 Broad-scale habitat present in NG 17

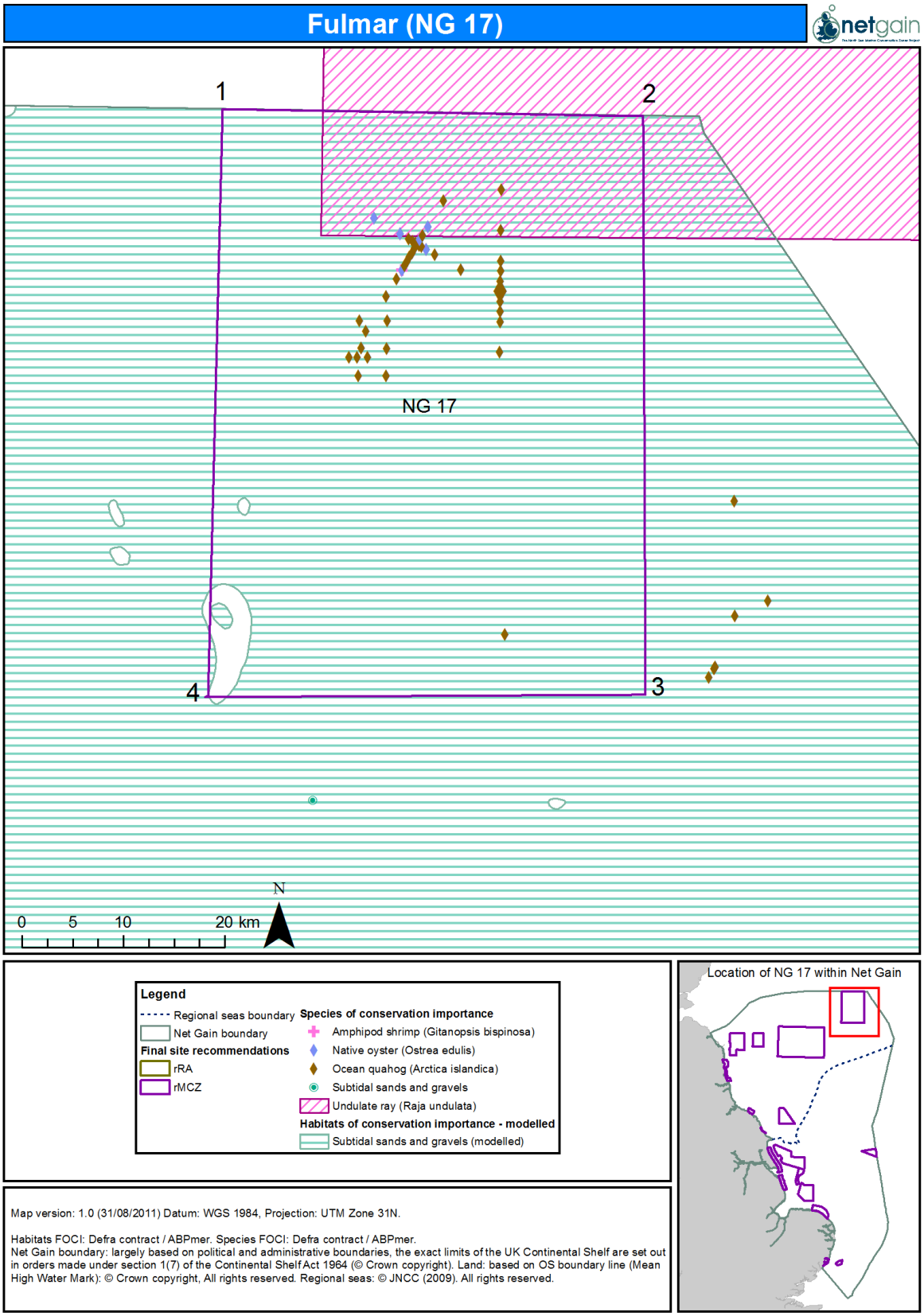


Figure 7.146 FOCI habitat and species present in NG 17

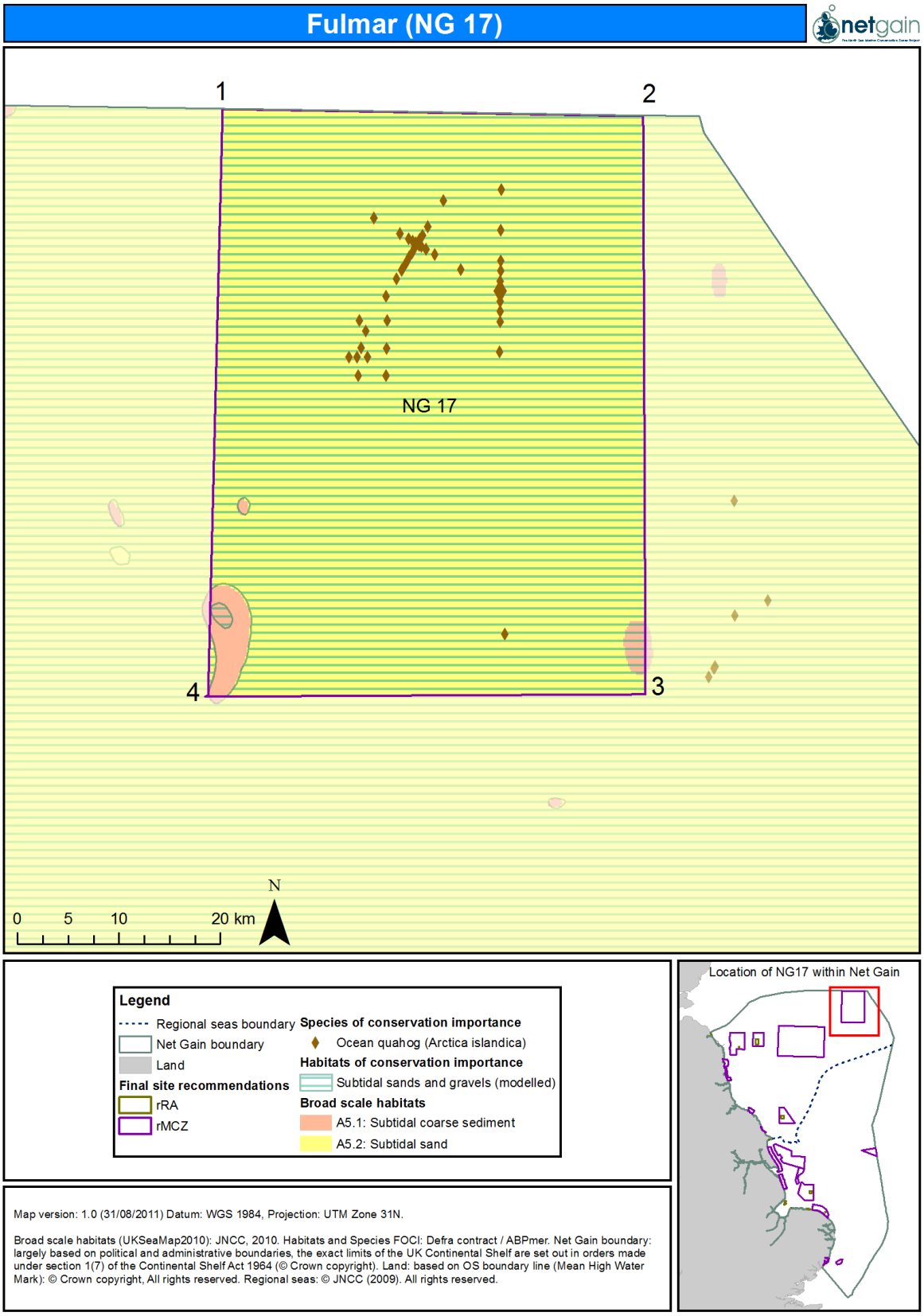


Figure 7.147 Features put forward for recommendation in NG 17

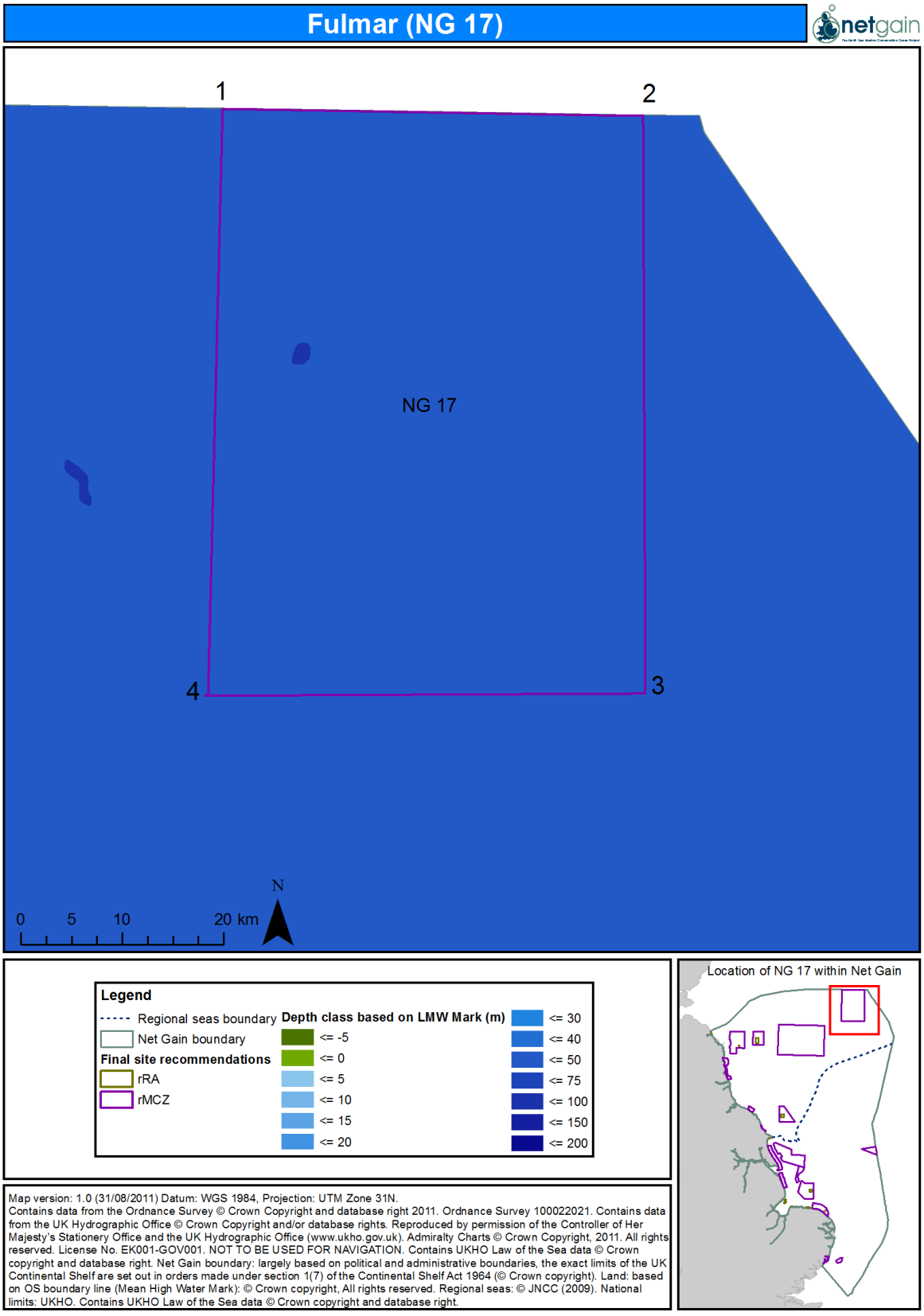


Figure 7.148 Bathymetry of NG 17

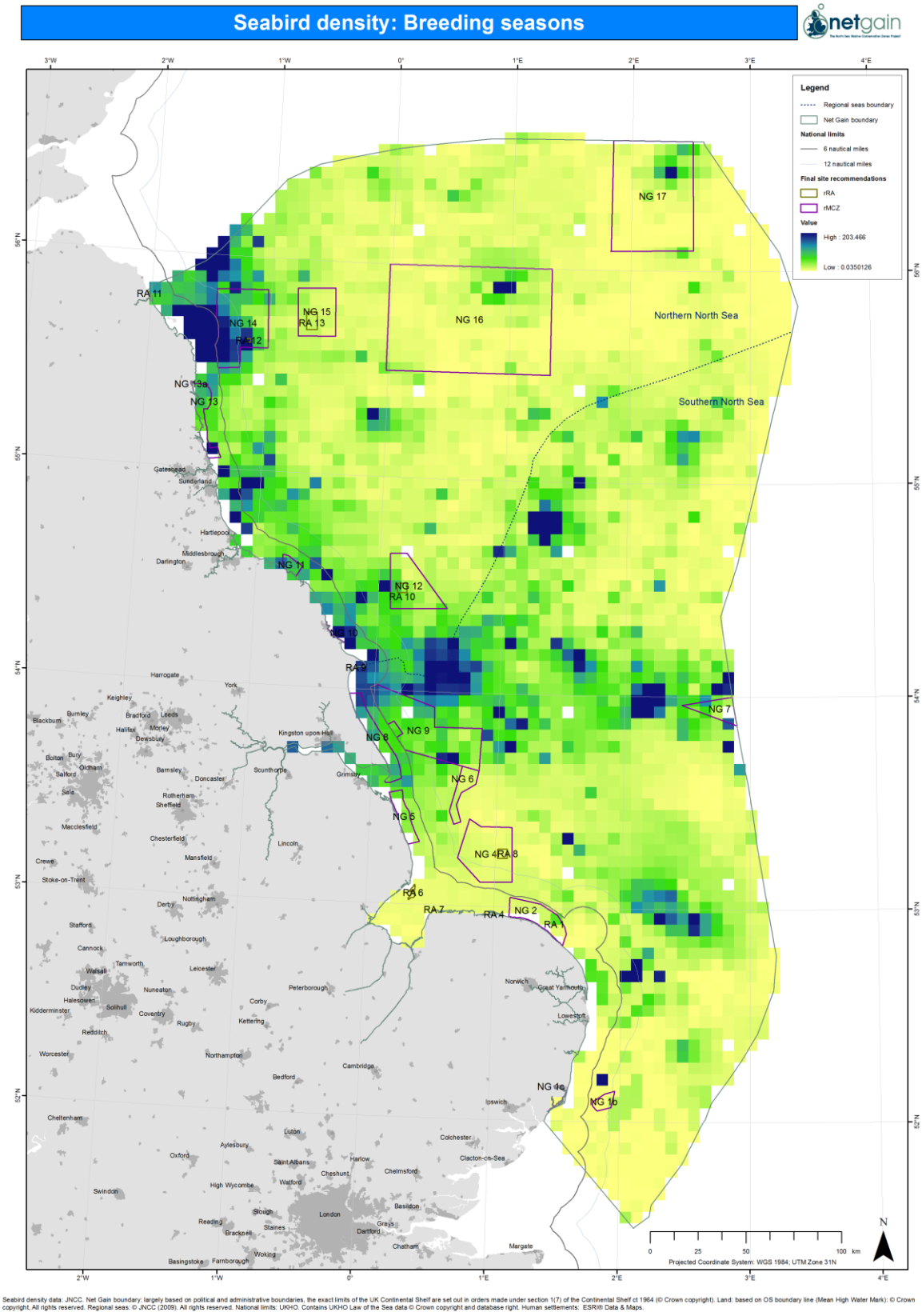
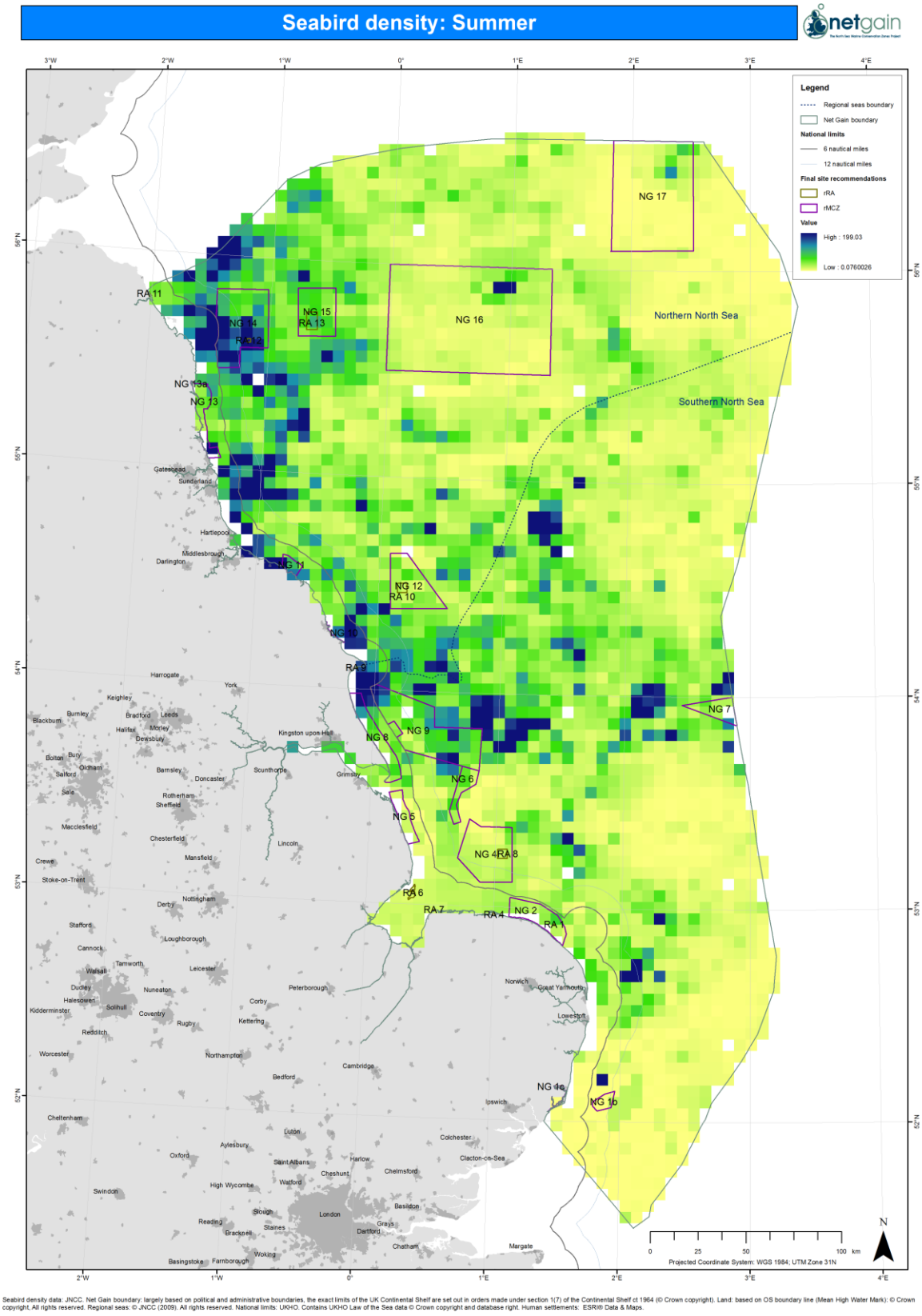


Figure 7.149 Seabird densities: breeding season



Seabird density data: JNCC. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.150 Seabird densities: summer

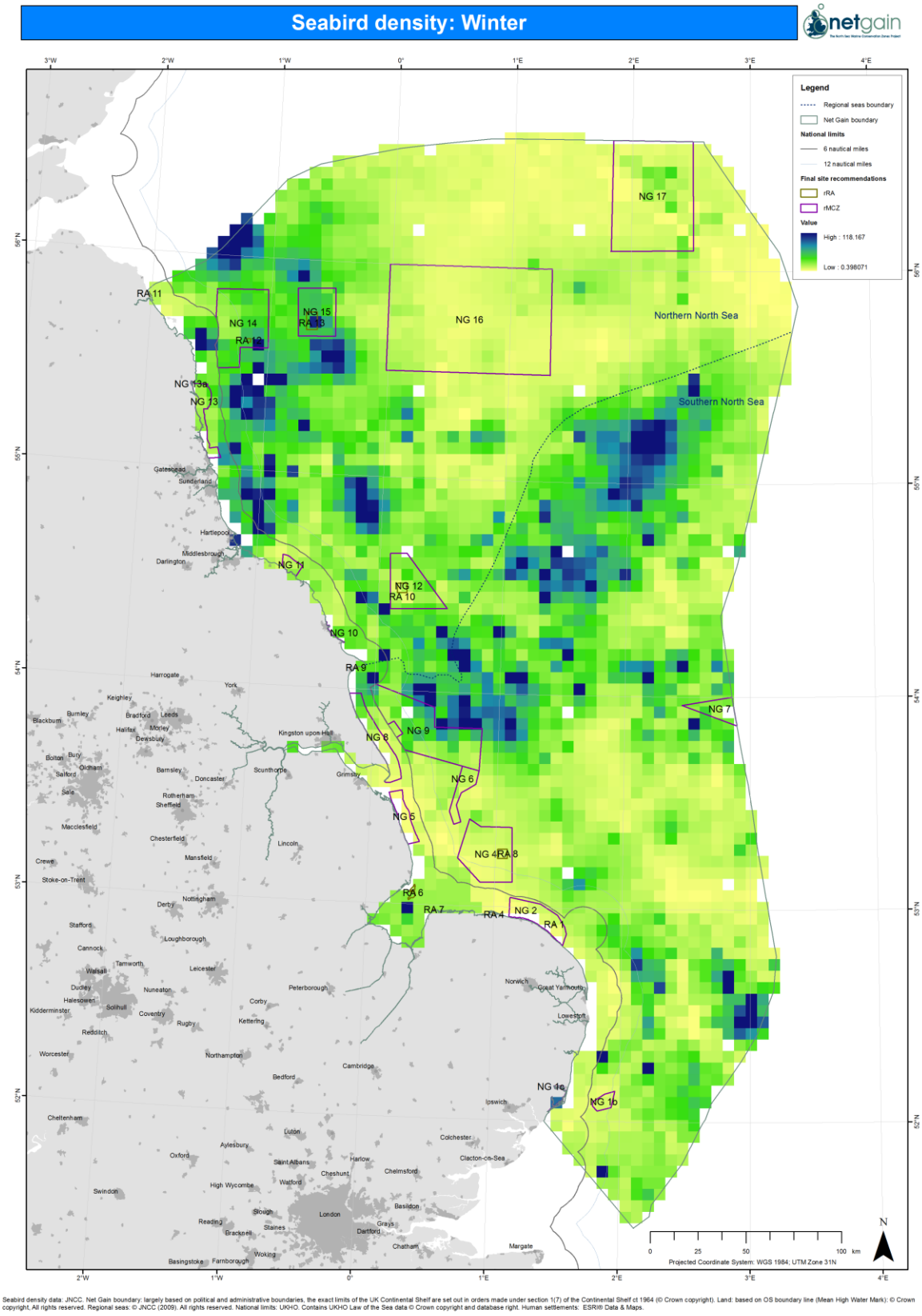


Figure 7.151 Seabird densities: winter

Site boundary

This site was derived from the original site NG 2.22 from the 2nd iteration, and was recommended to help satisfy the adequacy targets for the broad-scale habitat subtidal sand. The original site provided over 15,500km² of subtidal sand, more than 7,000km² of which fell within the Dogger Bank pSAC. The Gap Analysis provided by JNCC and Natural England takes into the account the contributions made by Dogger Bank pSAC designation to meeting the adequacy targets for BSH types. The inclusion of subtidal sand in the pSAC meant that across Net Gain the overall MPA network (including the dMCZs outlined in the 2nd iteration) exceeded the adequacy target for subtidal sand by c.7,250km².

As a development to this the group decided that a significant reduction in size of the original site was acceptable and the site was reduced by 5,000km² to form both NG 16, Swallow Sand and NG 17, Fulmar (previously Ekofisk). The boundaries for NG 17, Fulmar was guided by using information on fishing intensity from international fishing fleets, and infrastructure present on the seabed. During the May Hub meetings the decision was made to reduce the southern boundary by 10km to allow for a corridor between the two sites in an area that is heavily fished.

CEFAS fisheries management within the site prevents the retention of Norway Pout caught with towed gear all year round.

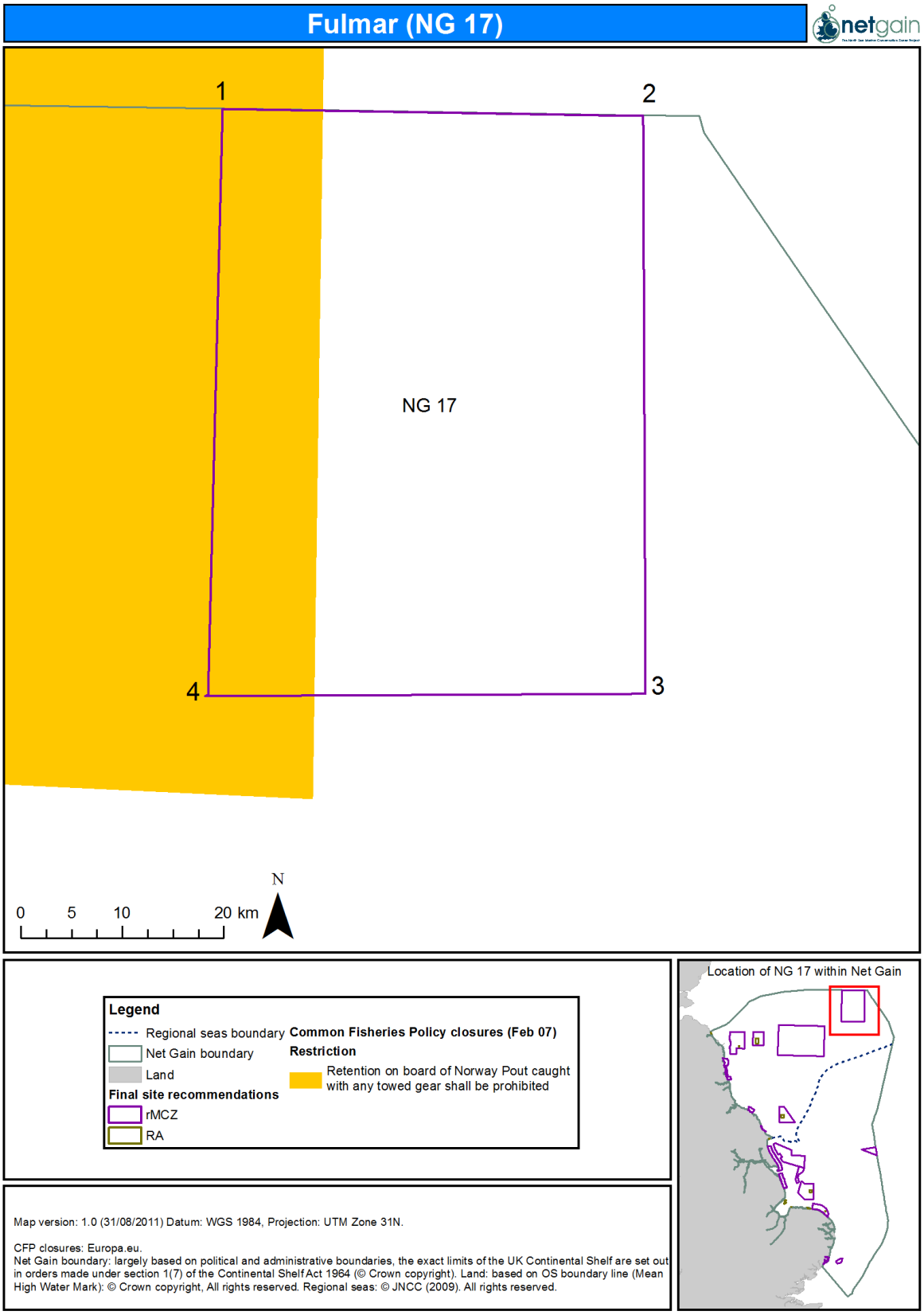


Figure 7.152 NG 17 site boundary with associated fishery management location

Conservation objectives

Table 7.148 Conservation objectives for site NG 17, A5.1: Subtidal coarse sediment

Conservation Objective	
1 Maintain/ recover	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal coarse sediment in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal coarse sediment in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal coarse sediment is sensitive to the pressures: **Pressure** — **Sensitivity** — **Confidence** Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — L-H — L Surface abrasion: damage to seabed surface features — NS-H — L

	Physical change (to another seabed type)	M	L
	Salinity changes - local	L-M	L
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	L
	Siltation rate changes (low)	NS-M	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.149 Conservation objectives for site NG 17, A5.2: Subtidal sand[32]

Conservation Objective	
1 Maintain/ recover	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, maintain the Subtidal sand in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sand in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sand is sensitive to the pressures: **Pressure** **Sensitivity** **Confidence**

[32] Feedback received from JNCC suggested that for subtidal sand conservation objective to be set to "recover" due to the cumulative pressures (for all pressures covered by infrastructure), taking into consideration pipelines (23 pipelines), cables (1 active cable), wellheads (129 wellheads), and platforms (4 platforms), advise that there is moderate exposure and moderate vulnerability . Whilst JNCC's comments are duly noted, the position that was developed with the RSG (subtidal sand conservation objective set to maintain) has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub has therefore been maintained.

	Physical change (to another seabed type)	H	L
	Physical loss (to land or freshwater habitat)	H	L
	Siltation rate changes (high)	H	L
	Physical removal (extraction of substratum)	L-H	M
	Siltation rate changes (low)	M	L
	Temperature changes - regional/national	M	L
	Salinity changes - local	L-M	L
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	L-M
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	NS-M	L
	Surface abrasion: damage to seabed surface features	NS-M	L
	Water flow (tidal & ocean current) changes - regional/national	NS-L	L
	Water flow (tidal current) changes - local	NS-L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.150 Conservation objectives for site NG 17, Subtidal sands and gravels[33]

Conservation Objective	
1 Maintain/ recover	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, maintain the Subtidal sands and gravels in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Subtidal sands and gravels in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	
3 Pressures	Subtidal sands and gravels is sensitive to the pressures: **Pressure** **Sensitivity** **Confidence**

[33] Feedback received from JNCC suggested that subtidal sand and gravels conservation objective to be set to "recover" due to the cumulative pressures (for all pressures covered by infrastructure), taking into consideration pipelines (23 pipelines), cables (1 active cable), wellheads (129 wellheads), and platforms (4 platforms), advise that there is moderate exposure and moderate vulnerability. Whilst JNCC's comments are duly noted, the position that was developed with the RSG (subtidal sand and gravels conservation objective set to maintain) has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub has therefore been maintained.

	Physical loss (to land or freshwater habitat)	H	L
	Surface abrasion: damage to seabed surface features	NS-H	M-H
	Physical change (to another seabed type)	M	H
	Physical removal (extraction of substratum)	M	H
	Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm	L-M	H
	Structural abrasion/penetration: Structural damage to seabed >25mm	L-M	M-H
	Introduction or spread of non-indigenous species & translocations (competition)	NS-M	L
	Removal of non-target species (lethal)	NS-M	L-M
	Removal of target species (lethal)	NS-M	L
	Siltation rate changes (high)	NS-M	M-H
	Siltation rate changes (low)	NS-M	M-H
	Salinity changes - local	L	L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.		

Table 7.151 Conservation objectives for site NG 17, Ocean quahog (*Arctica islandica*)[34]

Conservation Objective	
1 Maintain/ recover	Ocean quahog (*Arctica islandica*) is on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, maintain the ocean quahog (*Arctica islandica*) in favourable condition, such that the:
2 Attributes and parameters (indicated by *) of feature	**Species** the • natural range, • habitat extent, • population structure, • population density, • size structure, • natural environmental quality*, and natural environmental processes* representative of Ocean quahog (*Arctica islandica*) in the biogeographic region are maintained, such that the feature makes its contribution to the network.
Advice on operations	

[34] Feedback received from JNCC suggested that Ocean quahog (*Arctica islandica*) conservation objective be set to "recover" due to the cumulative pressures (for all pressures covered by infrastructure), taking into consideration pipelines (23 pipelines), cables (1 active cable), wellheads (129 wellheads), and platforms (4 platforms), advise that there is low exposure and moderate vulnerability (however recognises low confidence in the assessment). Whilst JNCC's comments are duly noted, the position that was developed with the RSG (subtidal sand and gravels conservation objective set to maintain) has been preserved. Following receipt of JNCC's advice there was no opportunity to fully discuss this suggestion with the RSG and the agreed position developed at the Regional Hub has therefore been maintained.

3 Pressures	Ocean quahog (*Arctica islandica*) is sensitive to the pressures: **Pressure** / **Sensitivity** / **Confidence** Physical change (to another seabed type) — H — L Physical loss (to land or freshwater habitat) — H — L Physical removal (extraction of substratum) — H — M Removal of non-target species (lethal) — H — L Shallow abrasion/penetration: damage to seabed surface and penetration ≤25mm — H — H Siltation rate changes (high) — H — L Structural abrasion/penetration: Structural damage to seabed >25mm — H — H Temperature changes - local — H — L Wave exposure changes - local — M — L Water flow (tidal & ocean current) changes - regional/national — L — L Water flow (tidal current) changes - local — L — L
Human activities	Human activities which cause these pressures will need to be managed if they prevent the conservation objectives from being achieved to ensure the rMCZ contributes to an ecologically coherent and well-managed network of Marine Protected Areas.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

The boundary of NG 17 aligns with the north eastern Net Gain boundary, and falls approximately 33km east of NG 16. There are no MPAs that fall within or adjacent to the site.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The groups' views were polarised over the degree of support for the site, with one group recording 'strong support' whilst the other (skewed by commercial fishermen) recorded that they were 'strongly against'. The group that recorded strong support for the site noted that there had been a high level of support for this site across the Regional Hub members throughout the process (which is recorded in previous iteration reports and the Draft Final Recommendations). In the other group, commercial fishing representatives did not want to put forward a consensus view of support.

Confidence in the underlying data ranged from low to high. Whilst noting that confidence was generally low, one group noted that data around gas (and oil) platforms appeared to be highly focussed and detailed. This point was reflected by the other group who suggested that, because of the presence of the oil and gas industries, the area was well surveyed.

Contention associated with the site was felt to be low, with little activity that may potentially be affected occurring in the area.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- The Crown Estate:- Support
- The Wildlife Trusts:- Site recommendation is supported but with points of clarification raised, and suggestions for improvement

Table 7.152 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
European seabirds at sea (ESAS)	Modelled data	Kober, et al. 2010
Ocean quahog (*Artica islandica*), Amphipod shrimp (*Gitanopsis bispinosa*), Native oyster (*Ostrea edulis*)	Combination of historical and recent records	Seeley, et al. 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010.
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009
Undulate ray (*Raja undulata*)	Combination of historical and recent records	Ellis, et al. 2010

References

BOLAM, S.G., BARRIO-FROJAN, C.R.S., EGGLETON, J.D., 2010. *Macrofaunal production along the UK continental shelf.* JOURNAL OF SEA RESEARCH 64 166-179

EHLERS, J and WINGFIELD, R. 1991. *The extension of the Late Weichselian/Late Devensian ice sheets in the North Sea Basin.* JOURNAL OF QUATERNARY SCIENCE 6 (4) 313-326

ELLIS, J.R., READDY, L., SOUTH, A. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 15: Task 2B - Distribution of highly mobile species.* ABP Marine Environmental Research Ltd.

HEIP, C.; BASFORD, D.; CRAEYMEERSCH, J.; DEWARUMEZ, J.-M.; DE-WILDE, P.; DÖRJES, J.; DUINEVELD, G.; ELEFTHERIOU, A.; HERMAN, P.M.J.; HUYS, R.; IRION, G.; NIERMANN, U.; KINGSTON, P.; KÜNITZER, A.; RACHOR, E.; RUMOHR, H.; SOETAERT, K.; SOLTWEDEL, T. 1992. *The benthic communities of the North Sea : a summary of the results of the North Sea benthos survey. Pp 148-175 in Anon, . (Ed.): Report of the ICES Advisory Committee on Marine Pollution. ICES Cooperative Research Report, 190.* ICES: Copenhagen, Denmark.

JONES, L.A., COYLE, M.D., EVANS, D., GILLILAND, P.M. & MURRAY, A.R. 2004. *The Mid North Sea Marine Natural Area Profile: A contribution to regional planning and management of the seas around England.* Peterborough: English Nature.

KINGSTON, P.F., & RACHOR, E., 1982. *North Sea level bottom communities.*

International Council for the Exploration of the Sea. C.M.1982/L:41, Biological

Oceanography Committee.

KOBER, K., WEBB, A., WIN, I., LEWIS, M., O'BRIEN, S., WILSON, L.J., REID, J.B. 2010. *An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs.* JNCC report No. 431.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

RSPB, 2010. *RSPB species foraging ranges, mean, mean maximum and maximum*, received from Martin Kerby 2010

SABATINI,M., PIZZOLLA, P. and WILDING, C. 2008. Arctica islandica*. Icelandic cyprine. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 24/08/2011*]. Available from: <http://www.marlin.ac.uk/speciesfullreview.php?speciesID=2588>

SEELEY, B., LEAR, D., HIGGS, S., NEILLY, M., BILEWITCH, J., EVANS, J., WILKES, P., ADAMS, L. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 14: Task 2B - Mapping of species with limited mobility (Benthic Species). ABP Marine Environmental Research Ltd.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer.*

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

WINGFIELD, RTR. 1983. *Cruise inventory MV Whitethorn 2/83 Leg 6. British Oceanographic Data Centre [on line]* .Cited 24/08/2011 Available at https://www.bodc.ac.uk/data/information_and_inventories/cruise_inventory/report/10506/

7.19 Marine Conservation Zone: rRA 1, North Norfolk Blue Mussel Beds

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 1, North Norfolk Blue Mussel Beds (falls within NG 2, Cromer Shoal Chalk Beds)

Site centre location

52° 55’ 14’’N, 1° 28’ 52’’E
52.920754°, 1.481329°
Lambert Azimuthal Equal Area projection, ETRS89 datum

Site surface area

0.25km² / 25ha
Lambert Azimuthal Equal Area projection, ETRS89 datum

Biogeographic region

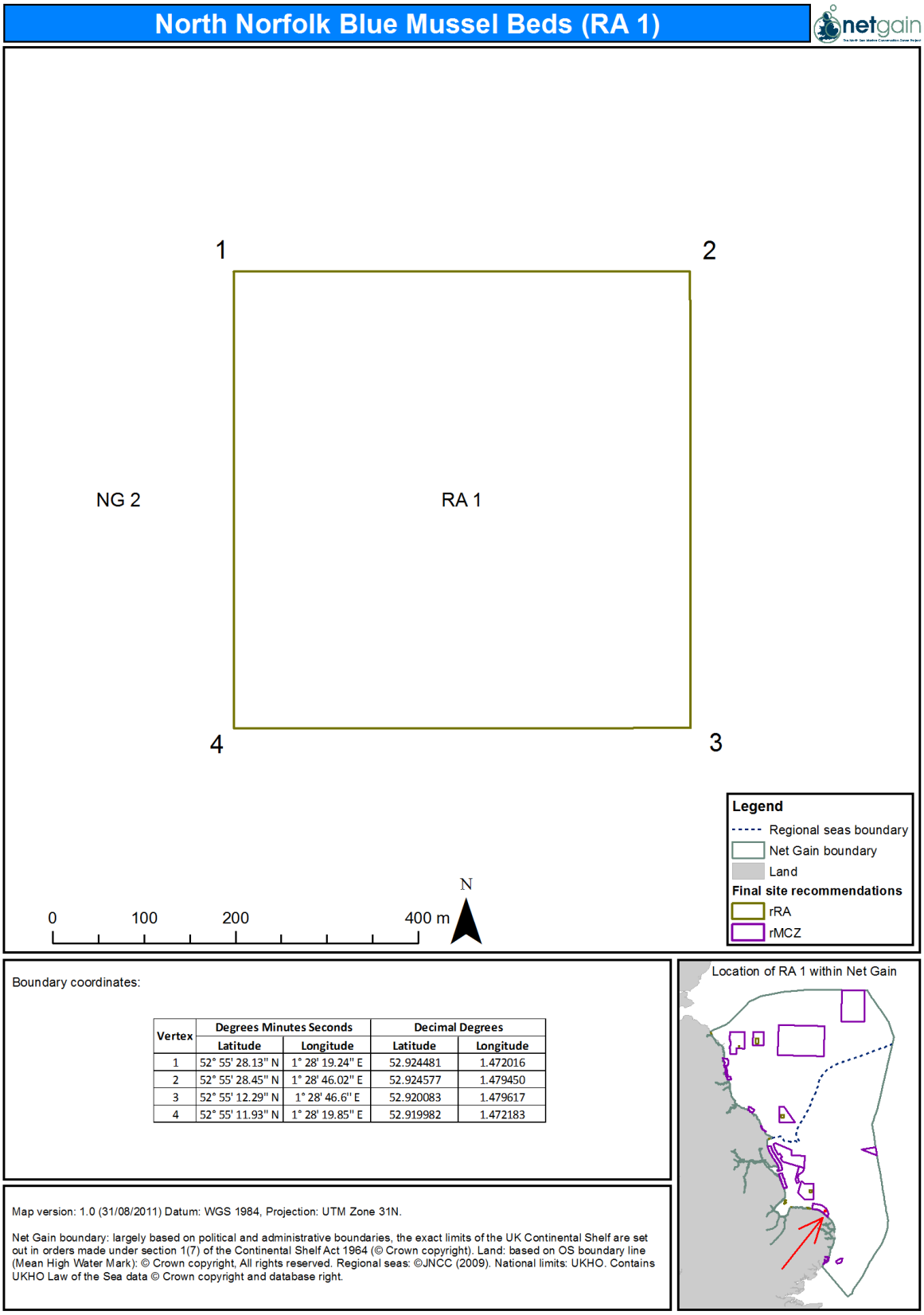
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.153 Features proposed for designation within rRA 1, North Norfolk Blue Mussel Beds

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A3.2: Moderate energy infralittoral rock	0.25km²
Habitat of conservation importance	Blue mussel beds	0.25km²
Habitat of conservation importance	Subtidal chalk (modelled)	0.003km²
Habitat of conservation importance	Subtidal sands and gravels (modelled)	0.25km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 1, North Norfolk Blue Mussel Beds not proposed for designation

All features that are present within rRA 1 have been recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 55' 28.13" N	1° 28' 19.24" E	52.924481	1.472016
2	52° 55' 28.45" N	1° 28' 46.02" E	52.924577	1.479450
3	52° 55' 12.29" N	1° 28' 46.6" E	52.920083	1.479617
4	52° 55' 11.93" N	1° 28' 19.85" E	52.919982	1.472183

Figure 7.153 Location and extent of rRA 1 (North Norfolk Blue Mussel Beds)

Site summary

Recommended RA 1 falls within NG 2 approximately 5 km from the Norfolk Coast, in the East of England. The depth of the site from the UKHO data layer is 15m (Figure 7.157), and is being put forward for recommendation to protect blue mussel beds. The presence of this feature has been confirmed by Eastern IFCA surveys using a day grab sampling method (Eastern IFCA, 2011). It is a site that is already monitored by the Eastern IFCA, and they have indicated that this monitoring would continue. The blue mussel beds provide a habitat for species such as seaweeds, anemones, barnacles, gastropods, starfish and worms (Natural England, 2011) creating an area that supports a biodiverse fauna and flora. Other habitats present within the site include moderate energy infralittoral rock, subtidal chalk and subtidal sands and gravels.

Detailed site description

rRA1 is primarily being recommended for designation for the presence of blue mussel (*Mytilus edulis*) beds. In addition three other features are recommended for designation, moderate energy infralittoral rock, subtidal chalk (modelled) and subtidal sands and gravels (modelled).

Cromer blue mussel surveys by the Eastern IFCA (2011) show the site to have high densities of blue mussels present. The surveys show the mussel occurs in a dense, homogenous coverage, creating a layer of finer sediment (pseudofaeces) around them. The mussels form extensive beds, with living and dead mussels, sand and mud all bound together by the mussels' sticky 'beards' of byssus threads. The data received from the Eastern IFCA, shows the surveyed area has varying densities, and suggests that the mussel beds may continue further than has been surveyed to date. As this blue mussel bed occurs within a no trawl zone (Figure 7.158), should the site be designated, the existing management would provide a buffer and increased protection of the beds. Grab samples and video footage yielded mussel and a mixture of sand and gravel, classifying the area as sublittoral mixed sediment. Their role in this habitat is of particular importance as they provide a hard surface and attract and support a greater range of marine life than would otherwise be found there (Natural England, 2011). Seaweeds, anemones, barnacles, sea snails and starfish and worms have been found living on blue mussel beds (Natural England, 2011). Recent surveys carried out by the Wildlife Trusts' North Sea Project (2011) have uncovered 131 types of seaweed in areas adjacent to North Norfolk, areas surrounding this recommended Reference Area.

Subtidal chalk is a relatively scarce environmental resource and the chalk within this site forms part of the longest chalk reef in Europe. The subtidal chalk present within this site is present based on modelled data; however it is known that the subtidal chalk present within NG 2 hosts large communities of burrowing piddock shells, sponges and worms (Natural England, 2011). Seasearch dives within and surrounding this area have identified sponges, sea squirts, finger bryozoans and squat lobsters (Spray and Watson, 2010a).

Subtidal sands and gravels are the most common habitats found below the level of the lowest low tide around the coast of the United Kingdom and they are also found within rRA1. They are largely derived and formed from rock material (Maddock, 2008). The diversity of flora and fauna within this site, and the surrounding NG2 should be noted. Communities living within the biotopes vary according to the level of environmental stress to which they are exposed.

Photos courtesy of Cromer Blue Mussel bed surveys, Eastern IFCA, 2011.

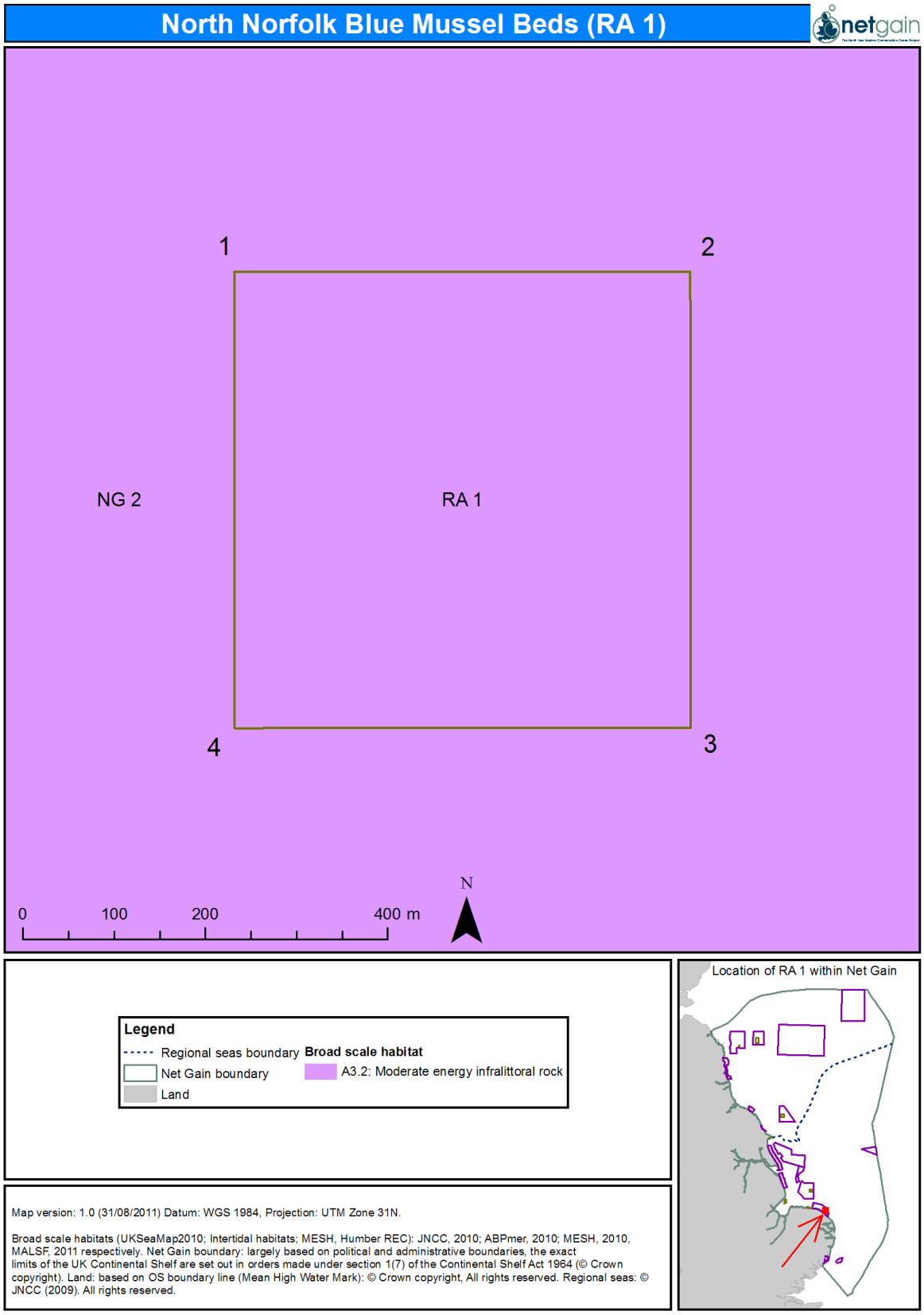


Figure 7.154 Broad-scale habitat present within rRA 1

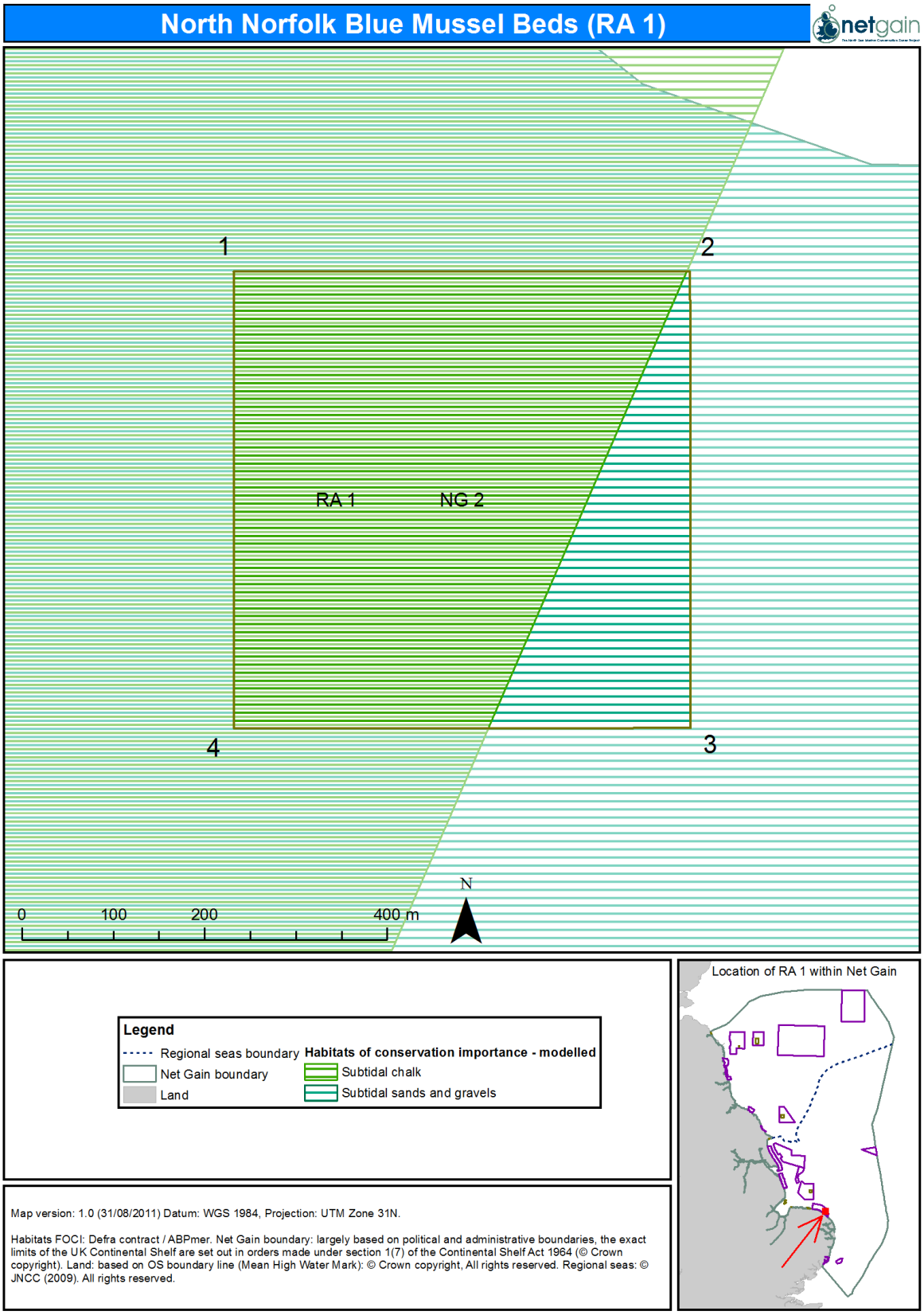


Figure 7.155 FOCI habitat present within rRA 1

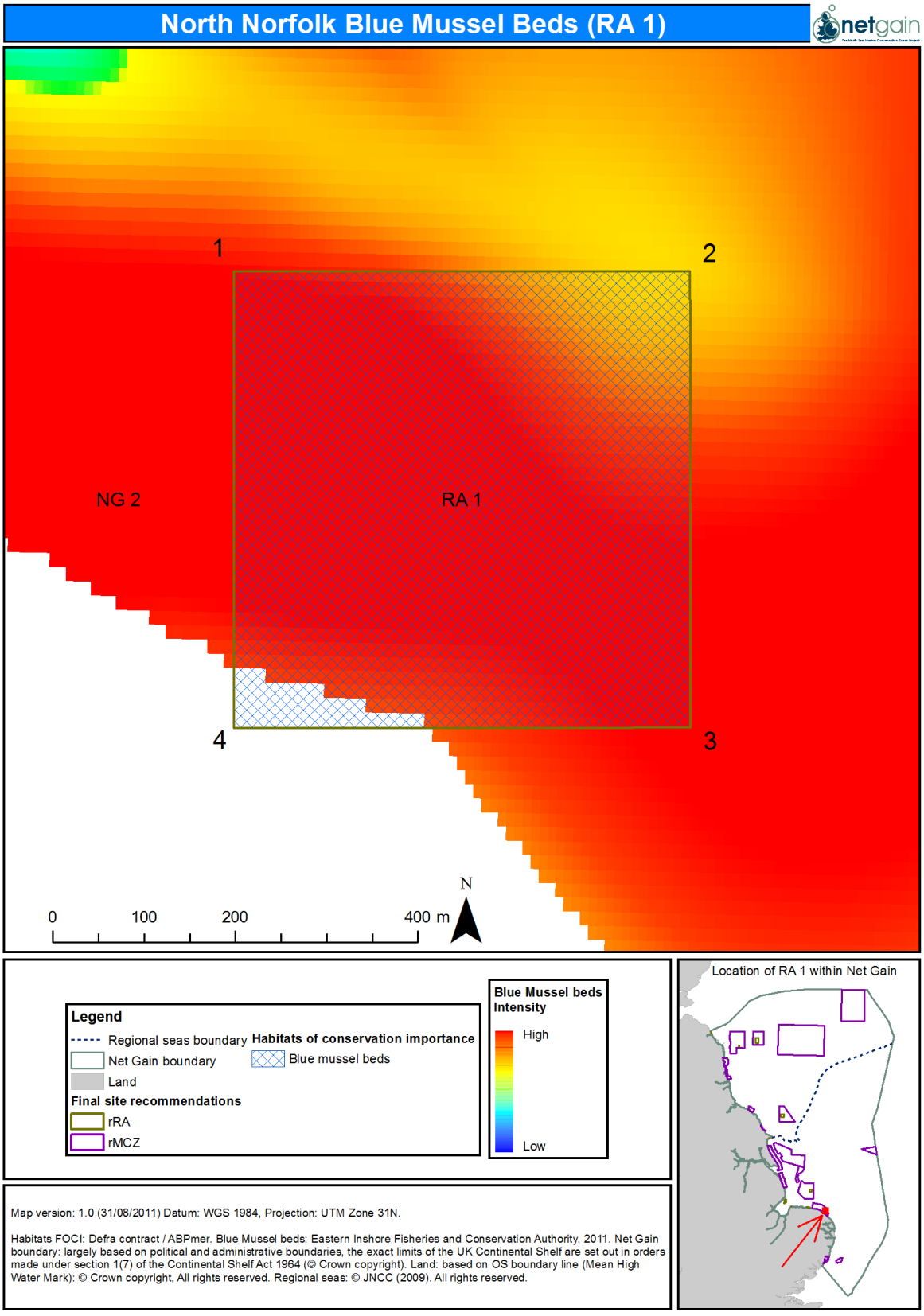


Figure 7.156 Extent of blue mussel bed data provided by Eastern IFCA

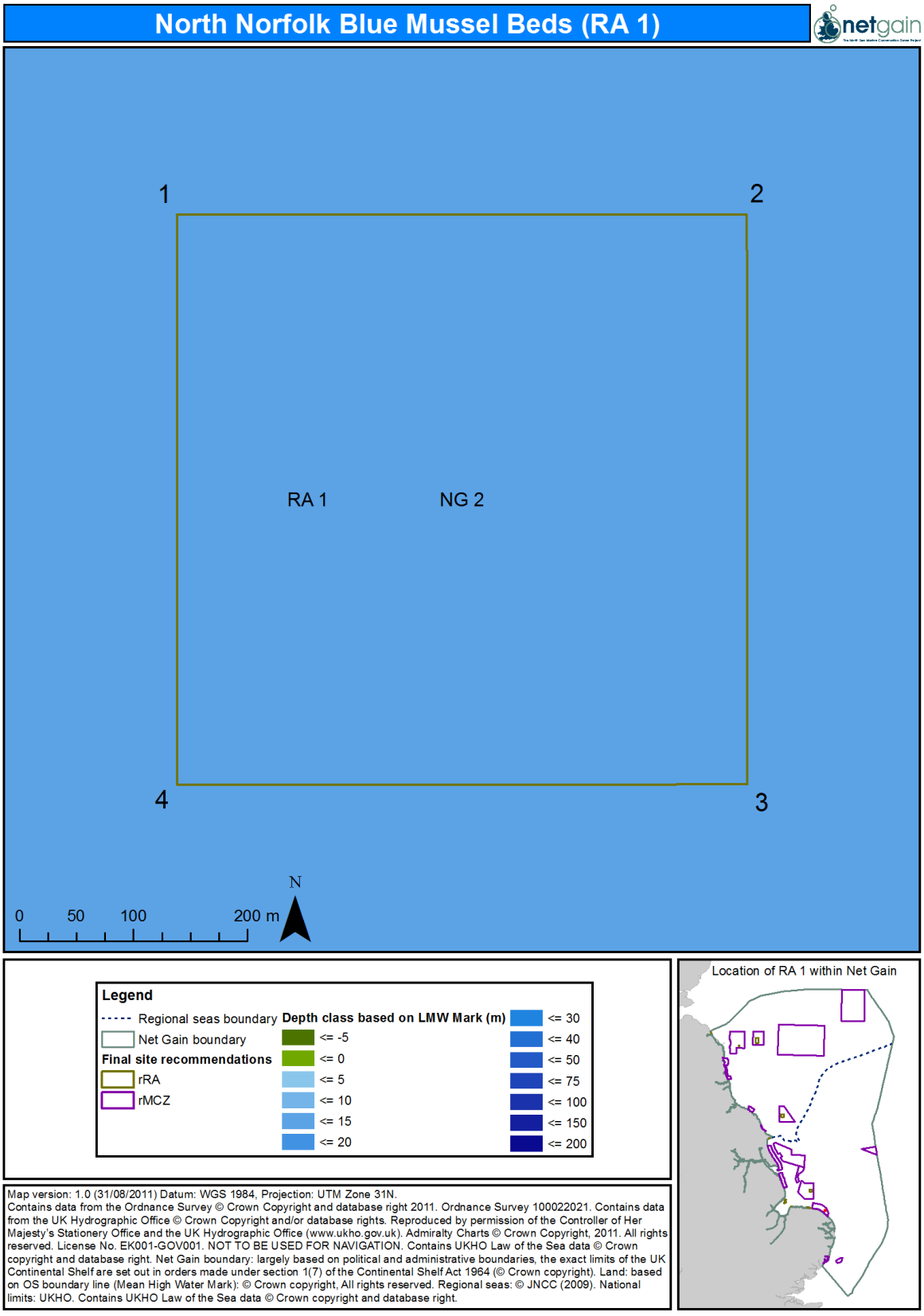


Figure 7.157 Bathymetry of rRA 1

Site boundary

The site boundary is a 500m x 500m polygon that covers high abundance areas of blue mussel beds from available Eastern IFCA survey data. The site was set to be landward as much as possible of the 3nm limit, while still maintaining high abundance. Up to the 3nm limit is currently a 'no trawl' area so potential disruption from trawling occurring outside of the 3nm limit would be minimised (if not avoided altogether). The site lies within NG 2 providing a buffer for protection of the site should it be designated.

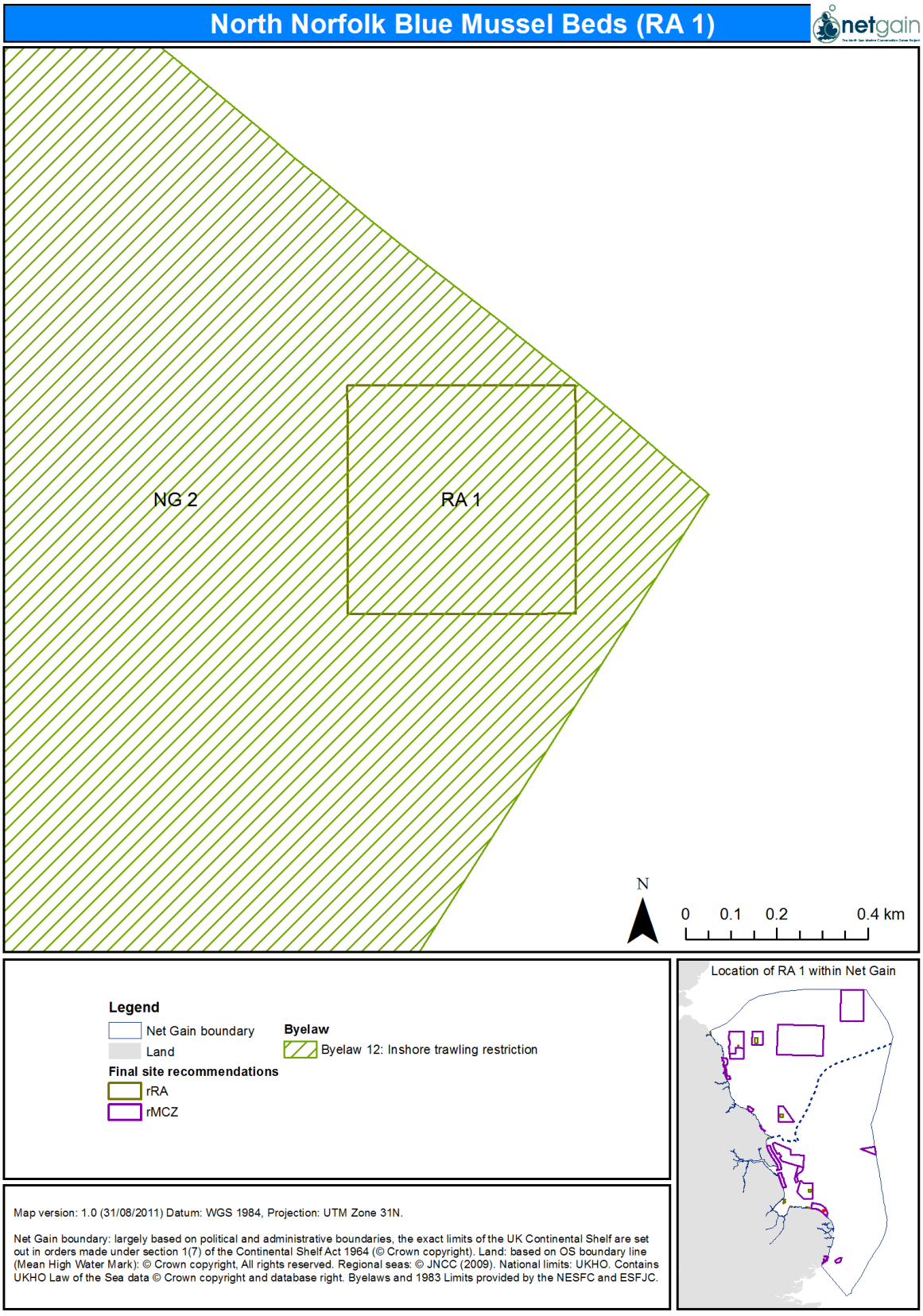


Figure 7.158 rRA 1 site boundary with associated fishery management location

Conservation objectives

Table 7.154 Conservation objectives for site rRA 1, A3.2: Moderate energy infralittoral rock

Section	
1 Conservation Objective	Moderate energy infralittoral rock is exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, recover the Moderate energy infralittoral rock to favourable condition by 2020 and maintain thereafter, and recover the Moderate energy infralittoral rock in the area marked on map Figure 7.154 to reference condition, such that:
2 Attributes and parameters (indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of Moderate energy infralittoral rock in the biogeographic region are recovered and the moderate energy infralittoral rock area marked on map Figure 7.154 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.155 Conservation objectives for site rRA 1, Blue mussel beds

Section	
1 Conservation Objective	Blue Mussel beds (including intertidal beds on mixed and sandy sediments) are on the UK List of Priority Species and Habitats (UK BAP) and OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the Blue Mussel beds (including intertidal beds on mixed and sandy sediments) to reference condition by 2020 and maintain thereafter, and recover the blue mussel beds in the area marked on map Figure 7.156 to reference condition, such that: :
2 Attributes and parameters (indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the blue mussel beds in the biogeographic region are recovered and the blue mussel beds area marked on map Figure 7.156 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.156 Conservation objectives for site rRA 1, Subtidal chalk

Section	
1 Conservation Objective	Subtidal chalk is on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal chalk to favourable condition by 2020 and maintain thereafter, and recover the subtidal chalk in the area marked on map Figure 7.155 to reference condition, such that:
2 Attributes and parameters (indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal chalk in the biogeographic region is recovered and the subtidal chalk area marked on map Figure 7.155 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.157 Conservation objectives for site rRA 1, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.155 to reference condition, such that:
2 Attributes and parameters (indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region are all recovered and the subtidal sands and gravels area marked on map Figure 7.155 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

This site currently lies within NG 2 and no other MPAs.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site received good support, the consensus views being that the site should be rated at '3' or '4' ('support' or 'strong support'). The MCS noted that, if it could be demonstrated that the blue mussel bed was overlying soft sediments then they would be strongly in support if the site. Stakeholders in the other group considering this site also tempered their support with a comment that they had reservations over the accuracy of the modelled data and that this would potentially limit their support for the site.

In terms of the underlying data at the site stakeholders' confidence was 'high' for the blue mussel beds themselves, but was 'low' for modelled (habitat FOCI) data across the site. It was suggested that more research is needed in the area and additional guidance over the classification of blue mussel beds (in relation to the substrate they are associated with) from the SNCBs is required.

The potential level of contention surrounding the site was felt to be 'low' – the site lies within a no-trawl zone (and so significant fishing interests are not compromised) and it avoids (existing and planned) infrastructure in the area.

Table 7.158 Supporting documentation

Information	Type of information	Source
Blue mussel beds	Survey	Eastern IFCA, 2011
Broad-scale habitat	Modelled data	Mc Breen, 2010
Subtidal sands and gravels, Subtidal chalk	Modelled data	Tyler-Walters, et al. 2009

References

EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY. 2011. *Cromer Blue mussel beds survey*.

JNCC, 2011. *North Norfolk Coast, SPA description*. Available: http://jncc.defra.gov.uk/default.aspx?page=2008. Last accessed 10 August 2011.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

NATURAL ENGLAND. 2011a. *Blue Mussel beds*. Available at: http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/habitats/bluemusselbeds.aspx. Last accessed: 14 August 2011.

NATURAL ENGLAND. 2011b. *Broad Habitats*. Available at: http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/broadhabitats/default.aspx. Last accessed: 17 August 2011.

SPRAY, R. & D. WATSON. 2010(a). *North Norfolk's Chalk Reef, A report on marine surveys conducted by Seasearch East.* Available at: http://www.seasearch.co.uk/downloads/Norfolk%20Chalk%20Reef%20report%202010.pdf. Last accessed 12 Aug 2011.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.20 Marine Conservation Zone: rRA 2a and rRA 2b Seahorse Lagoon and Arnold's Marsh

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 2a and rRA 2b, Seahorse Lagoon and Arnold's Marsh

Site centre location

rRA 2a

52° 57' 42''N, 1° 03' 43''E
52.961692°, 1.062201°
Lambert Azimuthal Equal Area projection

rRA 2b

52° 57' 36''N, 1° 04' 05''E
52.96032°,1.068311°
Lambert Azimuthal Equal Area projection

Site surface area

rRA 2a

0.05km² / 5.46ha
Lambert Azimuthal Equal Area projection

rRA 2b

0.09km² / 9.26ha
Lambert Azimuthal Equal Area projection

Biogeographic region

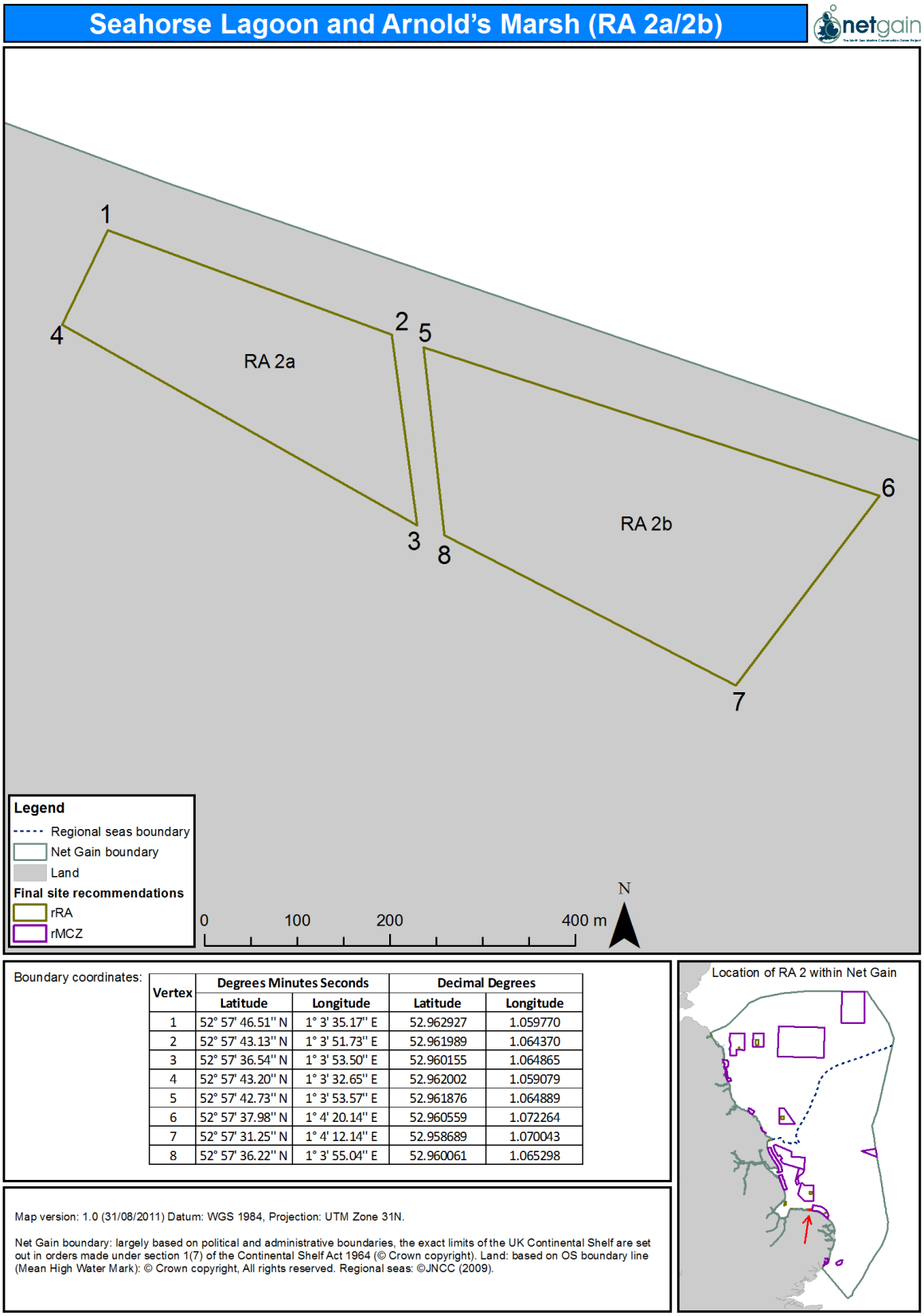
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.159 Features proposed for designation within rRA 2a and 2b, Seahorse Lagoon and Arnold's Marsh

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	n/a	n/a
Habitat of conservation importance	n/a	n/a
Species of conservation importance	Starlet sea anemone (*Nematostella vectensis*)	No data, records available from Natural England, 2010
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 2a and 2b, Seahorse Lagoon and Arnold's Marsh not proposed for designation

All features that are present in rRA 2a and 2b are being recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 57' 46.51" N	1° 3' 35.17" E	52.962927	1.059770
2	52° 57' 43.13" N	1° 3' 51.73" E	52.961989	1.064370
3	52° 57' 36.54" N	1° 3' 53.50" E	52.960155	1.064865
4	52° 57' 43.20" N	1° 3' 32.65" E	52.962002	1.059079
5	52° 57' 42.73" N	1° 3' 53.57" E	52.961876	1.064889
6	52° 57' 37.98" N	1° 4' 20.14" E	52.960559	1.072264
7	52° 57' 31.25" N	1° 4' 12.14" E	52.958689	1.070043
8	52° 57' 36.22" N	1° 3' 55.04" E	52.960061	1.065298

Figure 7.159 Location and extent of rRA 2a and 2b (Seahorse Lagoon and Arnold's Marsh)

Site summary

NG 2a and 2b are two saline lagoons (Seahorse Lagoon and Arnold's Marsh) located within the Norfolk Wildlife Trust Cley Marshes Reserve on the North Norfolk Coast. The sites are recommended for designation for starlet sea anemone (*Nematostella vectensis*), based on survey data provided by Natural England. Natural England continues to conduct scientific monitoring surveys within these sites. An information board highlighting the biological details of the starlet sea anemone is already in situ on the footpath between the two lagoons. Due to the inland location of these sites, the Net Gain team holds no data to suggest habitat types that are present within the lagoon. The lagoons have formed from sea water filtering under the shingle ridge, and the substrate present is likely to be muddy shingle.

Detailed site description

RA2a and RA2b are being recommended for designation for the presence of starlet sea anemones (*Nematostella vectensis*) in the saline lagoons on the landward side of the coast close to the village of Cley-next-the-Sea.

There are a number (over 20) of saline lagoons on the Cley Marshes Reserve owned and managed by the Norfolk Wildlife Trust of which RA 2a and 2b are two. Saline (or coastal) lagoons are a feature of the North Norfolk Coast Special Area of Conservation as they are an Annex 1 habitat under the Habitats Directive.

These lagoons are percolation lagoons. These are normally separated from the sea by shingle banks. Seawater enters by percolating through the shingle or occasionally by over-topping the bank (e.g. in storms). The water level shows some variation with tidal changes, and salinity may vary. Since percolation lagoons are normally formed by natural processes of sediment transport, they are relatively transient features, which may be eroded and swept away over a period of years or decades or may become infilled by movement of the shingle bank. The bottom of each pool is shingle overlain by soft mud. A typical view of the site is show in the Figure 7.160 below.

Figure 7.160 Arnold's Marsh Lagoon

The starlet sea anemone (*Nematostella vectensis*) lives in isolated or semi-isolated brackish lagoons at or above high water with a salinity range of 18-40 practical salinity units (psu). They are found

typically in mud, muddy sand and muddy shingle (Sheader, 2011 pers. comm.) where algae is often present.

Abundance varies with geographic area and time of year. In September 1974 more than 12,500 /m^2 were found in a Norfolk pool (William, unpublished, cited in Williams, 1983) showing that this area had a successful native population due to naturally occurring biotopes.

Nematostella vectensis is known to reproduce both sexually and asexually. In most populations in England only females are found (Sheader et al. 1997) and there seems to be only asexual reproduction in England (Sheader pers. comm). Asexual reproduction is achieved through transverse fission, known to occur in only four other sea anemones (Shick 1991, cited in Hand and Uhlinger 1994).

On a national scale, starlet sea anemones are scarce and are listed as Vulnerable on the IUCN Red list. *Nematostella vectensis* is under threat because it is recorded from only a few restricted coastal areas and these are especially vulnerable to coastal change (Williams 1991). If the lagoons were to dry out or become polluted whole populations would be extinguished. The isolation of lagoons leads to fragmentation of populations and reduced genetic mixing.

The following species were identified as present in Seahorse Lagoon and Arnold's Marsh in 2010; the lagoon cockle (*Cerastoderma glaucum*), small amphipod crustaceans (*Gammarus* spp.), small brackish water snails (*Hydrobia* spp.), an opossum shrimp (*Neomysis integer*) and the Atlantic ditch shrimp (*Paleomonetes varians*) (Natural England, 2010). The Lagoon cockle fails to colonise the higher shoreline due to an inability to tolerate aerial exposure. Its distribution is believed to be restricted by the damaging effect of wave action on newly settled spat. Lagoon sand shrimp has been protected under Schedules 5 and 8 of the Wildlife and Countryside Act 1981. Since 1988 it has been illegal to catch or handle the species without a specific licence from the national Nature Conservation agency, now Natural England.

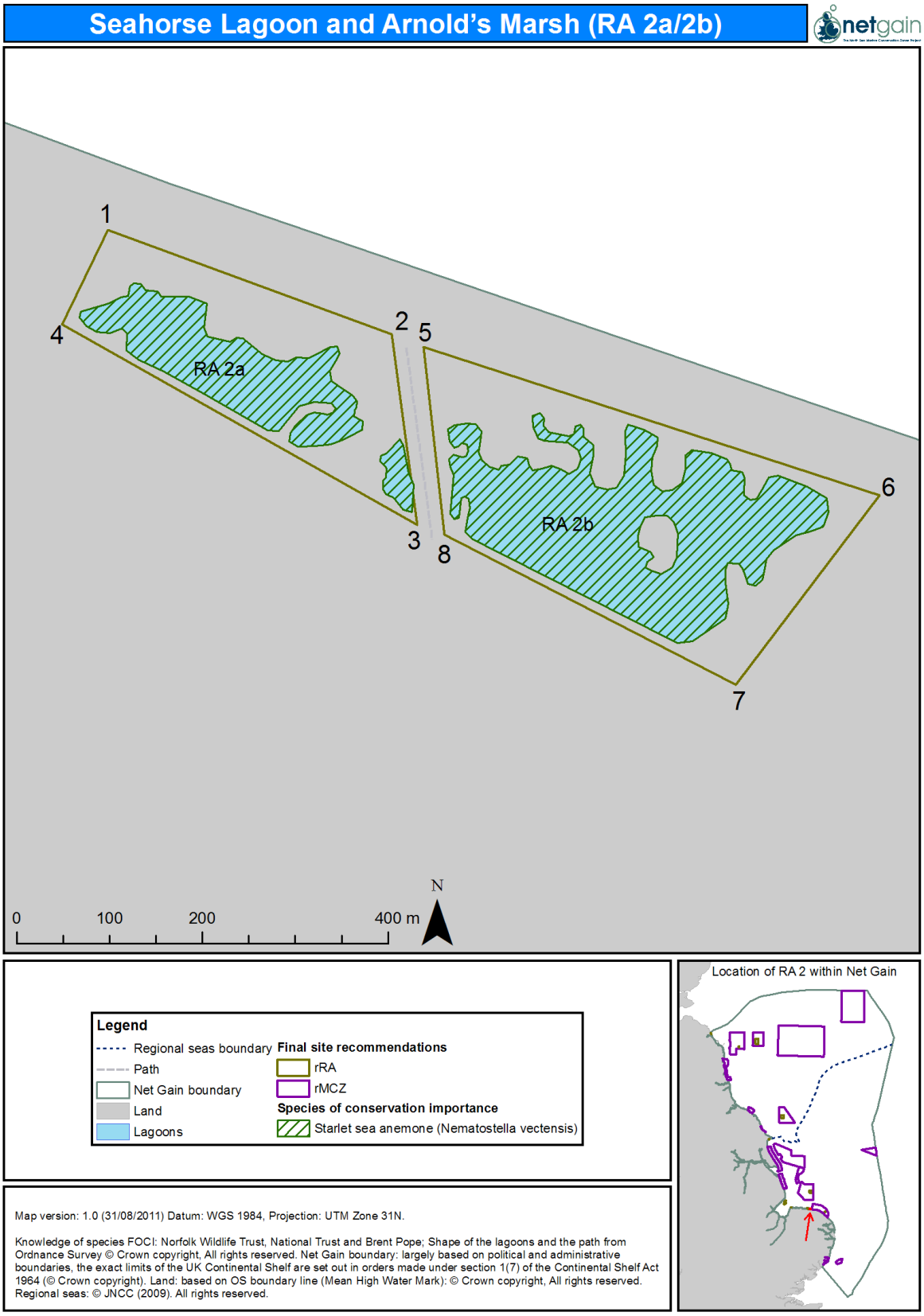


Figure 7.161 Features recommended for designation in rRA 2a and 2b

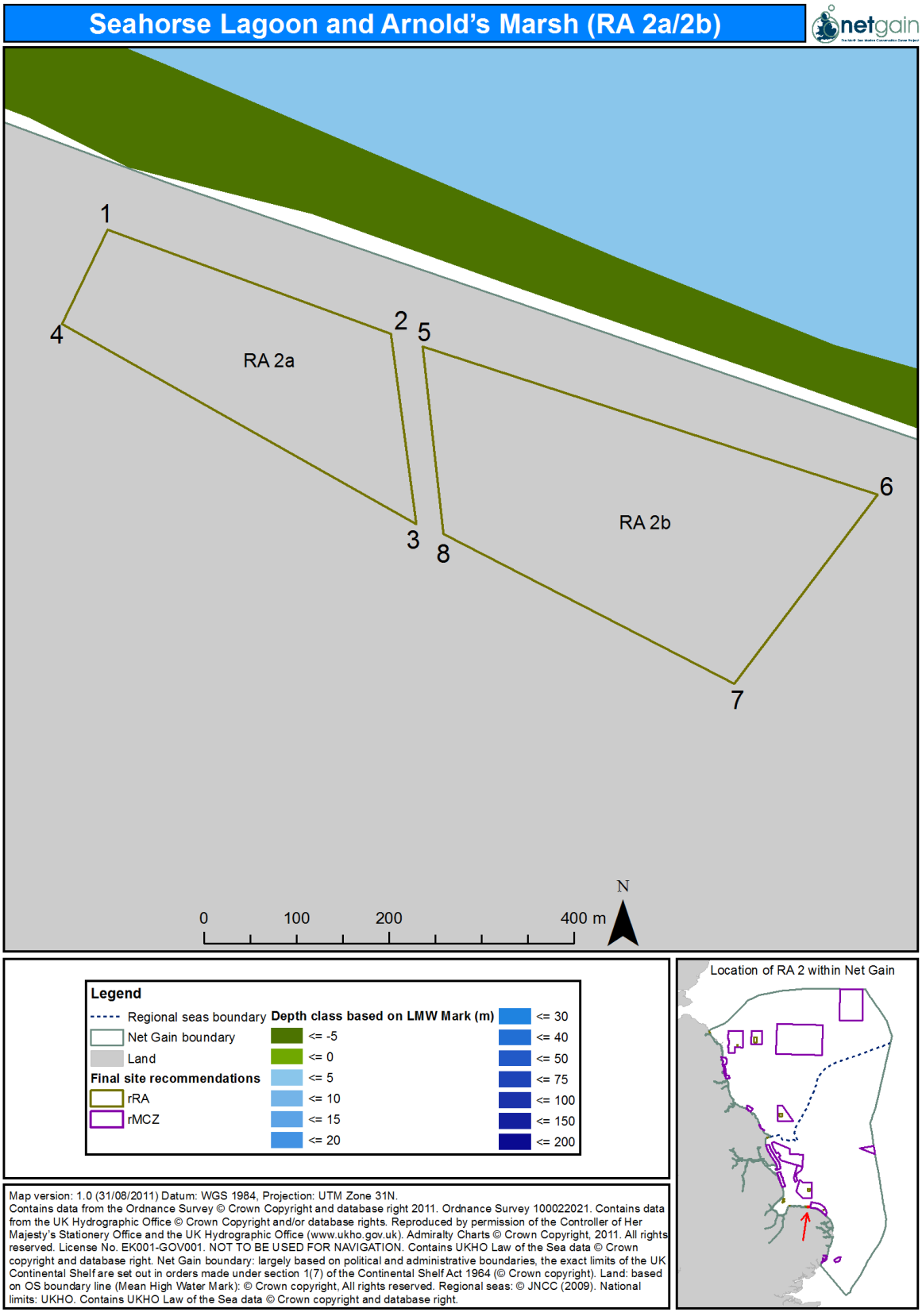


Figure 7.162 Bathymetry of rRA 2a and 2b

Site boundary

The site boundaries for rRA 2a and 2b were originally put forward as two 500m x 500m sites surrounding point data available for starlet sea anemone (*Nematostella* vectensis) also within the North Norfolk Wildlife Trust Cley Marshes Reserve. Surveys completed by Natural England in summer 2010, and meetings with Natural England, the Norfolk Wildlife Trust and Net Gain Liaison Officers in May 2011 determined which lagoons were the best for protection of the anemone. The boundaries of the site were decided on to include two large lagoons, Seahorse Lagoon (rRA 2a) and Arnold's Marsh (rRA 2b), along with a third much smaller lagoon adjacent to the Seahorse Lagoon, known as Reed Lagoon (within rRA 2a). Between the two sites there is a public footpath, locally known as the East Bank allowing access to the beach.

Conservation objectives

Table 7.160 Conservation objectives for site rRA 2a and 2b, Starlet sea anemone (*Nematostella vectensis*)

Section	
1 Conservation Objective	Starlet sea anemone (*Nematostella vectensis*) is on the UK List of Priority Species and Habitats (UK BAP) and the Wildlife and Countryside Act 1981 (Schedule 5). Subject to natural change, recover the Starlet sea anemone (*Nematostella vectensis*) to favourable condition by 2020 and maintain thereafter, and recover the Starlet sea anemone (*Nematostella vectensis*) in the area marked on map Figure 7.161 to reference condition, such that:
2 Attributes and parameters (indicated by *)	**Species** the • natural range, • habitat extent, • population structure, • density, • size structure, • natural environmental quality*, and natural environmental processes* representative of the Starlet sea anemone (*Nematostella vectensis*) in the biogeographic region is recovered and the Starlet sea anemone (*Nematostella vectensis*) area marked on map Figure 7.161 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 2a and 2b lie within the North Norfolk Coast SAC, SPA and Ramsar site, and in very close proximity to The Wash and North Norfolk Coast SAC (70m), North Norfolk SSSI and 5km from Weybourne Cliffs SSSI. The site also lies in close proximity to NG 2, approximately 3km away.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.161 MPAs present within or adjacent to rRA 2a and 2b

MPA Type	Site Name	Features Protected
SAC	The Wash and North Norfolk Coast	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal macrophyte-dominated sediment Ross worm (*Sabellaria spinulosa*) reefs Seagrass beds Sea-pen and burrowing megafauna communities Sheltered muddy gravels Subtidal sands and gravels Coastal saltmarsh Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SAC	North Norfolk Coast	Not in GAP table Coastal Lagoons Vegetation Sand dunes
SPA	North Norfolk Coast	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds
SSSI	North Norfolk Coast	A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Coastal saltmarsh Saline lagoons
Ramsar site	North Norfolk Coast	Not in GAP table Wetland site for migrating bird species

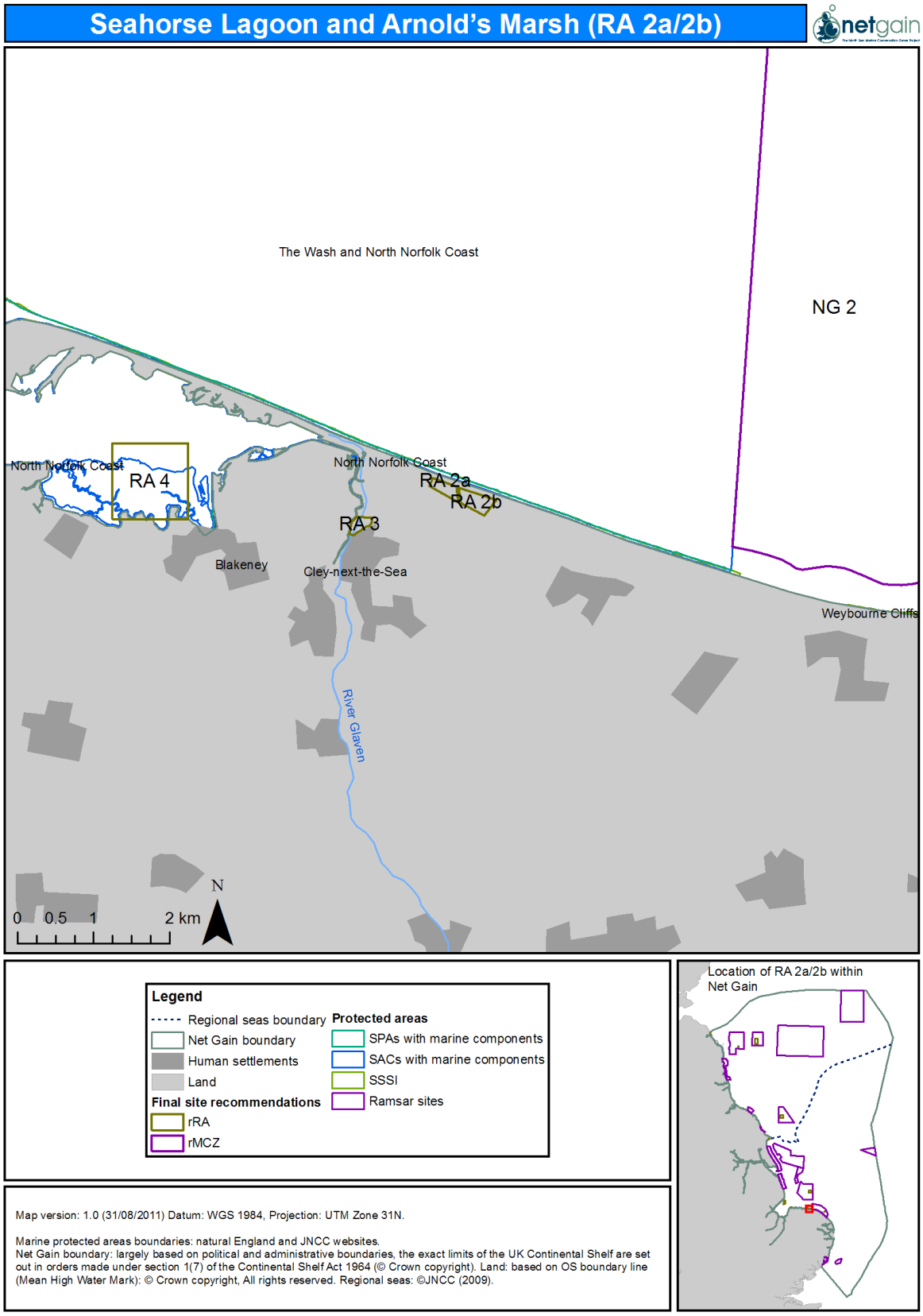


Figure 7.163 MPAs/rMCZs within or adjacent to rRA 2a and 2b

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The two locations for the site were considered together and were given strong support (a score of '4') from the group that reviewed the option at the LGM.

The quality of the underlying data was felt to be high – the sites are accessible and discrete and, as data acquisition should not be an issue, the information that has underpinned the site identification and selection should be of good quality.

The level of contention associated with the site should it be carried forward to designation was thought to be (very, very) low.

On 3 August 2011 Net Gain and Natural England met with the Historic and Common Rights Holders, Parish Councils and local NGOs to share information about the proposed Reference Areas rRA 2a, rRA 2b, rRA 3, rRA 4, rRA 5 to gather further information on activities in these sites.

Table 7.162 Supporting documentation

Information	Type of information	Source
Starlet sea anemone (*Nematostella vectensis*)	Survey	Natural England unpublished report, 2010

References

HAND, C. and UHLINGER, K.R., 1994. *The unique, widely distributed, estuarine sea anemone, Nematostella vectensis, Stephenson: A review, new facts and questions*. *Estuaries*, **17**, 501-508.

NATURAL ENGLAND, 2010. *2010 Natural England Saline Lagoon Survey*. Natural England, unpublished report.

SHEADER, 2011. pers.comm. *Details about Nematostella vectensis*.

SHEADER, M., SUWAILEM, A.M. & ROWE, G.A., 1997. The anemone, *Nematostella vectensis*, in Britain: considerations for conservation management. *Aquatic Conservation: Marine and Freshwater Ecosystems*, **7**, 13-25.

WILLIAMS, R.B., 1983. *Nematostella vectensis. In The IUCN invertebrate red data book (ed. S.M. Wells, R.M. Pyle and N.M. Collins)*, pp. 43-46. Gland: IUCN.

WILLIAMS, R.B., 1991. *Nematostella vectensis. In British Red Data Books. III. Invertebrates other than insects (ed. J.H. Bratton), pp. 32-33.* Peterborough: Joint Nature Conservation Committee.

7.21 Marine Conservation Zone: rRA 3, Glaven Reedbed

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. Addition of The Wash and North Norfolk SAC and North Norfolk SSSI to Table 7.161. No changes have been made to recommendations or boundaries.

Site name

rRA 3, Glaven Reedbed

Site centre location

52° 57’ 25’’N, 1° 02’ 43’’E
52.957211°, 1.045663°
Lambert Azimuthal Equal Area projection

Site surface area

0.04km² / 4.46ha
Lambert Azimuthal Equal Area projection

Biogeographic region

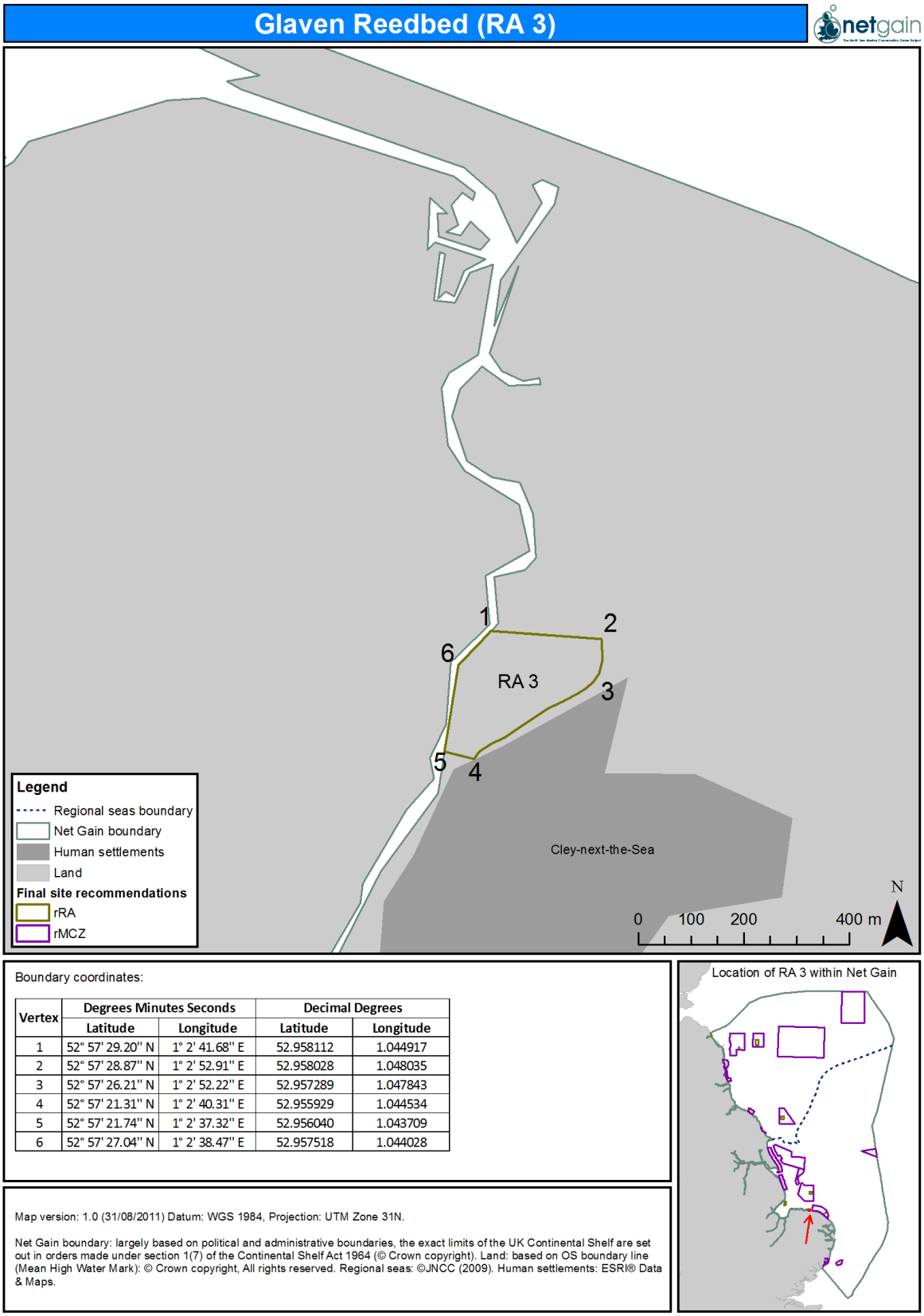
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.163 Features proposed for designation within rRA 3, Glaven Reedbed

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A2.5: Coastal saltmarshes and saline reedbeds	0.04km²
Habitat of conservation importance	n/a	n/a
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Feature within rRA 3, Glaven Reedbed not proposed for designation

All features that are present in rRA 3 are being recommended for designation.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 57' 29.20" N	1° 2' 41.68" E	52.958112	1.044917
2	52° 57' 28.87" N	1° 2' 52.91" E	52.958028	1.048035
3	52° 57' 26.21" N	1° 2' 52.22" E	52.957289	1.047843
4	52° 57' 21.31" N	1° 2' 40.31" E	52.955929	1.044534
5	52° 57' 21.74" N	1° 2' 37.32" E	52.956040	1.043709
6	52° 57' 27.04" N	1° 2' 38.47" E	52.957518	1.044028

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.164 Location and extent of site rRA 3 (Glaven Reedbed)

Site summary

Recommended RA 3 is located within the Cley Marshes Reserve in North Norfolk in the East of England, currently managed by Norfolk Wildlife Trust. The site is recommended for the protection of the broad-scale habitat saline reedbeds (A2.5: Coastal saltmarshes and saline reedbeds) which provides habitat for birdlife and a variety of algae and invertebrates. As this site is not regularly cut or harvested (unlike other reedbeds on the North Norfolk Coast), the Regional Hub members felt it represented a good candidate for a reference area. In addition as the site falls within an established nature reserve, the footpaths within the reserve allow the site to be easily accessed and monitored.

Detailed site description

rRA3 is being recommended to protect the presence of saline reedbeds. This is part of the larger broad scale habitat feature of 'A2.5: Coastal Saltmarsh and Saline Reedbeds'. Coastal Saltmarsh is proposed for protection in rRA 4. Site rRA 3 is located on the landward side of the coast, east of the River Glaven next to the village of Cley-next-the-sea. A view of part of the reedbed system is shown in Figure 7.165 below.

Figure 7.165 Glaven Reedbed

Saline reedbeds are listed under the UK BAP list of priority habitats (Maddock, 2008). The site lies within the North Norfolk Coast SAC, SPA, SSSI, and Ramsar site as well as within The Wash and North Norfolk Coast SAC. rRA 3 is on an area of land owned and managed by the Norfolk Wildlife Trust within its Cley Marshes Reserve. The reedbed on this site is not regularly cut and harvested, as is the case with other reedbeds on the North Norfolk Coast (Hawke and Jose, 1996) and there are existing pathways within the reserve which allow the site to be easily monitored.

Saline reedbeds are wetlands dominated by stands of the common reed (*Phragmites australis*), (Maddock, 2008) where the water table is at or above ground level for most of the year. Occurring on the extreme upper shore of sheltered coasts and periodically covered by high tides. The vegetation develops on a variety of sandy and muddy sediment types and may have mixtures of coarser material. The character of the saltmarsh communities is affected by height up the shore, resulting in a zonation pattern related to the degree or frequency of immersion in seawater.

Filamentous green algae and charophytes may be found in association with the feature. *Phragmites australis* stabilises the sediment and develops organic sediment by providing a litter layer providing primary productivity to the aquatic ecosystem, making it a key structural species within the feature (Tyler-Walters, 2008).

Reedbeds are amongst the most important habitats for birds in the UK, they support a distinctive breeding bird assemblage including three nationally rare Red Data Birds the bittern (*Botaurus stellaris*), marsh harrier (*Circus aeruginosus*) and the common crane (*Grus grus*) (Maddock, 2008). In winter they are used as roosting sites for several raptor species such as the merlin (*Falco columbarius*) and the peregrine (*Falco peregrines*) and the protected hen harrier (*Circus cyaneus*) (Hawke and Jose 1996). Five GB Red Data Book invertebrates are also closely associated with reedbeds including red leopard moth (*Phragmataecia castanaea*) and a rove beetle (*Lathrobium rufipenne*) (Hawke and Jose, 1996).

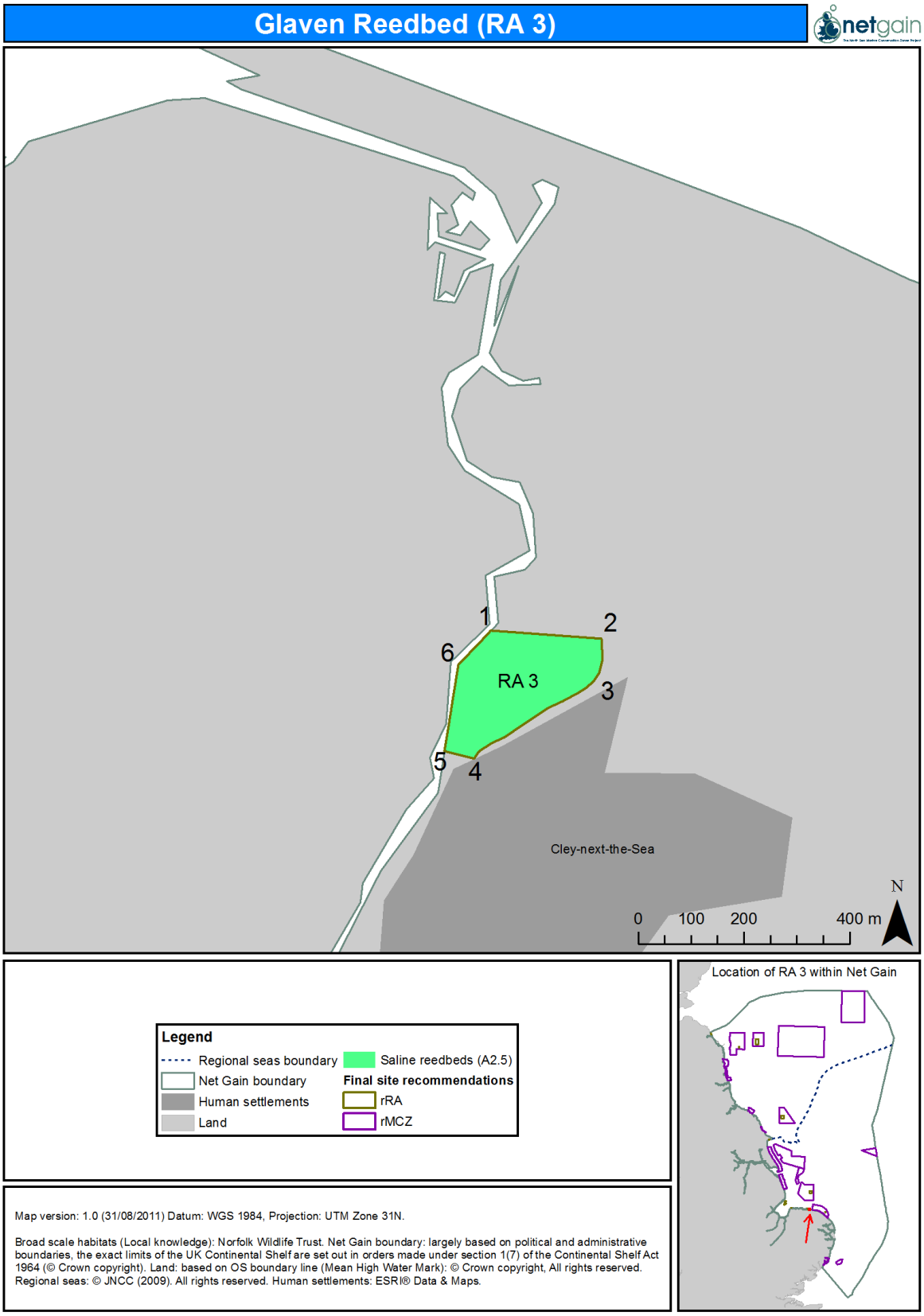


Figure 7.166 Features recommended for designation in rRA 3

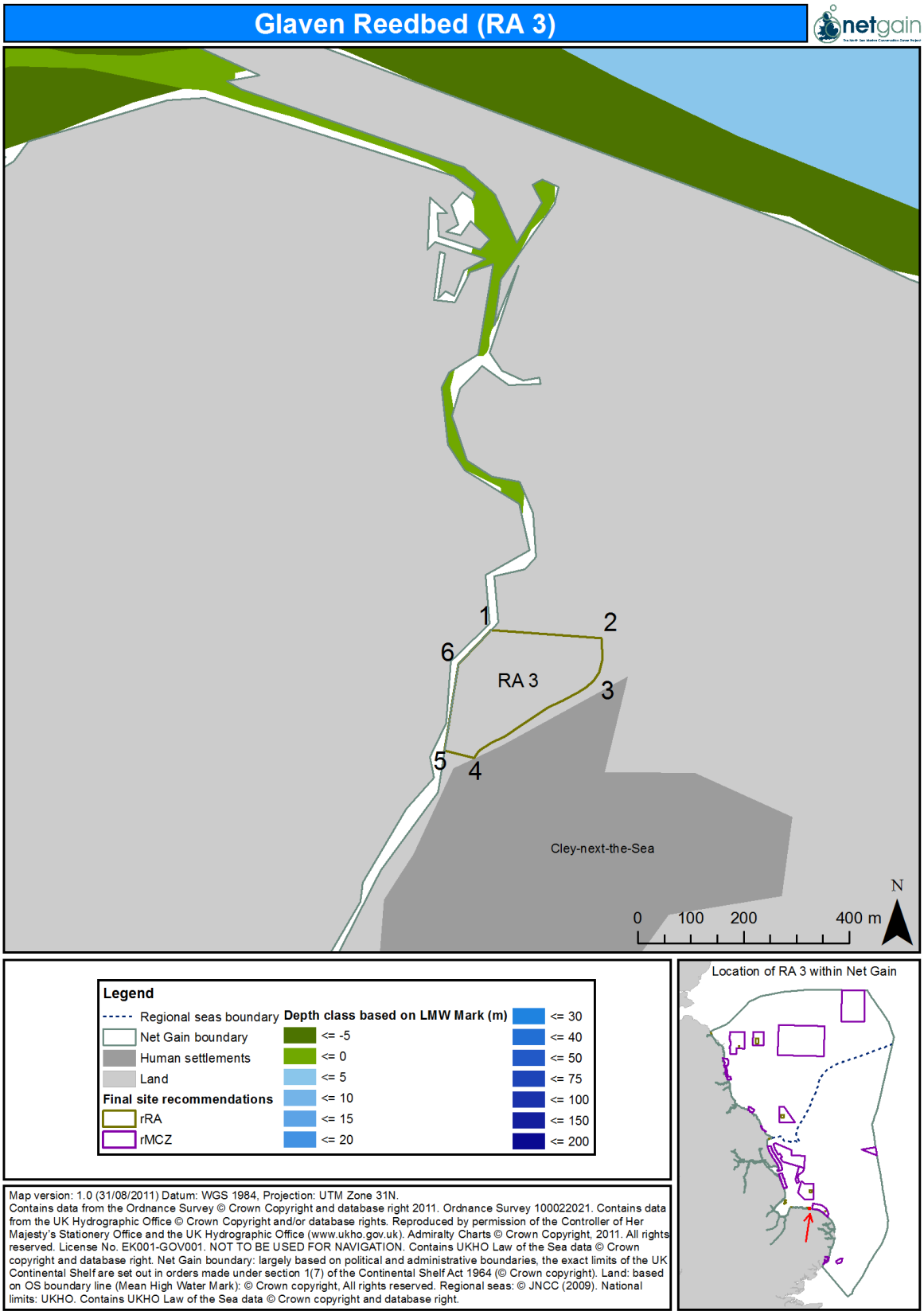


Figure 7.167 Bathymetry of rRA 3

Site boundary

The boundary of rRA 3 was developed during meetings with Natural England, Net Gain liaison officers and a Norfolk Wildlife Trust representative for Cley Marshes. The boundaries fall over a patch of saline reedbed to the east of the River Glaven, west of the public footpath and north of "Cley windmill" and sluice.

The boundaries were discussed and agreed by members of the East of England and Lincolnshire and The Wash Regional Hubs in June, 2011.

Conservation objectives

Table 7.164 Conservation objective for site rRA 3 A2.5: Coastal saltmarshes and saline reedbeds

Section	
1 Conservation Objective	Coastal saltmarsh and saline reedbeds are protected under the Birds Directive, Annex 1 of the Habitats Directive, the Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981, and are a UKBAP Priority Habitat. Subject to natural change, recover the coastal saltmarsh and saline reedbed to favourable condition by 2020 and maintain thereafter, and recover the coastal saltmarsh and saline reedbed in the area marked on Figure 7.166 to reference condition, such that:
2 Attributes and parameters (indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the coastal saltmarsh and saline reedbed in the biogeographic region are all recovered.and the coastal saltmarsh and saline reedbed area marked on map Figure 7.166 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 3 is approximately 1km from rRA 2a and rRA 2b, 2km from rRA 4 and 4.75km from NG 2. The site falls within the North Norfolk Coast SAC, SPA, and Ramsar site and 5m from North Norfolk SSSI. A very small portion of the site overlaps with The Wash and North Norfolk Coast SAC.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.165 MPAs within or adjacent to rRA 3

MPA Type	Site Name	Features Protected
SAC	The Wash and North Norfolk Coast	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal macrophyte-dominated sediment Ross worm (*Sabellaria spinulosa*) reefs Seagrass beds Sea-pen and burrowing megafauna communities Sheltered muddy gravels Subtidal sands and gravels Coastal saltmarsh Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SAC	North Norfolk Coast	Not in GAP table Coastal Lagoons Vegetation Sand dunes
SPA	North Norfolk Coast	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds
SSSI	North Norfolk Coast	A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Coastal saltmarsh Saline lagoons
Ramsar site	North Norfolk Coast	Not in GAP table Wetland site for migrating bird species

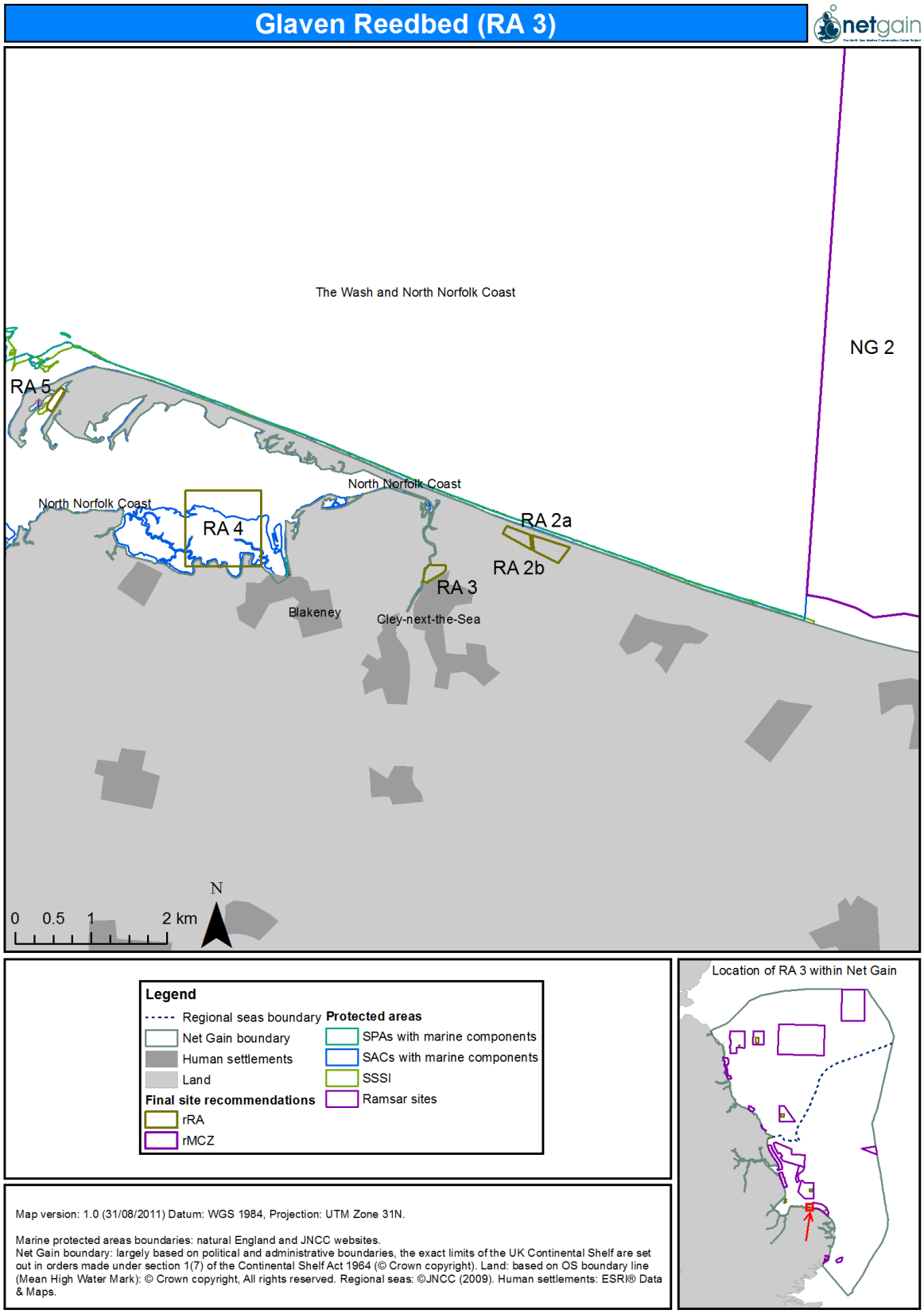


Figure 7.168 MPAs/rMCZs within or adjacent to rRA 3

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

Support for the site at the LGM was scored as '3' and '4' (support and strong support) by the two groups that reviewed it. However, the MCS suggested that there must be a better example, as the site is small and therefore barely meets the viability criteria. In addition, reservations that wildfowling in areas adjacent to the site may need to be managed were voiced and it was suggested that this activity will need to be considered more closely prior to the site being promoted further.

Data quality at the site was felt to be high (the site is accessible and the collation of data to support the site's recommendation should have been relatively straightforward).

Potential contention over the promotion of the site was felt to be low (but this judgement was based on the assumption that the question of the potential impacts of wildfowling activity (potentially damaging, disturbing and extraction) in the area is adequately addressed.

On 3 August 2011 Net Gain and Natural England met with the Historic and Common Rights Holders, Parish Councils and local NGOs to share information about the proposed Reference Areas rRA 2a, rRA 2b, rRA 3, rRA 4, rRA 5 to gather further information on activities in these sites.

Table 7.166 Supporting documentation

Information	Type of information	Source
Saline Reedbeds	Local knowledge	Norfolk Wildlife Trust, 2011

References

CONNER, D.W., ALLEN, J.H., GOLDING N., HOWELL, K.L., LIEBERKNECHT, L.M., NORTHEN, K.O. and REKER, J.B. 2004. *The Marine Habitat Classification for Britain and Ireland Version 04.05* JNCC, Peterborough (internet version).

HAWKE, C.J. and JOSE, P.V. 1996. *Reedbed management for commercial and wildlife interests*. Taken from, Sandy, UK: Royal Society for the Protection of Birds vi, pg 212.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

NORFOLK-WILDLIFE TRUST, 2011. *Coastal saltmarsh and saline reedbeds local knowledge.*

TYLER-WALTERS, H. 2008. *Phragmites australis swamp and reed beds. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line*]. Plymouth: Marine Biological Association of the United Kingdom. [cited 16/08/2011].

7.22 Marine Conservation Zone: rRA 4, Blakeney Marsh

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 4, Blakeney Marsh

Site centre location

52° 57’ 42’’N, 1° 00’ 15’’E
52.96167°, 1.00432°
Lambert Azimuthal Equal Area projection

Site surface area

1km² / 100ha
Lambert Azimuthal Equal Area projection

Biogeographic region

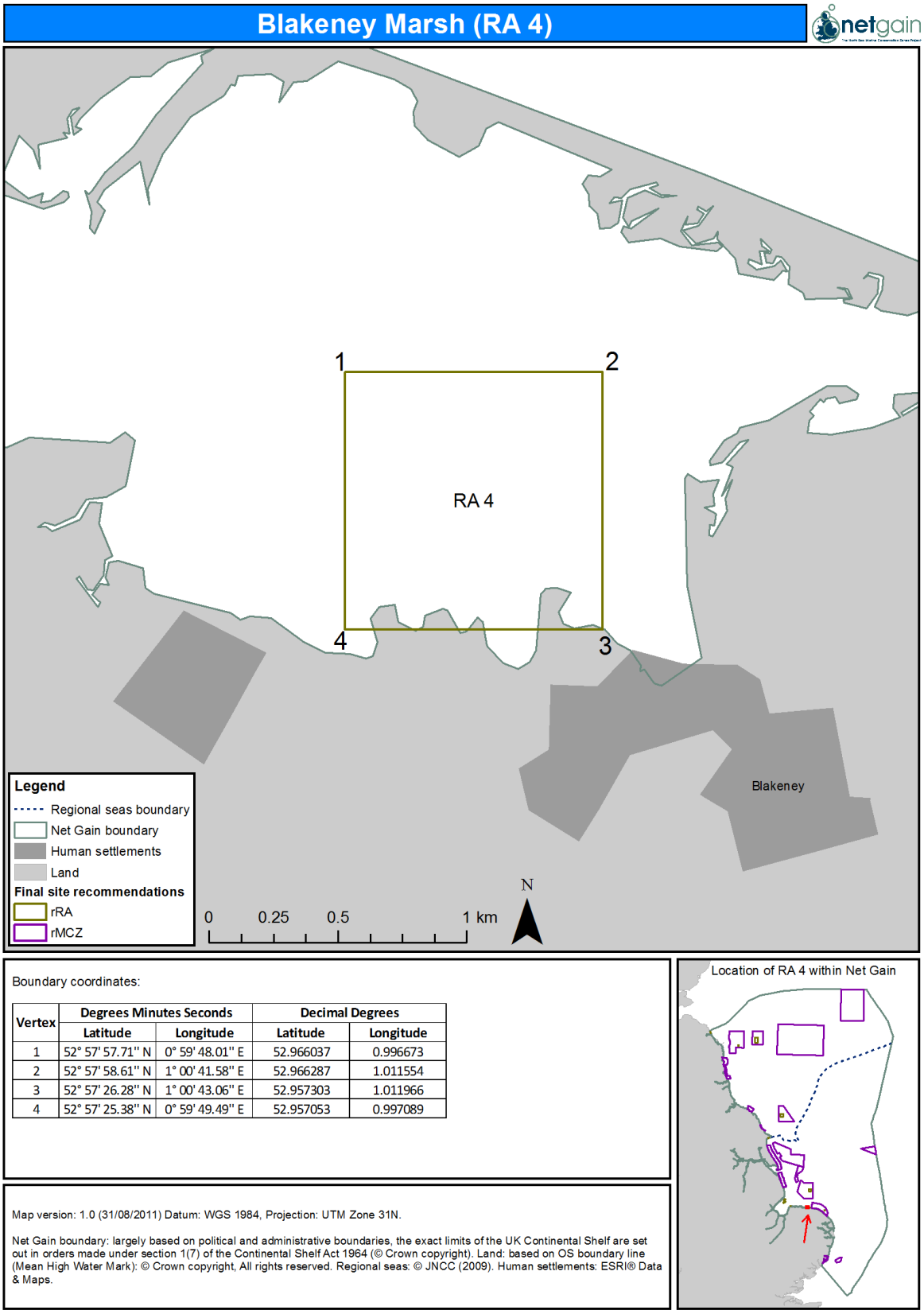
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.167 Features proposed for designation within rRA 4, Blakeney Marsh

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	0.04km²
Broad-scale habitat	A2.3: Intertidal mud	0.03km²
Broad-scale habitat	A2.5: Coastal saltmarshes and saline reedbeds	0.90km²
Habitat of conservation importance	Littoral chalk communities (modelled)	6.83km (line)
Species of conservation importance	n/a	n/a
Geological feature	North Norfolk Coast (subtidal)	0.96km²
Other feature	n/a	n/a

Features within rRA 4, Blakeney Marsh not proposed for designation

All features that are present in rRA 4 are recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 57' 57.71" N	0° 59' 48.01" E	52.966037	0.996673
2	52° 57' 58.61" N	1° 00' 41.58" E	52.966287	1.011554
3	52° 57' 26.28" N	1° 00' 43.06" E	52.957303	1.011966
4	52° 57' 25.38" N	0° 59' 49.49" E	52.957053	0.997089

Figure 7.169 Location and extent of site rRA 4 (Blakeney Marsh)

Site summary

Recommended RA 4 is located within Morston Salt Marsh between the villages of Morston and Blakeney, on the North Norfolk Coast in the East of England. The main habitats found along the North Norfolk coastline include extensive intertidal sand and mud-flats, saltmarshes, shingle and sand dunes together with areas of freshwater grazing marsh and reedbed. The North Norfolk coast contains some of the best examples of saltmarsh in Europe, and it is this feature which is being put forward for recommendation (A2.5: coastal saltmarshes and saline reedbeds).

rRA 4 sits in the landward side of Blakeney Harbour, in an intertidal area which is exposed at low tide. The saltmarshes which have formed in the lee of these spits are shallow on their exposed sides. The outer shingle spit, which terminates with the ever-evolving Blakeney Point forms a barrier coast, behind which the Harbour has formed (JNCC, 2001).

Detailed site description

rRA4 is being proposed to protect the broad-scale habitat A2.5: coastal saltmarshes and saline reebeds.

Saltmarsh receives protection under the Ramsar Convention, The Birds Directive (2009/147/EC), Annex I of the Habitats Directive (92/43/EEC), and is an important feature in estuarine Sites of Special Scientific Interest, under the UK Wildlife and Countryside Act 1981, plus they are a UK BAP Priority Habitat.

rRA4 lies within Morston saltmarshes (a barrier-connected saltmarsh) and the North Norfolk Coast Special Area of Conservation (SAC). The saltmarshes of north Norfolk have been described as the finest coastal marshes in Great Britain (Steers, 1946b) and are among the best-documented and researched in the world. There are sheltered, muddy areas at the top of the shore, which are occasionally inundated by seawater, where salt-tolerant flowering plants grow.

The boundaries of the site were proposed so as to capture the succession sequence from scarcely vegetated mud at the seaward boundary of the marsh to maritime grassland on the upper marsh. In general terms the foremarsh is commonly characterised by colonising species such as glasswort (*Salicornia* spp.) and cord grass (*Spartina anglica*). Sea aster (*Aster tripolium*) is often dominant on the lower marsh which in turn grades into the extensive areas of midmarsh. Sea lavender (*Limonium vulgare*) is dominant with sea purslane (*Halimione portulacoides*) lining the banks of the creeks. Other species occurring in this zone include sea plantain (*Plantago maritime)*, sea arrow grass (*Triglochin maritime*), annual seablite (*Suaeda maritime*) and sea wormwood (*Artemisia maritime*). The upper saltmarsh is characterised by grasses such as sea couch grass (*Elymus pycnanthus*) and sea poa grass (*Puccinellia maritime*). Shorter vegetation is often found on the upper marsh near the saltmarsh-shingle interface. It is diverse and includes two rare species; matted sea lavender (*Limonium bellidifolium*) and sea heath (*Frankenia laevis*).

Saltmarshes form a natural coastal defence because they trap and stabilise sediments and also dampen the effects of waves (Möller *et al*. 2001). Saltmarshes are protected under the Birds Directive (2009/147/EC) as they are important for wading birds and wildfowl, which take refuge there when the tide covers the mudflats on which they feed. A number of relict saltmarsh creeks on the marshes have developed into brackish reedbeds of considerable ornithological importance (English Nature, not dated). Breeding birds such as tern colonies with little tern (*Sterna albifrons*), common tern (*Sterna hirundo*), sandwich tern (*Sterna sandvicensis*), ringed plover (*Charadrius hiaticula*), oystercatcher (*Haematopus ostralegus*), shelduck (*Tadorna tadorna*), Brent geese (*Branta bernicla*) and waders use the area in winter. Bearded tits (*Panurus biarmicus*), bitterns (*Botaurus stellaris*) and marsh harriers (*Circus aeruginosus*) are regular breeders in small numbers and garganey (*Anas querquedula*) and black-tailed godwit (*Limosa limosa*) breed on occasions (English Nature, 1997).

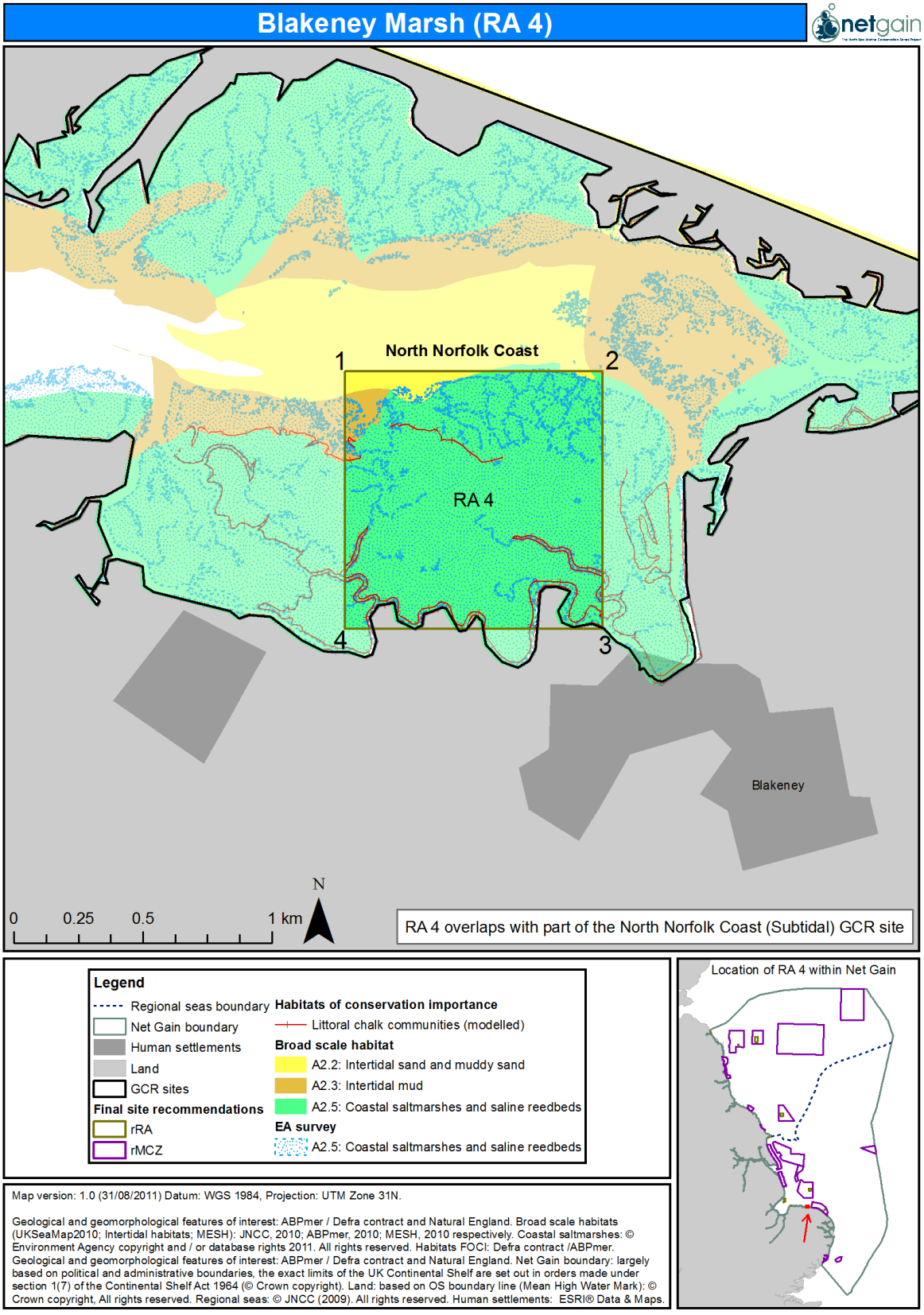


Figure 7.170 Features recommended for designation in rRA 4

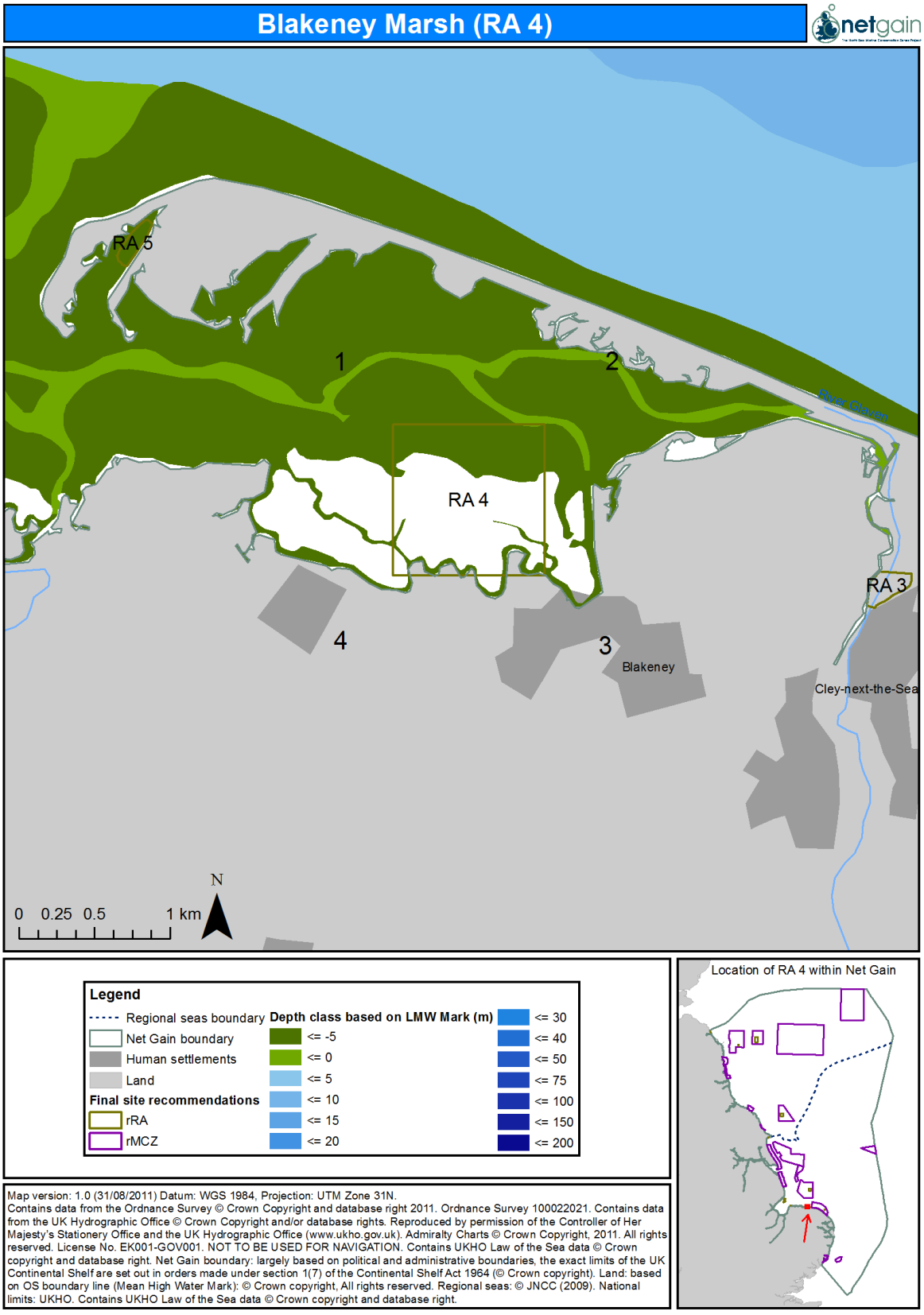


Figure 7.171 Bathymetry of rRA 4

Site boundary

The boundary of rRA 4 was developed to protect a 1km x 1km section of the Morston Salt Marsh. The site location was initially discussed during meetings with Natural England, Net Gain liaison officers and The National Trust. These initial discussions informed planning at the reference area meeting held by Net Gain at the end of June, 2011 for East of England and Lincolnshire and the Wash Regional Hub members. The boundary has been set to encompass the succession in salt marsh communities from the coast to the seaward side of the marsh.

Conservation objectives

Table 7.168 Conservation objective for site rRA 4, A2.2: Intertidal sand and muddy sand

Section	
1 Conservation Objective	Intertidal sand and muddy sand habitats are widespread along stretches of open coast around the British Isles whilst muddy sands are usually found in more sheltered areas such as estuaries. Subject to natural change, recover the intertidal sand and muddy sand to favourable condition by 2020 and maintain thereafter, and recover the intertidal sand and muddy sand in the area marked on map Figure 7.170 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal sand and muddy sand in the biogeographic region are all recovered and the intertidal sand and muddy sands area marked on map Figure 7.170 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.169 Conservation objective for site rRA 4, A2.3: Intertidal mud

Section	
1 Conservation Objective	Intertidal mud is protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981. It is also a UKBAP Priority Habitat and on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the intertidal mud to favourable condition by 2020 and maintain thereafter, and recover the intertidal mud in the area marked on map Figure 7.170 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal mud in the biogeographic region are all recovered and the intertidal mud area marked on map Figure 7.170 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.170 Conservation objective for site rRA 4, A2.5: Coastal saltmarshes and saline reedbeds

Section	
1 Conservation Objective	Coastal saltmarsh and saline reedbeds are protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981, and a UKBAP Priority Habitat. Subject to natural change, recover the coastal saltmarshes and saline reedbeds to favourable condition by 2020 and maintain thereafter, and recover the coastal saltmarshes and saline reedbeds in the area marked on map Figure 7.170 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the coastal saltmarshes and saline reedbeds in the biogeographic region are all recovered and the coastal saltmarshes and saline reedbeds area marked on map Figure 7.170 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.171 Conservation objective for site rRA 4, Littoral chalk communities

Section	
1 Conservation Objective	Littoral chalk communities are on the UK List of Priority Species and Habitats (UK BAP) and OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the littoral chalk communities to favourable condition by 2020 and maintain thereafter, and recover the littoral chalk communities in the area marked on map Figure 7.170 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the littoral chalk communities in the biogeographic region are all recovered and the littoral chalk communities area marked on map Figure 7.170 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.172 Conservation objective for site rRA 4, North Norfolk Coast (subtidal) geological feature

Section	
1 Conservation Objective	The North Norfolk Coast (subtidal) geological containing gently sloping abandoned cliffs separated from sand and shingle beaches by extensive saltmarshes and intertidal flats. Subject to natural change, recover the North Norfolk Coast (subtidal) geological feature to favourable condition by 2020 and maintain thereafter, and recover the North Norfolk Coast (subtidal) geological feature in the area marked on map Figure 7.170 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Geological/ Geomorphological</u>** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the North Norfolk Coast (subtidal) geological feature in the biogeographic region is recovered and the North Norfolk Coast (subtidal) geological feature area marked on map Figure 7.170 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 4 falls approximately 2km west of rRA 3, and approximately 2km south east of rRA 5. It lies within the North Norfolk Coast SAC, SPA, SSSI and Ramsar site, as well as The Wash and North Norfolk Coast SAC.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.173 MPAs within or adjacent to rRA 4

MPA Type	Site Name	Features Protected
SAC	The Wash and North Norfolk Coast	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal macrophyte-dominated sediment Ross worm (*Sabellaria spinulosa*) reefs Seagrass beds Sea-pen and burrowing megafauna communities Sheltered muddy gravels Subtidal sands and gravels Coastal saltmarsh Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SAC	North Norfolk Coast	Not in GAP table Coastal lagoons Vegetation Sand dunes
SPA	North Norfolk Coast	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds
SSSI	North Norfolk Coast	A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Coastal saltmarsh Saline lagoons
Ramsar site	North Norfolk Coast	Not in GAP table Wetland site for migrating bird species

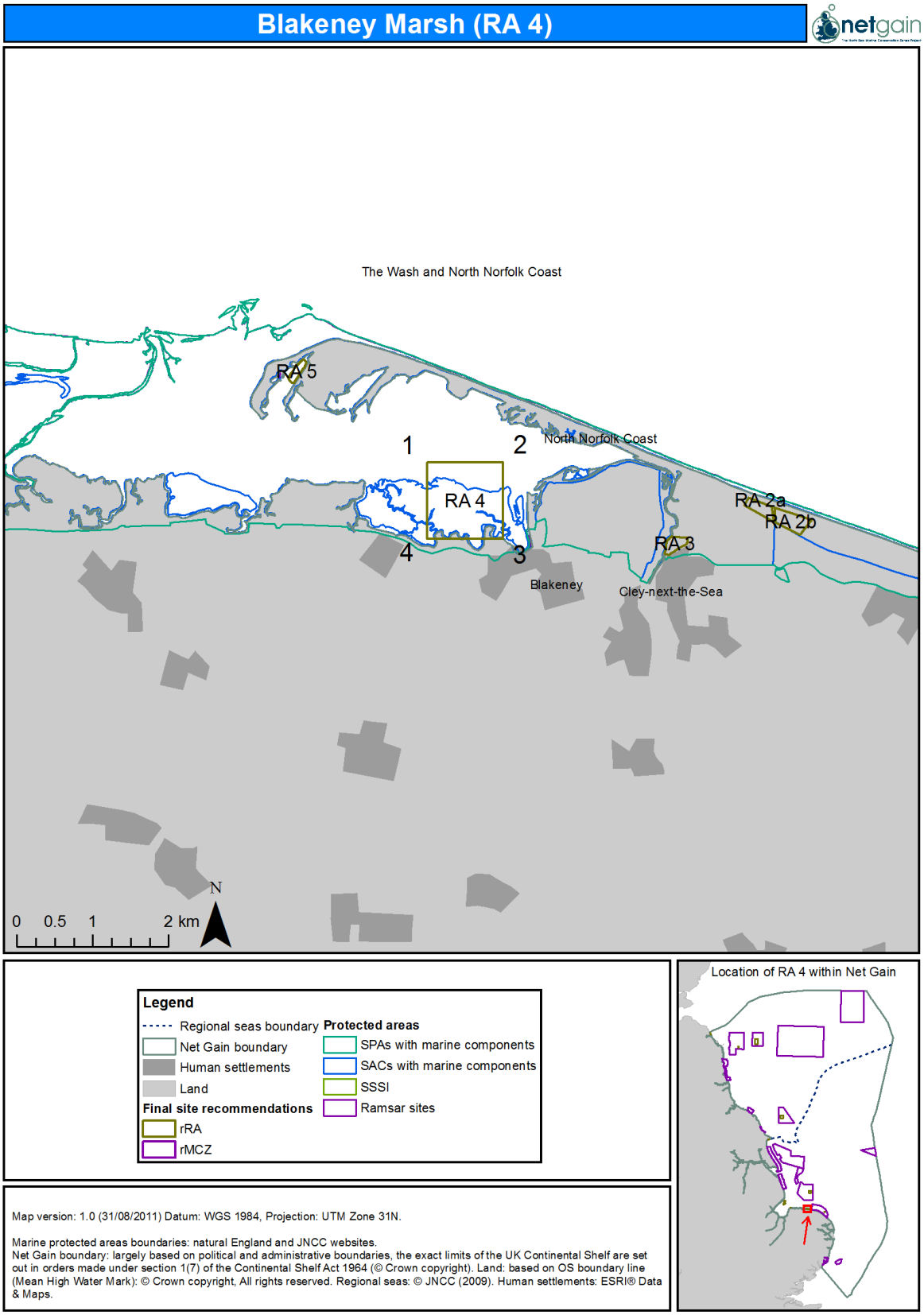


Figure 7.172 MPAs/rMCZs within or adjacent to rA 4

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site was strongly supported (scores of '4') by both groups who reviewed it at the LGM. However, there was a request for greater clarity over the apparent enlargement and repositioning of the site since the preceding Regional Hub meeting. There is some shooting (wildfowling) activity in the area and there may be objections to the site proposals if this activity is subject to additional management (no stakeholders present were able to represent the wildfowling interests in any detail).

Whilst there was a high level of confidence in the underlying data (the data provided gave a good impression of what was needed) it was questioned whether the site was in exactly the right position. It was suggested that the local National Trust officer could provide further assistance in ground-truthing the precise location for the features (and hence the site) if this was felt to be necessary.

Contention at the site was felt likely to be low (although this assessment would be subject to local wildfowling interests not being adversely affected, as discussed above).

On 3 August 2011 Net Gain and Natural England met with the Historic and Common Rights Holders, Parish Councils and local NGOs to share information about the proposed Reference Areas rRA 2a, rRA 2b, rRA 3, rRA 4, rRA 5 to gather further information on activities in these sites.

Table 7.174 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Collated habitat maps	Coltman, et al. 2008
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitat maps	Frost, 2010
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Littoral chalk communities (modelled)	Modelled data	Tyler-Walters, et al. 2009

References

BROOKS, A.J., ROBERTS, H., KENYON, N.H.2009. *Acessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 8: *Task 2A-mapping of Geological and Geomorphilogical Features.* ABP Marine Environment Research Ltd.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

ENGLISH NATURE. Not dated. *North Norfolk Coast*. Available online at: http://www.english-nature.org.uk/citation/citation_photo/1001342.pdf. Accessed 26th August 2011.

ENGLISH NATURE. 1997. *North Norfolk Natural Area Profile*. Available online at: http://www.norfolkcoastaonb.org.uk/mediaps/pdfuploads/pd000369.pdf. Accessed 26th August 2011.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 24:*Task 2I. Intertidal habitats datalayer* (Final). ABP Marine Environmental Research Ltd.

JNCC, 2001. *SPA description, North Norfolk Coast*. Accessed at http://jncc.defra.gov.uk/page-2008

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

MÖLLER, I, SPENCER, T, FRENCH, J R, LEGGETT, D J and DIXON, M (2001) *The sea defence value of saltmarshes: field evidence from north Norfolk*. Journal of the Chartered Institute of Water and Environmental Management, 15, 109–116

TYLER_WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F-Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Reseach Ltd.

7.23 Marine Conservation Zone: rRA 5, Blakeney Seagrass

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. Addition of the North Norfolk SAC to Table 7.180. No changes have been made to recommendations or boundaries.

Site name

rRA 5, Blakeney Seagrass

Site centre location

52° 58’ 34’’N, 0° 58’ 13’’E
52.97638°, 0.970665°
Lambert Azimuthal Equal Area projection

Site surface area

0.03km² / 2.98ha
Lambert Azimuthal Equal Area projection

Biogeographic region

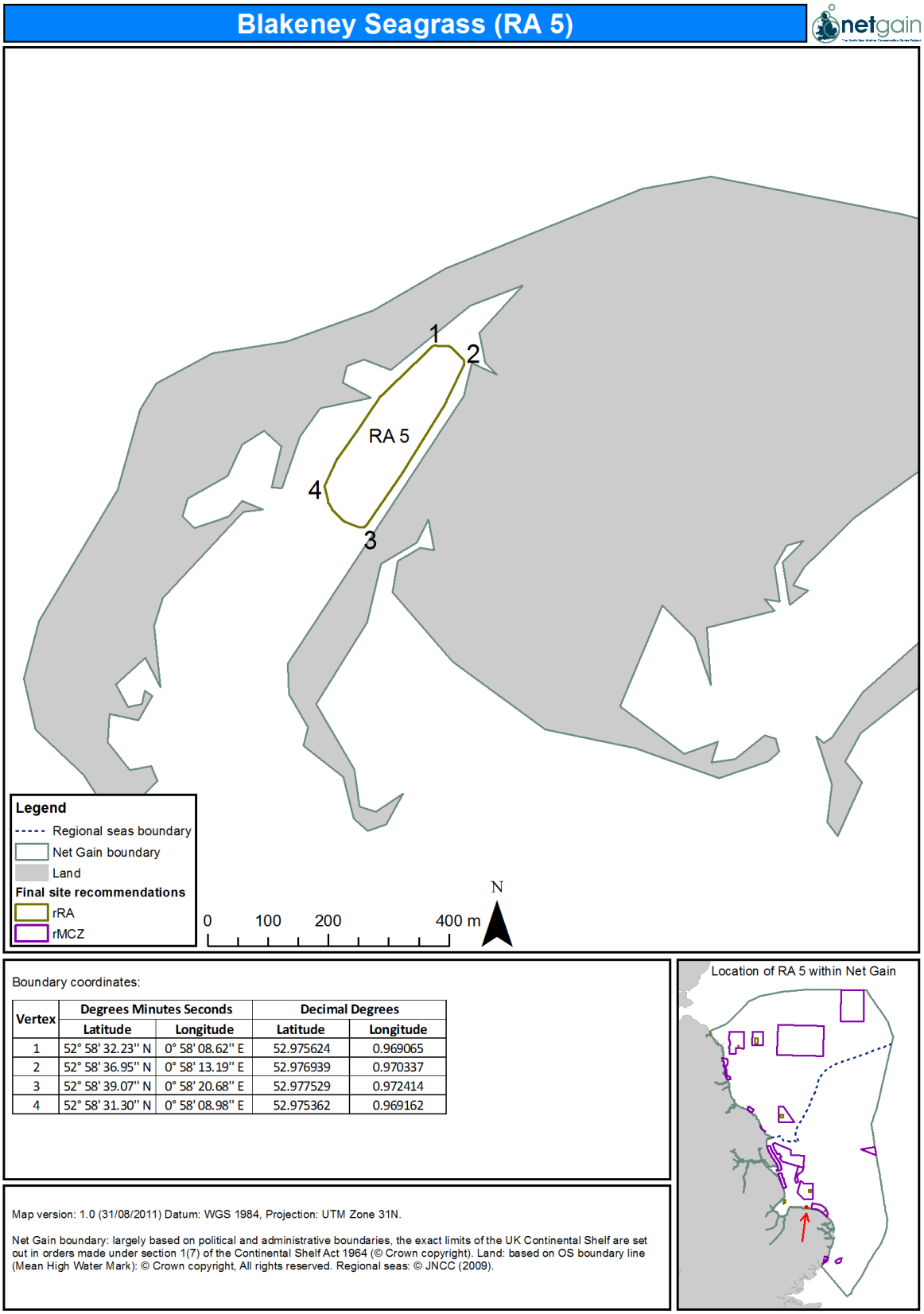
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.175 Features proposed for designation within rRA 5, Blakeney Seagrass

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	0.0003km²
Broad-scale habitat	A2.3: Intertidal mud	0.03km²
Habitat of conservation importance	Seagrass beds	0.02km²
Species of conservation importance	n/a	n/a
Geological feature	North Norfolk Coast (subtidal)	0.03km²
Other feature	n/a	n/a

Features within rRA 5, Blakeney Seagrass not proposed for designation

All features present within rRA 5 are recommended for designation.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 58' 32.23" N	0° 58' 08.62" E	52.975624	0.969065
2	52° 58' 36.95" N	0° 58' 13.19" E	52.976939	0.970337
3	52° 58' 39.07" N	0° 58' 20.68" E	52.977529	0.972414
4	52° 58' 31.30" N	0° 58' 08.98" E	52.975362	0.969162

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.173 Location and extent of site rRA 5 (Blakeney Seagrass)

Site summary

Recommended RA 5 is located within the sheltered inlet of Blakeney Point, within Stanley's Cockle Bight on the North Norfolk Coast, in the East of England. The site is recommended for designation for the seagrass bed. Seabed depth data suggests that this is a site that is regularly exposed at low tide (Figure 7.175). Seagrass provides a habitat and nursery areas for juvenile fish, adult fish, shellfish and invertebrates. Within the vicinity of the site there is a large colony of common and grey seals, and Blakeney Point is an important area for seabirds such as sandwich and common tern. The recommended location is a stable, monitored site; increasing its suitability as a reference area.

Detailed site description

rRA5 is being recommended for designation for the presence of seagrass beds (*Zostera* species). It currently lies within The Wash and North Norfolk Coast SAC and The North Norfolk Coast Special Area of Conservation (SAC), Special Protection Area (SPA), SSSI and Ramsar site. Other habitats present within the site include A2.2: Intertidal sand and muddy sand, A2.3: Intertidal mud and North Nofolk Coast (subtidal) geological feature.

Blakeney National Nature Reserve (NNR) forms part of one of the largest expanses of undeveloped coastal habitat in Europe. The reserve consists of extensive intertidal muds and sands, saltmarshes, shingle banks and sand dunes. It is also classified as an Area of Outstanding Natural Beauty on the Norfolk coastline. Blakeney point is a natural coastal barrier system composed of a shingle bank that is still affected by westward longshore drift. rRA5 lies within a bay created by this process (called Stanley's Cockle Bight) and will be affected by natural sediment movements in the future (West, et al. 2010).

Dwarf eelgrass (*Zostera noltii*) is included in a habitat action plan under the UK Biodiversity Action Plan with seagrass beds recognised internationally as important coastal ecosystem (Asmus, 2000a and Asmus 2000b). Seagrass traps fine sediments reducing particle load in the water column and improving water quality. The detrital matter produced from the seagrass adds to the organic matter settling on the seabed.

The infaunal community is characterised by the lug worm (*Arenicola marina*), common cockle (*Cerastoderma edule*), seed mussels and samphire *(Salicornia)*. The green algae (*Enteromorpha* spp.) may be present on the sediment surface. The National Trust has also noted the presence of the pioneer but invasive saltmarsh species *Spartina anglica*.

Within the vicinity of the site, terns are regular visitors to Blakeney NNR, with Blakeney Point providing an internationally important habitat for breeding. Four species of these seabirds breed on Blakeney Point: sandwich tern (*Sterna sandvicensis*); common tern (*Sterna hirundo*); Arctic tern (*Sterna paradisaea*) and little tern (*Sternula albifrons*). Overwintering wildfowl include Brent geese (*Branta bernicla*), widgeon (*Anas Penelope*), and waders, like dunlin (*calidris alpina*) and curlew (*numenius arquata*). Heavy grazing by these species can reduce the extent of the plant cover significantly during winter months – but this is not thought to be a significant problem at this site.

The common seal (*Phoca vitulina*), also known as the harbour seal, uses Blakeney Point mostly as a 'haul-out' site for resting and sleeping and forms part of the much larger breeding population in the Wash. The population of the grey seal (*Halichoerus grypus)* has increased rapidly, from just occasional sightings in the 1980s, to a booming breeding colony since 2000.

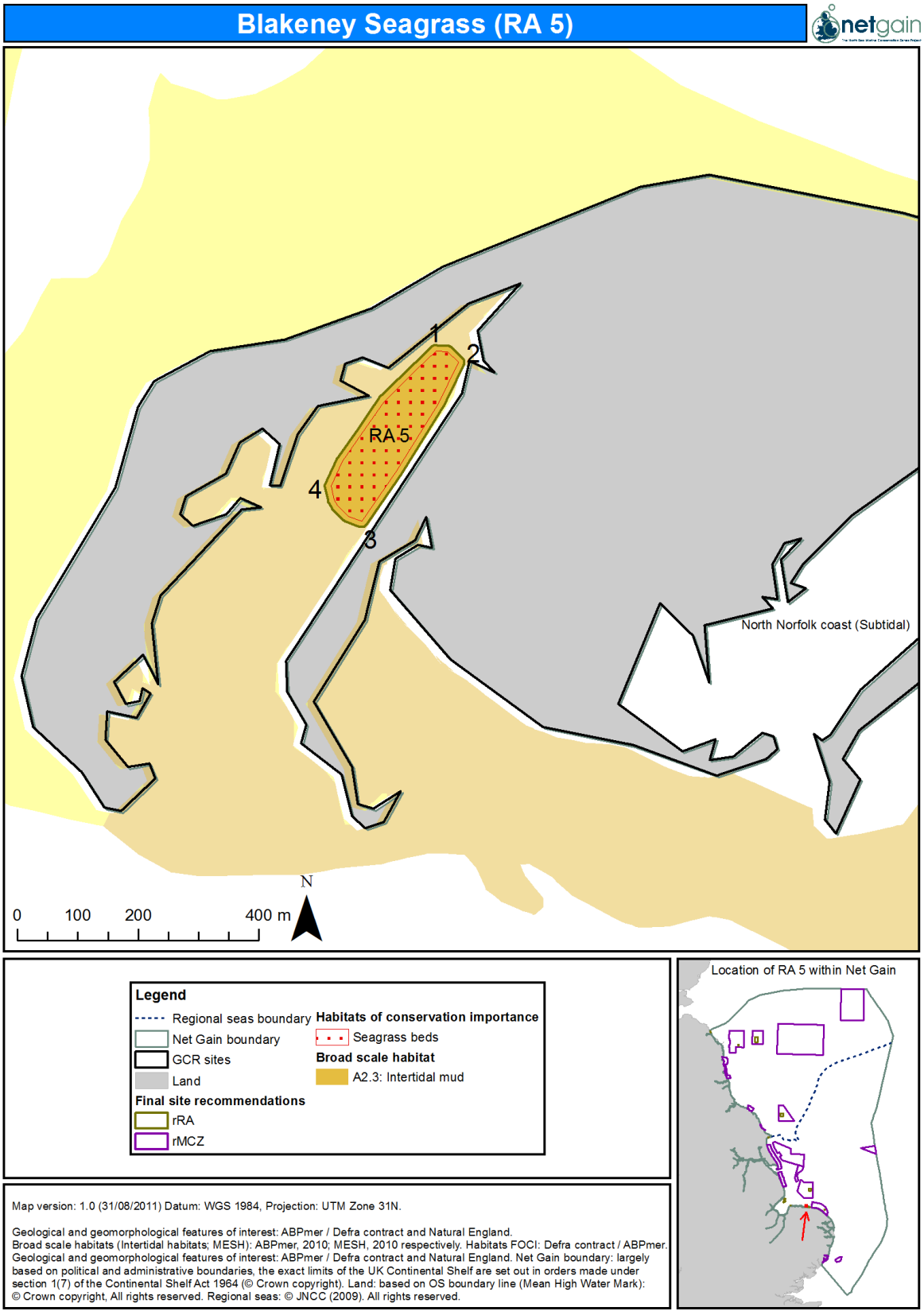


Figure 7.174 Features recommended for designation in rRA 5

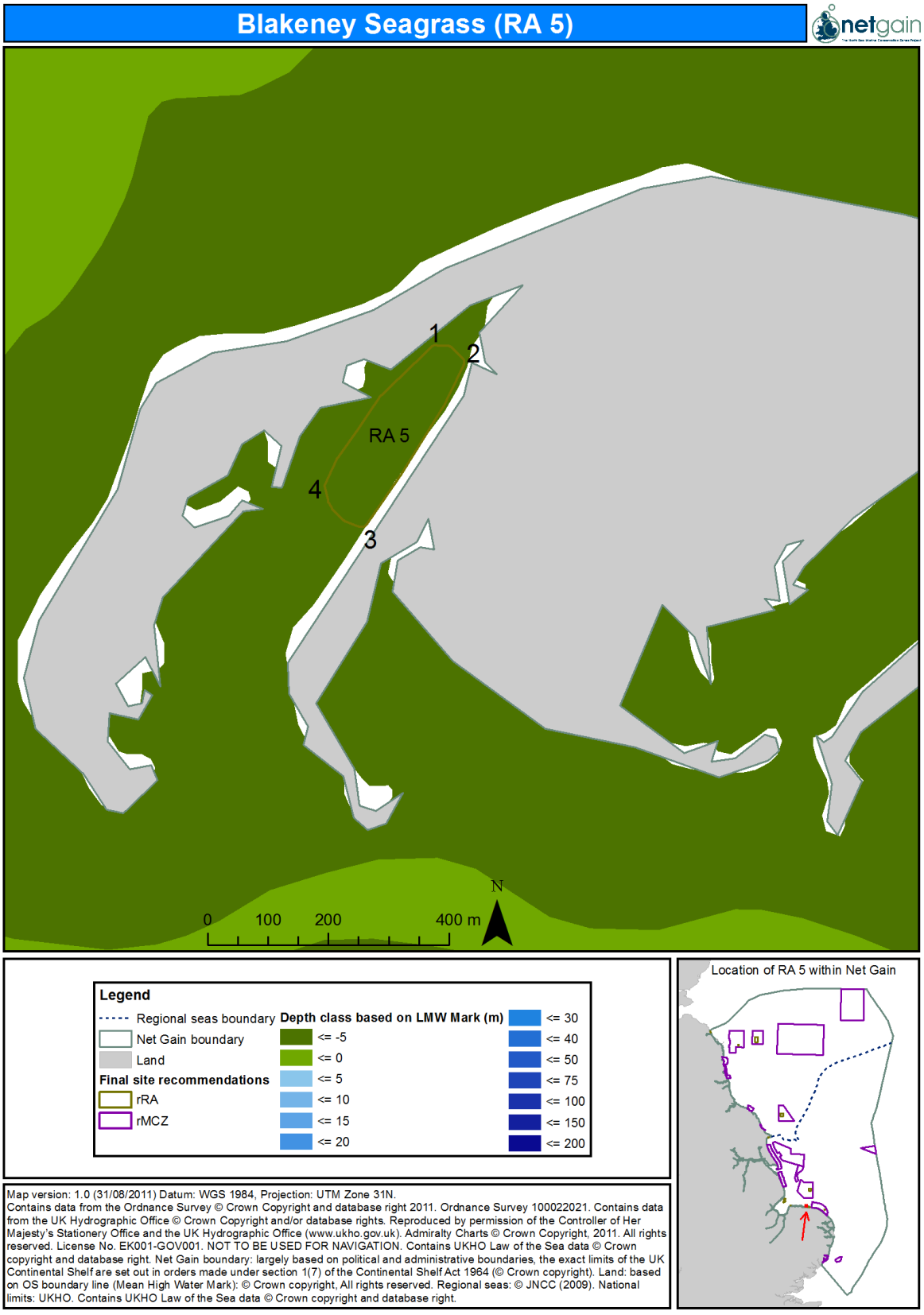


Figure 7.175 Bathymetry of rRA 5

Site boundary

The proposed boundary of rRA 5 was initially based on data that Net Gain holds for the seagrass beds within Stanley's Cockle Bights, in the inlet adjacent to Blakeney Point. Further to this, Natural England and the Net Gain liaison officers met with the National Trust, who manage the area, to discuss the feasibility of the site as a reference area. Following these initial meetings, the boundaries were discussed in the Net Gain reference area meeting held at the end of June, 2011 with members from the East of England and Lincolnshire and the Wash Regional Hubs. Discussions at the Hub meeting resulted in the inclusion of a 10m buffer around the location of the existing seagrass bed, in order to increase protection for the feature while minimising impacts on local stakeholder activity utilising the surrounding sedment.

Conservation objectives

Table 7.176 Conservation objective for site rRA 5, A2.2: Intertidal sand and muddy sand

Section	
1 Conservation Objective	Intertidal sand and muddy sand are widespread along stretches of open coast around the British Isles whilst muddy sands are usually found in more sheltered areas such as estuaries. Subject to natural change, recover the intertidal sand and muddy sand to favourable condition by 2020 and maintain thereafter, and recover the intertidal sand and muddy sand in the area marked on map Figure 7.174 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal sand and muddy sand in the biogeographic region are all recovered and the intertidal sand and muddy sand area marked on map Figure 7.174 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.177 Conservation objectives for site rRA 5, A2.3: Intertidal mud

Section	
1 Conservation Objective	Intertidal mud is protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981. It is also a UKBAP Priority Habitat and on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the intertidal mud to favourable condition by 2020 and maintain thereafter, and recover the intertidal mud in the area marked on map Figure 7.174 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal mud in the biogeographic region are all recovered and the intertidal mud area marked on map Figure 7.174 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.178 Conservation objectives for site rRA 5, Seagrass beds

Section	
1 Conservation Objective	Seagrass beds are on the UK List of Priority Species and Habitats (UK BAP) and OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the seagrass beds to favourable condition by 2020 and maintain thereafter, and recover the seagrass beds in the area marked on map Figure 7.174 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the segrass beds in the biogeographic region are all recovered and the seagrass beds area marked on map Figure 7.174 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.179 Conservation objective for site rRA 5, North Norfolk Coast (subtidal) geological feature

Section	
1 Conservation Objective	The North Norfolk Coast (subtidal) geological containing gently sloping abandoned cliffs separated from sand and shingle beaches by extensive saltmarshes and intertidal flats. Subject to natural change, recover the North Norfolk Coast (subtidal) geological feature to favourable condition by 2020 and maintain thereafter, and recover the North Norfolk Coast (subtidal) geological feature in the area marked on map Figure 7.174 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Geological/ Geomorphological</u>** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the North Norfolk Coast (subtidal) geological feature in the biogeographic region is recovered and the North Norfolk Coast (subtidal) geological feature area marked on map Figure 7.174 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 5 lies approximately 2km northwest of rRA 4, approximately 5.3km northwest of rRA3. The site lies within The Wash and North Norfolk Coast SAC and North Norfolk Coast SAC, SPA, SSSI and Ramsar site.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.180 MPAs within or adjacent to rRA 5

MPA Type	Site Name	Features Protected
SAC	The Wash and North Norfolk Coast	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal macrophyte-dominated sediment Ross worm (*Sabellaria spinulosa*) reefs Seagrass beds Sea-pen and burrowing megafauna communities Sheltered muddy gravels Subtidal sands and gravels Coastal saltmarsh Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SAC	North Norfolk Coast	Not in GAP table Coastal Lagoons Vegetation Sand dunes
SPA	North Norfolk Coast	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds
SSSI	North Norfolk Coast	A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Coastal saltmarsh Saline lagoons
Ramsar site	North Norfolk Coast	Not in GAP table Wetland site for migrating bird species

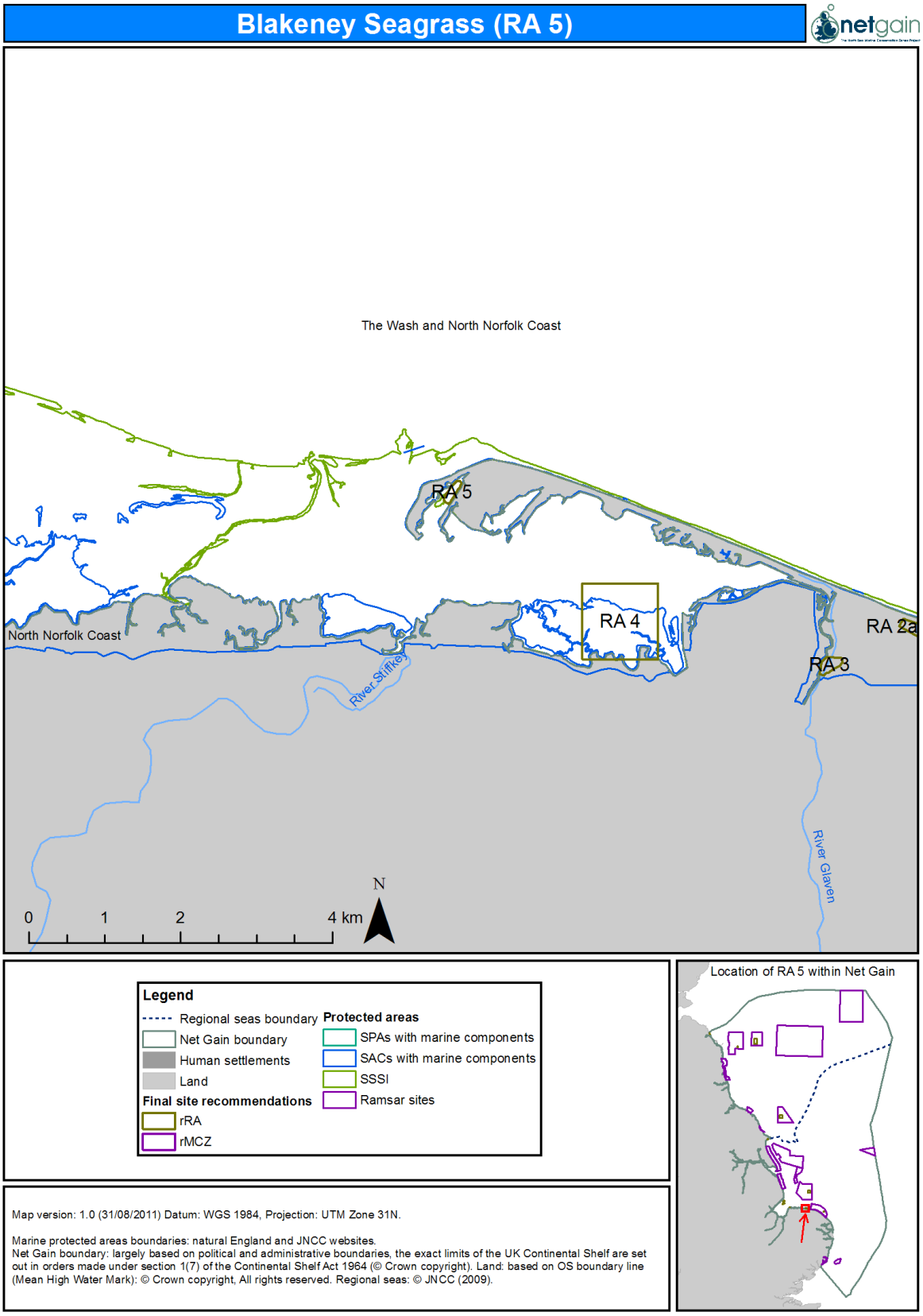


Figure 7.176 MPAs/rMCZs within or adjacent to rRA 5

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site received strong support from both groups that reviewed it at the LGM (both groups scoring it as '4'). Whilst strongly supporting the site, one group questioned whether a 'better' example could be found.

Confidence it the underlying data was high. One group commented that the quality of habitat data had been discussed earlier in the process and no issues had been identified. In terms of data on activities however, the group felt that the activities listed in relation to the site did not occur within the site boundary but adjacent to it.

Contention at the site was felt likely to be low-moderate (one score of 'L', on e of 'M'). The group that identified a greater potential level of contention did so particularly in relation to the impacts on recreational users (and especially bait diggers) in the area, and cockle digging which occurs around the seagrass beds. It was suggested that more information on likely management would be needed before a definitive view on contention could be developed.

On 3 August 2011 Net Gain and Natural England met with the Historic and Common Rights Holders, Parish Councils and local NGOs to share information about the recommended Reference Areas rRA 2a, rRA 2b, rRA 3, rRA 4, rRA 5 to gather further information on activities in these sites.

Table 7.181 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Modelled data	Mc Breen, 2010
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Seagrass beds	Combination of historical and recent records	Tyler-Walters, et al. 2009

References

Asmus, H. & Asmus, R., 2000). *ECSA - Workshop on intertidal seagrass beds and algal mats: organisms and fluxes at the ecosystem level*. (Editorial). *Helgoland Marine Research*, **54**, 53-54.

Asmus, H. & Asmus, R., 2000b. *Material exchange and food web of seagrasses beds in the Sylt-Rømø Bight: how significant are community changes at the ecosystem level? Helgoland Marine Research*, **54**, 137-150.

BROOKS, A.J., ROBERTS, H., KENYON, N.H. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 8: *Task 2A - Mapping of Geological and Geomorphological Features*. ABP Marine Environmental Research Ltd.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 24: Task 2I. Intertidal habitats data layer (Final).* ABP Marine Environmental Research Ltd.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5*). JNCC.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

WEST, R.B., GRENHAM, M.F., KIRBY, J.S. 2010. Survey of Eelgrass species (Zostera spp.) on intertidal habitats within the Wash and North Norfolk Coast Marine Special Area on Conservation. Natural England.

7.24 Marine Conservation Zone: rRA 6, Dogs Head Sandbanks

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 6, Dogs Head Sandbanks

Site centre location

53° 03’ 08’’N, 0° 21’ 43’’E
53.052489°, 0.362148°
Lambert Azimuthal Equal Area projection

Site surface area

12.31km² / 1,231.13ha
Lambert Azimuthal Equal Area projection

Biogeographic region

JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

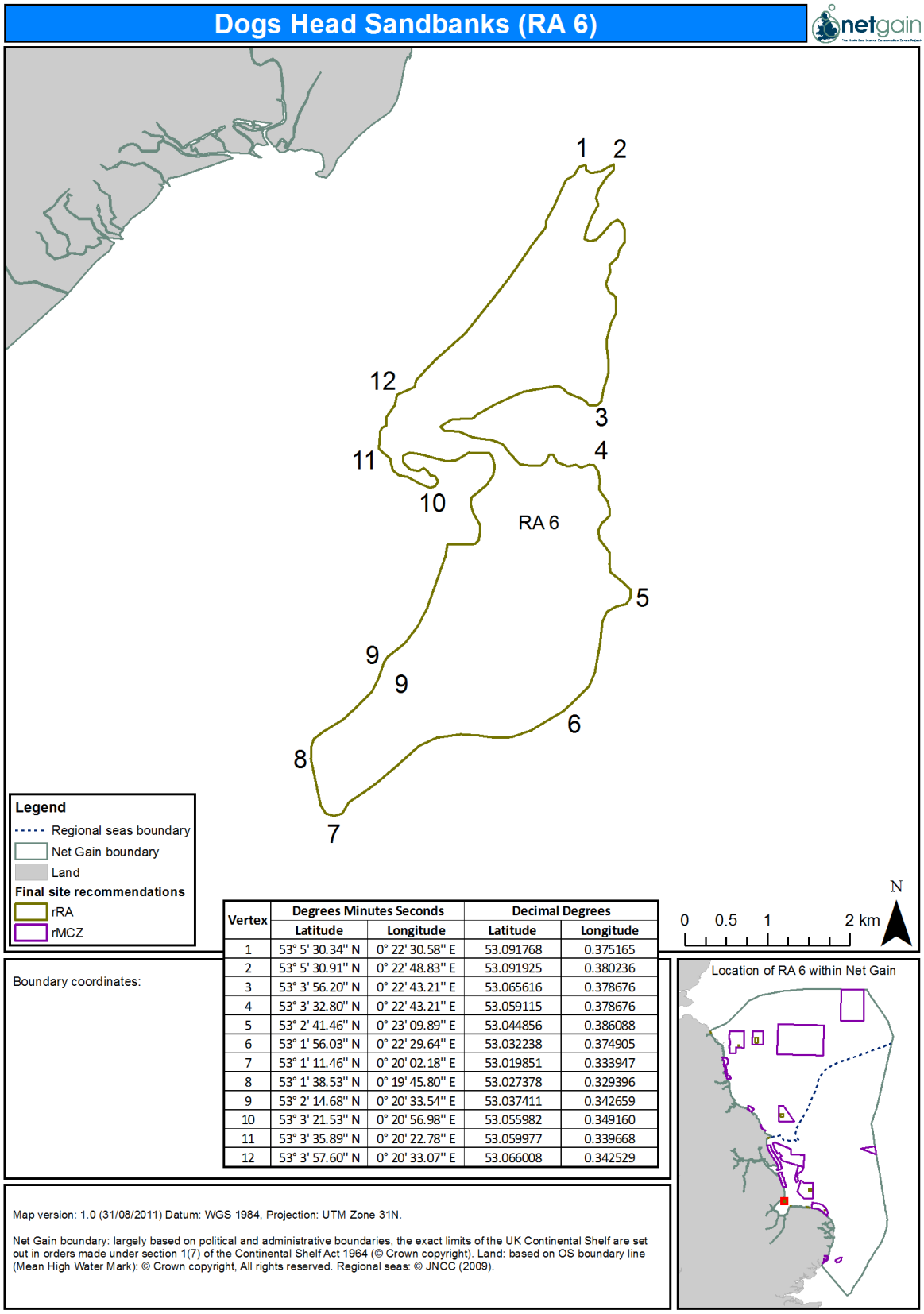
Table 7.182 Features proposed for designation within rRA 6, Dogs Head Sandbanks

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A2.3: Intertidal mud	4.07 km²
Broad-scale habitat	A5.2: Subtidal sand	7.27 km²
Broad-scale habitat	A5.3: Subtidal mud	0.63 km²
Broad-scale habitat	A5.4: Subtidal mixed sediments	0.28 km²
Broad-scale habitat	A5.6: Subtidal biogenic reefs	0.06 km²
Habitat of conservation importance	Ross worm (*Sabellaria spinulosa*) reefs	0.06 km²
Habitat of conservation importance	Subtidal sands and gravels Subtidal sands and gravels (modelled)	7.66 km²; 1 point 10.98km²
Habitat of conservation importance	Subtidal chalk (modelled)	8.05 km²
Species of conservation importance	n/a	n/a
Geological feature	Gibraltar Point (subtidal)	1.30 km²
Other feature	n/a	n/a

It should be noted here that the site is put forward for intertidal features digitised from nautical charts (UK Hydrographic office, 2011) and validated with local knowledge. However the data that Net Gain holds suggests that many of the features present within the site (based on boundaries of the Inner and Outer Dog Bank from nautical charts) are subtidal.

Features within rRA 6, Dogs Head Sandbanks not proposed for designation

All features present in rRA 6 have been recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 5' 30.34" N	0° 22' 30.58" E	53.091768	0.375165
2	53° 5' 30.91" N	0° 22' 48.83" E	53.091925	0.380236
3	53° 3' 56.20" N	0° 22' 43.21" E	53.065616	0.378676
4	53° 3' 32.80" N	0° 22' 43.21" E	53.059115	0.378676
5	53° 2' 41.46" N	0° 23' 09.89" E	53.044856	0.386088
6	53° 1' 56.03" N	0° 22' 29.64" E	53.032238	0.374905
7	53° 1' 11.46" N	0° 20' 02.18" E	53.019851	0.333947
8	53° 1' 38.53" N	0° 19' 45.80" E	53.027378	0.329396
9	53° 2' 14.68" N	0° 20' 33.54" E	53.037411	0.342659
10	53° 3' 21.53" N	0° 20' 56.98" E	53.055982	0.349160
11	53° 3' 35.89" N	0° 20' 22.78" E	53.059977	0.339668
12	53° 3' 57.60" N	0° 20' 33.07" E	53.066008	0.342529

Figure 7.177 Location and extent of rRA 6 (Dogs Head Sandbanks)

Site summary

rRA 6 is located approximately 2.6km from Gibraltar Point on the Lincolnshire coast in the East of England. The site covers the Dogs Head Sandbank and has been proposed for intertidal sediment features. The site is important as a spawning ground and nursery for brown shrimp. There is also a grey and common seal haul out present, with the common seal using the sandbanks for breeding, however more recently the grey seal are replacing the common seal populations (Lincolnshire Wildlife Trusts, 2011 pers.comm). Sea birds such as common scoter, eider, gulls, terns and cormorants use the sandbank for foraging, roosting and loafing.

Detailed site description

rRA6 at Inner and Outer Dogs Head is recommended as a reference area for intertidal sand and muddy sand. The site is located approximately 1 km southeast of Gibraltar Point; an important feeding ground for many seabird species, with the mudflats providing 80% of little tern dietry needs (The Wildlife Trusts, RSPB and Seasearch, 2010) at the entrance to The Wash embayment.

Nearshore sediment transport along the Lincolnshire coastline is southerly and the dynamic formation of intertidal sandbanks at Inner and Outer Dogs Head is due to the slowing of currents and consequent accretion of sand and muddy sand. These sedimentary processes produce and sustain important intertidal habitats in rRA6 and surrounding areas (Manning, 2011 pers. comm.).

The site is recommended as a reference area for intertidal features; however the site boundary of rRA6 also contains subtidal habitats due to the dynamic nature of the feature and the use of modelled data (Figure 7.178).

The intertidal sand supports diverse infaunal polchaetes and opportunistic species adapted to the conditions of mobile sediments subject to periodic natural change. The accretions of muddy sand are found in the more sheltered areas, and are likely to be less mobile. Muddier sands support hinged-shelled bivalves, including the common cockle, and sea snails like the laver spire shell (Manning, 2011 pers.comm).

Sea birds such as common scoter, eider, gulls, terns and cormorants use the sandbank for foraging, roosting and loafing and the intertidal mudflats at this location are an important winter feeding areas for waders and wildfowl.

The site is important as a spawning ground and nursery for brown shrimp. There is also a grey and common seal haul out present, with the common seal using the sandbanks for breeding, however more recently the grey seal are replacing the common seal populations (Lincolnshire Wildlife Trusts, 2011 pers.comm).

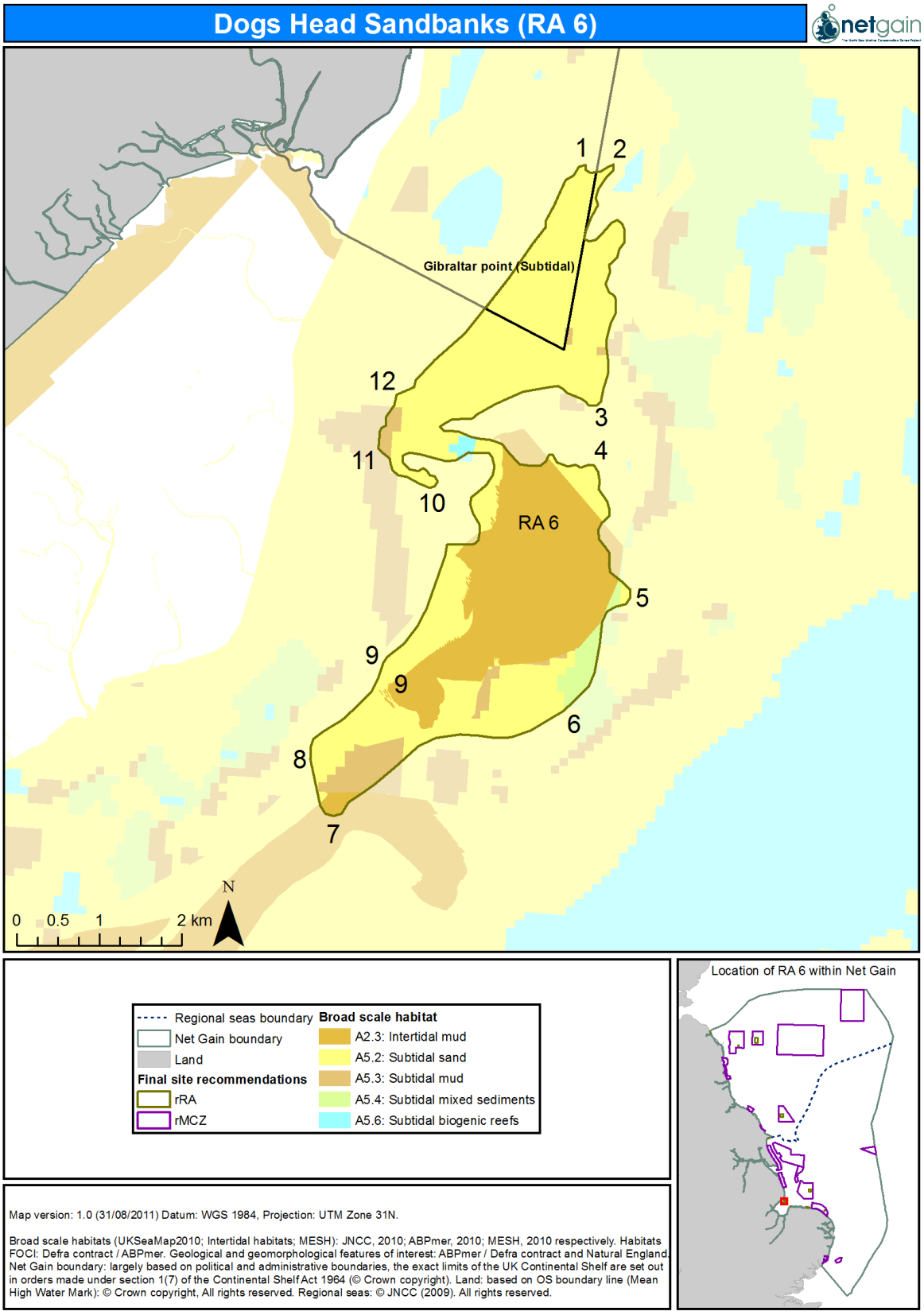


Figure 7.178 Broad-scale habitat and geology recommended for designation in rRA 6

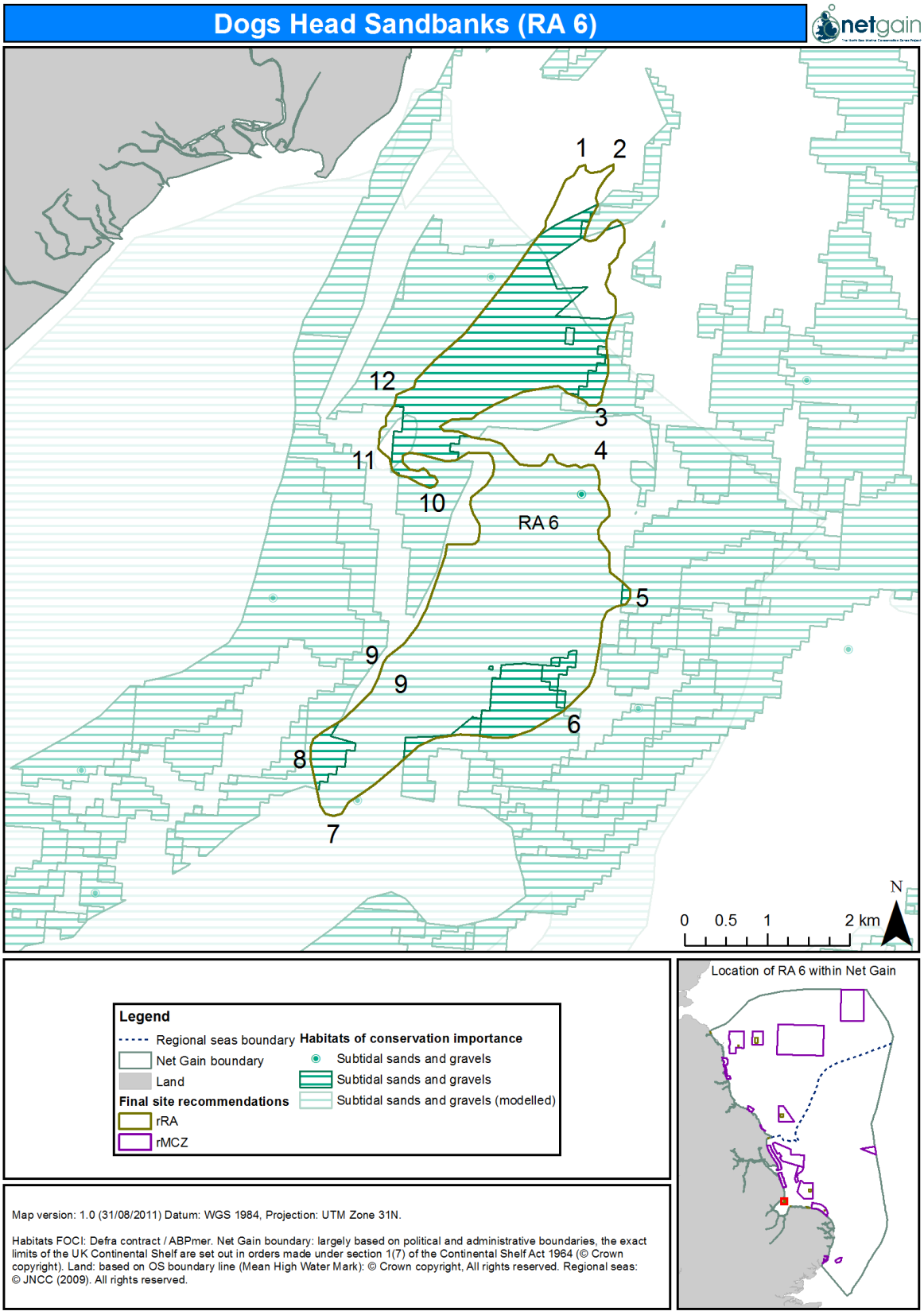


Figure 7.179 FOCI habitat recommended for designation in rRA 6 (map 1)

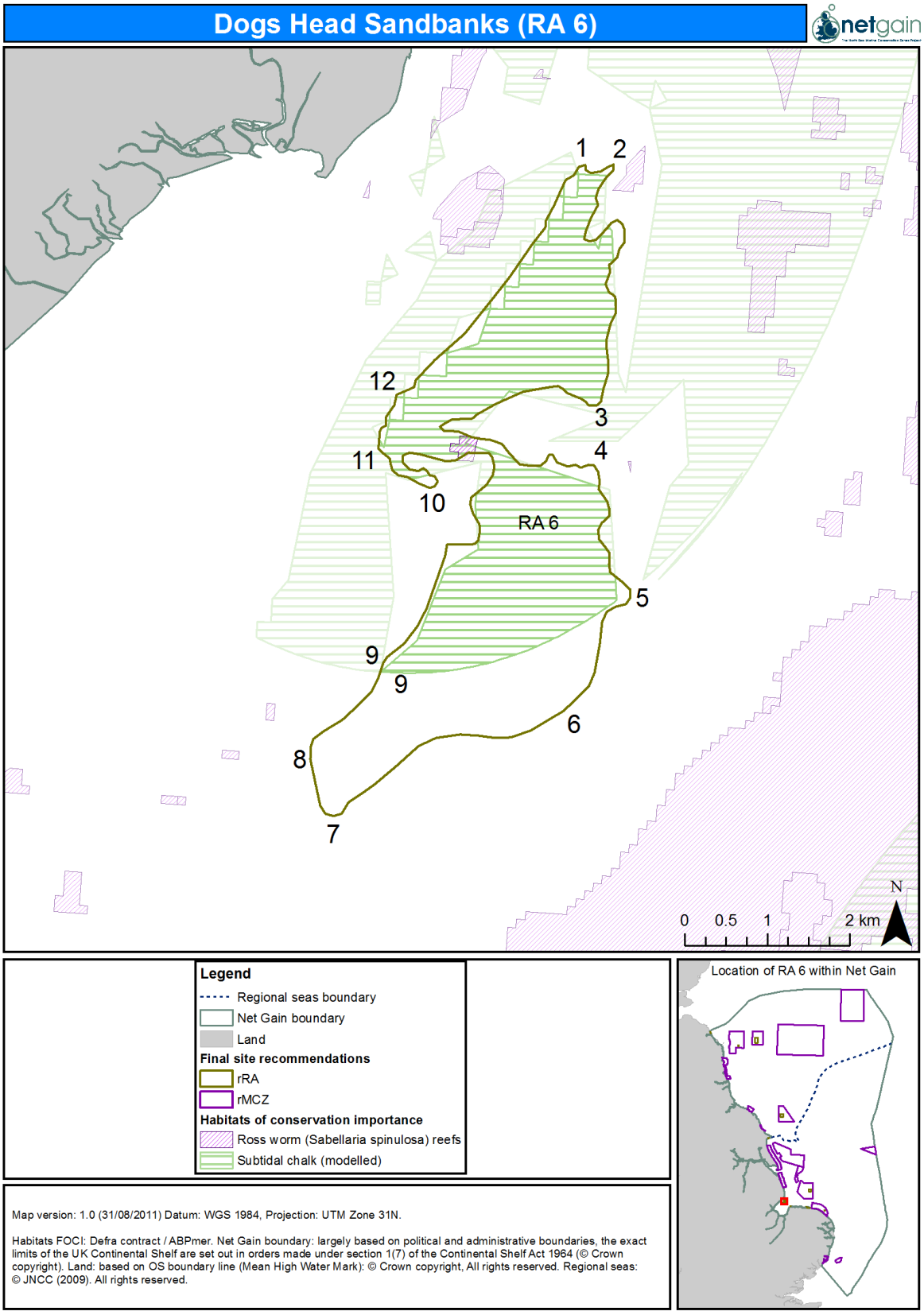


Figure 7.180 FOCI habitat recommended for designation in rRA 6 (map 2)

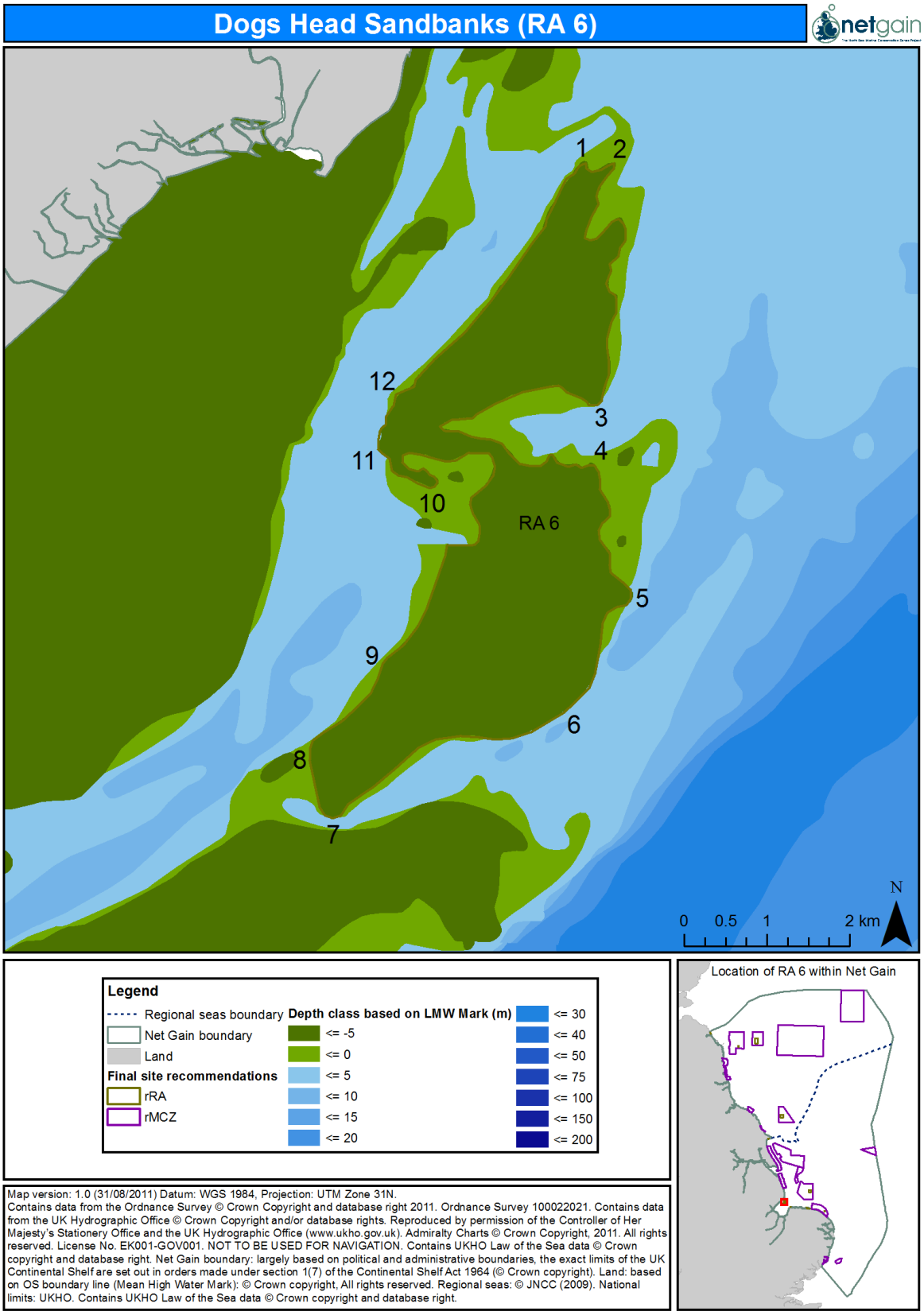


Figure 7.181 Bathymetry of rRA 6

Site boundary

rRA 6 was recommended to cover the “Inner and Outer Dog Banks”, the boundary presented in the map has been digitised from a nautical chart (UK Hydrographic office, 2011) and validated with local knowledge. However the habitat data that Net Gain holds suggests that many of the features present within the site (based on boundaries of the Inner and Outer Dog Bank from nautical charts) are subtidal. The group consensus decision was to move forward with the site to protect the intertidal features of the sand banks.

Conservation objectives

Table 7.183 Conservation objectives for site rRA 6, A2.3: Intertidal mud

Section	
1 Conservation Objective	Intertidal mud is protected under the Birds Directive, Annex 1 of the Habitats Directive, Ramsar Convention and are an important feature in estuary SSSIs under the Wildlife and Countryside Act 1981. It is also a UKBAP Priority Habitat and on the OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the intertidal mud to favourable condition by 2020 and maintain thereafter, and recover the intertidal mud in the area marked on map Figure 7.178 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal mud in the biogeographic region are all recovered and the intertidal mud area marked on map Figure 7.178 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.184 Conservation objectives for site rRA 6, A5.2: Subtidal sand

Section	
1 Conservation Objective	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal sand to favourable condition by 2020 and maintain thereafter, and recover the subtidal sand in the area marked on map Figure 7.178 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sand in the biogeographic region are all recovered and the subtidal sand area marked on map Figure 7.178 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.185 Conservation objectives for site rRA 6, A5.3: Subtidal mud

Section	
1 Conservation Objective	Subtidal mud is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal mud to favourable condition by 2020 and maintain thereafter, and recover the subtidal mud in the area marked on map Figure 7.178 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal mud in the biogeographic region are all recovered and the subtidal mud area marked on map Figure 7.178 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.186 Conservation objectives for site rRA 6, A5.4: Subtidal mixed sediments

Section	
1 Conservation Objective	Subtidal mixed sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal mixed sediments to favourable condition by 2020 and maintain thereafter, and recover the subtidal mixed sediments in the area marked on map Figure 7.178 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal mixed sediments in the biogeographic region are all recovered such that the feature makes its contribution to the network. and the subtidal mixed sediments area marked on map Figure 7.178 is recovered to reference condition,
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.187 Conservation objectives for site rRA 6, A5.6: Subtidal biogenic reefs

Section	
1 Conservation Objective	Subtidal biogenic reefs are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal biogenic reefs to favourable condition by 2020 and maintain thereafter, and recover the subtidal biogenic reefs in the area marked on map Figure 7.178 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal biogenic reefs in the biogeographic region are all recovered and the subtidal biogenic reefs area marked on map Figure 7.178 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.188 Conservation objectives for site rRA 6, Ross worm (*Sabellaria spinulosa*) reefs

Section	
1 Conservation Objective	Ross worm (*Sabellaria spinulosa*) reefs are on the UK List of Priority Species and Habitats (UK BAP) and OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the ross worm (*Sabellaria spinulosa*) reefs to favourable condition by 2020 and maintain thereafter, and recover the ross worm (*Sabellaria spinulosa*) reefs in the area marked on map Figure 7.180 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the ross worm (*Sabellaria spinulosa*) reefs in the biogeographic region are all recovered and the ross worm (*Sabellaria spinulosa*) reefs area marked on map Figure 7.180 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.189 Conservation objectives for site rRA 6, Subtidal chalk (modelled)

Section	
1 Conservation Objective	Subtidal chalk is on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal chalk to favourable condition by 2020 and maintain thereafter, and recover the subtidal chalk in the area marked on map Figure 7.180 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal chalk in the biogeographic region are all recovered and the subtidal chalk area marked on map Figure 7.180 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.190 Conservation objectives for site rRA 6, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.179 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region are all recovered and the subtidal sands and gravels area marked on map Figure 7.179 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.191 Conservation objectives for site rRA 6, Gibraltar point (subtidal) geological feature

Section	
1 Conservation Objective	Spurn Head is a SSSI (Site of Special Scientific Interest). Geomorphologists monitor its changing shape and, in spring and autumn, migrating birds pause here in their thousands, attracting visitors to the bird observatory. The sea continues to build and erode this unique hooked peninsula of sand and shingle. Subject to natural change, recover the Gibraltar point (subtidal) geological feature to favourable condition by 2020 and maintain thereafter, and recover the Gibraltar point (subtidal) geological feature in the area marked on map Figure 7.178 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Geological/ Geomorphological** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the Gibraltar point (subtidal) geological feature in the biogeographic region is recovered and the Gibraltar point (subtidal) geological feature area marked on map Figure 7.178 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 6 overlaps in part with The Wash and North Norfolk Coast SAC and The Wash SSSI, SPA and Ramsar site. The site is also adjacent to the Inner Dowsing, Race Bank, North Ridge SAC and Gibralter Point SPA and SSSI.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.192 MPAs within or adjacent to rRA 6

MPA Type	Site Name	Features Protected
SAC	The Wash and North Norfolk Coast	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal macrophyte-dominated sediment Ross worm (*Sabellaria spinulosa*) reefs Seagrass beds Sea-pen and burrowing megafauna communities Sheltered muddy gravels Subtidal sands and gravels Coastal saltmarsh Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SPA	The Wash	Not in GAP table Wintering and breeding bird species
SSSI	The Wash	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds Ross worm (*Sabellaria spinulosa*) reefs Coastal saltmarsh Intertidal mudflats Saline lagoons
Ramsar site	The Wash	Not in GAP table Wetland site for migrating bird species

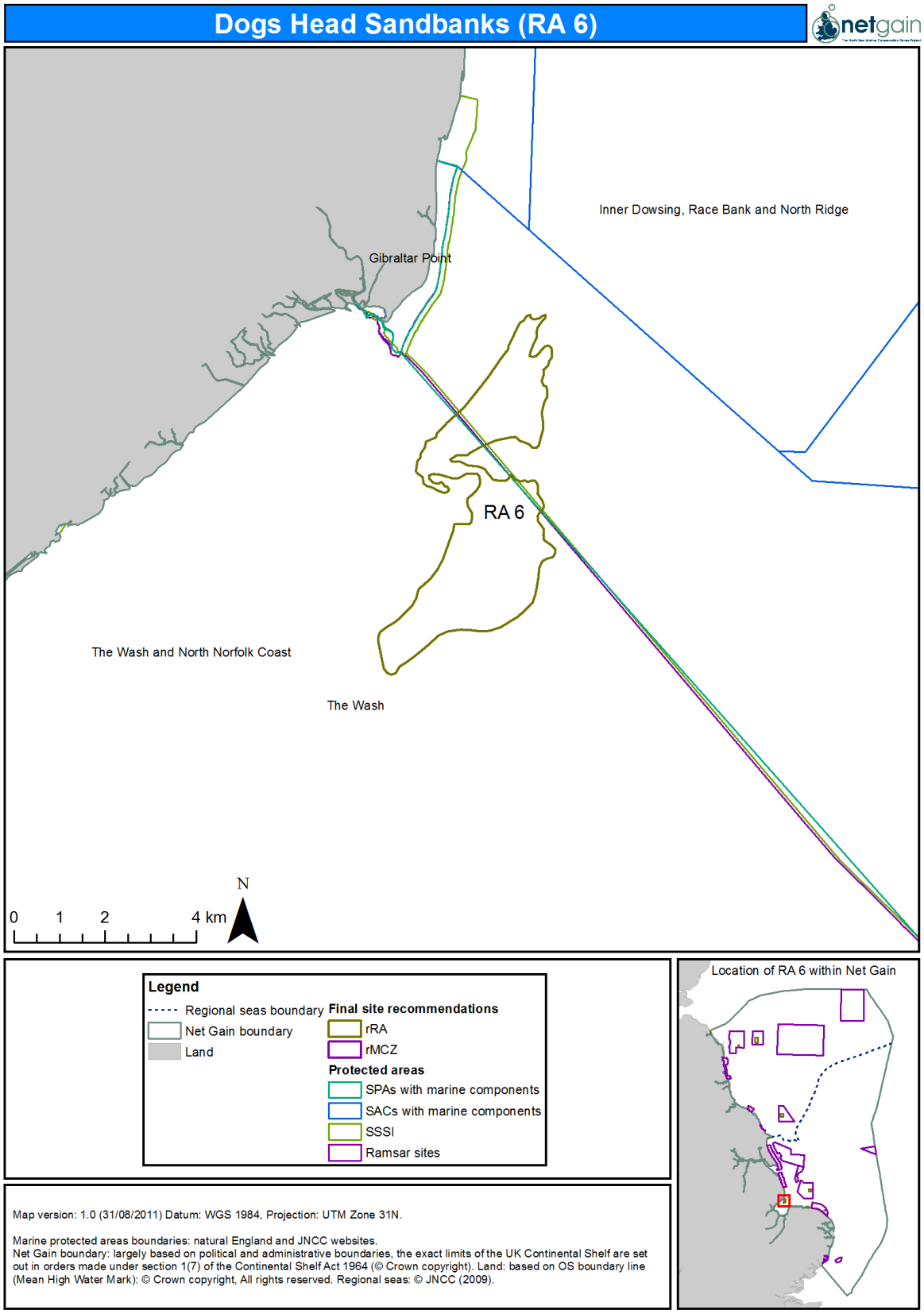


Figure 7.182 MPAs/rMCZs within or adjacent to rRA 6

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site was strongly supported by both groups who reviewed it at the LGM, with one group suggesting that 'most issues' had been addressed.

There was a high level of confidence in the underlying data; the fact that the site encompassed a discrete and well-charted drying sandbank feature (the Inner & Outer Dogs Head Sandbank) meant that there could be a high level of confidence in the site's shape and the fact that the broad-scale habitat was composed primarily of intertidal sediment features. In contrast, the fact that the Inner & Outer Dogs Head Sandbank is mobile may reduce confidence in the boundary if this was to be fixed to enable designation.

Whilst it was felt there would be a low level of contention associated with the site, it was pointed out that management (e.g. by the MMO/IFCA) may be problematical – e.g. issues around the management of a moving feature and clarification of what forms part of the site and what is excluded. In addition, whilst the site was initially proposed by the commercial fishing and recreational sectors, it was noted that it would be important for sailing boats and recreational anglers to be able to continue to navigate (and fish) the adjacent channels. In addition it was noted that the channels are also used to provide shelter and safe passage in adverse weather or sea conditions, not just for recreational vessels, but for commercial vessels (e.g. drift netters) too. The option to use the channels in this way would need to be maintained to avoid contention over the site.

Table 7.193 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Frost, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels, Subtidal chalk	Modelled data	Tyler-Walters, et al. 2009

References

BROOKS, A.J., ROBERTS, H., KENYON, N.H. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes*. Report No 8: *Task 2A - Mapping of Geological and Geomorphological Features*. ABP Marine Environmental Research Ltd.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

FROST, N.J. 2010. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 24: Task 2I. Intertidal habitats data layer (Final).* ABP Marine Environmental Research Ltd.

LINCOLNSHIRE WILDLIFE TRUST, 2011. Net Gain ecological benefit meetings. pers.comm.

MANNING, 2011. pers. comm.

McBREEN, F. 2010*. UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

THE WILDLIFE TRUSTS, RSPB and SEASEARCH, 2010. *Biodiverse Areas within the Net Gain region: A supportive guide to aid stakeholder identification of ecological interest areas that meet aspects of the Ecological Network Guidance.* November, 2010.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

UK HYDROGRAPHIC OFFICE. 2011. Admiralty Chart 0108 Approaches to the Wash. Scale 1: 75,000 Metric.

7.25 Marine Conservation Zone: rRA 7, Seahenge Peat and Clay

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 7, Seahenge Peat and Clay

Site centre location

52° 58’ 36’’N, 0° 32’ 10’’E
52.976803°, 0.536332°
Lambert Azimuthal Equal Area projection

Site surface area

0.26km² / 25.74ha
Lambert Azimuthal Equal Area projection

Biogeographic region

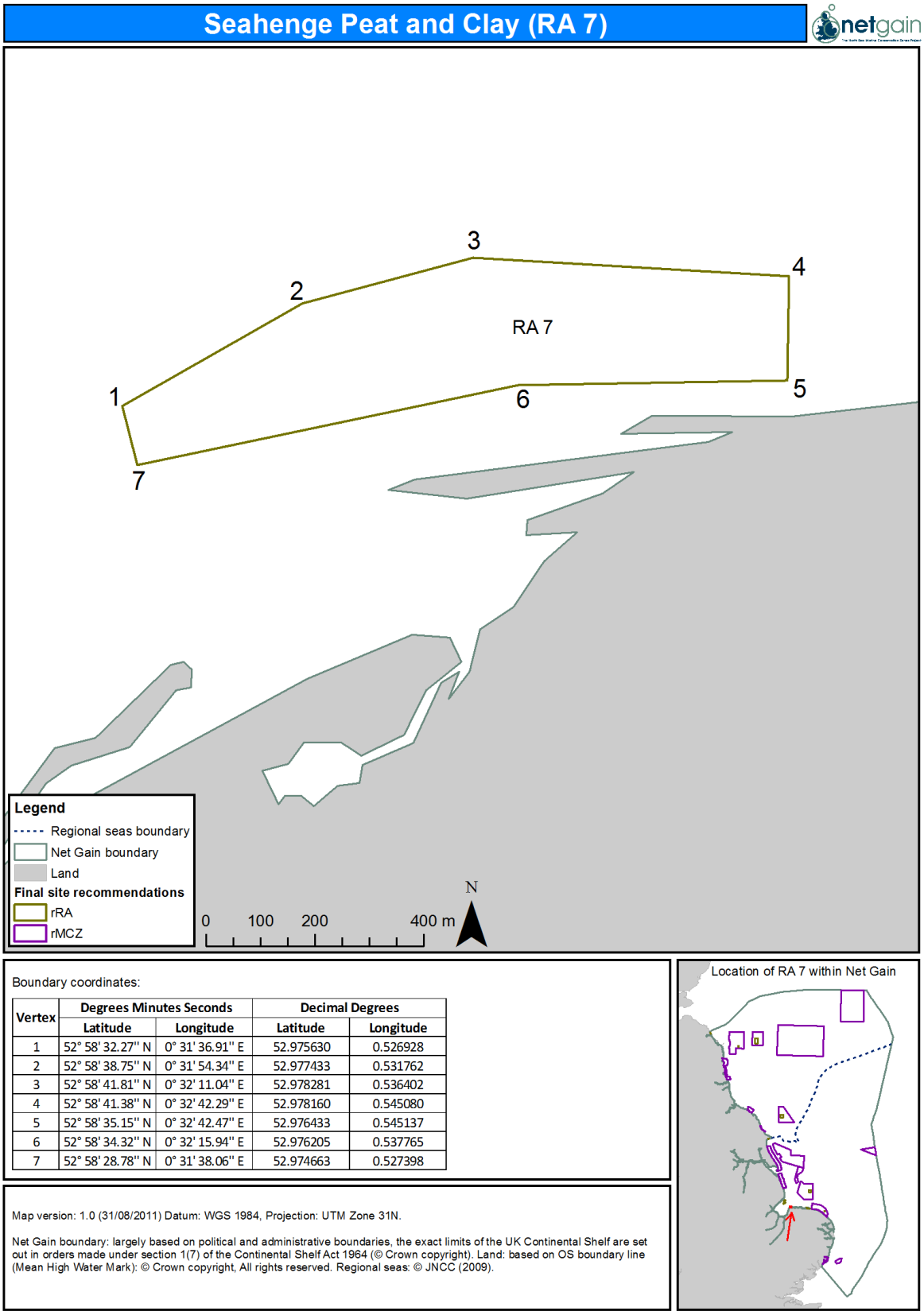
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.194 Features proposed for designation within rRA 7, Seahenge Peat and Clay

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	0.25km²
Broad-scale habitat	A5.2: Subtidal sand	0.003km²
Habitat of conservation importance	Peat and clay exposures	0.09km² 1 point
Habitat of conservation importance	Subtidal sands and gravels	0.15km²
Species of conservation importance	n/a	n/a
Geological feature	North Norfolk Coast (subtidal)	0.26km²
Other feature	n/a	n/a

Features within rRA 7, Seahenge Peat and Clay not proposed for designation

All features present in rRA 7 are recommended for designation.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	52° 58' 32.27" N	0° 31' 36.91" E	52.975630	0.526928
2	52° 58' 38.75" N	0° 31' 54.34" E	52.977433	0.531762
3	52° 58' 41.81" N	0° 32' 11.04" E	52.978281	0.536402
4	52° 58' 41.38" N	0° 32' 42.29" E	52.978160	0.545080
5	52° 58' 35.15" N	0° 32' 42.47" E	52.976433	0.545137
6	52° 58' 34.32" N	0° 32' 15.94" E	52.976205	0.537765
7	52° 58' 28.78" N	0° 31' 38.06" E	52.974663	0.527398

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.183 Location and extent of site rRA 7 (Seahenge Peat and Clay)

Site summary

rRA 7 is located 67 metres off the North Norfolk Coast north of Holme-next-the-Sea in the East of England, making it an easily accessible site for monitoring. The site is intertidal and recommended for the protection of peat and clay exposures. Within the vicinity of the site approximately 40, 000 seabirds overwinter. The site lies adjacent to seahenge archaeological sites (Holme I and Holme II).

Detailed site description

Site rRA7 is being recommended to protect the presence of peat and clay exposures. In the UK there are few records of this feature type. Recommended reference area 7 lies within The Wash and North Norfolk Coast SAC, the North Norfolk Coast SPA, Site of Special Scientific Interest (SSSI) and Ramsar site, and the Holme Dunes National Nature Reserve (NNR), which is owned and managed by Norfolk Wildlife Trust and covers 213 hectares.

The survey data for this site has come from a site visit by Davis and Dinwiddy, 2011 (see below) and from English Heritage, 2011. Outcrops of fossilised peat may project above sand level by > 15cm with coverings of 10-15mm sand (Figure 7.184). Where the peat becomes covered by a layer of sand it can adversely affect algal species, especially propagules. Variations in the abundance and species of seaweeds present would be expected to vary according to the season and summer spawning success.

Figure 7.184 Outcrops of fossilised peat at site rRA 7

Interesting features within the site included branch structures, tree stumps, blue mussel beds and evidence of burrowing activity (Davis and Dinwiddy 2011 – see Figure 7.185 below). The clay exposures are less frequent than the petrified wood. Peat tends to be firm and relatively erosion resistant (Murphy 1981). Burrowing activity can indicate the presence of the white piddock (*Barnea candida*) and American piddock (*Petricola pholadiformis*). Piddocks are thought to contribute to the relatively high silt environment derived from burrowing activities with abandoned burrows used by other invertebrate species.

Figure 7.185 Features within site rRA 7

Photographs taken by Davis and Dinwiddy, 2011, show algal mats and surface pools across the exposures in rRA7. The surface of the peat can be covered by a dense mat of red seaweed (*Ceramium virgatum*), and gut weed (*Ulva intestinalis*) and *Polysiphonia* spp. Damp areas within the algal mat have aggregations of sand mason worm (*Lanice conchilega*) and the fan worm (*Sabella pavonina*). Small pools on the peat may contain the hydroids *Obelia longissima* and *Kirchenpaueria pinnata*, and the prawn *Crangon crangon*. The crabs *Carcinus maenas* and *Cancer pagurus* occur in crevices in the peat and are the predominant mobile species, scavenging for food.

Terns are a significant feature of the Holme Dunes Nature Reserve. In Britain and Ireland, the Arctic tern (*Sterna paradisaea*) is almost exclusively a coastal breeder, usually nesting on the immediate shoreline and is never found nesting far inland (Gibbons *et al.*, 1991; Mitchell *et al*., 2004). Arctic terns which feed on a wide variety of small fish, crustaceans and zooplankton, would have a feeding range across this site (Ewins 1985; Kirkham and Nisbet, 1987; Hatch, 2002). Other birds noted to utilise this coast are the sandwich tern (*Sterna sandvicensis*), common tern (*Sterna hirundo*), the northern fulmar (*Fulmarus glacialis*) and the roseate turn (*Sterna dougallii*).

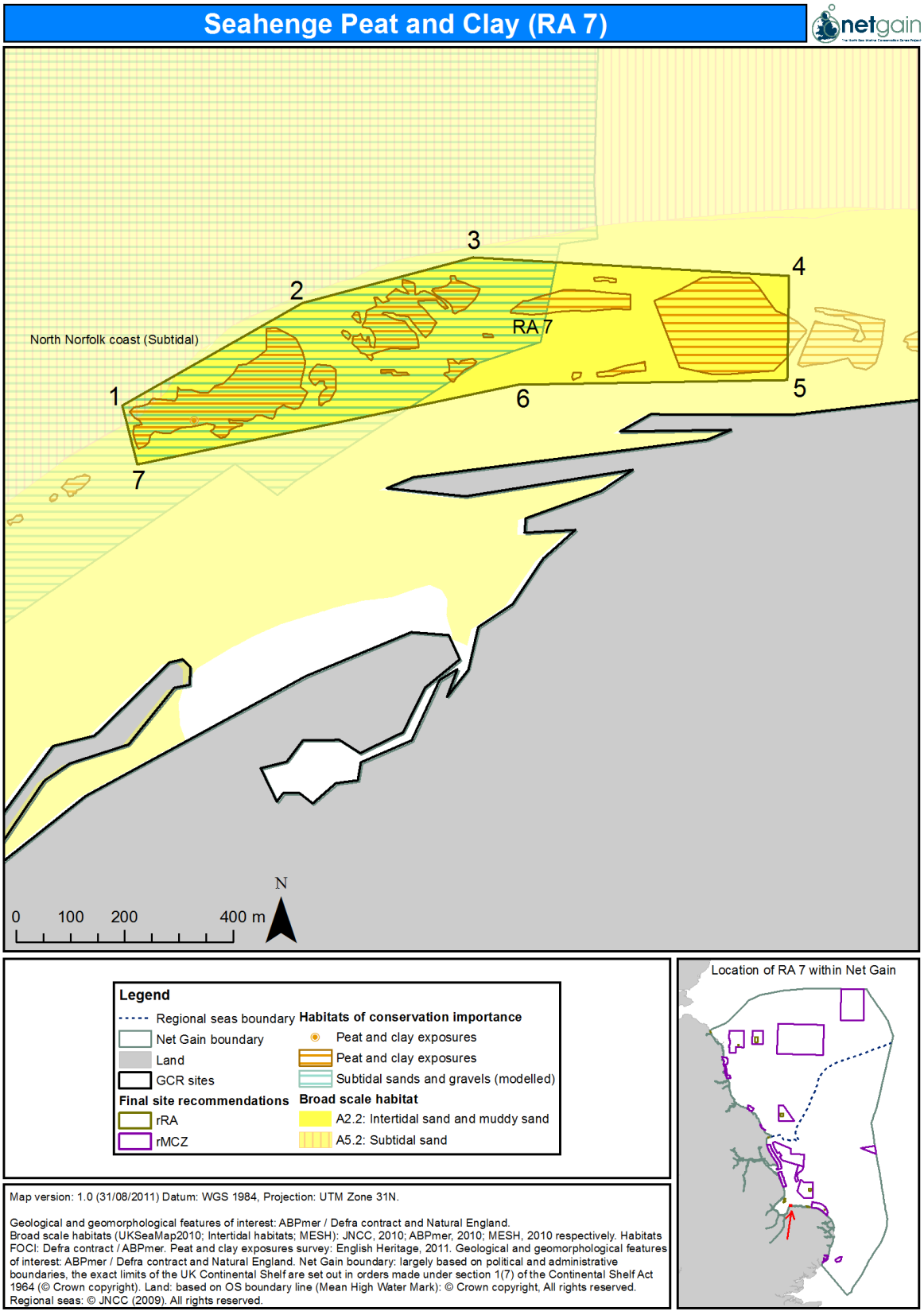


Figure 7.186 Features recommended for designation in rRA 7

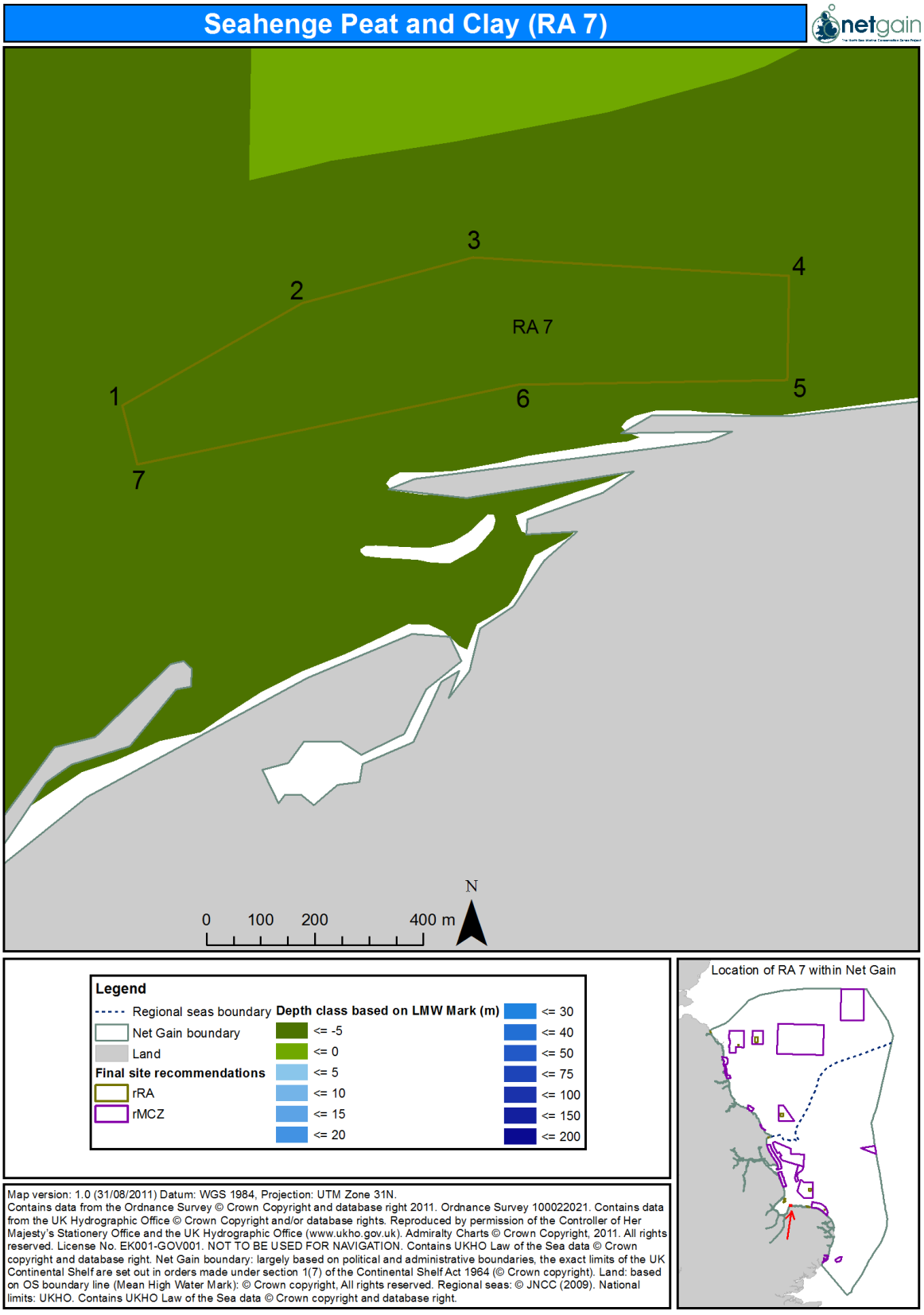


Figure 7.187 Bathymetry of rRA 7

Site boundary

The development of rRA 7 originated with a survey completed by a Net Gain liaison officer and John Dinwiddy during February, 2011 that identified the location of the peat and clay exposures. Following this survey a map of peat and clay exposures adjacent to the seahenge archaeological sites was received from English Heritage and digitised. The site boundary was set during the Net Gain reference area meeting at the end of June, 2011, attended by members of the Lincolnshire and the Wash and East of England Regional Hubs. The boundary covers an area of approximately 0.25km² (required reference area size for peat and clay exposures) of peat and clay while avoiding the archaeological sites to allow for future archaeological digs.

Conservation objectives

Table 7.195 Conservation objectives for site rRA 7, A2.2: Intertidal sand and muddy sand

Section	
1 Conservation Objective	Intertidal sand and muddy sand are widespread along stretches of open coast around the British Isles whilst muddy sands are usually found in more sheltered areas such as estuaries. Subject to natural change, recover the intertidal sand and muddy sand to favourable condition by 2020 and maintain thereafter, and recover the intertidal sand and muddy sand in the area marked on map Figure 7.186 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal sand and muddy sand in the biogeographic region is recovered and the intertidal sand and muddy sand area marked on map Figure 7.186 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.196 Conservation objectives for site rRA 7, A5.2: Subtidal sand

Section	
1 Conservation Objective	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal sand to favourable condition by 2020 and maintain thereafter, and recover the subtidal sand in the area marked on map Figure 7.186 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sand in the biogeographic region is recovered and the subtidal sand area marked on map Figure 7.186 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.197 Conservation objectives for site rRA 7, Peat and clay exposures

Section	
1 Conservation Objective	Peat and clay exposures are on the UK List of Priority Species and Habitats (UK BAP).Subject to natural change, recover the peat and clay exposures to favourable condition by 2020 and maintain thereafter, and recover the peat and clay exposures in the area marked on map Figure 7.186 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the peat and clay exposures in the biogeographic region is recovered and the peat and clay exposures area marked on map Figure 7.186 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.198 Conservation objectives for site rRA 7, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.186 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is recovered and the subtidal sands and gravels area marked on map Figure 7.186 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.199 Conservation objectives for site rRA 7, North Norfolk Coast (subtidal) geological feature

Section	
1 Conservation Objective	The North Norfolk Coast (subtidal) geological containing gently sloping abandoned cliffs separated from sand and shingle beaches by extensive saltmarshes and intertidal flats. Subject to natural change, recover the North Norfolk Coast (subtidal) geological feature to favourable condition by 2020 and maintain thereafter, and recover the North Norfolk Coast (subtidal) geological feature in the area marked on map Figure 7.186 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Geological/ Geomorphological</u>** the • extent, • component features, • spatial distribution, • integrity • natural environmental quality*, and • natural environmental processes* representative of the North Norfolk Coast (subtidal) geological feature in the biogeographic region is recovered and the North Norfolk Coast (subtidal) geological feature area marked on map Figure 7.186 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 7 falls within The Wash and North Norfolk Coast SAC, North Norfolk Coast SPA, SSSI and Ramsar site.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.200 MPAs within or adjacent to rRA 7

MPA Type	Site Name	Features Protected
SAC	The Wash and North Norfolk Coast	A2.1: Intertidal coarse sediment A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal macrophyte-dominated sediment Ross worm (*Sabellaria spinulosa*) reefs Seagrass beds Sea-pen and burrowing megafauna communities Sheltered muddy gravels Subtidal sands and gravels Coastal saltmarsh Lagoon sand shrimp (*Gammarus insensibilis*) Starlet sea anemone (*Nematostella vectensis*)
SPA	North Norfolk Coast	A2.2: Intertidal sand and muddy sand A2.3: Intertidal mud A2.5: Coastal saltmarshes and saline reedbeds
SSSI	North Norfolk Coast	A2.5: Coastal saltmarshes and saline reedbeds A2.6: Intertidal sediments dominated by aquatic angiosperms Coastal saltmarsh Saline lagoons
Ramsar site	North Norfolk Coast	Not in GAP table Wetland site for migrating bird species

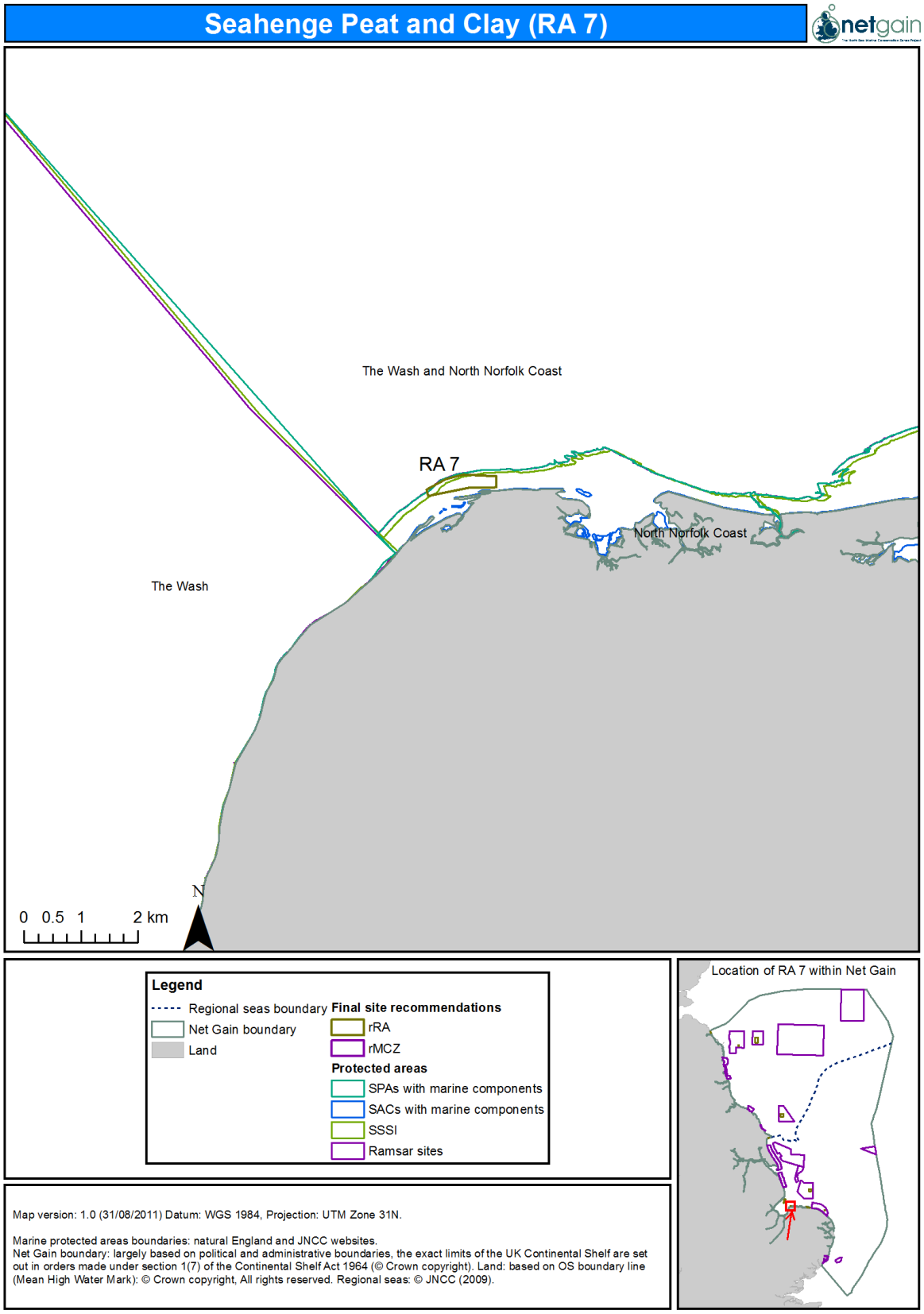


Figure 7.188 MPAs/rMCZs within or adjacent to rRA 7

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

This site received strong support from the one group that reviewed it at the LGM. The site is intertidal and has 5 to 6ft coverage every tide. Sailing is one of the very few examples of local activities that may be affected although common rights issues will need to be considered further (see below).

There was high confidence in the underlying data, especially as first-hand photographic evidence of the nature and extent of the exposed peat features at the site had been made available by Net Gain.

There was felt to be only a low level of contention at this site although holders of common rights will need to be drawn into discussions over the site through its consultation and designation process. There are possibly some local fixed netting interests (stake nets) although, there are thought to be very few of these operated in the area.

A meeting has been organised by Natural England with Holme Parish Council, local residents and common rights holders on 5 October, 2011. The site information will be presented and information on current activites and issues obtained.

Table 7.201 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Geological and geomorphological features of interest	Survey	Brooks, et al. 2009
Peat and clay exposures	Survey: records	Davis, and Dinwiddy, 2011.
Peat and clay exposures	Survey	English Heritage, 2011
Peat and clay exposures	Combinate of historical and recent records	Tyler-Walters, et al. 2009
Ross worm (*Sabellaria spinulosa*) reefs, Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

BROOKS, A.J., ROBERTS, H., KENYON, N.H. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes.* Report No 8: *Task 2A - Mapping of Geological and Geomorphological Features*. ABP Marine Environmental Research Ltd.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

DAVIS, D., DINWIDDY, J. 2011. *Visit to potential reference site-Holme Next The Sea (Gore Point); survey records of peat and clay exposures.*

ENGLISH HERITAGE. 2011. *Holme Beach monitoring project 2003-2008*. NAU Archaeology Report 1444.

EWINS, P.J. 1985. *Growth, diet and mortality of Arctic tern Sterna paradisaea chicks in Shetland*. *Seabird* 8:59-68.

GIBBONS, D.W., REID, J.B. and CHAPMAN, R.A. 1991. *The new atlas of breeding birds in Britain and Ireland 1988-1991.* Poyser, London.

HATCH. J.J. 2002. Arctic Tern (*Sterna paradisaea*). *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online at: http://bna.birds.cornell.edu and http://seabird.wikispaces.com/Arctic+Tern

KIRKHAM, I.R. and NISBET, I.C.T. 1987. *Feeding techniques and field identification of Arctic, Common and Roseate Terns. British Birds* 80:41-47McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

MITCHELL, P.I., NEWTON, S.F., RATCLIFFE, N., and DUNN, T.E. 2004. *Seabird populations of Britain and Ireland.* London, UK: T&AD Poyser Ltd.

MURPHY, J.P. 1981. Marine Algae on Peat. *Irish Naturalists' Journal*, **20**, 254.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.26 Marine Conservation Zone: rRA 8, Wash Approach rRA

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 8, Wash Approach rRA (falls within NG 4, Wash Approach)

Site centre location

53° 14’ 54’’N, 1° 03’ 24’’E
53.248545°, 1.056762°
Lambert Azimuthal Equal Area projection

Site surface area

25.01km² / 2,500.97ha
Lambert Azimuthal Equal Area projection

Biogeographic region

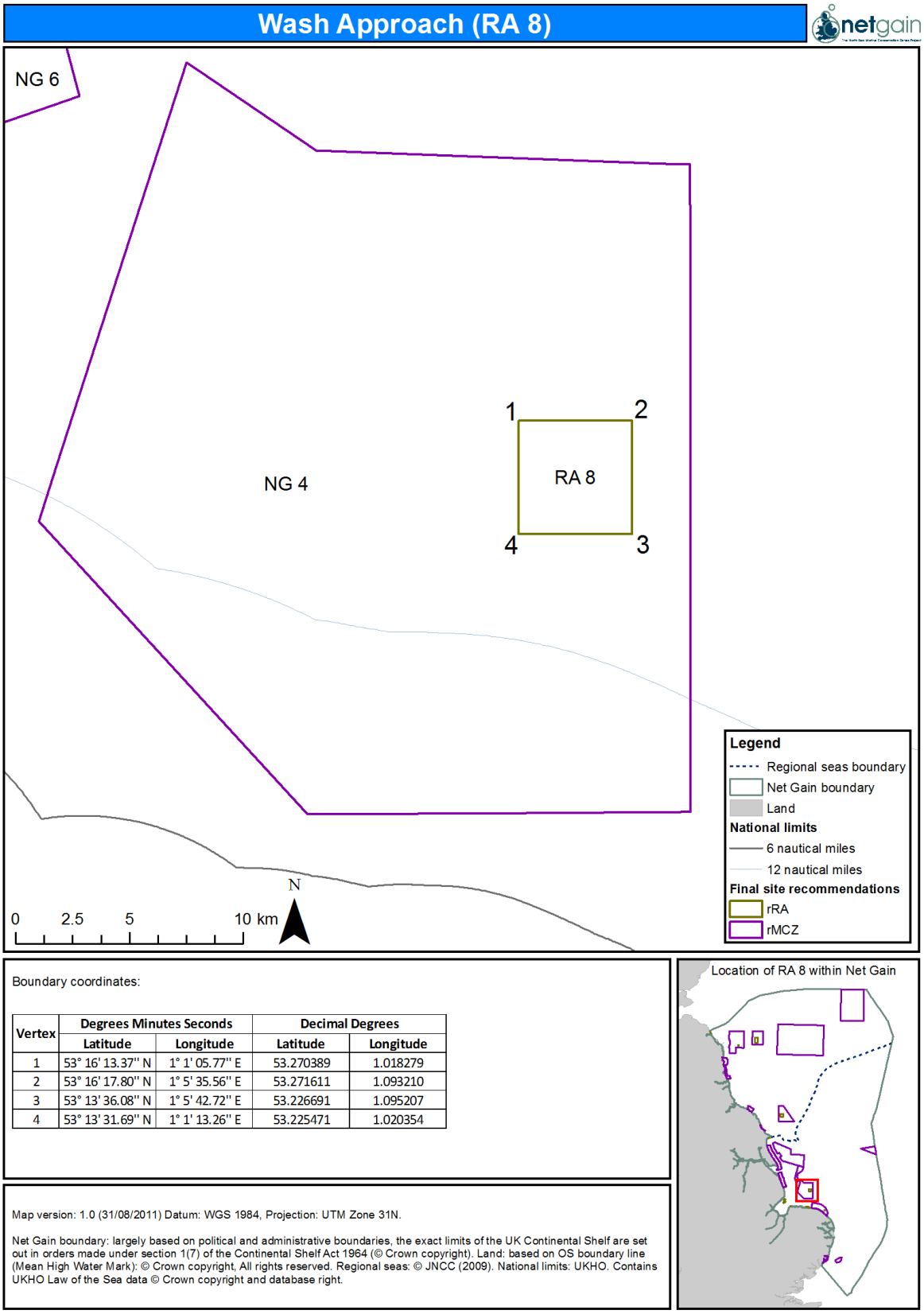
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.202 Features proposed for designation within rRA 8, Wash Approach rRA

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A5.4: Subtidal mixed sediments	25km²
Habitat of conservation importance	Sands and gravels (modelled)	25km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 8, Wash Approach rRA not proposed for designation

All features present within rRA 8 are recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	53° 16' 13.37" N	1° 1' 05.77" E	53.270389	1.018279
2	53° 16' 17.80" N	1° 5' 35.56" E	53.271611	1.093210
3	53° 13' 36.08" N	1° 5' 42.72" E	53.226691	1.095207
4	53° 13' 31.69" N	1° 1' 13.26" E	53.225471	1.020354

Figure 7.189 Location and extent of rRA 8 (Wash Approach rRA)

Site summary

rRA 8 is located within NG 4 approximately 27km off the Lincolnshire Coast, in the East of England. The depth of the site is between 10-15m (Figure 7.192) and the seabed is composed of subtidal mixed sediments and sands and gravels. The sediments support diverse communities of flora and fauna, including worms, bivalves, echinoderms, anemones, hydroids, bryozoa and starfish amongst other benthic organisms. Throughout the year the site is a popular feeding area for seals visiting from the common seal colony in the Inner Wash, and seabirds such as guillemot, fulmar, gannet and terns use the site to forage.

Detailed site description

rRA8 is being recommended for designation for the presence of the broadscale habitat; subtidal mixed sediments and the habitat of conservation importance subtidal sands and gravels. Due to the nature of these sediment types they can support a variety of organisms both within and on the sediment. Animals found include worms, bivalves, starfish, anemones, sea firs and sea mats (Natural England, 2011). rRA8 occurs within NG4 and is about 200m away from the Inner Dowsing, Race Bank and North Ridge SAC which protects subtidal course sediment, subtidal sand, subtidal mixed sediment, subtidal biogenic reefs, Ross worm (*Sabellaria spinulosa*) reefs and subtidal sands and gravels.

Field interpretation of multibeam and sidescan sonar in conjunction with Hamon grabs, drop down video and still photography has confirmed the presence of *Sabellaria spinulosa* to the east of Silver Pit within the Inner Dowsing, Race Bank and North Ridge SAC which overlaps with this area. Field analysis has classified this as a biogenic reef and a final report is due to be drawn up in March 2012 to confirm this (Saunders, 2011, Pers. Comm.).

Subtidal mixed sediments can be composed of different types of sediments from muddy, gravely sands to mosaics of cobbles and pebbles in sand, gravel or mud seabed. As the seabed is varied, it supports a wide range of animals both in and on the sediment. Worms, bivalves, echinoderms, anemones, hydroids and bryozoa can be found here (Natural England, 2011).

Subtidal sands and gravels are the most common habitats found below the level of the lowest low tide around the coast of the United Kingdom and they are also found within rRA8. They are largely derived and formed from rock material (Maddock, 2008). The diversity of flora and fauna living within the habitat varies according to the level of environmental stress to which they are exposed.

The site is of moderate ecological importance, data shows the area may be an important nursery and spawning ground for a variety of species such as herring, Dover sole, lemon sole, whiting and sandeels (Ellis, et al. 2010) (Figure 7.193; Figure 7.194). Survey data shows this site lies within the foraging range of Atlantic puffins, common guillemot, northern fulmar, northern gannet and sandwich tern (RSPB, 2010).

The wider area is a popular feeding site for seals all year round as it is close to a colony of common seal *(Phoca vitulina*) at the entrance of the Inner Wash and sightings are common (Clark et al., 2010; Natural England, 2010a; Centrica, 2007; Scira Offshore Energy, 2006). Harbour porpoise sightings are also regularly observed (Natural England, 2010b; Centrica, 2000).

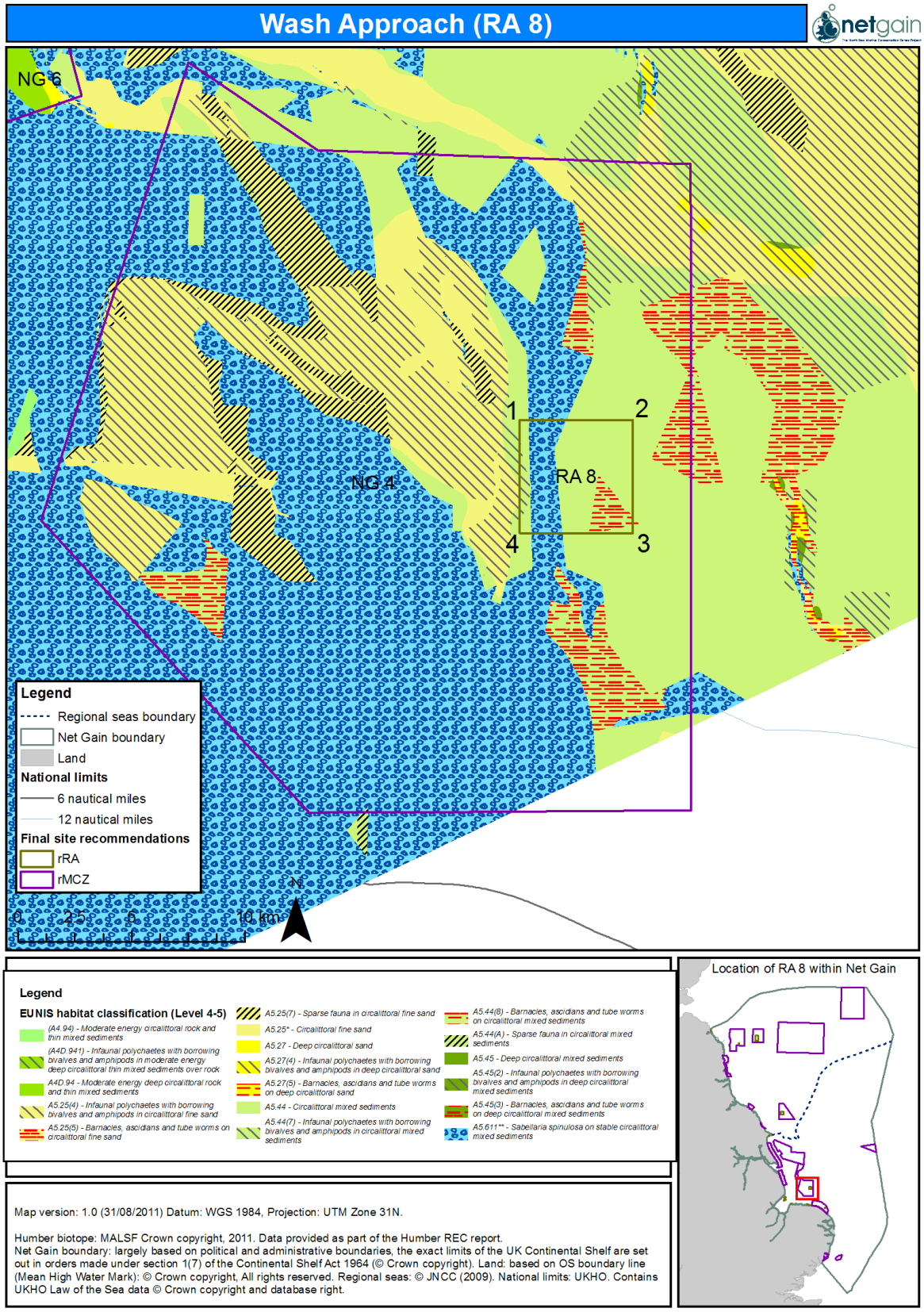


Figure 7.190 Features recommended for designation in rRA 8

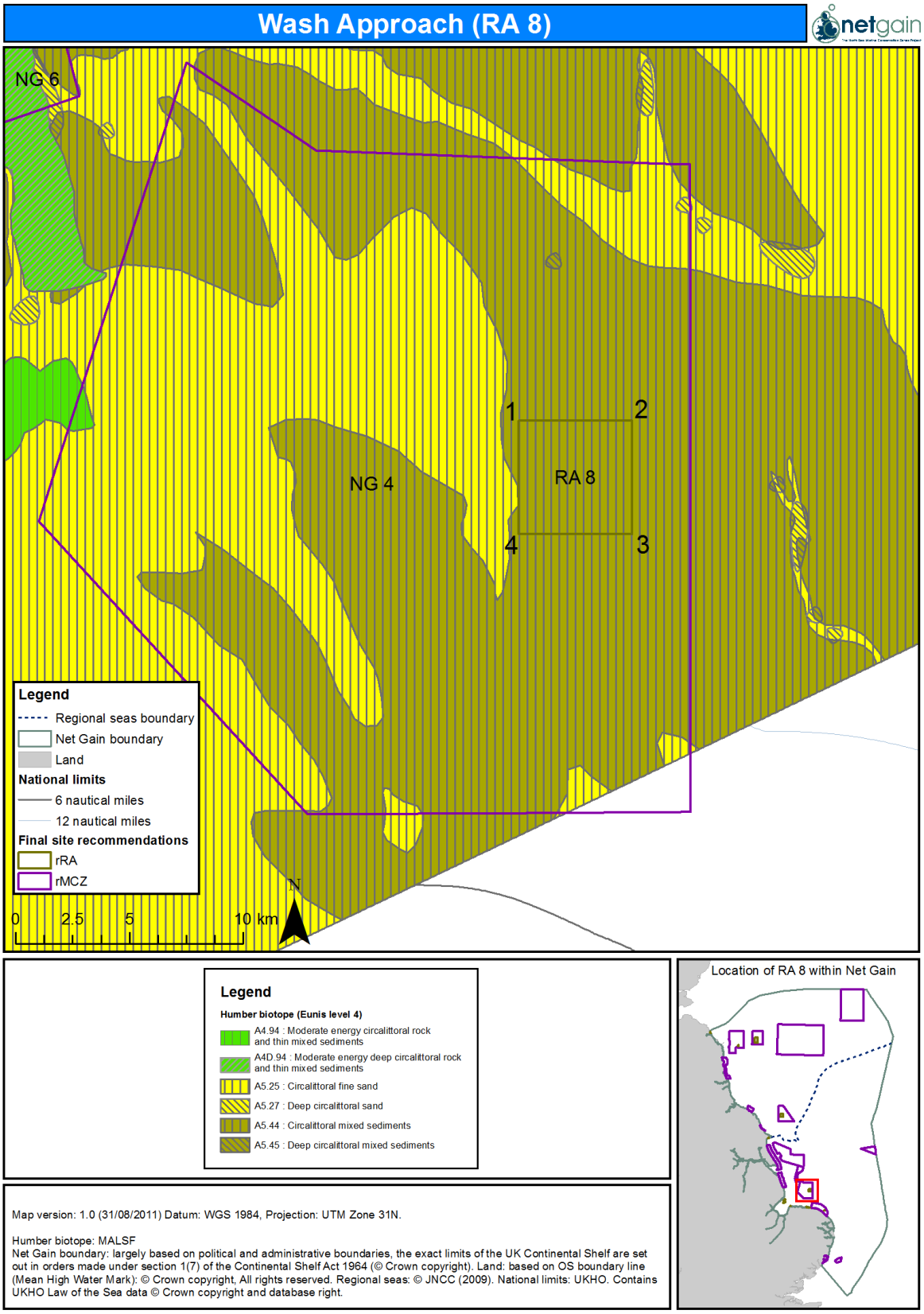


Figure 7.191 Additional broad-scale habitat data: Humber Regional Environmental Characterisation

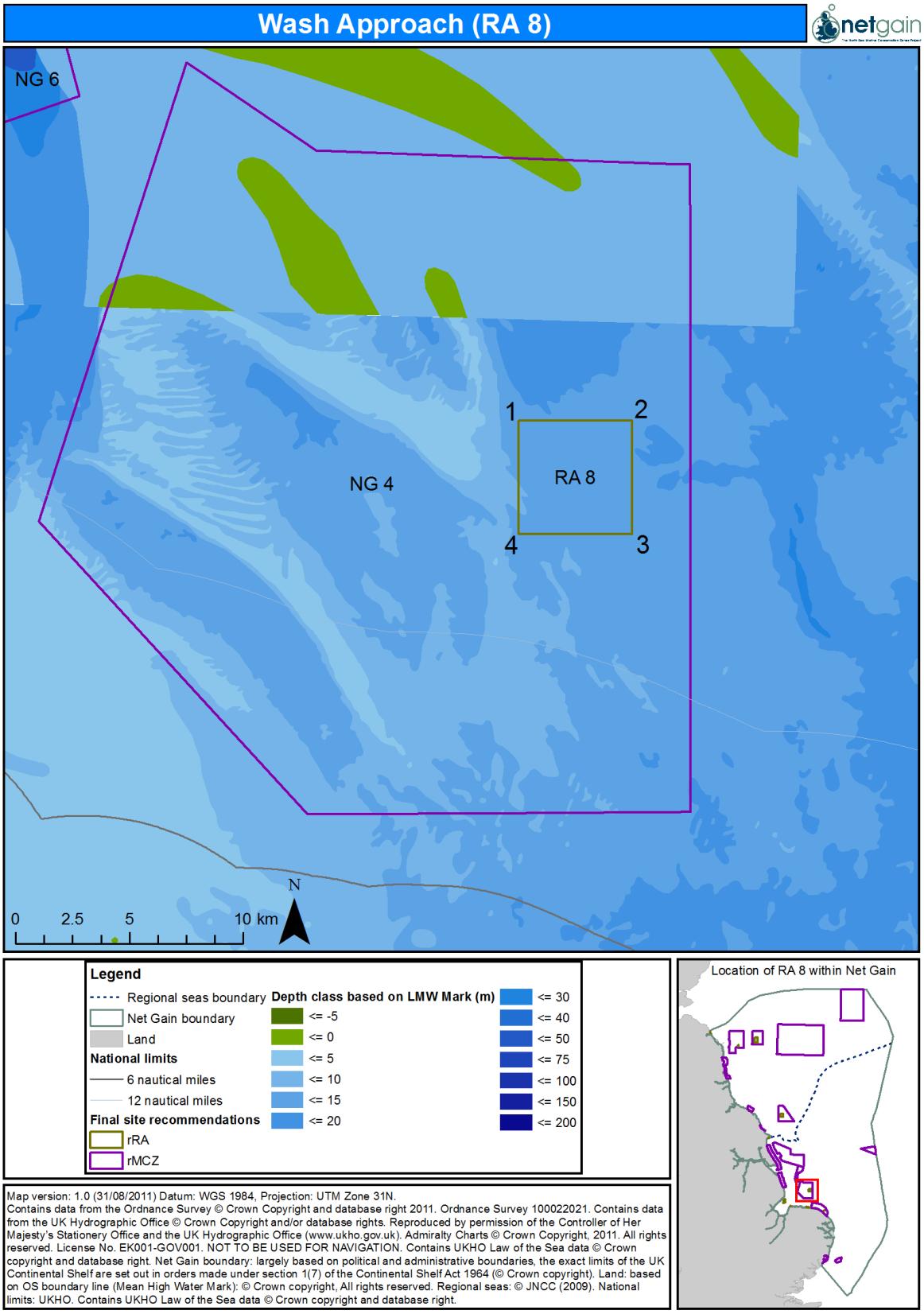
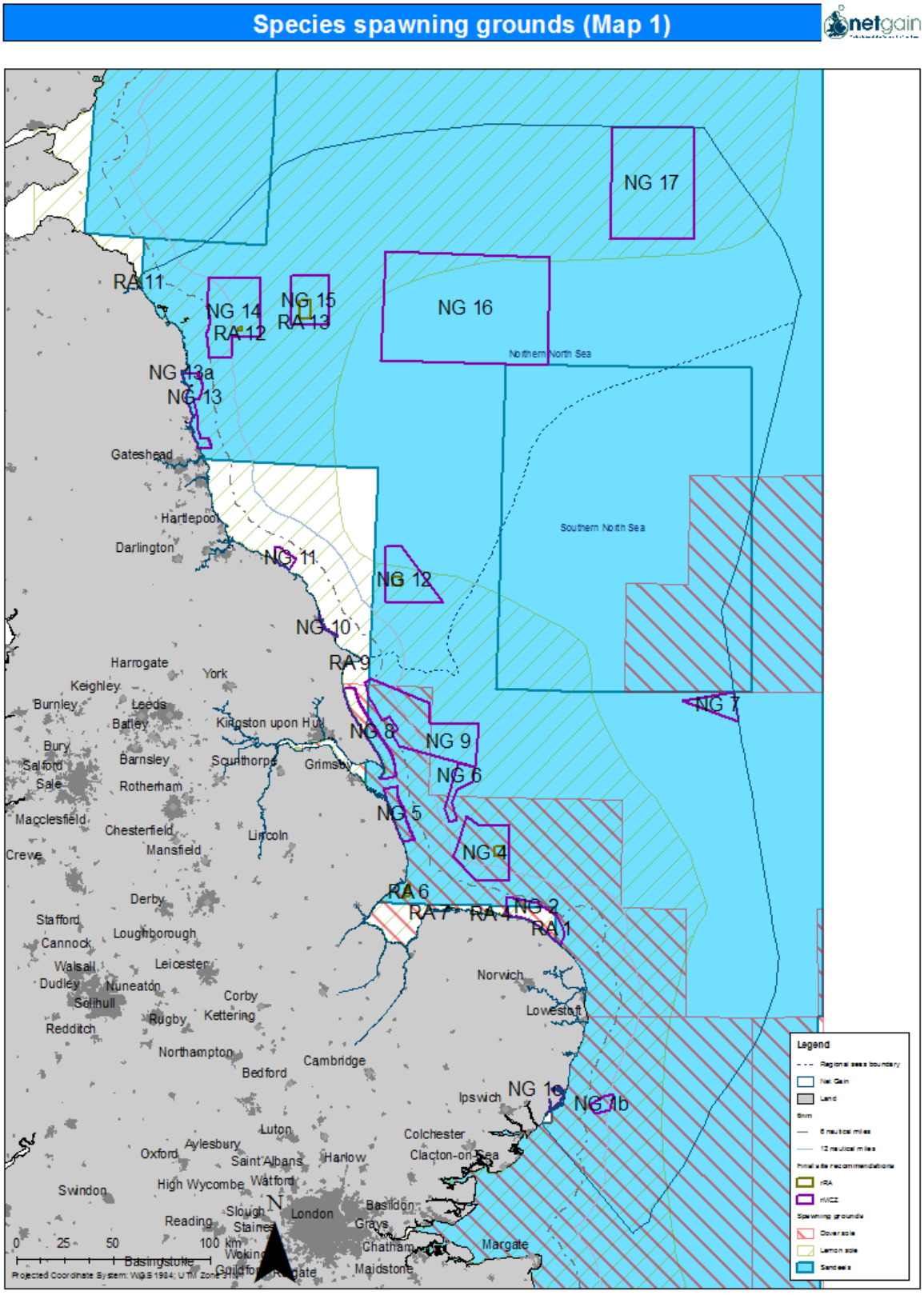
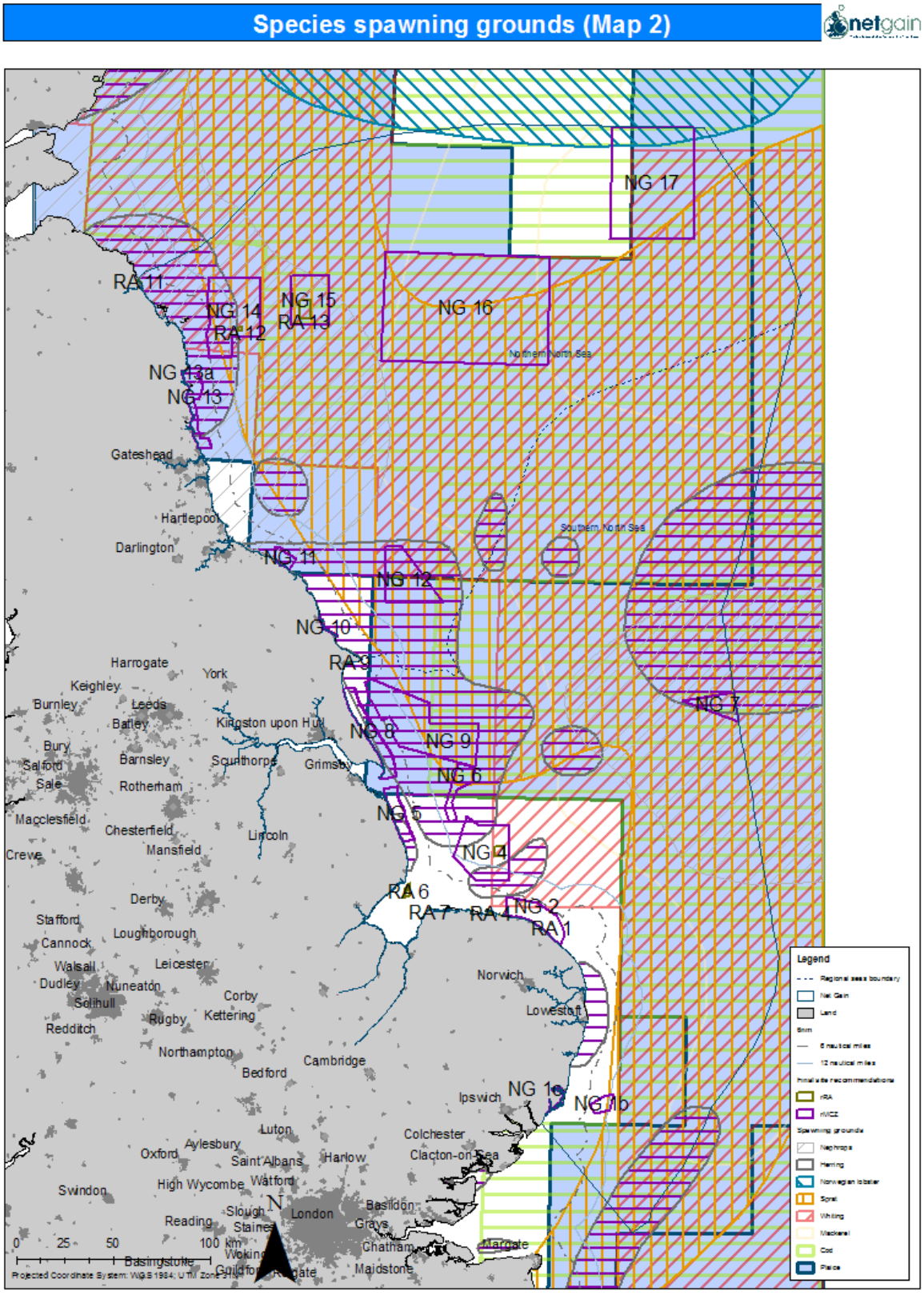


Figure 7.192 Bathymetry of rRA 8



Spawning data: Defra contract ME5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.193 Spawning grounds (map 1)



Spawning data: Defra contract MB5301. Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf ct 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright. All rights reserved. Regional seas ©JNCC (2009). Regional seas © JNCC (2009). All rights reserved. National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right. Human settlements: ESRI® Data & Maps.

Figure 7.194 Spawning grounds (map 2)

Site boundary

The site boundary for rRA 8 was derived from two options that had been previously discussed by the Regional Hub, both of which lay within NG 4. One of the options lay in the south-western portion of the site, the second roughly half way up the eastern boundary of the site. Discussions within the Hub concluded that the eastern site would be the preferred option to move forward with as this would have the least impact on sectors operating within the area.

Conservation objectives

Table 7.203 Conservation objectives for site rRA 8, A5.4: Subtidal mixed sediments

Section	
1 Conservation Objective	Subtidal mixed sediment is widespread around the British Isles and mainland Europe Subject to natural change, recover the subtidal mixed sediments to favourable condition by 2020 and maintain thereafter, and recover the subtidal mixed sediments in the area marked on map Figure 7.190 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal mixed sediments in the biogeographic region is recovered and the subtidal mixed sediments area marked on map Figure 7.190 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.204 Conservation objectives for site rRA 8, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.190 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is recovered and the subtidal sands and gravels area marked on map Figure 7.190 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 8 lies within NG 4. The north western boundary of the site is in close proximity (~200m) to the Inner Dowsing, Race Bank and North Ridge SAC.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.205 MPAs within or adjacent to rRA 8

MPA Type	Site Name	Features Protected
SAC	Inner Dowsing, Race Bank and North Ridge	A5.1: Subtidal coarse sediment A5.2: Subtidal sand A5.4: Subtidal mixed sediments A5.6: Subtidal biogenic reefs Ross worm (*Sabellaria spinulosa*) reefs Subtidal sands and gravels

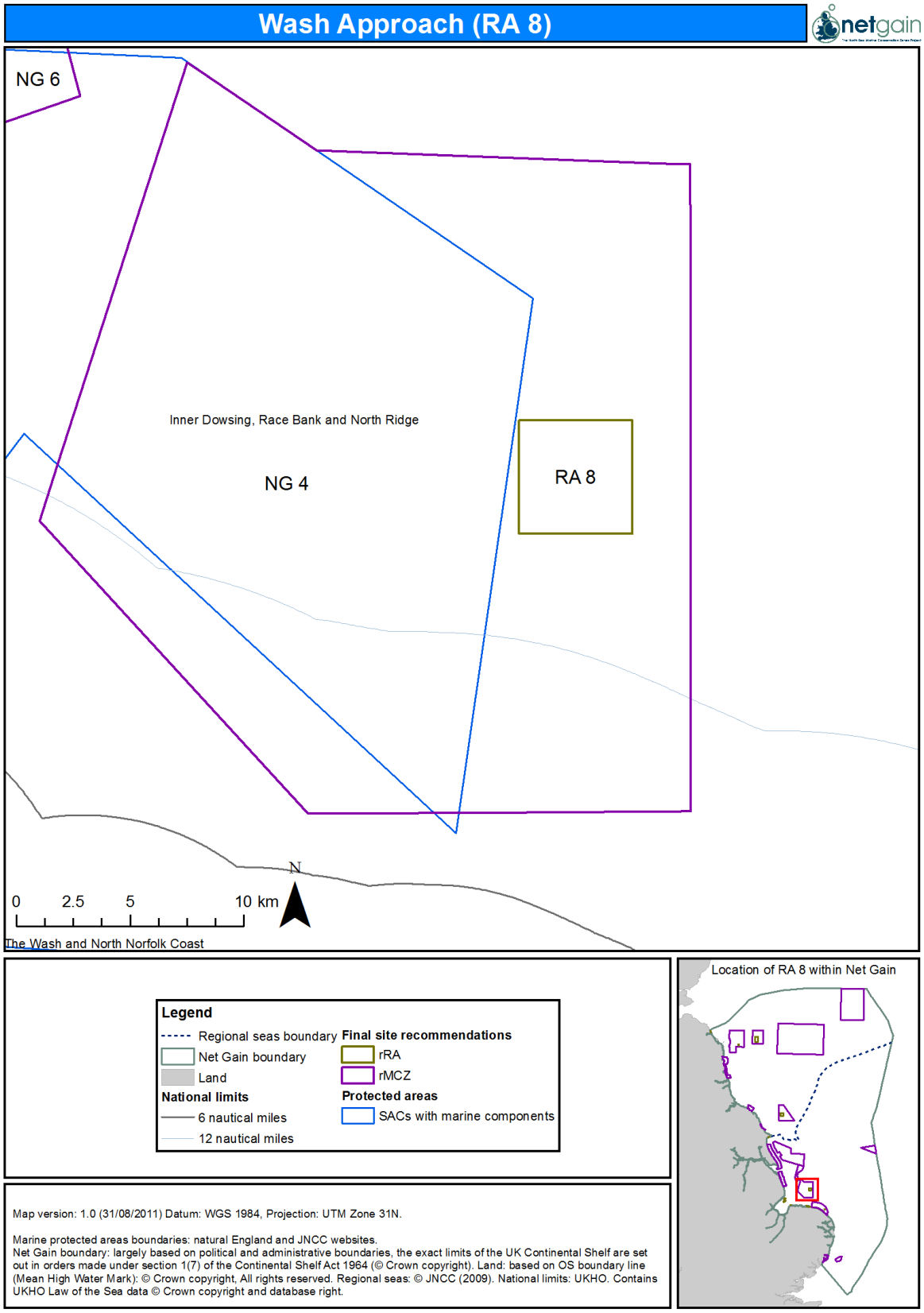


Figure 7.195 MPAs/rMCZs within or adjacent to rRA 8

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The consensus on the degree of support for the site was neutral. Whilst it was recognised that the site supported a variety of features, local static gear (potting) commercial fishing interests were strongly against it. This was especially in the light of the fact that the sector feels that offshore renewable developments are also effectively creating no take zones in the same area.

The confidence in the underlying data was low to moderate. Much of the discussion underpinning the site selection had been based on modelled data interpolated from REC data. There was less confidence in the data that related specifically to this site than there was for site NG4 (within which this Reference Area is located). It was suggested that the selection of the site had been based on stakeholders' discussions and the avoidance of impacts rather than the objective review of available data; consequently site boundaries are related more to management implications and potential impacts on industry rather than feature distribution. Questions were asked regarding the reconciliation of different (spatially coincident) data sets – (for example REC-derived mixed sediment features and the (modelled) subtidal sands and gravel habitat FOCI data).

No specific view was given regarding the potential level of contention over the site but it was suggested that the importance of this site to the commercial fishing sector may be cyclical, with the area becoming very important from a socio-economic standpoint on a five-year cycle.

Table 7.206 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Broad-scale habitat	Survey	Tappin, et al. 2011
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

CENTRICA, 2007. Lincs Offshore Windfarm Environmental Statement.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area.* JNCC.

ELLIS, J.R., MILLIGAN, S., READDY, L., SOUTH, A., TAYLOR, N. and BROWN, M. 2010. *Mapping the spawning and nursery grounds of selected fish for spatial planning*. Report to the Department of Environment, Food and Rural Affairs from Cefas. Defra Contract No. MB5301.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC

NATURAL ENGLAND. 2011. Subtidal Mixed Sediments. Available at: http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/broadhabitats/subtidalmixedsediments.aspx. Last accessed: 13 August 2011.

NATURAL ENGLAND. 2010a. Evidence Base for designation of Inner Dowsing, Race Bank and North Ridge Special Area of Conservation. Available at: http://www.naturalengland.org.uk/Images/IDRB-finalIA_tcm6-21633.pdf. Last accessed 12 August 2011

NATURAL ENGLAND. 2010b. Special Area of Conservation (SAC): Inner Dowsing, Race Bank and North Ridge. SAC Selection Assessment. Version 5.0. 1-34.

RSPB species foraging ranges, mean, mean maximum and maximum, received from Martin Kerby 2010

SAUNDERS, I. 2011. Pers comm.. (email)

SCIRA OFFSHORE ENERGY LTD, 2006. Sheringham Shoal Offshore Windfarm Environmental Statement.

TAPPIN, D.R., PEARCE, B., FITCH, S., DOVE, D., GEARY, B., HILL, J.M., CHAMBERS, C., BATES, R., PINNION, J., DIAZ DOCE, D., GREEN, M., GALLYOT, J., GEORGIOU, L., BRUTTO, D., MARZIALETTI, S., HOPLA, E., RAMSAY, E., FIELDING, H. 2011. *The Humber Regional Environmental Characterisation*. British Geological Survey Open Report OR/10/54. 357pp. MALSF, Crown copyright.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.27 Marine Conservation Zone: rRA 9, Flamborough Head No Take Zone

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. Addition of Flamborough Head and Bempton Cliffs SPA to Table 7.215. No changes have been made to recommendations or boundaries. Addition of footnote 33.

Site name

rRA 9, Flamborough Head No Take Zone

Site centre location

54° 05’ 53’’N, 0° 09’ 13’’W
54.098292°, -0.153684°
Lambert Azimuthal Equal Area projection

Site surface area

0.94km² / 93.53ha
Lambert Azimuthal Equal Area projection

Biogeographic region

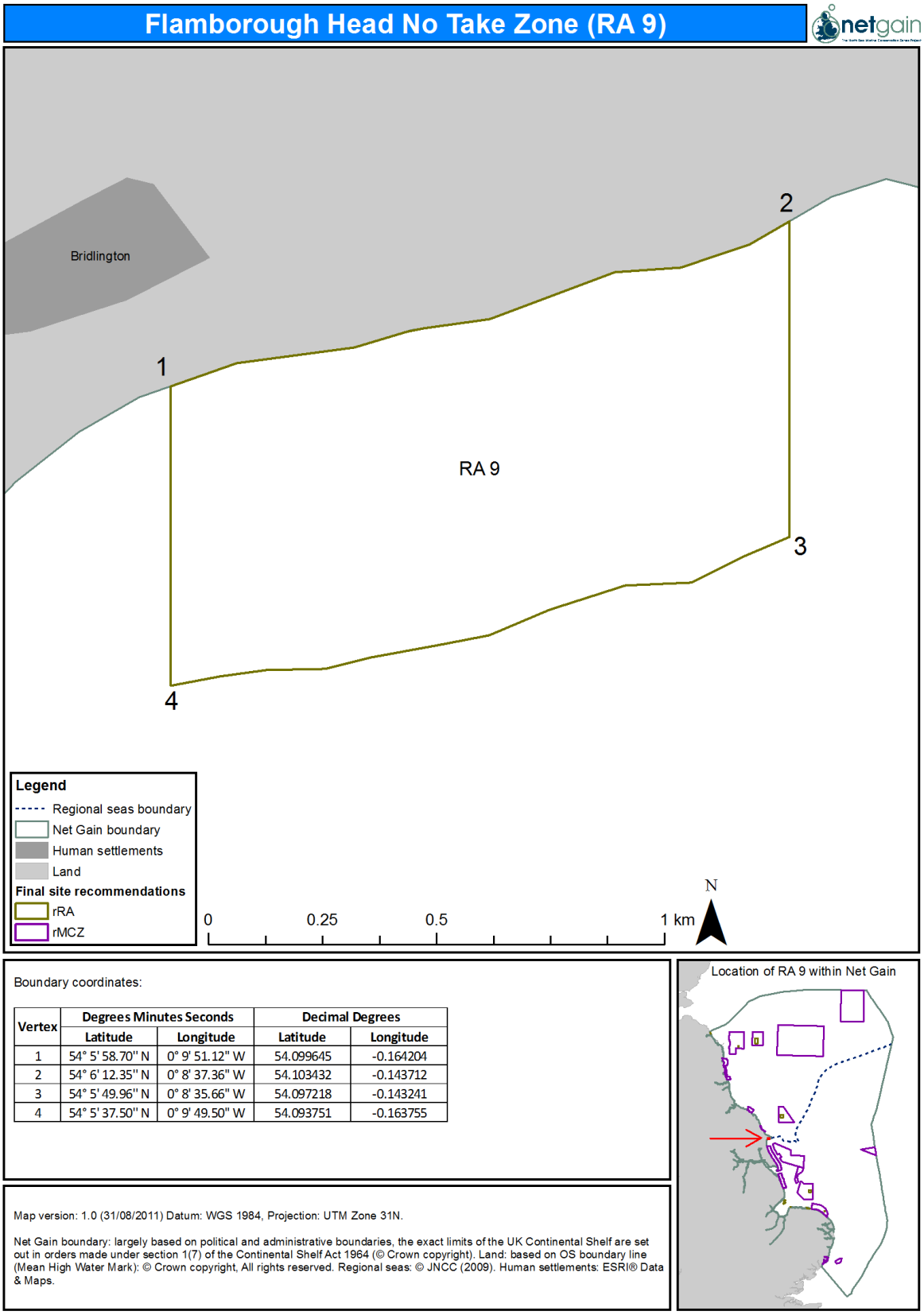
JNCC Regional Sea: Southern North Sea
OSPAR Region II: Greater North Sea

Table 7.207 Features proposed for designation within rRA 9, Flamborough Head No Take Zone

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A1.2: Moderate energy intertidal rock	0.00005km²
Broad-scale habitat	A2.1: Intertidal coarse sediments	0.0004km²
Broad-scale habitat	A2.2: Intertidal sand and muddy sand	0.00001km²
Broad-scale habitat	A3.1: High energy infralittoral rock	0.15km²
Broad-scale habitat	A3.2: Moderate energy infralittoral rock	0.79km²
Habitat of conservation importance	Littoral chalk communities (modelled)	0.53km length
Habitat of conservation importance	Subtidal sands and gravels	0.40km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 9, Flamborough Head No Take Zone not proposed for designation

All features present in rRA 9, Flamborough Head No Take Zone have been recommended for designation.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	54° 5' 58.70" N	0° 9' 51.12" W	54.099645	-0.164204
2	54° 6' 12.35" N	0° 8' 37.36" W	54.103432	-0.143712
3	54° 5' 49.96" N	0° 8' 35.66" W	54.097218	-0.143241
4	54° 5' 37.50" N	0° 9' 49.50" W	54.093751	-0.163755

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Net Gain boundary: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark): © Crown copyright, All rights reserved. Regional seas: © JNCC (2009). Human settlements: ESRI® Data & Maps.

Figure 7.196 Location and extent of site rRA 9 (Flamborough Head No Take Zone)

Site summary

rRA 9 is a coastal site located south west of Flamborough Head. The depth within the site is between 6m above mean low water mark and 2m deep (Figure 7.198). The site is put forward for the protection of littoral chalk communities, however there are also a number of sediment and rock features present within the site that would be afforded protection. Because of the North Eastern IFCA no take zone (NTZ) within the site, the area is currently monitored and good baseline data is available. The NTZ prevents the removal of fish and shellfish, with the aims to examine changes to populations of marine species. There are strong tides within the site and the area is generally very turbid. The site has a high diversity of species that include blue mussels, barnacles, limpets, whelks, winkles, algae, fish, bryozoans, crustaceans, and sea squirts to name a few. Due to the close proximity to the Flamborough Head and Bempton Cliffs SPA and RSPB reserve, the area supports abundant numbers of seabirds and populations of migrating European importance, including kittiwake, razorbill, guillemot, puffins, gannets and gulls.

Detailed site description

Recommended RA9 is being proposed to protect the presence of littoral chalk communities that provide substrate for unique communities of seaweeds and invertebrate species. rRA9 has a depth range of 0-2m according to UKHO data received by the Net Gain team (Figure 7.198), it has strong tides and due to the exposed nature of the site the water is generally very turbid. The erosion of chalk exposures on the coast has resulted in the formation of vertical cliffs and gently sloping intertidal platforms with a range of microhabitats of biological importance. Such coastal exposures of chalk are rare in Europe: over half of these seascapes (57%) (ICES 2003) are recorded from the southern and eastern coasts of England.

rRA9 lies within the Flamborough Head Special Area of Conservation (SAC) and the Flamborough Head site of Special Scientific Interest (SSSI). The SAC is designated for high energy intertidal rock, high energy infralittoral rock, high energy circalittoral rock, subtidal biogenic reefs, blue mussel beds, intertidal underboulder communities, littoral chalk communities, subtidal chalk and sea caves. Within rRA9 recommended features include the moderate energy intertidal rock, intertidal coarse sediment, intertidal sand and muddy sand, high and moderate energy infralittoral rock, along with the subtidal sands and gravels and littoral chalk communities habitat FOCI.

Chalk communities are protected under the UKBAP Priority Habitats and the OSPAR List of Threatened and/or Declining Species and Habitats (Region II – Greater North Sea). The south side of the headland encompassing rRA9 has softer chalk reducing the likelihood of exposed and submerged sea caves.

North Eastern Sea Fisheries Committee (NESFC), now North Eastern Inshore Fisheries and Conservation Authority (NEIFCA), developed Byelaw XXVII - Flamborough Head No Take Zone (NTZ). The area runs from Sewerby Steps to Dane's Dyke, extending 700m seaward from the cliff base and is largely coincident with rRA9. This byelaw prohibits the removal of seafish, including shellfish, by any method from within the defined area. This area was the third NTZ to be formally designated in UK waters and the first to contain intertidal habitat. This aims to examine any changes to populations of marine species if they are no longer removed from this area, and to help the area return to a more "natural" state (Flamborough Head Management Plan - Annual Report 2010/11). This will also help to increase the local blue mussel (*Mytilus edulis*) spawning stock biomass through the protection and development of a permanent brood stock within the Flamborough Head NTZ. Blue mussel on sediment is identified as a UK BAP priority habitat.

Blue mussels (*Mytilus edulis*) are found on moderate energy and high energy intertidal rock commonly found associated with barnacles (*Semibalanus balanoides)*, limpets (*Patella vulgate),* whelks (*Nucella lapillus)* and winkles (*Littorina littorea)* within the mussel bed. Lower on the shore there is low abundance of the wrack, *Fucus serrate,s* and red seaweeds. The red seaweeds may

include *Palmaria palmata*, *Mastocarpus stellatus,* and *Chondrus crispus*. In the sublittoral fringe is a biotope dominated by the kelp *Laminaria digitata*. These species occur down to about 15m and provide important nursery areas for fish such as wrasse and shelter for bryozoans, anemones and sea squirts. A seasearch survey conducted in 2009 in the Flamborough Head NTZ (coincident with rRA 9) found that crustaceans dominated the site, with 13 species recorded, including the spiny squat lobster (*Galathea strigosa),* velvet swimming crab (*Necora puber*), common shore crab (*Carcinus maenas*), harbour crab (*Liocarcinus depurator*), and edible crab (*Cancer pagurus*).

rRA9 lies adjacent to the Flamborough Head and Bempton Cliffs Special Protected Area (SPA) which supports at least 20,000 seabirds with populations of European importance of migratory species. The chalk cliffs have been weathered by wind and sea, creating nesting ledges for seabirds during the summer months. These include the internationally important kittiwake (*Rissa tridactyla*), nationally important razorbill (*Alca torda*) with 7,700 individuals, guillemot (*Uria aalge*) with 45,000 individuals and puffin (*Fratercula arctica*) with 7,000 individuals. During winter the cliffs are utilised by shag (*Phalacrocorax aristotelis*), and year round herring gull (*Larus argentatus*). The cliffs also support England's only, and the UK's largest, mainland gannet (*Morus bassanus*) colony during the summer. Kittiwake are by far the most abundant of the nesting seabirds on the cliffs of Flamborough Head with an average of 44,000 pairs from 2000-2004; 12% of the UK population. The seabirds feed and raft in the waters around the cliffs, outside the SPA, as well as feeding more distantly in the North Sea.

Algaes such as Chrysophyceae, small yellowish brown flagellates, and Haptophyceae are found on vertical upper littoral fringe soft rock showing distinct zonation patterns (Anand 1937a, b, c; Magne, 1974; Tittley and Shaw 1980). The height of the supralittoral zone and the height of each individual algal zone is dependent on moisture and humidity. The surface of soft rock provides an extra complexity of pits and crevices that retain moisture and provide shelter from drying winds and sunlight. These organisms are single celled microalgae and form a thallus of algal cells bound by mucilage or filaments of mucilage (van den Hoek, et al. 1995). Zones have distinct colours of orange (*Chrysotila lamellosa*), brown, black and green (*Epocladia perforans*). Terrestrial species are associated with this zone are red mites, insects and centipedes, moving in as the tides fall to graze upon the algae. The most commonly found marine grazer is the small winkle (*Melarhaphe neritoides*) (Tittley & Spurrier 2001).

Intertidal aspects of rRA9 have dense mats of green seaweeds, such as gut weed (*Ulva intestinalis*) and sea lettuce (*Ulva lactuca*). Closer to the low water mark, specialised rock-boring animals such as the common piddock (*Pholas dactylus*) a bivalve, and the chalk boring yellow sponge (*Cliona celatal)* are found. They are only able to survive in these soft rock biotopes, with old burrows providing refuge for other species. Eunice Pinn (2011. pers. comm.) found a statistically significant increase in species diversity where old burrows were present compared to where they were absent, influencing overall biodiversity. This species is highly vulnerable to the loss of chalky substratum. These are overlain by mostly algal-dominated communities (fucoids and red algal turfs) (Gubbay, 2002).

Flamborough Head is known for harbour porpoise sightings and due to the highly migratory nature of this species it can be assumed that they may utilise the waters in rRA9. The mixing of water causes an upwelling of nutrients around the headland resulting in a food chain of plankton, fish, seabirds and cetaceans. Other sightings from Flamborough Head have included minke whales and common dolphins.

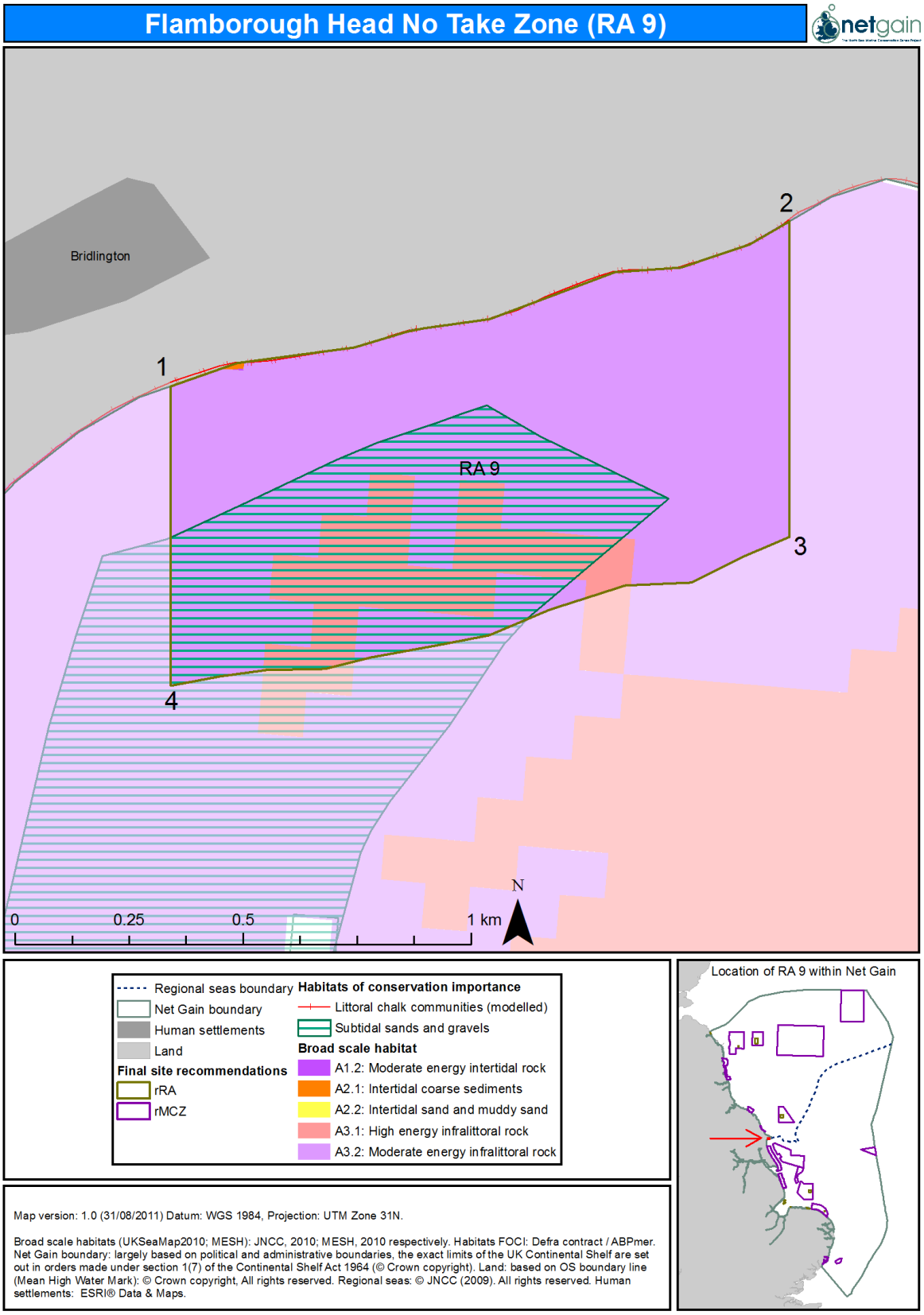


Figure 7.197 Features recommended for designation in rRA 9

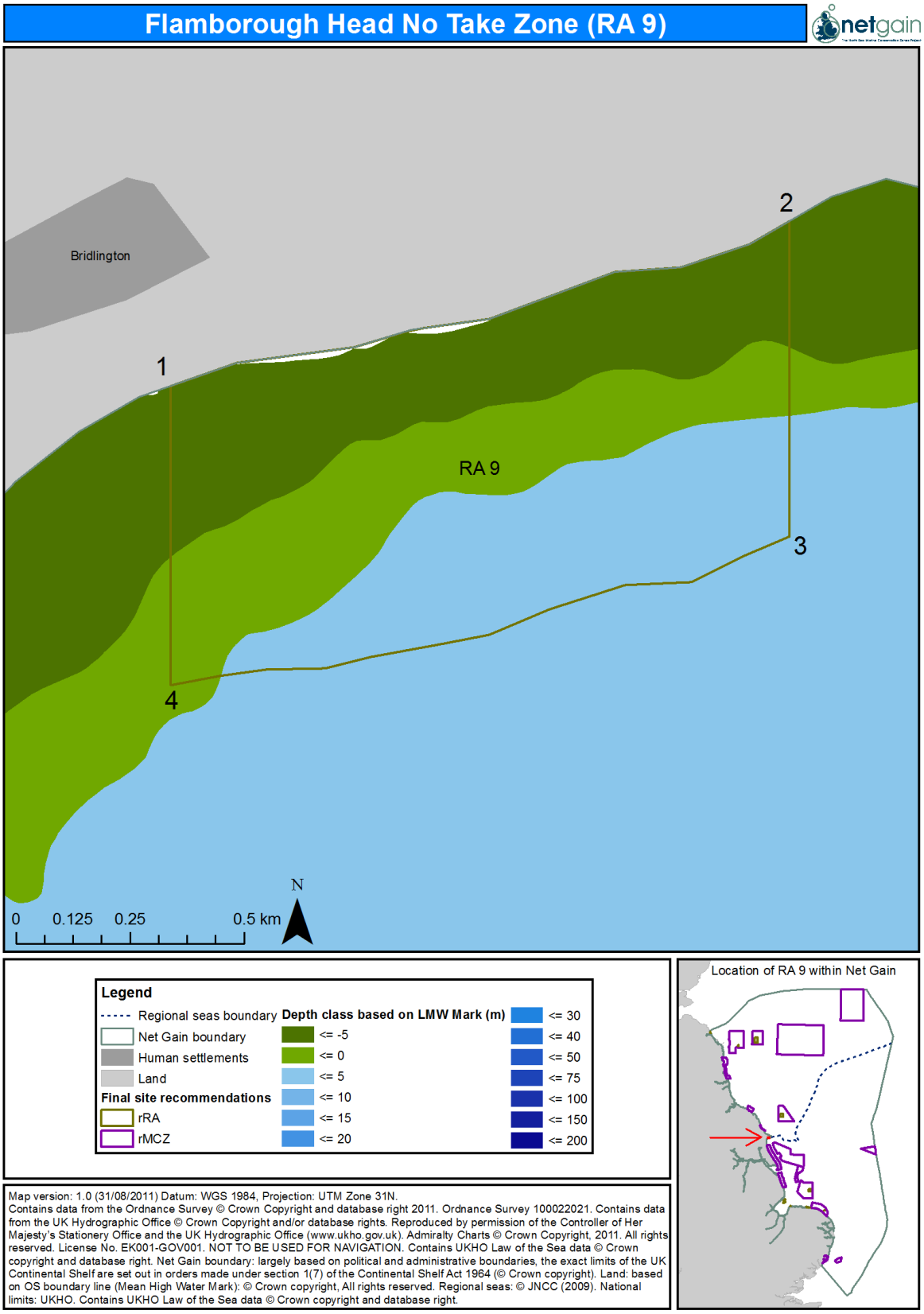


Figure 7.198 Bathymetry of rRA 9

Site boundary

The boundary of rRA 9 was extended from the shoreline (where it was originally discussed for the protection of littoral chalk communities) to cover the intertidal and immediate subtidal areas coincident with the existing NTZ. A further extended area (c.300m south from the existing no-take zone that is present at Flamborough Head, running from Danes Dyke to Sewerby Steps and 700m seaward) was recommended on the assumption that there would not be any implications for ongoing fishing activity in the area[35]. It is thought that the addition of the reference area will assist in protecting the littoral chalk communities and other features present.

[35] Given that designation of a reference area would result in removal of all extractive, depositional and potentially damaging or disturbing activities from the site, there would be clear implications on ongoing fishing activity if the 300m extension to the site beyond the existing NTZ was approved. For that reason, although there is implied agreement for the extension, Net Gain has not included the extension within the proposed site boundary, analysis of ENG targets or Impact Assessment. All analysis has been based on rRA9 boundaries which coincide with the existing NTZ.

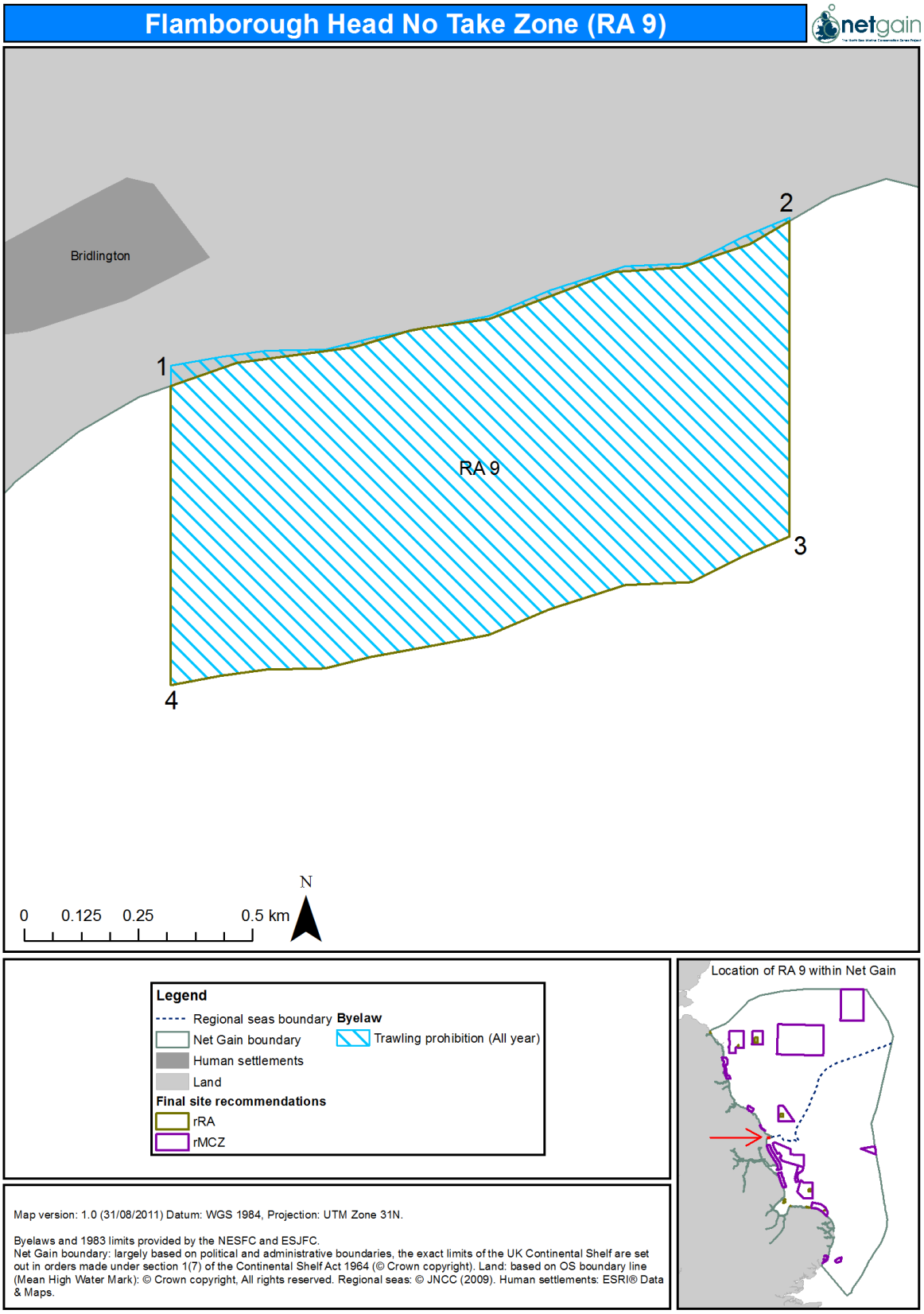


Figure 7.199 rRA 9 site boundary with associated fishery management locations

Conservation objectives

Table 7.208 Conservation objectives for site rRA 9, A1.2: Moderate energy intertidal rock

Section	
1 Conservation Objective	Moderate energy intertidal rock is moderately exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, recover the moderate energy intertidal rock to reference condition by 2020 and maintain thereafter, and recover the moderate energy intertidal rock in the area marked on map Figure 7.197 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the moderate energy intertidal rock in the biogeographic region is recovered and the moderate energy intertidal rock area marked on map Figure 7.197 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.209 Conservation objectives for site rRA 9, A2.1: Intertidal coarse sediment

Section	
1 Conservation Objective	Intertidal coarse sediment is an uncommon broadscale habitat found at a few scattered sites in the British Isles and in north-western Europe Subject to natural change, recover the intertidal coarse sediment to favourable condition by 2020 and maintain thereafter, and recover the intertidal coarse sediment in the area marked on map Figure 7.197 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal coarse sediment in the biogeographic region is recovered and the intertidal coarse sediment area marked on map Figure 7.197 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.210 Conservation objectives for site rRA 9, A2.2: Intertidal sand and muddy sand

Section	
1 Conservation Objective	Intertidal sand and muddy sand are widespread along stretches of open coast around the British Isles whilst muddy sands are usually found in more sheltered areas such as estuaries. Subject to natural change, recover the intertidal sand and muddy sand to favourable condition by 2020 and maintain thereafter, and recover the intertidal sand and muddy sand in the area marked on map Figure 7.197 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal sand and muddy sand in the biogeographic region is recovered and the intertidal sand and muddy sand area marked on map Figure 7.197 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.211 Conservation objectives for site rRA 9, A3.1: High energy infralittoral rock

Section	
1 Conservation Objective	High energy infralittoral rock is representative of shallow water rock, below the tides exposed to very strong waves and currents Subject to natural change, recover the high energy infralittoral rock to favourable condition by 2020 and maintain thereafter, and recover the high energy infralittoral rock in the area marked on map Figure 7.197 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the high energy infralittoral rock in the biogeographic region is recovered and the high energy infralittoral rock area marked on map Figure 7.197 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.212 Conservation objectives for site rRA 9, A3.2: Moderate energy infralittoral rock

Section	
1 Conservation Objective	Moderate energy infralittoral rock is exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, recover the moderate energy infralittoral rock to favourable condition by 2020 and maintain thereafter, and recover the moderate energy infralittoral rock in the area marked on map Figure 7.197 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the moderate energy infralittoral rock in the biogeographic region is recovered and the moderate energy infralittoral rock area marked on map Figure 7.197 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.213 Conservation objectives for site rRA 9, Littoral chalk communities (modelled)

Section	
1 Conservation Objective	Littoral chalk communities are on the UK List of Priority Species and Habitats (UK BAP) and OSPAR List of Threatened and/or Declining Species and Habitats. Subject to natural change, recover the littoral chalk communities to favourable condition by 2020 and maintain thereafter, and recover the littoral chalk communities in the area marked on map Figure 7.197 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the littoral chalk communities in the biogeographic region is recovered and the littoral chalk communities area marked on map Figure 7.197 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.214 Conservation objectives for site rRA 9, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.197 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is recovered and the subtidal sands and gravels area marked on map Figure 7.197 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 9, lies within the existing Flamborough Head SAC and SSSI, and in close proximity to the Flamborough Head and Bempton Cliffs SPA.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.215 MPAs within or adjacent to rRA 9

MPA Type	Site Name	Features Protected
SAC	Flamborough Head	A1.1: High energy intertidal rock A3.1: High energy infralittoral rock A4.1: High energy circalittoral rock A5.6: Subtidal biogenic reefs Blue mussel beds Intertidal underboulder communities Littoral chalk communities Subtidal chalk
SSSI	Flamborough Head	Not in GAP table Geological Botanical
SPA	Flamborough Head and Bempton Cliffs	Not in GAP table Breeding birds

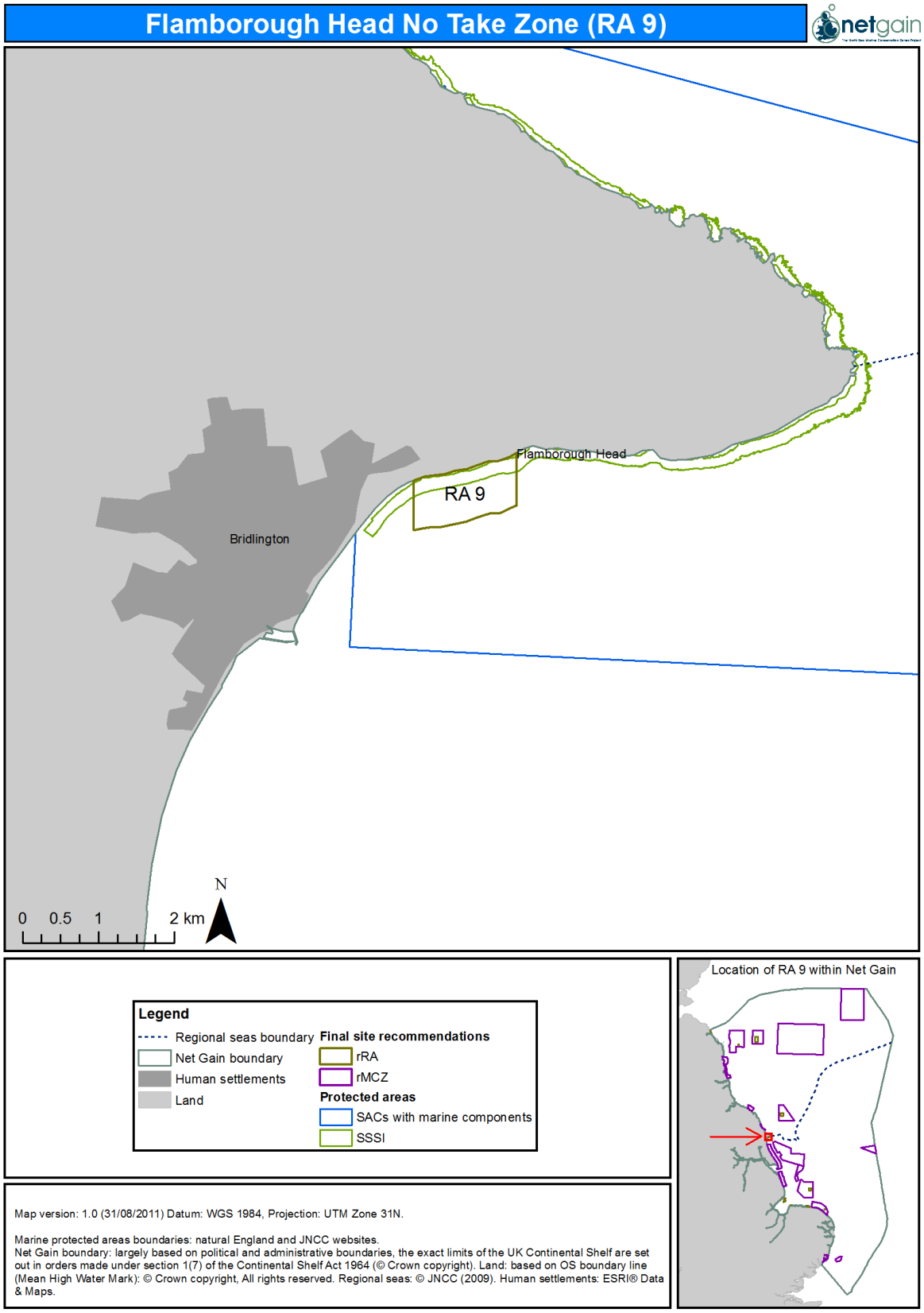


Figure 7.200 MPAs/rMCZs within or adjacent to rRA 9

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

In terms of the consensus view expressed at the LGM, the site was strongly supported, reflecting consensus achieved at the Regional Hubs.

Confidence in the underlying data was high, and it was noted that the data collection process was ongoing (with East Riding of Yorkshire Council surveys being undertaken). It was suggested that there may be more data available that has not yet been collated but which may be used to provide additional support for site designation.

The potential level of contention associated with the site was felt to be low.

Table 7.216 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Littoral chalk communities	Modelled data	Tyler-Walters, et al. 2009
Subtidal sands and gravels	Combination of historical and recent records	Tyler-Walters, et al. 2009

References

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

EUNICE PINN, 2011. pers. comm..

HILL, J., 2006. *Pholas dactylus*. *Common piddock*. *Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line*]. Plymouth: Marine Biological Association of the United Kingdom. [cited 14/08/2011McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

PIZZOLLA, P., 2008. *Ulva lactuca*. *Sea lettuce. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line].* Plymouth: Marine Biological Association of the United Kingdom. [cited 14/08/2011].

SABATINI, M., 2005. *Calliblepharis ciliata. Eyelash weed. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line*]. Plymouth: Marine Biological Association of the United Kingdom. [cited 14/08/2011].

SNOWDEN, E., 2007. *Cliona celata. A sponge. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line*]. Plymouth: Marine Biological Association of the United Kingdom. [cited 14/08/2011].

TYLER-WALTERS, H. 2008. *Chrysophyceae on vertical upper littoral fringe soft rock. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line].* Plymouth: Marine Biological Association of the United Kingdom. [cited 14/08/2011].

TYLER-WALTERS, H. 2008. *Mytilus edulis and barnacles on very exposed eulittoral rock. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line].* Plymouth: Marine Biological Association of the United Kingdom. [cited 14/08/2011].

TYLER-WALTERS, H. 2008. *Fucoids and kelps in deep eulittoral rockpools. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line].* Plymouth: Marine Biological Association of the United Kingdom. [cited 14/08/2011

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.28 Marine Conservation Zone: rRA 10, Compass Rose rRA

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 10, Compass Rose rRA (falls within NG 12, Compass Rose)

Site centre location

54° 28’ 52’’N, 0° 11’ 23’’E
54.481324°, 0.189914°
Lambert Azimuthal Equal Area projection

Site surface area

25km² / 2,499.97ha
Lambert Azimuthal Equal Area projection

Biogeographic region

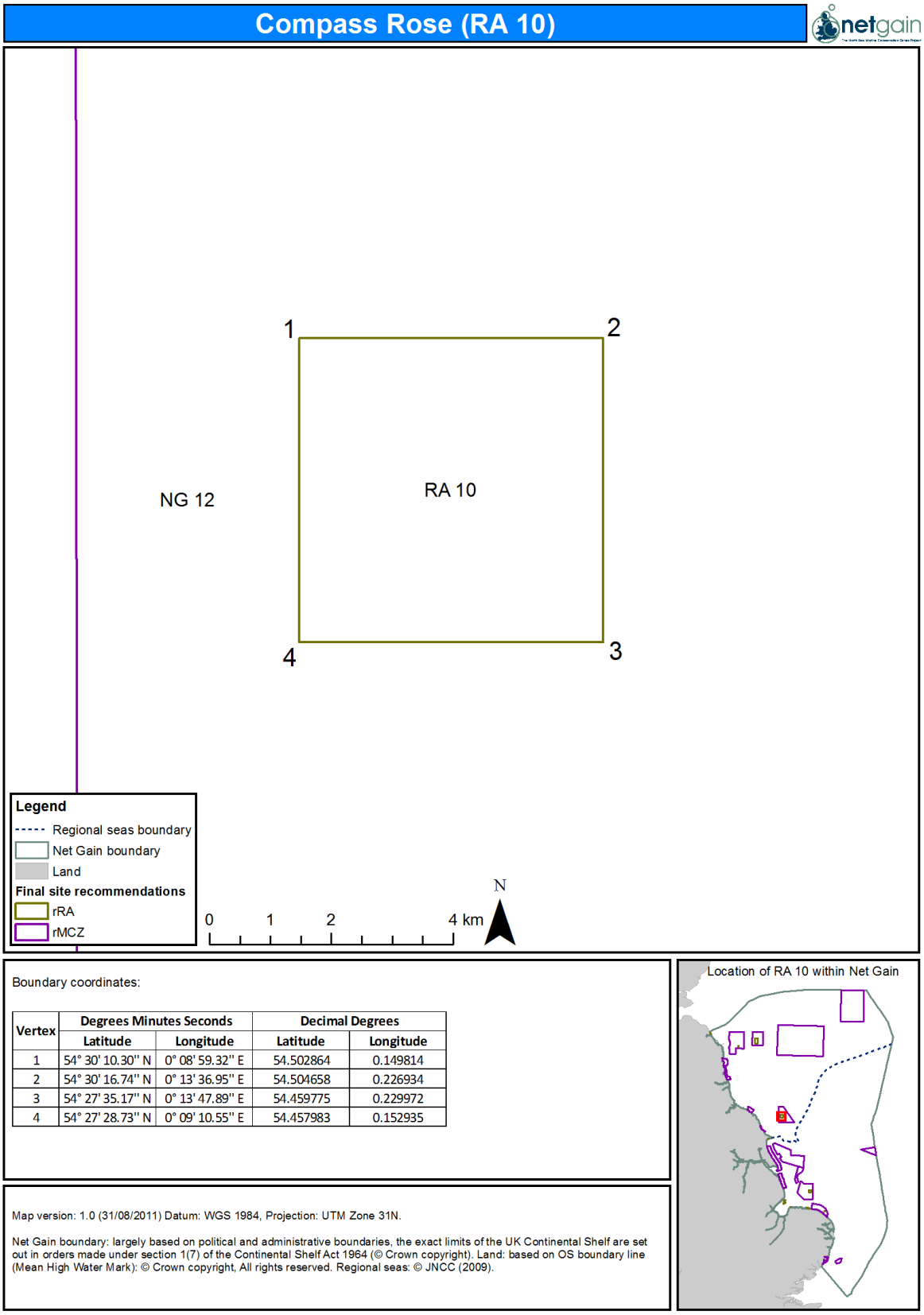
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.217 Features proposed for designation within rRA 10, Compass Rose rRA

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	21.80km²
Broad-scale habitat	A5.2: Subtidal sand	3.20km²
Habitat of conservation importance	Subtidal sands and gravels (modelled)	25km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 10, Compass Rose rRA not proposed for designation

All features present in rRA 10 are recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	54° 30' 10.30" N	0° 08' 59.32" E	54.502864	0.149814
2	54° 30' 16.74" N	0° 13' 36.95" E	54.504658	0.226934
3	54° 27' 35.17" N	0° 13' 47.89" E	54.459775	0.229972
4	54° 27' 28.73" N	0° 09' 10.55" E	54.457983	0.152935

Figure 7.201 Location and extent of site rRA 10 (Compass Rose rRA)

Site summary

rRA 10 falls within NG 12 approximately 28km offshore from the North Yorkshire coast in the North East of England. The depth of the site is approximately 50m (Figure 7.203) and the seabed is composed of two broadscale habitats; moderate energy circalittoral rock and subtidal sand, and the habitat FOCI subtidal sand and gravels. The site was chosen more specifically to protect the moderate energy circalittoral rock, as in the surrounding NG 12. This habitat supports communities of corals, anemones, sponges, mussels, worms, starfish, brittle stars and sea urchins (Natural England, 2011).

Detailed site description

Site rRA10 is located within the boundaries of rMCZ NG12 and is being recommended for designation mainly due to the presence of the two broad scale habitats, moderate energy circalittoral rock and subtidal sand and the subtidal sands and gravels habitat of conservation importance (HOCI). The site covers a total surface area of 25 km^2.

The broad-scale habitat (moderate energy circalittoral rock) which is the focus of this sites recommendation is defined as 'deeper water rock, with some shelter from waves and currents (JNCC, 2011). This habitat feature supports primarily algal species in shallow waters whilst in deeper waters, such as present within rRA 10 where there is insufficient sunlight for algal growth, high densities of animal communities are supported. Such communities can include cup coral, sea-fans, anemones, sponges, mussels, worms, starfish, brittle stars and sea urchins (Natural England, 2011).

Subtidal coarse sediments and subtidal sands are the two most common habitats below the lowest low level tide around the United Kingdom (Maddock, 2008). The flora and fauna associated with these habitats is dependent upon the level of local environmental stress. Areas of strong tidal action have little flora so the resident species tend to be burrowers such as polychaetes, bivalves, and amphipods (Maddock, 2008). This abundance of burrowing species makes ideal prey for mobile predators such as crabs, seals, and dolphins. Shallow sandy sediments (Subtidal sand) are an ideal habitat for sandeels which form an important diet constituent for marine mammals (particularly seals) and an important food source for seabirds (JNCC, 2011).

As this site is located within the boundaries of NG12, it may be influenced by the small portion of the Flamborough Frontal System which migrates into this area at different times of the year. The Flamborough Frontal system is defined by the distinct temperature gradient between the waters to the north and south of Flamborough Head (Jones, et al., 2004a). This boundary represents the mixing of the warmer waters of the southern North Sea and the cooler waters of the northern North Sea. The upwelling in locations such as this allow nutrients to be transported to the surface from deeper colder waters which in turn create a site of increased primary biomass production (Hill et al., 1993) Tidal flows in this region flood southwards and ebb northwards (Jones, et al. 2004b).

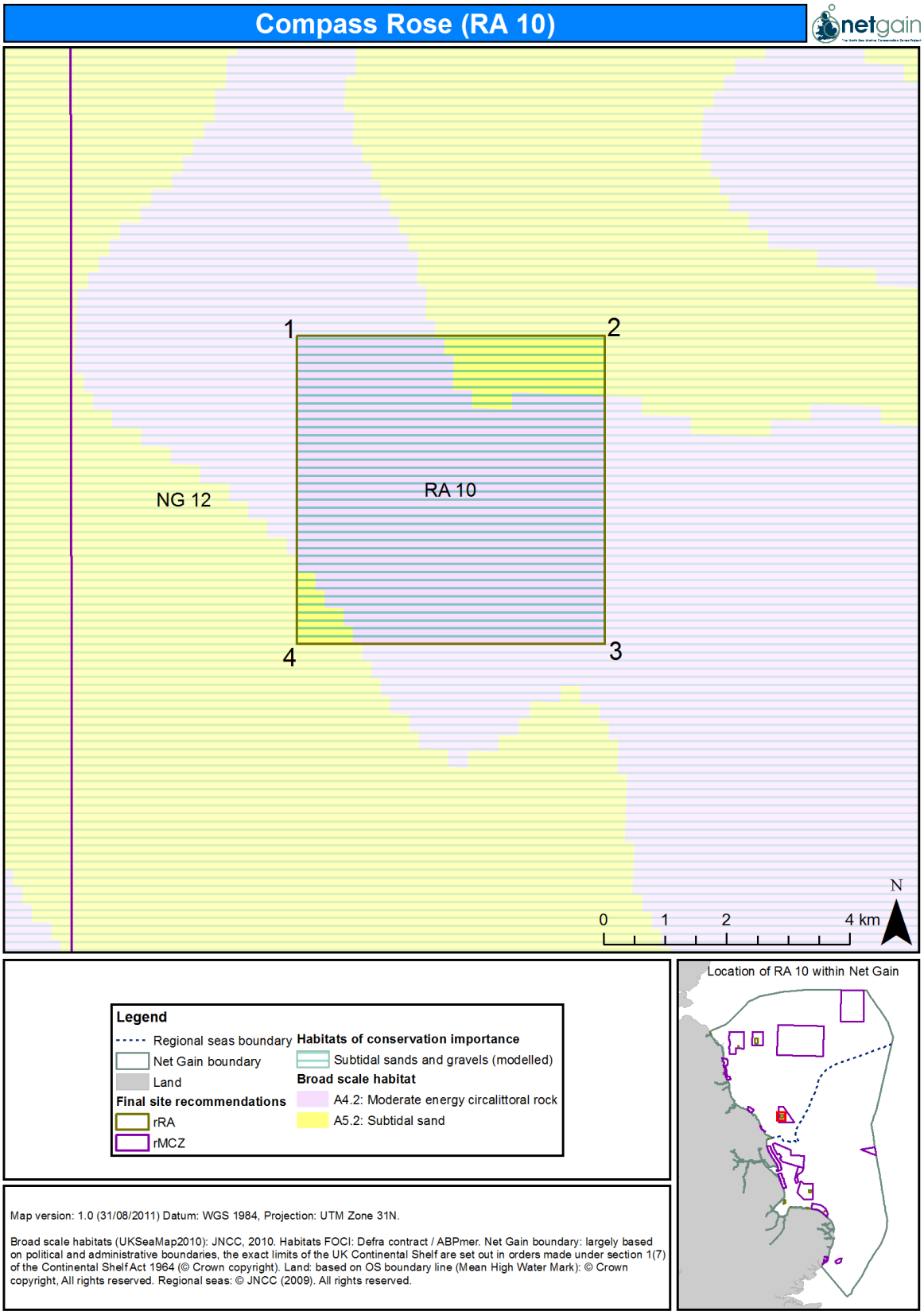


Figure 7.202 Features recommended for designation in rRA 10

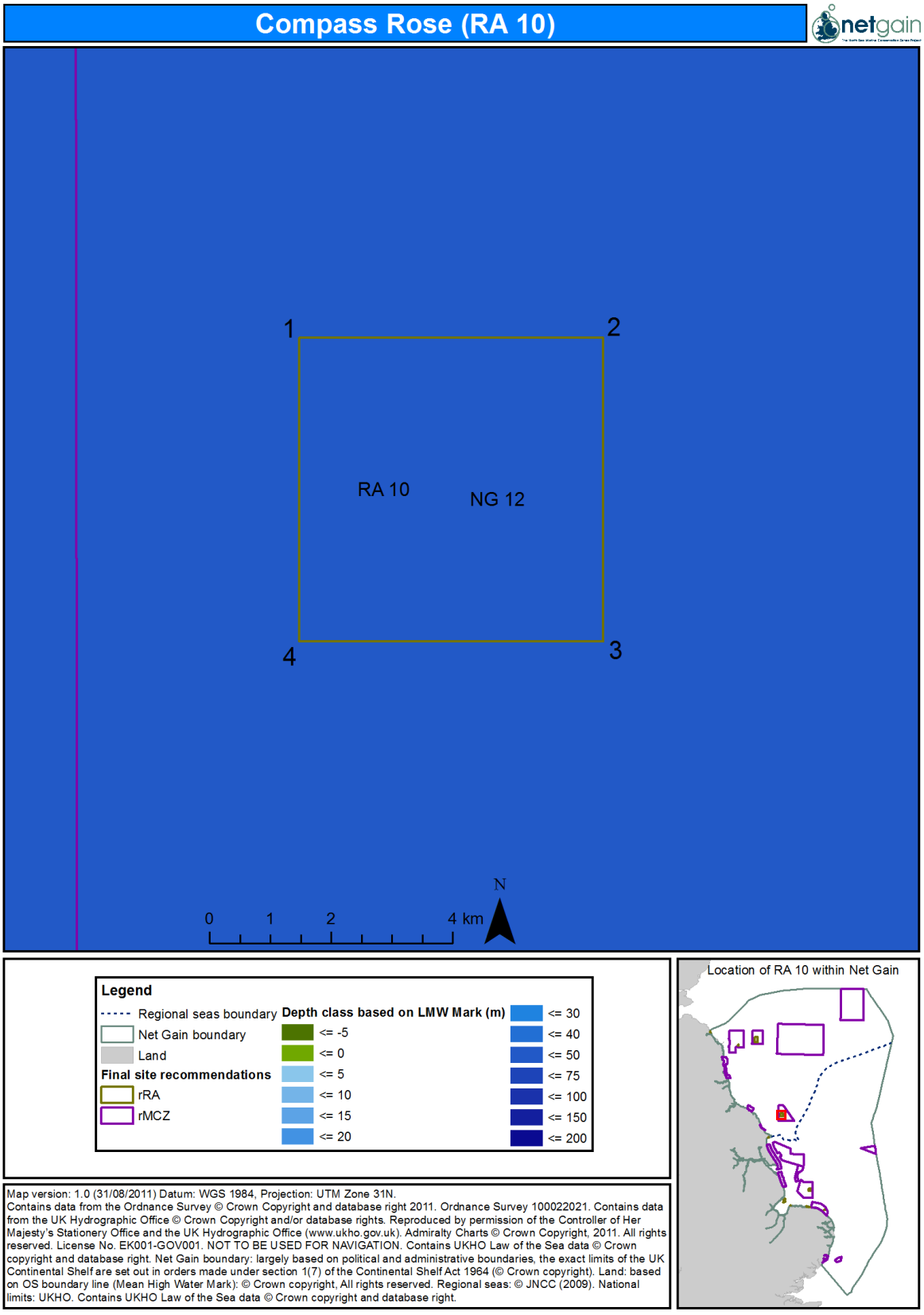


Figure 7.203 Bathymetry of rRA 10

Site boundary

The site has been recommended for protection of moderate energy circalittoral rock. A suitable boundary was chosen to include an area of the feature, which from the stand point of the Regional Stakeholders, would not be significantly contentious. The boundary avoids existing communication cables that run through, or in the immediate vicinity of, the reference area.

Conservation objectives

Table 7.218 Conservation objectives for site rRA 10, A4.2: Moderate energy circalittoral rock

Section	
1 Conservation Objective	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, recover the moderate energy circalittoral rock to favourable condition by 2020 and maintain thereafter, and recover the moderate energy circalittoral rock in the area marked on map Figure 7.202 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the moderate energy circalittoral rock in the biogeographic region is recovered and the moderate energy circalittoral rock area marked on map Figure 7.202 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.219 Conservation objectives for site rRA 10, A5.2: Subtidal sand

Section	
1 Conservation Objective	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal sand to favourable condition by 2020 and maintain thereafter, and recover the subtidal sand in the area marked on map Figure 7.202 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sand in the biogeographic region is recovered and the subtidal sand area marked on map Figure 7.202 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.220 Conservation objectives for site rRA 10, Subtidal sands and gravels (modelled)

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.202 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is recovered and the subtidal sands and gravels area marked on map Figure 7.202 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 10 falls within the boundaries of NG 12 and does not overlap with any existing MPAs.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The consensus view was that the site was supported by the group that reviewed it at the LGM. There were objections from the French commercial fishing erpresentative (French fleets have trawling grounds in the area). However, whilst it was acknowledged that there are other potential locations for sites to designate for moderate energy circalittoral rock, such alternatives would be likely to be more contentious.

The consensus view was that there was only a low level of confidence in the underlying data; stakeholders were not sure if the rock is exactly where it is purported to be. There may be additional surveys in the future (undertaken by the offshore renewables sector) which could help verify the data. The group felt that confirmation of the exact location of the moderate energy circalittoral rock would need to be confirmed before the site went forward for designation.

The level of contention relating to the site was felt to be moderate overall, although the fact that it would adversely affect the activity of the international commercial fishing fleet activity was noted by the NFFO. The NFFO also recorded that they are fundamentally against the inclusion of reference areas within the rMCZ network.

Table 7.221 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

HILL, A.E., JAMES, I.D., LINDEN, P.F., MATTHEWS, J.P., PRANDLE, D., SIMPSON, J.H.,GMITROWICZ, E.M., SMEED, D.A., LWZA, K.M.M., DURAZO, R., FOX, A.D. & BOWERS, D.G. (1993). *Dynamics of tidal mixing fronts in the North Sea*. Philosophical Transactions: Physical Sciences and Engineering. 343(1669): 431-446.

JNCC (2011). *Habitat account – Marine, coastal and halophytic habitats: 1110 Sandbanks which are slightly covered by seawater all of the time.* Available from: http://jncc.defra.gov.uk/ProtectedSites/SAC selection/habitat.asp?FeatureIntCode=H1110 , Accessed 07/08/11.

JONES, L.A., COYLE, M.D., EVANS, D., GILLILAND, P.M. & MURRAY, A.R. 2004a. *Southern North Sea Marine Natural Area Profile: A contribution to regional planning and management of the seas around England.* Peterborough: English Nature.

JONES, L.A., DAVIES, H., COYLE, M.D., EVANS, D., GILLILAND, P.M., IRVING, R. & MURRAY, A.R. 2004b. *Mid North Sea Marine Natural Area Profile : A contribution to regional planning and management of the seas around England.* Peterborough: English Nature.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

NATURAL ENGLAND, (2011). Broad Habitats: Moderate energy circalittoral rock. Available from: < http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/broadhabitats/moderateenergycircalittoralrock.aspx > Accessed 15/08/2011.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.29 Marine Conservation Zone: rRA 11, Berwick Coast

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 11, Berwick Coast

Site centre location

55° 47’ 41’’N, 2° 00’ 48’’W
55.794896°, -2.013465°
Lambert Azimuthal Equal Area projection

Site surface area

0.46km² / 45.88ha
Lambert Azimuthal Equal Area projection

Biogeographic region

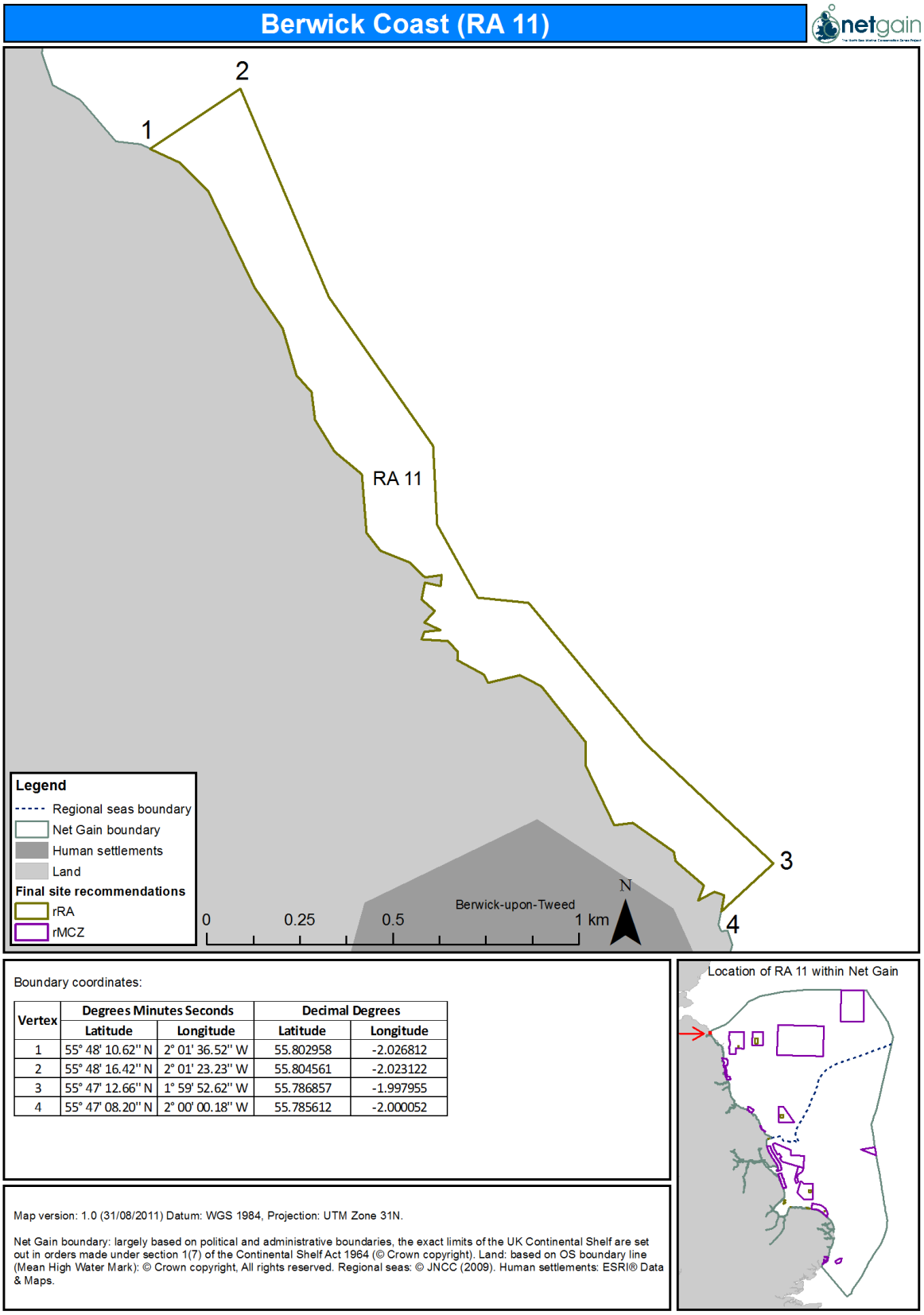
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.222 Features proposed for designation within rRA 11, Berwick Coast

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A1.1: High energy intertidal rock	0.13 km²
Broad-scale habitat	A1.2: Moderate energy intertidal rock	0.15 km²
Broad-scale habitat	A1.3: Low energy intertidal rock	0.004 km²
Broad-scale habitat	A5.1: Subtidal coarse sediment	0.18 km²
Habitat of conservation importance	Intertidal underboulder communities	3 points
Habitat of conservation importance	Subtidal sands and gravels	0.001 km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 11, Berwick Coast not proposed for designation

All features that are present in rRA 11 are being recommended for designation.



Boundary coordinates:

Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 48' 10.62" N	2° 01' 36.52" W	55.802958	-2.026812
2	55° 48' 16.42" N	2° 01' 23.23" W	55.804561	-2.023122
3	55° 47' 12.66" N	1° 59' 52.62" W	55.786857	-1.997955
4	55° 47' 08.20" N	2° 00' 00.18" W	55.785612	-2.000052

Map version: 1.0 (31/08/2011) Datum: WGS 1984, Projection: UTM Zone 31N.

Figure 7.204 Location and extent of site rRA 11 (Berwick Coast)

Site summary

rRA 11 is a coastal site put forward to protect rocky intertidal features, and has a maximum depth of 2m when the tide is in (UKHO) (Figure 7.206). Within the site there are examples of intertidal and submerged caves in the cliffs. The biological communities that characterise rRA 11 include sponges, bryozoans, ascidians, crustaceans, bivalves, worms and small fish. The site is important for seabirds having resident, wintering and summer populations which forage in the intertidal area.

Detailed site description

Recommended RA11 is being proposed to protect the mosaic of high, moderate and low energy intertidal rock broadscale habitats and intertidal underboulder communities habitat FOCI. Although recommended only for intertidal features, the broad-scale habitat data that is held by Net Gain indicates that there are subtidal features present within the site boundaries. For this reason, ground-truthing of the intertidal area and the features that are present is required to ensure that this site is only protecting intertidal species (for this reason, please disregard the presence of subtidal features within the site).

rRA11 is located on the coast of Berwickshire on the North East coast of England. The site falls within the Berwickshire and North Northumberland Coast SAC and the Northumberland Shore SSSI. There are examples of intertidal and submerged caves in the cliffs. Although sea caves are distributed throughout Europe where there are rocky coastlines, they are a relatively scarce habitat. The UK has the most varied and extensive sea caves on the Atlantic coast of Europe. Caves that are subject to strong wave surge are characterised by communities of mussels (*Mytilus edulis)*, barnacles (*Balanus crenatus)*, cushion sponges, encrusting bryozoans and colonial ascidians, depending on the degree of water movement and scour at particular points in the cave system. The area is subject to high wave and tidal energy exposing underlying bedrock with subtidal coarse sediments.

The biological community in rRA11 is made up of species able to attach to the rocks and seaweeds. Although there are a small number of species present due to the exposure levels and wave action, those that are able to survive are in high abundance. The rocks in rRA11 will have populations within cracks and crevices of the blue mussel (*Mytilus edulis),* limpets *(Patella* spp.) and barnacles (*Semibalanus balanoides).*

The moderately exposed intertidal rock is characterised by kelp (*Laminaria hyperborean)* beneath which can be found red seaweeds such as hornweed (*Ceramium virgatum*) and sea oak *(Phycodrys rubens*). These areas are subject to grazing by the echinoderm, *Echinus esculentus,* with encrusting algae present on rock surfaces. The orange clubbed sea slug (*Limacia clavigera)* is most commonly found in shallow subtidal waters on rocky surfaces and red seaweeds, but it can also be found under intertidal rocks and boulders. *Limacia clavigera c*an be found feeding on sea mats (Bryozoa), preferentially on the hairy sea mat (*Electra pilosa*). It has a limited range along the North Sea coast but does fall within rRA11 (MarLIN).

There are a number of overwintering bird populations significant to the area. The cliffs are utilised by a number of seabird populations protected under the Northumberland Shore SSSI covering 17 miles of the Berwickshire coast. Within rRA11 there are resident populations of redshank (*Tringa totanus*) and overwintering populations of purple sandpiper (*Calidris maritima*), sanderling (*Calidris alba*) and turnstone (*Arenaria interpres*). Summer populations include little tern (*Sterna albifrons*) and kittiwake (*Rissa tridactyla*) (RSPB, 2010). All of these populations rely on marine species as prey including crustaceans, winkles, molluscs, marine worms and fish. The exposed rock at low tide provides access for birds making it a key foraging area.

rRA11 lies just north of the Tweed estuary and as such is an important area for juvenile Diadromous species such as salmon (*Salmo salar*) and trout (Colclough, 2010).

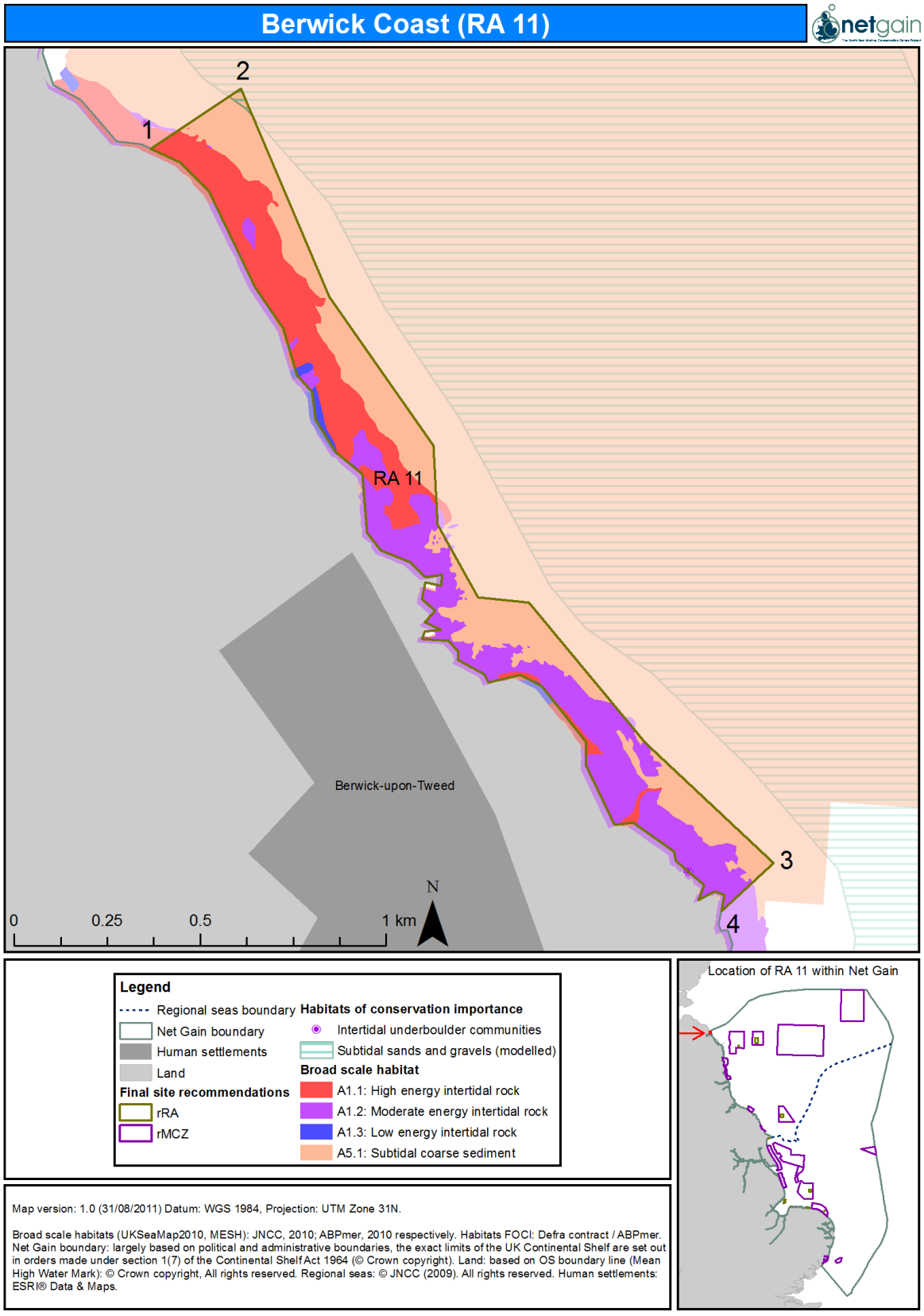


Figure 7.205 Features recommended for designation in rRA 11

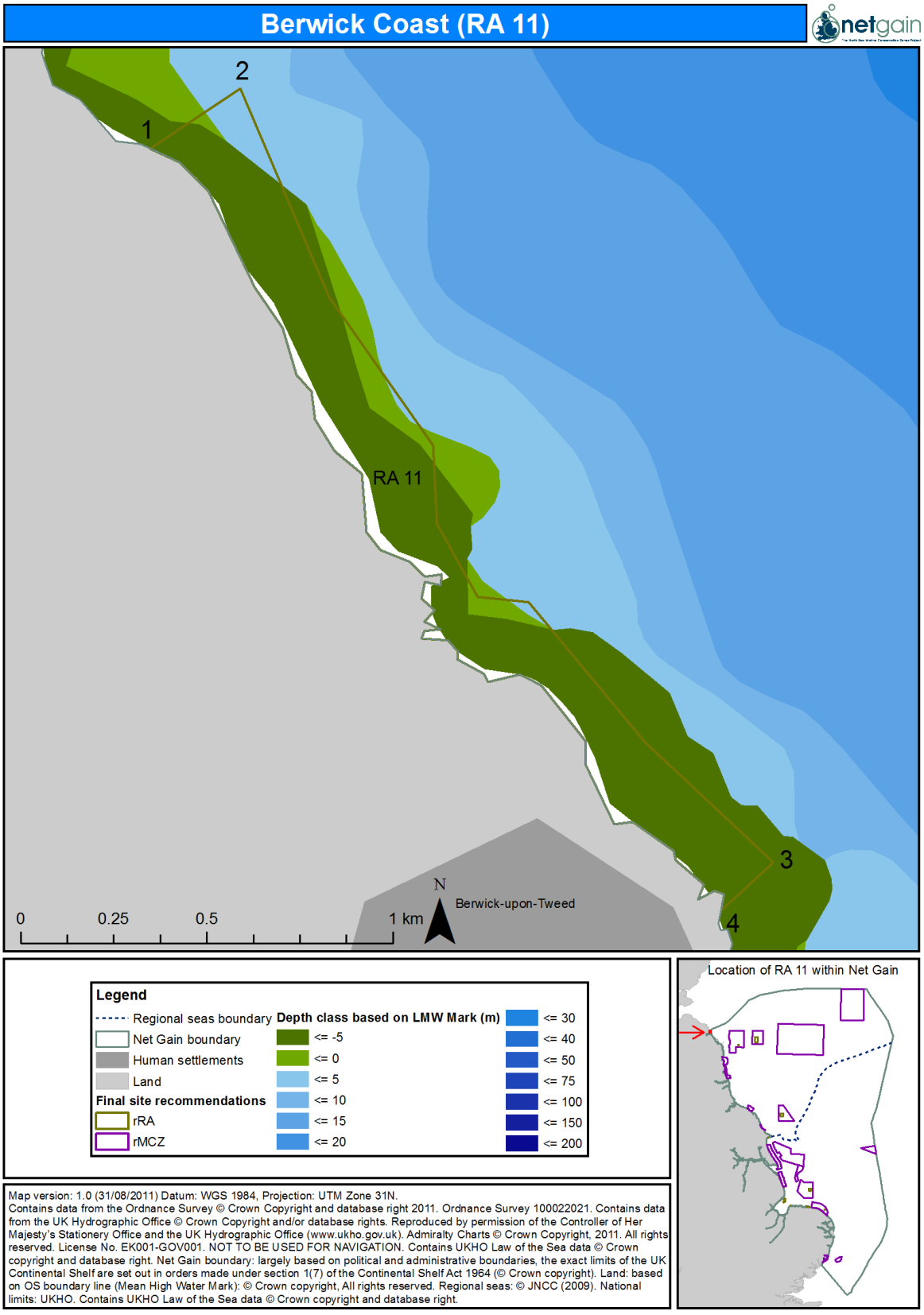


Figure 7.206 Bathymetry of rRA 11

Site boundary

Initial suggestions for the reference area were explored by the Net Gain liaison officer with local stakeholders before discussing the boundaries at the May 2011 Northeast Regional Hub meeting. During this meeting, the boundary for rRA 11 was developed to cover intertidal features down to the kelp line, with the northern limit of the site being at Marshall Meadows Country House, and the southern limit being coincident with the caravan site just north of Berwick upon Tweed.

The boundaries were set for intertidal features based on local knowledge and bathymetry data. However, the broad-scale habitat data that is held by Net Gain indicates that there are subtidal features present within the site boundaries. For this reason, ground-truthing of the intertidal area and the features that are present is required to ensure that this site is only protecting intertidal species (for this reason, please disregard the presence of subtidal features within the site).

The site lies within the Berwickshire and North Northumberland SAC to afford extra protection.

Conservation objectives

Table 7.223 Conservation objectives for site rRA 11, A1.1: High energy intertidal rock

Section	
1 Conservation Objective	High energy intertidal rock is representative of rocky seashores exposed to very strong waves and currents. Subject to natural change, recover the high energy intertidal rock to favourable condition by 2020 and maintain thereafter, and recover the high energy intertidal rock in the area marked on map Figure 7.205 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the high energy intertidal rock in the biogeographic region is recovered and the high energy intertidal rock area marked on map Figure 7.205 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.224 Conservation objectives for site rRA 11, A1.2: Moderate energy intertidal rock

Section	
1 Conservation Objective	Moderate energy intertidal rock is moderately exposed rocky or boulder shores found on the southwest and west coasts of Britain and Ireland and on the northeast English coast. Subject to natural change, recover the moderate energy intertidal rock to favourable condition by 2020 and maintain thereafter, and recover the moderate energy intertidal rock in the area marked on map Figure 7.205 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the moderate energy intertidal rock in the biogeographic region is recovered and the moderate energy intertidal rock area marked on map Figure 7.205 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.225 Conservation objectives for site rRA 11, A1.3: Low energy intertidal rock

Section	
1 Conservation Objective	Low energy intertidal rock sheltered rocky and boulder shores found around the British coast where there is shelter form the prevailing south-westerly wind. Subject to natural change, recover the low energy intertidal rock to favourable condition by 2020 and maintain thereafter, and recover the low energy intertidal rock in the area marked on map Figure 7.205 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the low energy intertidal rock in the biogeographic region is recovered and the low energy intertidal rock area marked on map Figure 7.205 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.226 Conservation objectives for site rRA 11, A5.1: Subtidal coarse sediment

Section	
1 Conservation Objective	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal coarse sediment to favourable condition by 2020 and maintain thereafter, and recover the subtidal coarse sediment in the area marked on map Figure 7.205 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal coarse sediment in the biogeographic region is recovered and the subtidal coarse sediment area marked on map Figure 7.205 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.227 Conservation objectives for site rRA 11, Intertidal underboulder communities

Section	
1 Conservation Objective	Intertidal underboulder communities are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the intertidal underboulder communities to favourable condition by 2020 and maintain thereafter, and recover the intertidal underboulder communities in the area marked on map Figure 7.205 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the intertidal underboulder communities in the biogeographic region is recovered and the intertidal underboulder communities area marked on map Figure 7.205 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.228 Conservation objectives for site rRA 11, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.205 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is recovered and the subtidal sands and gravels area marked on map Figure 7.205 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

Site rRA 11, lies within The Berwickshire and North Northumberland Coast SAC and Northumberland Shore SSSI.

The table below shows MCZ ENG features which are protected by existing designations, and where no ENG features are protected as indicated by the GAP analysis table (features protected by MPAs within the Net Gain region) further explanation is provided.

Table 7.229 MPAs within or adjacent to rRA 11

MPA Type	Site Name	Features Protected
SAC	Berwickshire and North Northumberland Coast	A1.2: Moderate energy intertidal rock A1.3: Low energy intertidal rock A2.4: Intertidal mixed sediments A2.7: Intertidal biogenic reefs A5.3: Subtidal mud Blue mussel beds Intertidal underboulder communities Intertidal sediments dominated by aquatic angiosperms Seagrass beds
SSSI	Northumberland Shore	Not in GAP table Nationally and locally significant bird populations

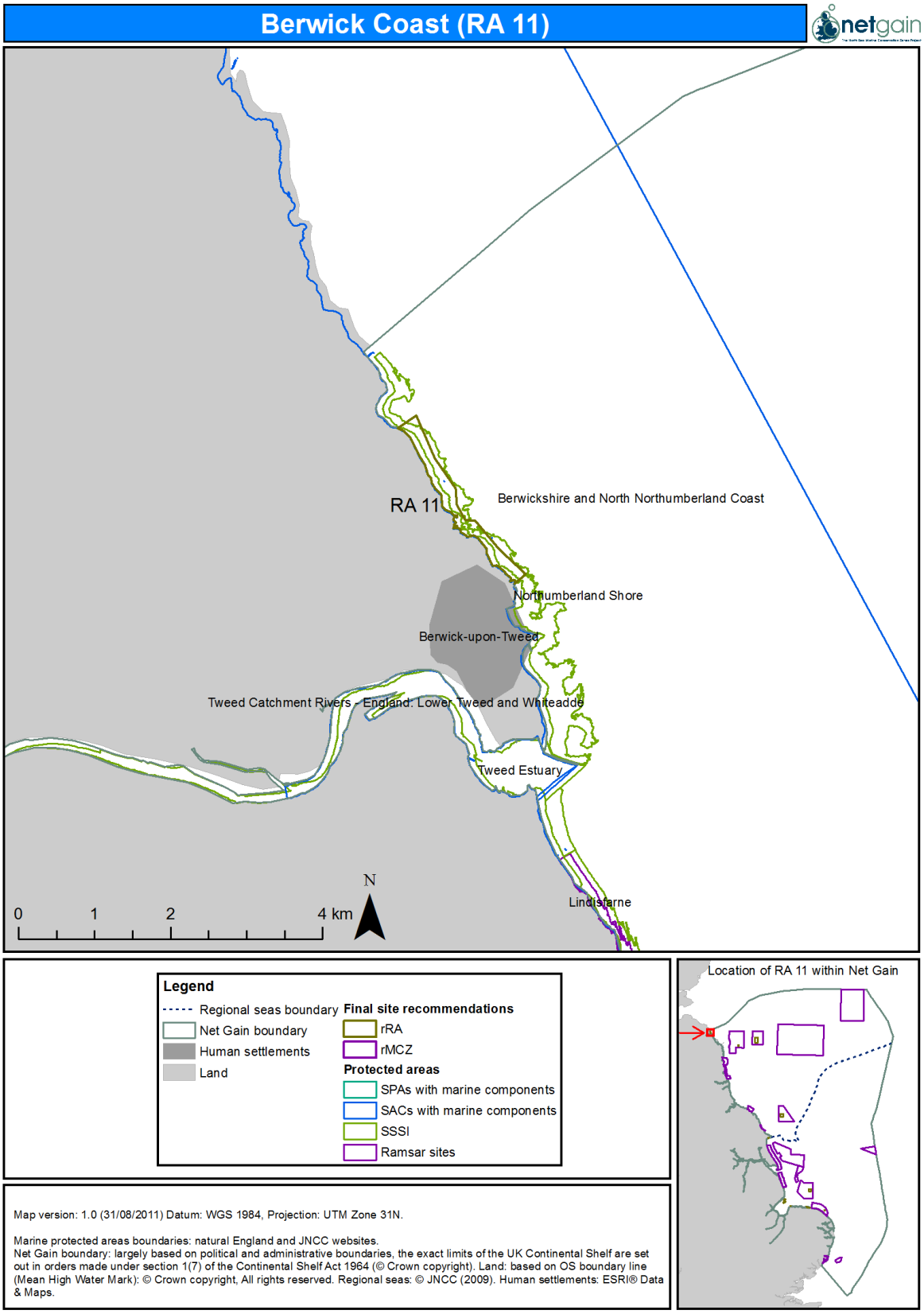


Figure 7.207 MPAs/rMCZs within or adjacent to rRA 11

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

Views on this site were split, with one group suggesting that they were strongly against the site (until legal issues over access are clarified and concerns over potential management restrictions on recreational anglers and walkers are addressed). The other group expressed support for the site, feeling that (whilst the site is less than ideal) no viable alternatives had been identified; the site represented the 'least worst' option.

There was high confidence in the underlying data (although information on tide swept channels was an exception to this). In addition, some concerns over features in the central portion of the site had been assumed to have been the result of mapping errors. The availability of bathymetry data had added some reassurance to the process.

The designation of the site was felt likely to be highly contentious with more clarification required over likely management measures that would be introduced to control access to the site. In Regional Hub discussions the boundaries of the site had been set to the intertidal zone only, to mitigate for potential impacts on the local static gear fleet. In addition it was noted that access to the site from Scotland may be an issue, making enforcement more difficult; it was suggested that the introduction of a code of conduct might be the best option for addressing this.

Table 7.230 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Broad-scale habitat	Collated habitats maps	Coltman, et al. 2008
Intertidal underboulder communities, Tide swept channels	Combination of historical and recent records	Tyler-Walters, et al. 2009

References

BALLERSTEDT, S., 2008. *Astarte sulcata. A bivalve mollusc. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line].* Plymouth: Marine Biological Association of the United Kingdom. [cited 12/08/2011].

BARNES, M., 2008. *Petromyzon marinus. Sea lamprey. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]*. Plymouth: Marine Biological Association of the United Kingdom. [cited 12/08/2011].

COLCLOUGH, S. 2010. *Marine Fish Nursery Function in the Tweed Estuary***.** Environment Agency.

COLTMAN, N., GOLDING, N., VERLING, E. 2008. *Developing a broadscale predictive EUNIS habitat map for the MESH study area*. JNCC.

EDWARDS, R., 2008. *Limacia clavigera. Orange-clubbed sea slug. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line*]. Plymouth: Marine Biological Association of the United Kingdom. [cited 12/08/2011].

HISCOCK, K. 2008. *Grazed Laminaria hyperborea with coralline crusts on infralittoral rock. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line*]. Plymouth: Marine Biological Association of the United Kingdom. [cited 12/08/2011].

HISCOCK, K., HARRIS, R. & LUCKEY, J. 2006. *Nationally Important Marine Features and Biodiversity Action Plan Priority Habitats and Species. Database prepared for the Joint Nature Conservation Committee by the Marine Biological Association, Plymouth*. JNCC Contract F90-01-892.

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5)*. JNCC.

TYLER-WALTERS, H., 2008. *Mytilus edulis. Common mussel. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line*]. Plymouth: Marine Biological Association of the United Kingdom. [cited 12/08/2011].

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

7.30 Marine Conservation Zone: rRA 12, Farnes Clay

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 12, Farnes Clay (falls within NG 14, Farnes East)

Site centre location

55° 36’ 20’’N, 1° 09’ 52’’W
55.605777°, -1.164724°
Lambert Azimuthal Equal Area projection

Site surface area

3.43km² / 342.69ha
Lambert Azimuthal Equal Area projection

Biogeographic region

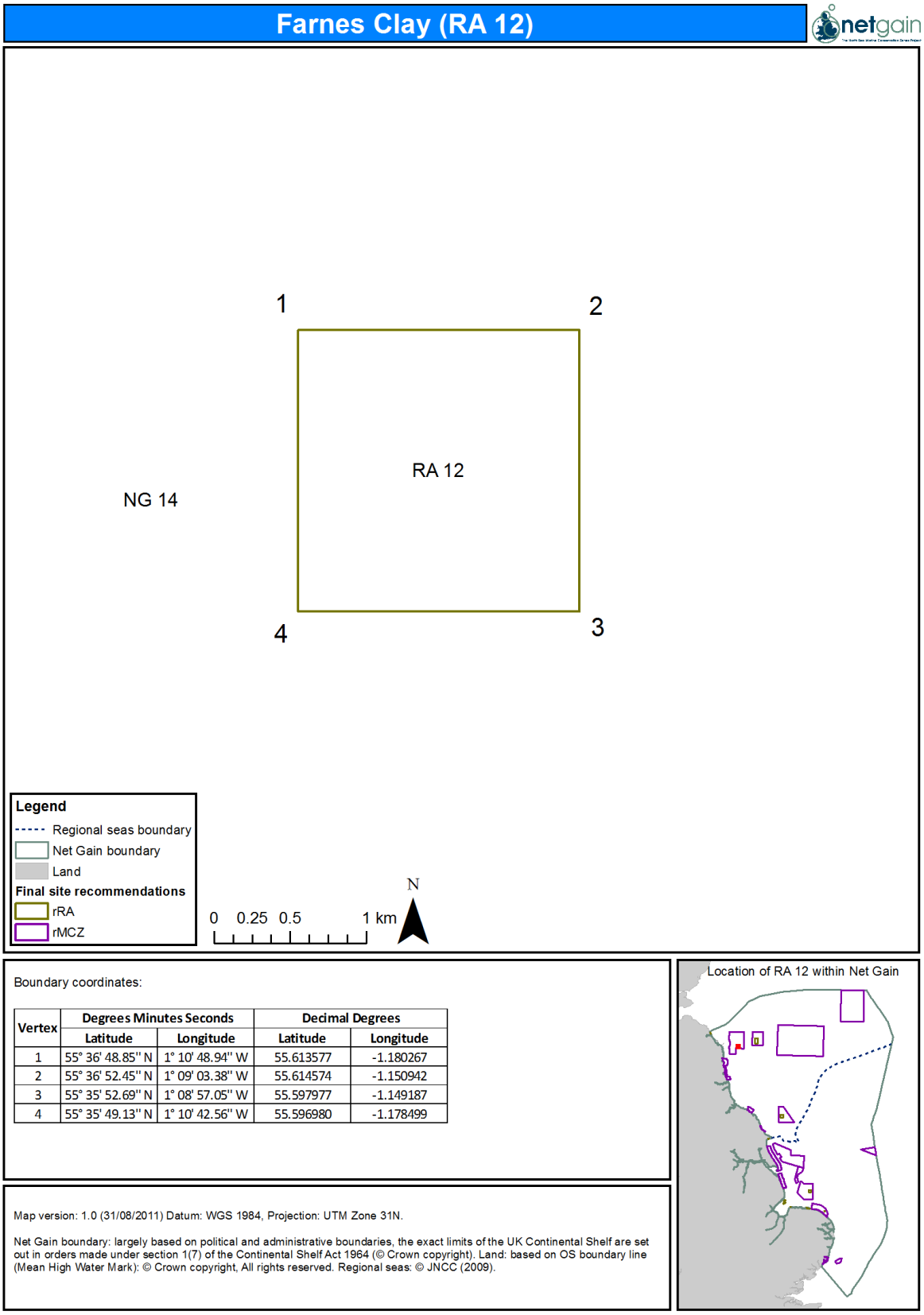
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.231 Features proposed for designation within rRA 12, Farnes Clay

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.2: Moderate energy circalittoral rock	3.28km²
Broad-scale habitat	A5.2: Subtidal sand	0.15km²
Habitat of conservation importance	Peat and clay exposures	2.75km²
Habitat of conservation importance	Subtidal sands and gravels (modelled)	3.43km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 12, Farnes Clay not proposed for designation

All features present in rRA 12 have been recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 36' 48.85'' N	1° 10' 48.94'' W	55.613577	-1.180267
2	55° 36' 52.45'' N	1° 09' 03.38'' W	55.614574	-1.150942
3	55° 35' 52.69'' N	1° 08' 57.05'' W	55.597977	-1.149187
4	55° 35' 49.13'' N	1° 10' 42.56'' W	55.596980	-1.178499

Figure 7.208 Location and extent of site rRA 12 (Farnes Clay)

Site summary

rRA 12 is located within NG 14 approximately 28km from the Berwickshire region of the Northumberland coast in the North East of England. The depth of the site is 50-100m (Figure 7.210) and has a seabed composed of peat and clay exposures, moderate energy circalittoral rock, subtidal sand and subtidal sand and gravels. The site was developed to protect the clay which provides habitat for species such as piddocks, crabs, anemones and algaes (Maddock, 2008).

Detailed site description

Recommended RA12 lies within site rMCZ NG14. The site is proposed as a reference area for subtidal Peat and Clay Exposures, which is a habitat feature of conservation importance (FOCI) identified by local stakeholder evidence (Lawrence, 2011).

Peat and clay exposures have formed over millions of years from former lakebed sediment and ancient forested peatland. The soft sediment substrates of exposed Peat or Clay in the subtidal marine environment can support populations of burrowing piddocks including *Pholas dactylus*, *Barnea candida* and *Barnea parva*.The holes these piddocks leave behind can further provide unique micro habitats for species such as small crabs and anenomes (Maddock 2008). These are nationally rare communities with a limited distribution in the North Sea area. Currently, very little is known about the distribution of subtidal peat and clay exposures and their full extent and maximum depth is unknown. It is thought that the flora and fauna of the subtidal examples are likely to differ from those found on intertidal examples.

The site also includes the broad-scale habitats of moderate energy circalittoral rock, subtidal sand and the habitat of conservation importance, subtidal sand and gravels.

The circalittoral rock habitat is fully submerged bedrock and boulder habitat exposed to moderate wave action and tidal currents. In deeper examples of this habitat algal growth is restricted allowing animal communities to dominate. Anemones can be present as well as mobile animals such as starfish, brittlestars, and sea urchins (Connor, 2004).

Sand and gravel habitats are the most common habitats in the North Sea and are often characterised by the presence of Venus bivalve communities (Kingston and Rachor 1982). Subtidal sands in particular are an important habitat for worms and bivalves which themselves are important for supporting larger predators higher up the food chain (Natural England, 2011).

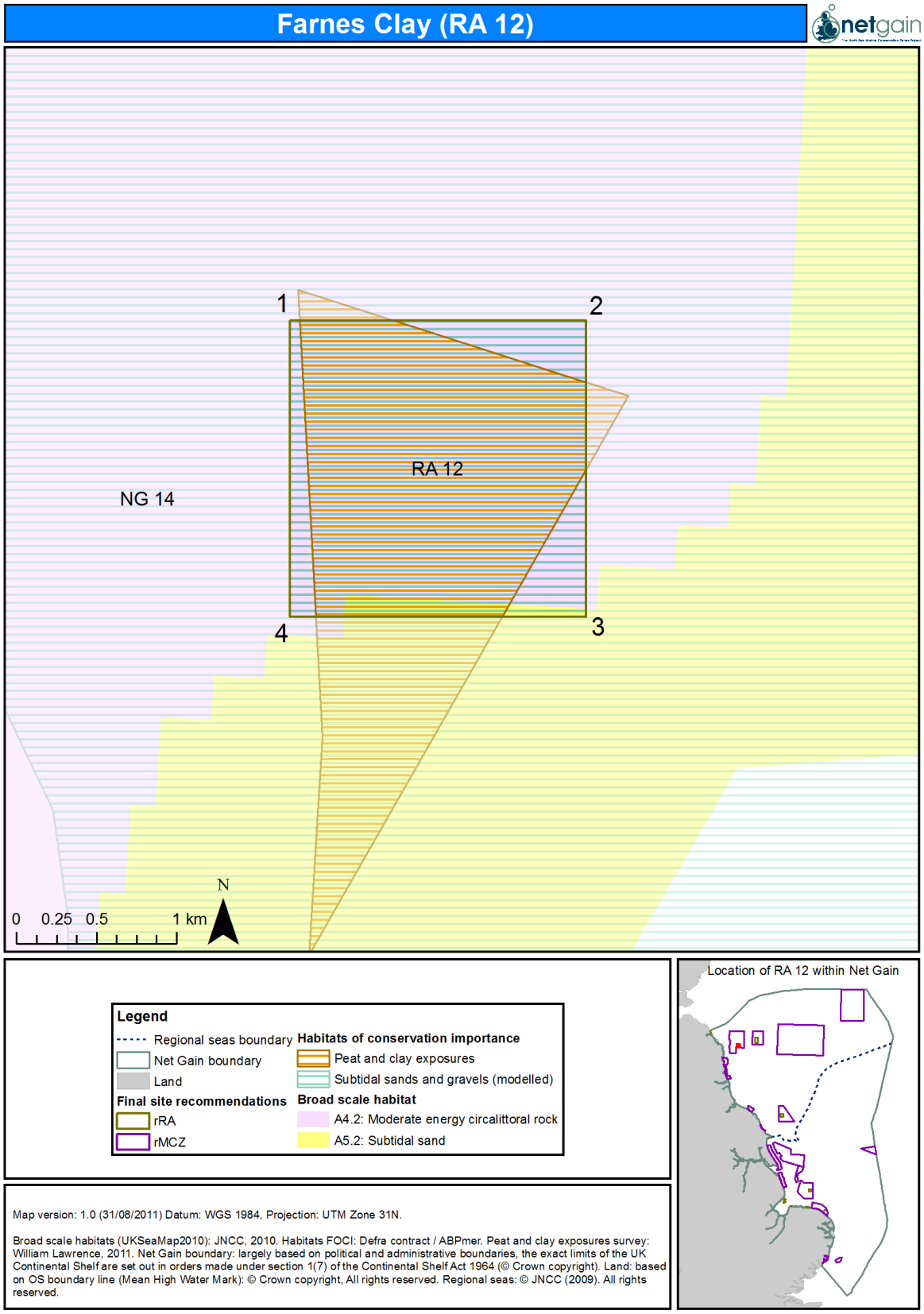


Figure 7.209 Features recommended for designation in rRA 12

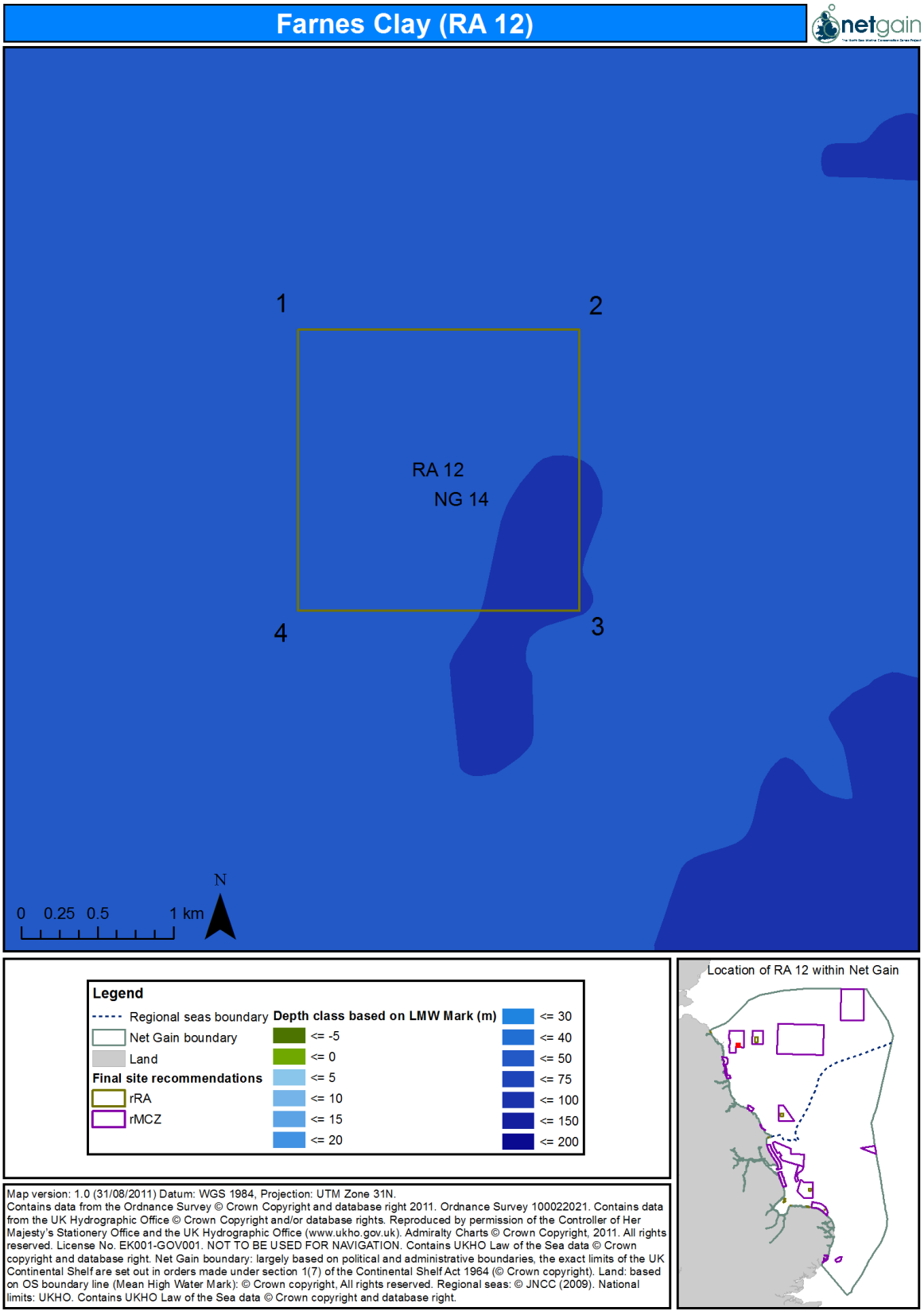


Figure 7.210 Bathymetry of rRA 12

Site boundary

The site boundary for rRA 12 has been developed to protect the peat and clay exposure feature and was recommended to be 1nm x 1nm within the extent of the peat and clay exposures. Within the site there is a CEFAS season fishing restriction which prohibits the retention of herring between August 15th and September 15th (only between 6-12nm limits).

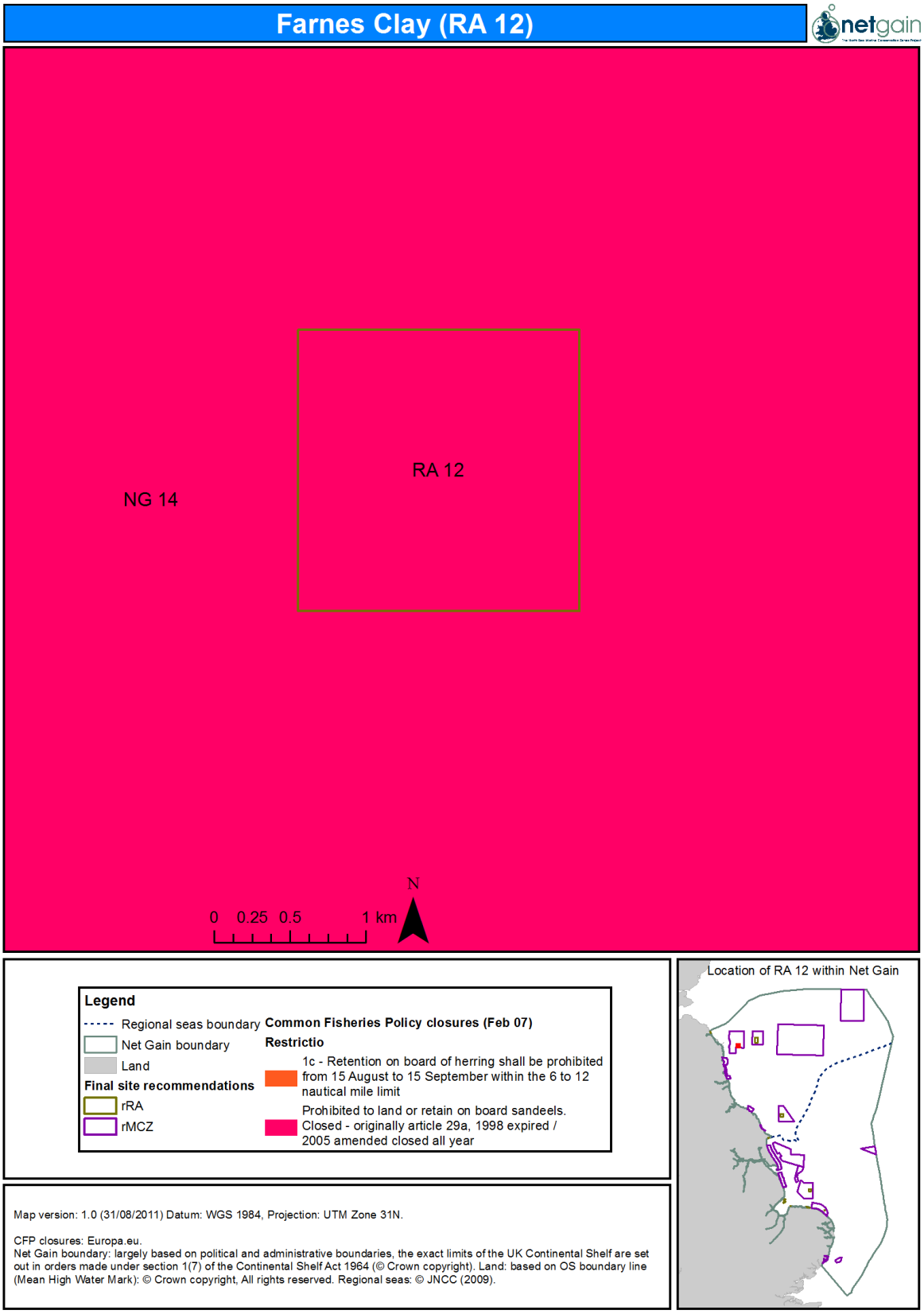


Figure 7.211 rRA 12 site boundary with associated fishery management locations

Conservation objectives

Table 7.232 Conservation objectives for site rRA 12, A4.2: Moderate energy circalittoral rock

Section	
1 Conservation Objective	Moderate energy circalittoral rock on exposed rocky headlands and coastlines mainly on the south west and west coasts of Britain and Ireland and northeast England. Subject to natural change, recover the moderate energy circalittoral rock to favourable condition by 2020 and maintain thereafter, and recover the moderate energy circalittoral rock in the area marked on map Figure 7.209 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the moderate energy circalittoral rock in the biogeographic region is recovered and the moderate energy circalittoral rock area marked on map Figure 7.209 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.233 Conservation objectives for site rRA 12, A5.2: Subtidal sand

Section	
1 Conservation Objective	Subtidal sand is widespread around the British Isles and mainland Europe.Subject to natural change, recover the subtidal sand to favourable condition by 2020 and maintain thereafter, and recover the subtidal sand in the area marked on map Figure 7.209 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sand in the biogeographic region is recovered and the subtidal sand area marked on map Figure 7.209 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.234 Conservation objectives for site rRA 12, Peat and clay exposures

Section	
1 Conservation Objective	Peat and clay exposures are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the peat and clay exposures to favourable condition by 2020 and maintain thereafter, and recover the peat and clay exposures in the area marked on map Figure 7.209 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the peat and clay exposures in the biogeographic region is recovered and the peat and clay exposures area marked on map Figure 7.209 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.235 Conservation objectives for site rRA 12, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP). Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.209 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**<u>Habitat</u>** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is recovered and the subtidal sands and gravels area marked on map Figure 7.209 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 12 falls within the boundaries of NG 14, Farnes East and is not protected by any other MPAs.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

The site was supported, but the fundamental value of reference areas was questioned. It was suggested that they may end up as 'scientific playgrounds' and, more importantly, the ability of SNCBs to provide appropriate resources to carry out thorough monitoring was questioned.

Confidence in the underlying data was high (especially due to data on the extent of the feature being provided by local fishermen).

Views on likely levels of contention were divided – one group suggesting 'low', the other 'high'.

Table 7.236 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Peat and clay exposures	Local knowledge	Lawrence, W. 2011.
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

CONNOR, D. ALLEN, J. GOLDING, N. HOWELL, K. LIEBERKNECHT, NORTHEN, K. REKER, J 2004. The Marine Habitat Classification for Britain and Ireland Version 04.05 JNCC, Peterborough ISBN 1 861 07561 8 (internet version)

KINGSTON, P.F., & RACHOR, E., 1982. *North Sea level bottom communities. International Council for the Exploration of the Sea.* C.M.1982/L:41, Biological Oceanography Committee.

LAWRENCE, W. 2011. *Peat and clay exposures.*

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

NATURAL ENGLAND, 2011. *Broad habitats*. < http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/mcz/features/broadhabitats/default.aspx> Accessed 05/08/11.

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method*. ABP Marine Environmental Research Ltd.

7.31 Marine Conservation Zone: rRA 13, Rock Unique rRA

Version and issue date	Amendments made
V1.0 31st August, 2011	Original release
V1.1 6th September, 2011	Minor corrections and edits
V1.2 2nd July, 2012	Minor corrections including spelling, grammatical errors, and edits to improve readability. No changes have been made to recommendations or boundaries.

Site name

rRA 13, Rock Unique rRA (falls within NG 15, Rock Unique)

Site centre location

55° 42’ 52’’N, 0° 39’ 03’’W
55.714833°, -0.650931°
Lambert Azimuthal Equal Area projection

Site surface area

52.49km² / 5,248.60ha
Lambert Azimuthal Equal Area projection

Biogeographic region

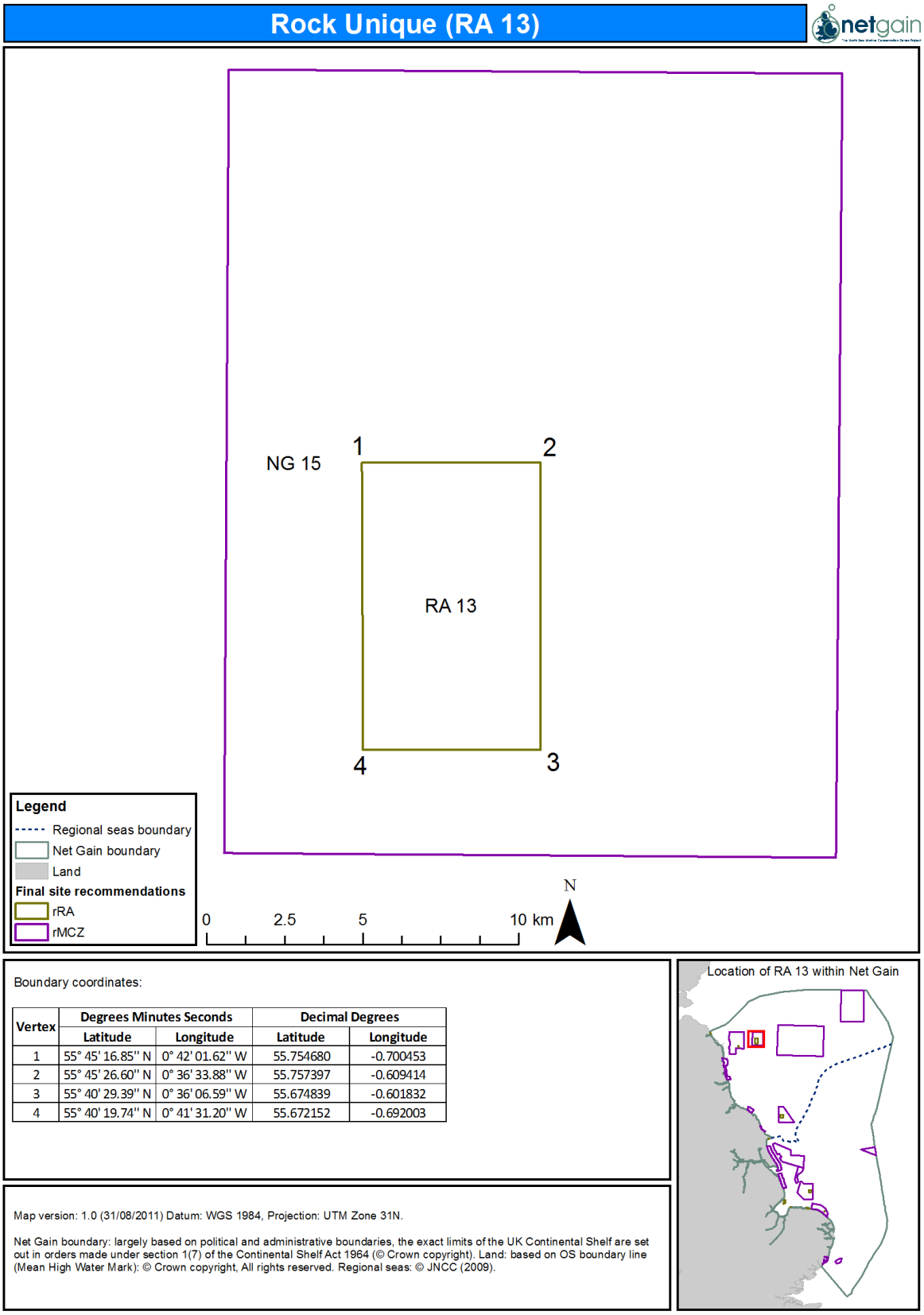
JNCC Regional Sea: Northern North Sea
OSPAR Region II: Greater North Sea

Table 7.237 Features proposed for designation within rRA 13, Rock Unique rRA

Feature type	Feature name	Area covered within site (for broad-scale habitats and habitats of conservation importance)
Broad-scale habitat	A4.3: Low energy circalittoral rock	13.88km²
Broad-scale habitat	A5.1: Subtidal coarse sediment	1.99km²
Broad-scale habitat	A5.2: Subtidal sand	36.63km²
Habitat of conservation importance	Subtidal sands and gravels (modelled)	48.07km²
Species of conservation importance	n/a	n/a
Geological feature	n/a	n/a
Other feature	n/a	n/a

Features within rRA 13, Rock Unique rRA not proposed for designation

All features that are present in rRA 13 are recommended for designation.



Vertex	Degrees Minutes Seconds		Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
1	55° 45' 16.85" N	0° 42' 01.62" W	55.754680	-0.700453
2	55° 45' 26.60" N	0° 36' 33.88" W	55.757397	-0.609414
3	55° 40' 29.39" N	0° 36' 06.59" W	55.674839	-0.601832
4	55° 40' 19.74" N	0° 41' 31.20" W	55.672152	-0.692003

Figure 7.212 Location and extent of site rRA 13 (Rock Unique rRA)

Site summary

rRA 13 lies within NG 15 approximately 60km offshore from the Berwickshire region of the North Northumberland coast in the North East of England. The depth of the site is 50m (Figure 7.214) and the seabed is composed of low energy circalittoral rock, subtidal coarse sediment, subtidal sand and subtidal sands and gravels. The site was developed to protect the low energy circalittoral rock as it is the only example of this feature present within the Net Gain region. The rock provides habitat for unique animal communities that include sea squirts, dead man's fingers, anemones and peacock worms (Conner, 2004).

Detailed site description

Recommended RA13 is located within rMCZ NG 15, and is predominantly subtidal sand with areas of subtidal course sediment and low energy circalittoral rock, with subtidal sands and gravels identified as habitats of conservation importance. The site contains the only example of low energy circalittoral rock in the Net Gain project area. This habitat is extremely rare around the UK, with a few examples being found in the Scottish lochs and a few isolated sites around the south-west of England and the west coast of Ireland (Connor, 2004).

Due to the low energy associated with this rocky habitat and the depth at which it occurs, a unique animal community is able to persist. With areas too deep for algae to obtain the light they need to grow, animal communities of sea squirts (*Ciona intestinalis, Ascidia mentula*), dead man's fingers and plumose anemones are able to proliferate as well as peacock worms, bristleworms, squat lobsters, hermit crabs and a number of species of urchin (Connor, 2004).

Subtidal sands and gravels habitat FOCI are identified as a priority habitat in the UK Biodiversity Action Plan (UK BAP) (Maddock, 2008). Coarse sediment habitats are characterised by polychaete worms, mobile crustacea,for example squat lobster, bivalve molluscs and a number of species of sea cucumber (Connor, 2004).

Sandy seabeds further offshore are not usually disturbed by waves and tides in the same way that inshore areas are and so are able to support polychaete worms, bivalve molluscs and amphipod crustacea within them (Connor, 2004).

Cetacean sightings for this area include year round sightings of white-beaked dolphin (*Lagenorhynchus albirostris),* along with harbour porpoise *(Phocoena phocoen),* minke whale (*Balaenoptera acutorostrata)* and humpback whale (*Megaptera novaeanglia)* (Bereton, 2010; Evans, 2003). All of which are Marine Biodiversity Action Plan (MBAP) species in the UK. Harbour porpoise is listed in Annex II of the EU Habitats Directive as species whose conservation requires the designation of Special Areas of Conservation. Sightings in the area coupled with known foraging distances of grey seal suggest that this site could be used by the grey seal population present on the Farne Islands (Thompson, 2010). The grey seal is afforded conservation protection under the EC Habitats Directive, Annex II and Annex V and is named in the Northumberland Biodiversity Action Plan (Cranson, 2008).

There are areas of NG15 which are fished for pelagic species (The Wildlife Trusts, 2010).

NG 15 has been shown to be important for seabirds including guillemot *(Uria aalge)*, kittiwake (*Rissa tridactyla)* and puffin (*Fratercula arctica)* (Kober, 2010). Foraging ranges of these birds suggest that these could be birds from the Farne Islands using this area for feeding.

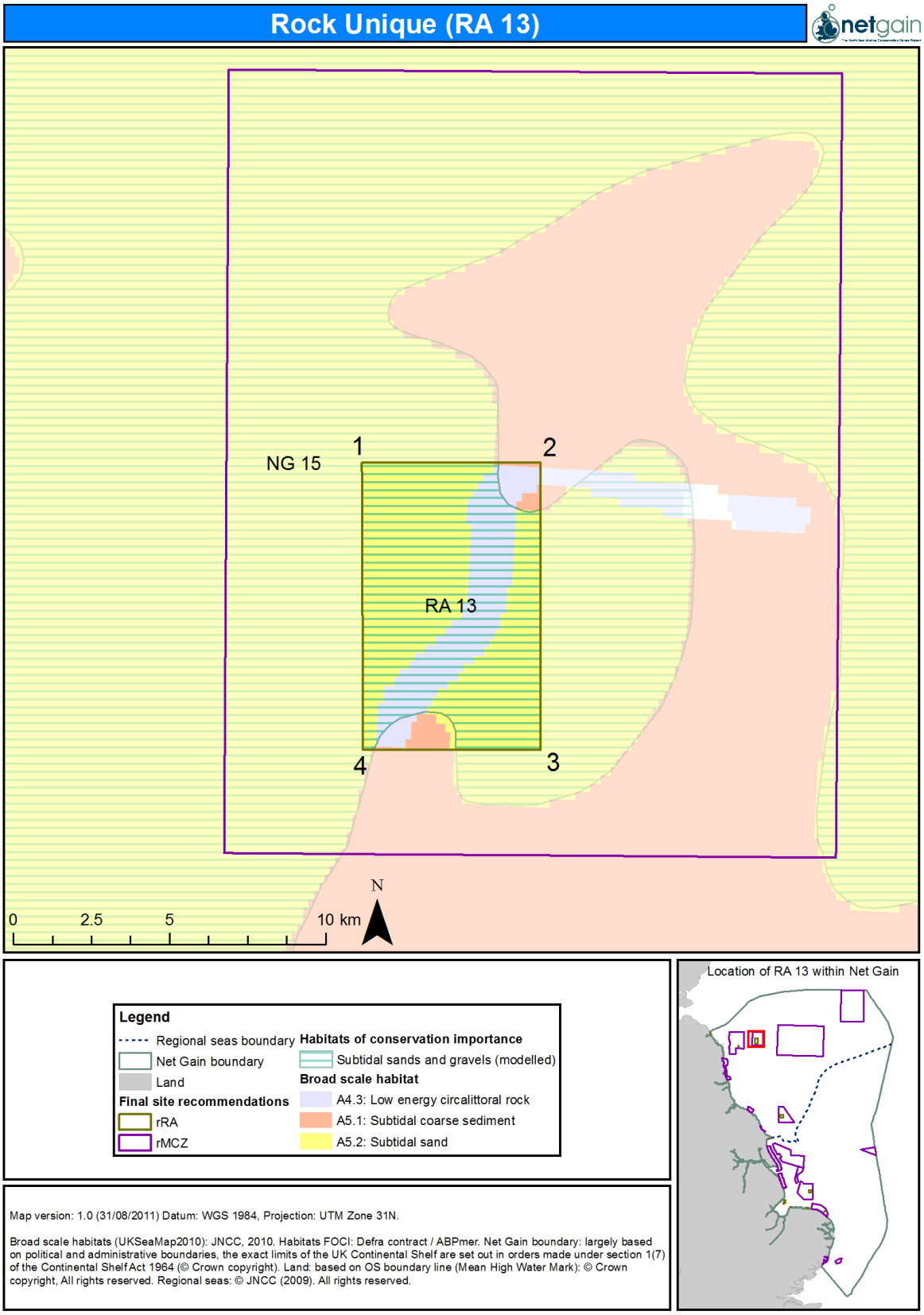


Figure 7.213 Features recommended for designation in rRA 13

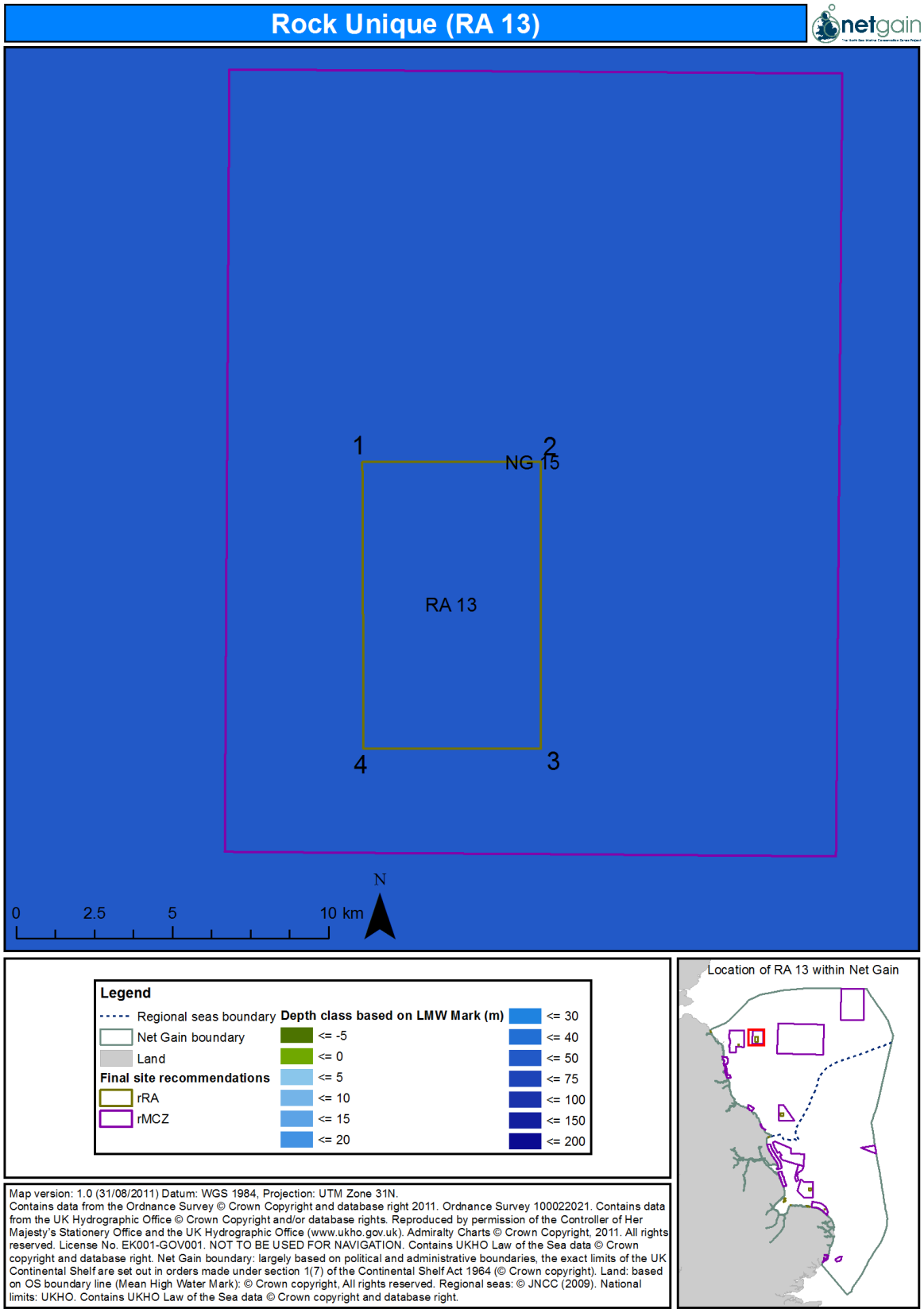


Figure 7.214 Bathymetry of rRA 13

Site boundary

The boundary of rRA 13 was proposed to cover three broad-scale habitats: low energy circalittoral rock, subtidal sand and subtidal coarse sediment, along with the habitat FOCI subtidal sands and gravels. Review of commercial fishing data indicated that there would not be a significant impact on the commercial fishing sector. It was suggested that the reference area should be aligned north - south as this configuration would avoid an area of high pelagic fishing activity.

Conservation objectives

Table 7.238 Conservation objectives for site rRA 13, A4.3: Low energy circalittoral rock

Section	
1 Conservation Objective	Low energy circalittoral rock is extremely rare around the UK apart from the Scottish lochs. There are a few isolated sites around the south-west of England and the west coast of Ireland. Subject to natural change, recover the low energy circalittoral rock to favourable condition by 2020 and maintain thereafter, and recover the low energy circalittoral rock in the area marked on map Figure 7.213 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the low energy circalittoral rock in the biogeographic region is recovered and the low energy circalittoral rock area marked on map Figure 7.213 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.239 Conservation objectives for site rRA 13, A5.1: Subtidal coarse sediment

Section	
1 Conservation Objective	Subtidal coarse sediment is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal coarse sediment to favourable condition by 2020 and maintain thereafter, and recover the subtidal coarse sediment in the area marked on map Figure 7.213 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal coarse sediment in the biogeographic region is recovered and the subtidal coarse sediment area marked on map Figure 7.213 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.240 Conservation objectives for site rRA 13, A5.2: Subtidal sand

Section	
1 Conservation Objective	Subtidal sand is widespread around the British Isles and mainland Europe. Subject to natural change, recover the subtidal sand to favourable condition by 2020 and maintain thereafter, and recover the subtidal sand in the area marked on map Figure 7.213 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sand in the biogeographic region is recovered and the subtidal sand area marked on map Figure 7.213 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Table 7.241 Conservation objectives for site rRA 13, Subtidal sands and gravels

Section	
1 Conservation Objective	Subtidal sands and gravels are on the UK List of Priority Species and Habitats (UK BAP).Subject to natural change, recover the subtidal sands and gravels to favourable condition by 2020 and maintain thereafter, and recover the subtidal sands and gravels in the area marked on map Figure 7.213 to reference condition, such that:
2 Attributes and parameters(indicated by *)	**Habitat** the • extent, • diversity, • community structure, • natural environmental quality*, and • natural environmental processes* representative of the subtidal sands and gravels in the biogeographic region is recovered and the subtidal sands and gravels area marked on map Figure 7.213 is recovered to reference condition, such that the feature makes its contribution to the network.
Advice on operations	
3 Human activities	Reference areas should be managed to remove or prevent all extraction, deposition or human-derived disturbance and damage.

Sites to which this site is related

This section considers neighbouring rMCZs and other MPAs that overlap with, or are adjacent to (i.e. within c.5km of) the rMCZ under discussion. Other sites that are linked with this rMCZ but which are outside of the scope of this section as defined are considered under 'Connectivity' within the ENG requirement section.

rRA 13 falls within NG 15 and is not protected by any MPAs.

Levels of stakeholder support

At the second Large Group Meeting (July 2011) stakeholders (who were assigned to groups to discuss the sites from their own Regional Hubs) were asked to provide **feedback on the consensus support** for the site (scoring 1 for 'strongly against' through to 4 for 'strongly support'), an indication of the likely level of contention that designation of the site might have (scored as 'L', 'M' or 'H'), and a view on the group's confidence in the underlying data used to develop site proposals (again scored as 'L', 'M' or 'H').

One group indicated that they could not support the site (scoring it '1', strongly against). This was primarily from the point of view of the commercial fishing sector; however it was recognised that the site had been identified as it was the only area of the low energy circalittoral rock broad-scale habitat feature in the Net Gain Project area. The other group were neutral in their view (scoring the site '2½'). They suggested that the level of support was not great but understood the importance of the area and its importance regarding meeting requirements of the ENG.

Confidence in the underlying data was high, the principal element of the site being a distinct and easily identified feature.

Whilst one group believed the potential contention around the site would be high, due to objections by the commercial fishing sector, the other group suggested that it would be low.

Formal sector-specific feedback on the network of MCZs presented in the Draft Final Recommendations report was provided by a number of stakeholders. A précis of their comments is provided below. Full copies of all formal feedback received for the Draft Final Recommendations, as well as for each of the three preceding iterations, are presented as an Annex to this report.

- NFFO - commercial fishing:- Strongly against (both on principle, and because of its size)

In previous Regional Hub discussions this site had achieved consensus. Site planning had been mindful of fishing activity, both in orienting the site in a north -south direction to avoid pelagic fishing activity and also in reducing the size of the original site suggested in the 3rd iteration to accommodate concerns from the commercial fishing sector.

Table 7.242 Supporting documentation

Information	Type of information	Source
Broad-scale habitat	Modelled data	Mc Breen, 2010
Pelagic ecological importance	Amalgamated pelagic data layer	The Wildlife Trusts, 2010
Subtidal sands and gravels	Modelled data	Tyler-Walters, et al. 2009

References

CONNOR, D. ALLEN, J. GOLDING, N. HOWELL, K. LIEBERKNECHT, NORTHEN, K. REKER, J 2004. *The Marine Habitat Classification for Britain and Ireland Version 04.05* JNCC, Peterborough ISBN 1 861 07561 8 (internet version)

CRANSON, A. WALTON, J. 2008. *Grey Seal (Halichoerus grypus) Species Action Plan*. Northumberland Biodiversity Action Plan.

MADDOCK, A. 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions.* Accessed from http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf

McBREEN, F. 2010. *UKSeaMap 2010 EUNIS model Version 3.0. UKSeaMap 2010: Predictive seabed habitat map (v5).* JNCC.

THE WILDLIFE TRUSTS. 2010. *Areas of additional pelagic ecological importance (APEI) data layer*.

THOMPSON, D. and DUCK, C. 2010 *Berwickshire and North Northumberland Coast European Marine Site: grey seal population status.* Report to Natural England

TYLER-WALTERS, H., MILLER, P., McQUATTERS-GOLLOP, A., SAUNDERS, J., FOX, C. 2009. *Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Task 2F - Development of a marine diversity data layer: review of approaches and proposed method.* ABP Marine Environmental Research Ltd.

Annex 1 Glossary of terms and acronyms

Terms

Activity: a human action which may have an effect on the marine environment e.g. fishing, energy production.

Adequacy: The overall size of the MPA network and the amount of each feature protected within it, to ensure the delivery of ecological objectives, and the long-term viability of those features.

Algae: marine plants that include macro-algae, commonly known as seaweed, and microscopic algae known as phytoplankton.

Angiosperms: Flowering plants. Seagrasses are the only truly marine angiosperms.

Anthropogenic: Caused by humans or human activities; usually used in reference to environmental degradation.

Area of search: Area indentified for discussion in stakeholder meetings where no formal boundaries for rMCZs were identified.

Benthic: A description for animals, plants and habitats associated with the seabed. All plants and animals that live in, on or near the seabed are benthos (e.g. sponges, crabs, seagrass beds).

Biodiversity: The variety of life forms, including plants, animals and microorganisms, the genes that they contain, and the biotopes and ecosystems that they form.

Biodiversity hotspots: Areas of high species and habitat richness.

Biogenic reef: Any structure that has been formed from living material. It is normally used to describe living structures such as those created by the cold-water coral *Lophelia pertusa*, colonial worms such as *Sabellaria* spp and molluscs, including the horse mussel *Modiolus modiolus.*

Biogeography: Biogeography is the study of geographical distributions of species and habitats, and the environmental or historical factors that produce such distributions.

Biogeographic region: An area of animal and plant distribution having similar or shared characteristics throughout.

Biotope: The physical habitat with its associated, distinctive biological communities. A biotope is the smallest unit of a habitat that can be delineated conveniently and is characterised by the community of plants and animals living there (for example, deep sea *Lophelia pertusa* reef).

Broad Area of Interest: Areas identified in the Net Gain first iteration as potential areas where an MCZ could be sited.

Broad-scale habitat (BSH): Habitats ranging from rocky habitats to sands and sediments. A list of broad-scale habitats was included in the Ecological Network Guidance for recommended protection by Marine Conservation Zones.

Buffer zone: A transition zone around a protected (or closed) area in which some activities may be restricted to enhance the benefits to be gained from the protected area.

Circalittoral: The subtidal zone characterised by animal dominated communities. The depth at which the circalittoral zone begins is directly dependent on how much light reaches seabed.

Connectivity: The extent to which populations in different parts of a species' range are linked by the exchange of eggs, larvae or other propagules, and juveniles or adults.

Conservation objective: A statement of the nature conservation aspirations for the feature(s) of interest within a site and an assessment of those human pressures likely to affect the feature(s).

Conservation objective guidance (COG): The guidance provided to stakeholders to aid their decision making around conservation objectives

Deep-sea: The seabed generally beyond 200 metres depth (in the context of the EUNIS habitat classification system).

Defra: The UK Government department responsible for the environment, for food and farming, and for rural matters.

Defra area MPA network: The Defra area MPA network will comprise existing MPAs including European marine sites (SACs and SPAs) and the marine components of SSSIs and Ramsar sites; and MCZs designated under the Marine and Coastal Access Act. The Defra area MPA network will extend across the territorial waters of England and UK offshore waters adjacent to England and Wales; and will contribute to the UK MPA network in these areas.

Demersal: Species that live on, or in close proximity to, the seabed, e.g. flat fish. The term also applies to fishing gear that is used on the seabed (e.g. trawling).

Draft Marine Conservation Zones (dMCZs): Draft Marine Conservation Zones. These sites are referred to as 'rMCZs' in the final recommendations report.

EC Habitats Directive: The EC Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) aims to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species at a favourable conservation status, introducing robust protection for those habitats and species of European importance.

EC Birds Directive: The Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version of Directive 79/409/EEC as amended) provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. Through this Directive, the European Community meets its obligations for bird species under the Bern Convention and Bonn Convention.

(Areas of) Ecological importance: Areas of the sea important for particular life stages or behaviours of species, areas of high productivity and areas of high biodiversity can be considered to be particularly ecologically significant.

Ecology: The study of the interrelationships between animals, plants and the non-living components of their environment, in their natural surroundings.

Ecosystem: A set of plants and animals inhabiting a given space, the interactions between the different species, and the interactions between the species and their physical environment. It is defined at a much broader scale than the term biotope, i.e. an ecosystem would commonly contain many biotopes. An ecosystem function is based on balanced interactions, such as food webs. Every component of an ecosystem (plants, animals, physical environments, biotopes) has a particular role or function, meaning that its loss or disruption can have knock-on effects that reverberate around the whole ecosystem.

Ecosystem Approach: A framework for looking at whole ecosystems in decision making, and for valuing the ecosystem services they provide, to ensure that we can maintain a healthy and resilient natural environment now and for future generations.

Ecosystem goods and services: Indirect or direct benefits to human society that derive from marine ecosystems. Examples would include food provision, recreation, nutrient cycling, gas and climate regulation.

Environment: The physical surroundings and climatic conditions that influence the behaviour, growth, abundance and overall performance of a population or species.

EUNIS: A European habitat classification system developed by the European Topic Centre on Biological Diversity, covering all types of habitats from natural to artificial, from terrestrial to freshwater and marine.

European marine site: A European site (SAC or SPA) which marine components.

Feature: A species, habitats, geological or geomorphological entity for which an MPA is identified and managed.

Features of conservation importance (FOCI): Habitats and species that are rare, threatened or declining in our waters.

Front: a boundary or transition zone between two water masses of different properties.

Geographic Information System (GIS): A system of hardware, software, and procedures designed to support the capture, management, manipulation, analysis, modelling, and display of spatially referenced data for solving complex planning and management problems.

Habitat – the place where an organism lives, as characterised by the physical features. For example, rocky reefs, sandbanks and mud holes all provide particular habitats that are occupied by animals adapted to live in or on one of them but probably cannot thrive, or even survive in the others.

Habitats of conservation importance (FOCI): Habitats that are rare, threatened or declining in our waters.

Heuristics: 'Rules of thumb' derived from scientific knowledge and understanding.

Home range: The geographic area in which an animal normally ranges.

Infralittoral zone: The shallowest subtidal zone (closest to the shore) characterised by plant dominated communities.

Intertidal: The foreshore or area of seabed between high water mark and low water mark which is exposed each day as the tide rises and falls. Also called the littoral zone.

Impact: The consequence of pressures (e.g. habitat degradation) where a change occurs that is different to that expected under natural conditions.

Impact Assessment: An Impact Assessment is a process for analysing and selecting policy options and a tool for communicating how preferred options have been chosen. It articulates the anticipated environmental, economic and social costs, benefits and impacts of a proposed policy or range or policies. These impacts are assessed against a baseline of the proposed policy interventions not taking place.

Non-native species: Plants and animals that are introduced to a new area and outcompete native species. Invasive species can reduce biodiversity and negatively affect marine ecosystems.

Joint Nature Conservation Committee (JNCC): The statutory adviser to Government on UK and international nature conservation. Its specific remit in the marine environment ranges from 12-200nm. JNCC delivers the UK and international responsibilities of the four country nature conservation agencies of the devolved regions, including Natural England.

Juvenile: An immature organism, i.e. one that has not reached sexual maturity.

Larvae: The developing animal after it has hatched from the egg but before it has reached the adult or even juvenile stage. Many marine larvae drift in the plankton.

Littoral: The edge of the sea, but particularly the intertidal zone.

Maerl: Twig-like, calcified red algae that act as keystone species and form a particular habitat.

Marine Conservation Zone (MCZ): a new type of Marine Protected Area (MPA) to be designated under **the** Marine and Coastal Access Act. MCZs will protect nationally important marine wildlife,

habitats, geology and geomorphology and can be designated anywhere in English and Welsh inshore and UK offshore waters.

Marine Conservation Zone Project: A project established by Defra, Natural England and the Joint Nature Conservation Committee to identify and recommend Marine Conservation Zones to Government. The Marine Conservation Zone Project will be delivered through four regional MCZ projects covering the South-West, Irish Sea, English North Sea and Eastern Channel and will work with sea users and interest groups to identify Marine Conservation Zones.

MCZ Project team: All those involved in the day-to-day running of the MCZ Project. This includes individuals from Defra, Natural England, JNCC and the regional MCZ projects.

Marine Protected Area (MPA): A generic term to cover all marine areas that are 'A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values'. MPAs may vary in their objectives, design, management approach or name (e.g. marine reserve, sanctuary, marine park). See also 'Protected Area' and 'OSPAR MPA'.

Marine Protected Area Network: A system of individual marine protected areas operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels, in order to fulfil ecological aims more effectively and comprehensively than individual sites could acting alone. The system will also display social and economic benefits, though the latter may only become fully developed over long time frames as ecosystems recover.

Monitoring: The regular and systematic collection of environmental and biological data by agreed methods and to agreed standards. Monitoring provides information on current status, trends and compliance with respect to declared standards and objectives.

Natura 2000: The EU network of nature protection areas (classified as SPAs and SACs) established under the 1992 Habitats Directive.

Natural England: The statutory advisor to Government established to conserve and enhance the natural environment, for its intrinsic value, the wellbeing and enjoyment of people and the economic prosperity that it brings. Natural England has a statutory remit for England out to 12 nautical miles offshore.

Non-native species: Any organism that has been introduced deliberately or accidentally by human activity and has established a self-sustaining population in an area beyond its normal geographic range. (See also invasive species).

Nursery area: An area readily identified as one of particular importance, year-on-year, for juvenile fish.

OSPAR: The Convention for the Protection of the Marine Environment of the North-East Atlantic (http://www.ospar.org).

OSPAR MPA: An area within the OSPAR maritime area for which protective, conservation, restorative or precautionary measures, consistent with international law have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment.

Pelagic: Living in the water column.

Phytoplankton: Microscopic plants floating in the water column that drift to-and-fro with the tides.

PISA: **P**otential **I**mpacts from **S**elected **A**ctivities - was developed to filter the full sensitivities database in order to identify, in relation to any activity, the subset of BSH or FOCI features that may potentially be affected. The software allowed the user to select any activity and to undertake an assessment based on any given combination of feature sensitivity to pressures.

Plankton: the animals and plants that float in mid water and drift to-an-fro with the tides.

pMCZ: Potential Marine Conservation Zone. This is the way that sites will be referred to when they are being considered for potential designation by the UK government.

Pressure: The mechanism (physical, biological or chemical) through which an activity has an effect on any part of the ecosystem (e.g. physical abrasion caused by trawling). Pressures can be physical, chemical or biological and the same pressure can be caused by a number of different activities.

Primary production: the growth produced by the organisms on the bottom of the food chain (plants, algae), which fuels the rest of the food chain.

PRISM: **PR**oducing **I**nformation from **S**ensitivity **M**atrices – was developed to filter the full sensitivities database in order to identify, in relation to any of the BSH or FOCI features, the subset of activities that may potentially need to be managed post-designation. The software allowed the user to select any BSH or FOCI feature and to undertake an assessment based on any given combination of feature sensitivity to pressures.

Productivity: The total biomass generated by a population, stock or species each year as a result of growth and reproduction – less the quantity lost through mortality.

Propagule: A plant seed or spore.

Protected Area: A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

Ramsar: Sites designated under the Convention for Wetlands of International Importance, signed in Ramsar, Iran in 1971. http://www.ramsar.org/

Rarity: A rare feature is one that is restricted to a limited number of locations or to small, few and scattered locations in UK waters.

Recommended reference area (rRA): A recommended area where the factor being tested (e.g. exposure to human pressure) is not applied (for example, within an MPA). As such, the control site serves as a standard for comparison against other areas where the factor *is* applied (those areas of the marine environment which are exposed to human pressure). These areas are sometimes referred to as reference or benchmark sites.

Recommended marine conservation zone (rMCZ): Recommended site for a new type of Marine Protected Area (MPA) to be designated under the Marine and Coastal Access Act. MCZs will protect nationally important marine wildlife, habitats, geology and geomorphology and can be designated anywhere in English and Welsh inshore and UK offshore waters.

Recovery: The absence of pressures to which the feature is sensitive, combined with evidence of ongoing improvement of the condition of the feature until a favourable stable state has been reached[36].

Reference area (RA): an area where the factor being tested (e.g. exposure to human pressure) is not applied (for example, within an MPA). As such, the control site serves as a standard for comparison against other areas where the factor *is* applied (those areas of the marine environment which are exposed to human pressure). These areas are sometimes referred to as reference or benchmark sites.

Regional MCZ project: Any one of the four projects that have been set up in the south-west, Irish Sea, English North Sea and south-east (covering English inshore and English, Welsh and Northern

[36] Tentative definition not yet formally agreed amongst SNCBs and Defra

Irish offshore waters) to deliver the MCZ Project, namely Finding Sanctuary, Irish Sea Conservation Zones, Net Gain and Balanced Seas.

Regional MCZ project area: The area of sea covered by each of the individual regional MCZ projects.

Regional MCZ project team: All those involved in the day-to-day running of any one of the four regional MCZ projects.

Regional MPA configurations: The Regional MPA configurations will comprise existing MPAs including European marine sites (SACs and SPAs) and the marine components of SSSIs and Ramsar sites; and MCZs designated under the Marine and Coastal Access Act. Each Regional MCZ project will recommend to JNCC and Natural England the MCZs that will complete their Regional MPA configurations for their respective project area, eventually contributing to the Defra area MPA network.

Regional Profile: Each Regional MCZ Project team will produce a Regional Profile that will provide an overview of the data available for that project area which will support decision-making. The Regional Profile will include for example, distribution maps for features of conservation importance and information about existing MPAs.

Regional stakeholder group: A group of sea users, regulators and interest groups that will decide upon the MCZ recommendations of the regional MCZ projects.

Representativity: The concept of protecting the full range of marine biodiversity within an MPA network by including examples of all habitats (and therefore the species associated with them) across their full geographic and ecological range.

Resilience: the ability of a system to maintain key functions and processes in the face of stresses or pressures by either resisting or adapting to change.

SAC (Special Area of Conservation): protected sites designated under the European Habitats Directive for species and habitats of European importance, as listed on Annex I and II of the Directive.

SAP (Science Advisory Panel): The SAP will provide the scientific knowledge, advice and judgement necessary to assist the regional MCZ projects in identifying MCZs and the Secretary of State in designating these sites as a contribution to an ecologically coherent network. Members and chair of the SAP were appointed by Defra.

Sensitivity: An assessment of the intolerance of a species or habitat to damage from an external factor and the time taken for its subsequent recovery. For example, a very sensitive species or habitat is one that is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, 'high' intolerance) and is expected to recover over a very long period of time, i.e. >10 or up to 25 years ('low'; recoverability). Intolerance and hence sensitivity must be assessed relative to change in a specific factor.

Sessile: an organism that does not move, but stays attached to one place on the sea floor, such as a mussel or a sea fan.

Shifting baselines: Refers to the fact that people measure ocean health against the best that they have experienced in their own lifetimes (even if those measures fall far short of historical ones) which causes a lowering of standards from one generation to the next. One generation sets a baseline for what is “healthy” and “natural” based on their own experience. Successive generations see even more degraded ecosystems as “healthy,” and therefore set their standards for ecosystem health even lower.

SPA (Special Protection Area): protected sites designated under the EC Birds Directive, for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species.

Species of conservation importance (FOCI): Habitats and species that are rare, threatened or declining in our waters.

SSSI (Site of Special Scientific Interest): Sites designated under the Wildlife and Countryside Act 1981 (as amended 1985, and superseded by the Countryside and Rights of Way Act 2000, and the Nature Conservation Act 2004).

Spawning aggregation: A collection of individuals which converge to mate; this collection is unusually concentrated and, thus, highly vulnerable to fishing effort.

Stakeholder: Individuals, groups of individuals, organisations, or political entities interested in and/or affected by the outcome of management decisions. Stakeholders may also be individuals, groups, or other entities that are likely to have an effect on the outcome of management decisions. Members of the public also may be considered stakeholders.

Stakeholder Advisory Panel (StAP): The Stakeholder Advisory Panel, chaired by Trevor Jameson was made up of national stakeholders and representatives from each of the regional hubs. The central remit of the StAP was to review the developing configuration of sites throughout the whole Net Gain area and provide feedback to the regional hubs. Trevor Jameson ultimately signed off the final recommendations report.

STARFISH - **S**implified **T**ables for **A**ssessing the need for **R**egulation, using **F**iltered **I**mpacts on **S**pecies and **H**abitats – was developed for use in debates around vulnerability assessment (to inform Conservation Objectives) and the possible need for management measures.

Statutory nature conservation bodies (SNCBs): The collective term for the Joint Nature Conservation Committee (JNCC) and Natural England.

Substrate/Substratum: the surface or medium on which an organism grows or is attached (e.g. seabed sediment).

Subtidal: Depths greater than the intertidal zone.

Thermocline: The layer which separates warmer surface water from cold deep water, and at which temperature decreases rapidly with increasing depth.

UK Biodiversity Action Plan (UK BAP): The UK BAP is the Government's response to the Convention on Biological Diversity (CBD) signed in 1992. The UK BAP includes a number of specific plans for species and habitats afforded priority conservation action.

UK MPA network: The UK MPA network will comprise existing MPAs including European marine sites (SACs and SPAs) and the marine components of SSSIs and Ramsar sites; and new national MPAs, which the UK Government and Devolved Administrations propose to introduce through the existing and forthcoming Marine Acts. The UK MPA network will extend across UK territorial waters and UK offshore waters.

Viability: The ability of an MPA to maintain the integrity of the features (i.e. population of the species or condition and extent of the habitat), for which it is designated, and to ensure individual sites are self-sustaining throughout natural cycles of variation.

Vulnerability Assessment: A proxy assessment of the feature's condition, which was carried out where survey evidence is limited. The feature's exposure to pressures is determined to assess whether or not it is vulnerable.

The Wildlife and Countryside Act 1981: A UK act which consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive) in Great Britain.

Acronyms

Acronym	Meaning
AOS	Area of search
BAI	Broad area of interest
BSH	Broad-scale habitat
CO	Conservation objective
COG	Conservation objective guidance
Defra	Department for Environment, Food, Farming and Rural Affairs
dMCZ	Draft marine conservation zone
EIFCA	Eastern Inshore Fisheries and Conservation Authority
EN	English Nature
EUNIS	European Nature Information System
FOCI	Features of conservation importance
GIS	Geographical information system
HOCI	Habitat of conservation importance
IA	Impact assessment
JNCC	Joint Nature Conservation Committee
LWT	Lincolnshire Wildlife Trust
MPA	Marine protected area
MCS	Marine Conservation Society
MCZ	Marine conservation zones
MMO	Marine Management Organisation
NE	Natural England
NEIFCA	North Eastern Inshore Fisheries and Conservation Authorities
NIFCA	Northumberland Inshore Fisheries and Conservation Authorities
nm	Nautical miles
NNR	National nature reserve
NWT	Norfolk Wildlife Trust
OSPAR	Oslo and Paris Convention
PISA	Potential impacts from selected activities tool
pMCZ	Potential marine conservation zones
PRISM	Producing information from sensitivity matrices tool
RA	Reference area
rMCZ	Recommended marine conservation zone
RSPB	Royal Society for the Protection of Birds
rRA	Recommended Reference Area
SAC	Special areas of conservation
SAP	Science Advisory Panel
SNCB	Statutory Nature Conservation Body
SOCI	Species of conservation importance
SPA	Special protection area
SSSI	Site of special scientific interest
StAP	Stakeholder Advisory Panel
STARFISH	Simplified tables for assessing the need for

	regulation, using filtered impacts on species and habitats
UK BAP	UK Biodiversity Action Plan
UK MPA	UK marine protected area
VA	Vulnerability assessment
YWT	Yorkshire Wildlife Trust

Annex 2 Vulnerability assessments

Note: This Annex is presented as a separate, stand-alone annex to the main report.

Annex 3 Stakeholder representation

Stakeholder representation at each of the Regional Hub and StAP meetings is shown in the tables below.

Table A3.1 North East Regional Hub – members and attendance

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	May 2011
Geoff Barber	Coastal forums	✓			✓	✓	
Sophie Barrell	Forewind			✓			✓
Niall Benson	Coastal forums etc		✓				
Helen Bloomfield	Newcastle University						
Michael Bould	Commercial fishing	✓	✓		✓	✓	✓
Al Brown	Recreational sea angling				✓	✓	
Emma Brown	Natural England						
Ronnie Buglass	Commercial fishing	✓	✓	✓			✓
Alex Caveen	Academic		✓	✓			
Alan Charlton	Recreational sea angling		✓	✓	✓	✓	
Ned Clark	Commercial fishing			✓	✓	✓	✓
Jane Delany	Academic	✓					
Ally Evans	Natural England						✓
Andrew Finlay	The Crown Estate			✓	✓	✓	
Gillian Flint	RSPB	✓					
Russell Gadbury	Northumberland CC		✓				
Jon Green	Northumberland IFCA	✓	✓	✓			✓
Mike Hardy	Northumberland IFCA	✓			✓	✓	
Sam Harris	Recreational sea angling	✓	✓	✓			
Andrew Hunt	Offshore renewables			✓			
Jacqui Huntley	Heritage	✓			✓	✓	✓
Roxana Jackson	Diving		✓				
Ana Jesus	JNCC				✓	✓	
Martin Kerby	RSPB		✓	✓	✓	✓	✓
Martin Kitching	N E Wildlife Tours			✓	✓	✓	✓
Aisling Lannin	Natural England	✓	✓	✓	✓	✓	✓
Billy Lawrence	Commercial fishing			✓			
Maeve Lee	Durham Heritage coast	✓		✓	✓	✓	✓
Gareth Lewis	Northumberland IFCA				✓	✓	
Paula Lightfoot	MCS	✓	✓	✓	✓	✓	✓
Steve Lowe	Wildlife Trust	✓	✓	✓	✓	✓	✓
Jan Lupton	MMO - Presenter				✓	✓	
Jill McCormick	Environment Agency			✓	✓	✓	✓
Nancy McLean	NAREC (Natural Power)						✓
Victoria	MMO – Presenter				✓	✓	

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	May 2011
Metheringham							
Katie Morton	MMO – Presenter				✓	✓	
Peter Nicholson	Yachting	✓	✓		✓	✓	
Bob Pailor	Tees INCA						
Alexander Ritchie	Commercial fishing	✓	✓	✓	✓	✓	✓
Neil Robinson	Northumberland IFCA				✓	✓	✓
Mike Sands	Recreational sea angling	✓	✓				
Catherine Scott	Natural England	✓					
David Shiel	Angling charter boat		✓				
Jim Stephenson	Commercial mobile fishing				✓	✓	✓
Natalie Stevenson	Narec (Natural Power)				✓	✓	✓
John Thomson	Northumberland IFCA		✓	✓			✓
Steve Walker	Recreational sea angling		✓				
Phil Walsh	Commercial fishing	✓	✓	✓	✓	✓	✓
John Walton	Heritage	✓	✓				✓
Tim Watson	Marinet	✓		✓	✓	✓	✓
Les Weller	Recreational angling	✓	✓	✓			✓
Martyn Youell	MMO				✓	✓	

Table A3.2 Yorkshire & Humber Regional Hub – members and attendance

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	April 2011
David Adamson	Recreation	✓	✓	✓	✓	✓	
Sophie Barrell	Forewind				✓	✓	✓
John Beech	Coastal forums		✓	✓		✓	✓
Helen Bloomfield	Academic	✓		✓			
Sue Boyes	Academic	✓					
Sally Bradley	MMO					✓	✓
Richard Brewer	Commercial fishing	✓					
Robert Briggs	Lobbying	✓	✓				
Emma Brown	Natural England	✓	✓	✓	✓	✓	✓
Daryl Burdon	Academic		✓	✓	✓	✓	✓
Jon Capel	Marinet	✓		✓	✓		
Alex Caveen	Academic		✓				
Sine Christiansen	DONG Energy						✓
Bob Coates	Bridlington & Flamborough Fishermans Society				✓	✓	✓
Nigel Corner	MMO						✓
Kirk Crimlisk	Commercial Fishing				✓	✓	✓
Tania Davey	Coastal forums (Humber INCA)		✓		✓	✓	✓
Tony Edwards	Coastal forums (Humber INCA)	✓		✓			
Dave Eldred	Recreational Angling						
Matthew Emmerson	Commercial fishing	✓					
Ally Evans	Natural England						✓
Andrew Finlay	The Crown Estate			✓	✓	✓	✓
Gillian Flint	RSPB	✓	✓				
John Hall	Commercial fishing					✓	
Andy Hammon	Heritage	✓			✓		✓
Rachel Hanbury	MMO		✓	✓	✓	✓	
Julian Harlow	Natural England						✓

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	April 2011
Geoffrey Hill	Yachting	✓	✓		✓		✓
Paul Huteson	Commercial fishing	✓			✓		
David Jenkinson	Commercial fishing	✓					
Chris Jenner	Offshore renewables			✓	✓	✓	
Tom Jeynes	Ports/Harbours		✓	✓		✓	✓
Paul Lane	North eastern IFCA		✓	✓	✓	✓	✓
Victor Leppington	Commercial fishing	✓	✓	✓	✓		✓
Michelle Lindsay	RSPB			✓	✓	✓	✓
Henrik Lund	Danish Commercial Fisheries				✓		
Jan Lupton	MMO					✓	
Danny Major	MCA	✓	✓		✓		✓
Stacey Mayer	MMO					✓	
Jill McCormick	Environment Agency		✓	✓	✓		✓
Cliff Morrison	Processing	✓		✓			✓
Robin Neale	Recreational angling	✓	✓	✓	✓	✓	✓
Chris Nicholson	MMO			✓			
Jeremy Pickles	East Riding of Yorkshire Council		✓				
Carrie Pillow	MCS	✓	✓	✓		✓	✓
Richard Pockley	Commercial fishing	✓	✓				
Tony Pockley	Bridlington & Flamborough Fishermen		✓	✓	✓		✓
Stephen Pratt	Recreational sea angling	✓	✓				
Nigel Proctor	Recreational sea angling		✓	✓	✓		
David Pybus	Cleveland Potash			✓			
Chris Robinson	Cleveland/NYork Coastal Forum		✓		✓		
Dale Rodmell	NFFO				✓	✓	✓
Mark Russell	BMAPA				✓		
Dave Screeton	Commercial fishing	✓					
Graham Singleton	Aggregates	✓	✓	✓		✓	✓

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	April 2011
Kirsten Smith	Wildlife Trusts	✓	✓	✓	✓	✓	✓
Rob Spray	MCS				✓		
Alan Stead	Commercial fishing						
David Swift	Recreational angling	✓		✓	✓	✓	✓
Jenny Thomas	Cleveland Potash Ltd				✓		✓
Ruth Thurstan	Recreational Diving		✓	✓	✓		
Declan Tobin	JNCC				✓		
Pim Visser	Visned (Danish commercial fishing)						✓
Jon Whitton	Angling charter boat	✓	✓	✓	✓	✓	✓
James Wood	North eastern IFCA	✓					
Shaun Wood	Processing	✓	✓				
Martyn Youell	MMO					✓	

Table A3.3 Lincolnshire & The Wash Regional Hub – members and attendance

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	May 2011	June 2011
Ken Bagley	Commercial fishing	✓					✓	
Alan Bagley	Boston Fishermen						✓	
Shane Bagley	Boston Fishermen						✓	
Trevor Baker	Offshore renewables	✓	✓	✓	✓	✓	✓	
Linda Bourne	MOD		✓	✓	✓	✓	✓	
Bryan Bowles	Landowner	✓						
Sally Bradley	MMO						✓	
Roy Brewster	Commercial fishing	✓					✓	
Katie Critchley	Environment Agency	✓	✓	✓	✓	✓	✓	✓
Amy Crossley	RSPB		✓					
Laurie Dawson	Recreational sea angling	✓	✓	✓			✓	
John Dinwiddy	Recreational Yachting				✓	✓	✓	
Ally Evans	Natural England						✓	
Andrew Finlay	The Crown Estate				✓	✓		
Bob Garnett	Commercial fishing	✓	✓	✓	✓	✓	✓	✓
Paul Garnett	Commercial fishing	✓	✓	✓	✓	✓	✓	✓
Kit Hawkins	Offshore Renewables						✓	
Tony Hogg	Recreational sea angling	✓	✓	✓				
Gordon Jackson	Recreational sea angling		✓	✓	✓	✓	✓	
Mike Jones	RSPB		✓	✓	✓	✓	✓	
Neil Lake	Boston Fishermen						✓	
Paul Learoyd	Wildlife Trust	✓		✓	✓	✓	✓	
Simon Letzer	Commercial fishing		✓					
Bob Lloyd	MOD	✓						
John Lorking	Ports & harbours				✓	✓	✓	✓
Rob Lucking	Other NGO (e.g. NT)	✓						
Tom Manning	Natural England	✓	✓	✓	✓	✓	✓	✓
Hannah Marriot	MMO				✓	✓		

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	May 2011	June 2011
Ian Martin	Commercial fishing	✓	✓		✓	✓	✓	
Victoria Metheringham	MMO				✓	✓		
Chris Pater	English Heritage	✓		✓	✓	✓	✓	
Ian Paterson	Natural England						✓	
Maria Phipps	Coastal forums etc		✓					
Paulo Pizzolla	Academic		✓	✓	✓	✓	✓	
Dale Rodmell	NFFO				✓	✓	✓	
Andy Roper	Commercial fishing		✓					
Joe Roper	Commercial fishing						✓	
Mark Russell	Aggregates	✓	✓	✓	✓	✓	✓	
Jez Sooben	MMO			✓	✓	✓	✓	
Ben Southerland	Commercial fishing							✓
Rob Spray	MCS	✓	✓	✓	✓	✓		✓
Caroline Steel	Wildlife Trust		✓					
Judith Stoutt	Eastern IFCA		✓	✓	✓	✓	✓	
Gillian Sutherland	Offshore renewables							
Fiona Tibbett	MCS						✓	
Steven Williamson	Processing	✓	✓	✓				
Jennifer Wilson	AMEC				✓	✓		
John Witt	Boston Fishermen						✓	
Jessica Woo	Eastern IFCA			✓				

Table A3.4 East of England Regional Hub – members and attendance

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	May 2011	June 2011
Elizabeth Bourke	NFFO						✓	
Jane Burch	Councils	✓	✓	✓				
David Chambers	Commercial fishing	✓						✓
Helen Chappell	English Heritage		✓	✓	✓	✓	✓	✓
Hester Clack	Natural England	✓	✓	✓	✓	✓	✓	
David Cowell	MMO				✓	✓		
Katie Critchley	Environment Agency	✓	✓	✓	✓	✓	✓	✓
Marcus Cross	Offshore Renewables			✓	✓	✓	✓	
Amy Crossley	RSPB			✓			✓	
Phil Durrant	North Sea Marine Cluster		✓					
Ally Evans	Natural England						✓	
Andrew Finlay	The Crown Estate			✓	✓	✓		
Russell Gadbury	MMO				✓	✓		
Alan Garnhan	Eastern IFCA				✓	✓		
Colin Gooding	MMO			✓				
Kit Hawkins	Offshore renewable							✓
Roger Hipwell	Commercial fishing	✓	✓	✓	✓	✓	✓	
John Hiskett	Wildlife Trust	✓	✓	✓	✓	✓	✓	✓
Aaron Howe	RSPB	✓						
Mark Johnson	Environment Agency							✓
Iain Johnston	Ports/Harbours	✓		✓	✓	✓	✓	✓
Kevin Jonas	Crab Fisherman				✓	✓	✓	✓
Mike Jones	RSPB			✓	✓	✓		
Adrian King	Angling and Diving Boat Charters				✓	✓		
Roger Knights	Yachting	✓						
John Lee	Commercial fishing				✓	✓	✓	✓
David Little	Commercial fishing	✓						
Dave Lock	Diving	✓	✓		✓	✓	✓	✓
Matt Mander	Eastern IFCA	✓						

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	May 2011	June 2011
Darren Marriott	Commercial fishing	✓			✓	✓		
Roger Mason	MMO				✓	✓	✓	✓
Stacey Mayer	MMO						✓	
Victoria Metheringham	MMO				✓	✓		
Keith Mountifield	Recreational sea angling	✓						
Bill Parker	Suffolk Local Authorities						✓	
Douglas Parrant	Offshore Renewables			✓				
Adam Pharaoh	Galloper Wind Farm				✓	✓	✓	
Graham Pickett	Academic	✓	✓		✓	✓		
Tom Pinborough	Recreational angling	✓						
David Richards	Commercial fishing	✓						
Kate Risley	MCS						✓	
Dale Rodmell	NFFO				✓	✓		
Mark Russell	Aggregates	✓	✓	✓	✓	✓	✓	
Roger Seago	Commercial fishing		✓	✓	✓	✓	✓	✓
Hugh Sims	Processing	✓	✓		✓	✓	✓	
Barrie Smart	MMO	✓	✓					
Rob Spray	MCS	✓	✓	✓	✓	✓		✓
Doug Stewart	North Sea Marine Cluster		✓	✓	✓	✓	✓	
Judith Stoutt	Eastern IFCA		✓	✓	✓	✓	✓	
Kirk Stribling	Processing	✓						
Gillian Sutherland	Renewables		✓					
Bob Thompson	Recreational sea angling	✓						
Helen Thompson	Offshore renewables		✓					
Kate Tibble	Offshore renewables	✓	✓					
David Vicary	Recreational sea angling	✓						
Ralph West	Commercial fishing	✓		✓	✓	✓	✓	✓
James White	Commercial fishing				✓	✓	✓	

Name	Sector or organisation	March 2010	June 2010	October 2010	January 2011	March 2011	May 2011	June 2011
Chris Wightman	Commercial fishing	✓		✓			✓	✓
John Winter	Commercial fishing	✓						
Jessica Woo	Eastern IFCA		✓	✓			✓	✓

Table A3.5 Stakeholder Advisory Panel (StAP) – members and attendance

Name	Sector or organisation	April 2010	June 2010	August 2010	November 2010	February 2011	April 2011	May 2011	July 2011
Peter Barham	Seabed User & Development Group	✓		✓		✓	✓		✓
Mick Borwell	Oil & Gas UK	✓				✓	✓	✓	
Michael Bould	Commercial Fishermen Hartlepool			✓					
Emma Brown	Natural England						✓		
Nigel Corner	MMO							✓	
Connor Donnoly	Natural England			✓					
Andrew Finlay	The Crown Estate							✓	
Robbie Fisher	Natural England	✓							
Rachel Hanbury	MMO			✓		✓			
Neal Hill	Royal Yachting Association	✓	✓	✓	✓	✓	✓	✓	✓
Ana Jesus	JNCC		✓	✓	✓	✓	✓	✓	✓
Paul Lane	NE IFCA		✓		✓	✓	✓		✓
Aisling Lannin	Natural England		✓		✓	✓		✓	✓
Paul Laeroyd	Wildlife Trust					✓			
Adrian Lester	Chamber of Shipping	✓		✓				✓	
Dave Lock	BSAC	✓	✓	✓	✓			✓	✓
Jan Lupton	MMO						✓		
Iain Mills	The Crown Estate	✓	✓	✓	✓	✓	✓		
Richard Nevinson							✓		
Chris Nicholson	MMO		✓		✓				✓
Evelyn Pizzollo	DECC							✓	
Nigel Proctor	Recreational Sea Angling / NSRAC	✓				✓	✓	✓	
Paul Reynolds	Renewables UK	✓	✓	✓	✓	✓	✓	✓	
Dale Rodmell	NFFO	✓	✓	✓	✓	✓	✓		✓
Mark Russell	BMAPA	✓	✓	✓	✓	✓	✓	✓	

Name	Sector or organisation	April 2010	June 2010	August 2010	November 2010	February 2011	April 2011	May 2011	July 2011
Peter Ryder	Chair of the SAP		✓	✓	✓				
Kirsten Smith	Wildlife Trust	✓	✓	✓	✓		✓	✓	✓
Rob Spray	MCS & Sea Search	✓	✓	✓	✓	✓	✓	✓	✓
Angie Fitch-Tillet	North Norfolk District Council							✓	
Christina Vina-Herbon	JNCC	✓							
Phil Walsh	NUTFA	✓							
Jon Whitton	Whitby Charter Boats	✓	✓	✓	✓	✓	✓	✓	
Steve Williamson	Kings Lynn Fishermen/EIFCA	✓	✓	✓	✓	✓	✓		✓

Table A3.6 Inaugural Large Group Meeting attendance (February 2010)

Name		Sector or organisation
David	Adamson	Kayak Anglers
Andrew	Allard	Jubilee Fishing
Derek	Atkins	
Peter	Barham	Seabed Users and Developers Group
Paul	Beal	BSAC
John	Beech	North York Moors National Park
Helen	Bloomfield	Newcastle University
Mick	Borwell	Oil & Gas UK
Michael	Bould	Amble Seine-Net & Keelboat Association
Elizabeth	Bourke	National Federation of Fishermen's Organisations
Robert	Briggs	Filey Brigg Research Group
Alan	Brown	Marine Committee (Angling Trust)
Colin	Brown	The Deep
Emma	Brown	Natural England
Ronnie	Buglass	Hartlepool Fishermans Association (NUTFA)
Jon	Capel	Marinet (& Humber Estuary Advisory Group)
John	Casey	Skegness Yacht Club
David	Chambers	Norfolk Ind. Fisherman Assoc.
Peter	Chaniotis	JNCC Scottish Offshore MPA Project
David	Charlesworth	The Crown Estate
Hester	Clack	Natural England
Darren	Clarke	Humber Industry Nature Conservation Association (Humber INCA)
John	Connell	Amble Seine Net & Keel Boat Association
Steve	Cowan	B.F.F.O.
Kirk	Crimlisk	Commercial fisherman
Katie	Critchley	Environment Agency
Tania	Davey	Project Manager - Humber Management Scheme
Mick	Edwards	Northern Federation of Sea Angling Societies
Dave	Eldred	Bridlington Charter Boats
Sophie	Elliott	JNCC
Matthew	Emmerson	Flamborough Harbour & Fisherman Commissioner
Andrew	Faichney	
Barry	Fawcett	Hartlepool Boatmans Association

Name		Sector or organisation
Dave	Feeman	Dave Feeman
Robbie	Fisher	Natural England
Gillian	Flint	RSPB
Bob	Garnett	Commercial fishing
Paul	Garnett	King's Lynn Fishing Industry Co-op
Andrew	Gibson	Yorkshire Wildlife Trust
Vaughan	Grantham	East Riding of Yorkshire Council
Jon	Green	Northumberland IFCA
Nikki	Hale	Eastern England Fish Producers Organisation Ltd
Mike	Haley	North East Sea Angling (NESA)
Andy	Hammon	English Heritage
Sam	Harris	Angling Trust - Chairman. Northeast Marine Div; Member of National Marine Div.
Geoffrey	Hill	Royal Yachting Association
Gary	Hodgson	Commercial fisherman
Neville	Horton	E.ON
Anthony	Hurd	Yorkshire Wildlife Trust
Paul Robert	Huteson	Commercial fisherman
Paul	Jefferson	Commercial S.A.C.
David	Jenkinson	Commercial fisherman
Tom	Jeynes	Associate British Ports
Paul	Lane	North Eastern IFCA
Aisling	Lannin	Natural England
Paul	Learoyd	Lincolnshire Wildlife Trust
Maeve	Lee	Durham Heritage Coast
Adrian	Lester	Chamber of Shipping
Paula	Lightfoot	Seasearch & Marine Conservation Society
David	Little	North Norfolk Inshore Fisherman
Dave	Lock	British Sub Aqua Club (BSAC)
Steve	Lowe	Northumberland Wildlife Trust
Dan	Major	RNLI
Tom	Manning	Natural England
Ian	Martin	Lincs Coast Fishermen's Association
Jill	McCormick	Environment Agency - Marine Technical Officer
Stuart	McPherson	Yorkshire Region Angling Trust

Name		Sector or organisation
Robin	Neale	YALASA, Reckitts SAC, Angling Trust Yorkshire Region, Sea Anglers Match Fed;
(Lt Col) Paul	Norrington-Davies OBE	MOD (Defence Training Estates)
Carrie	Pillow	Seasearch North East
Paolo	Pizzolla	Royal Haskoning
Richard	Pockley	Bridlington & Flamborough Fishermans Society
Stephen	Pratt	Secretary, Scarborough Boat Angling Club
Nigel	Proctor	Angling Trust, Reckitts SAC, NESFC, YALASA
Alexander (Sandy)	Ritchie	Anglo Scottish Fishermen's Association
Tom	Rossiter	Seafish
Kat	Sanders	Yorkshire Wildlife Trust
Mike	Sands	Hartlepool Boatmans Association
Dave	Screeton	Commercial fisherman
Graham	Singleton	CEMEX UK Marine Ltd
Kirsten	Smith	The Wildlife Trusts
Jean-Luc	Solandt	Marine Conservation Society
David	Steel	National Trust
Patrick	Stewart	SFF
John	Stipetic	MFA
Leanne	Stockdale	Natural England
Judith	Stoutt	Eastern IFCA
Ray	Stratford	Commercial fishing
Gillian	Sutherland	East Anglia Offshore Wind
David	Swift	Angling Trust
Bob	Thompson	Anglian Sportcast
John	Thomson	Northumberland IFCA
David	Vicary	Anglia Sportcast
Michael	Waddle	Shepherd Lad Fisheries
Philip	Walsh	Hartlepool Fishermans Assoc/NUTFA/SAIF
Sharn	Ward	Forewind
Tim	Watson	Friends of the Earth. MARINET
Brian	Weimer	
Les	Weller	Angling Trust
Phillip	Whelpdale	Yorkshire Wildlife Trust

Name	Sector or organisation
David Whitehead	British Ports Association
Jon Whitton	Whitby Charter Skippers Association
Chris Wightman	Maximus Sustainable Fishing
Steven Williamson	Kings Lynn Fishing Co-op; Lynn Shellfish Ltd
James Wood	North Eastern IFCA
Kathy Wood	AMEC
Shaun Wood	TG Wood Ltd
John Wrottesley	UK Cable Protection Committee

Table A3.7 Second Large Group Meeting attendance (July 2011)

Name		Sector / organisation		Day 1	Day 2
Trevor	Baker	Offshore renewables	RWE npower renewables	✓	✓
Sophie	Barrell	Offshore renewables	Forewind	✓	✓
Tom	Blasdale	JNCC		✓	✓
Linda	Bourne	MOD		✓	✓
Sally	Bradley	MMO		✓	✓
Emma	Brown	Natural England		✓	✓
Daryl	Burdon	IECS: Hull University		✓	✓
Alex	Caveen	Newcastle University		✓	✓
Sine	Christiansen	Offshore renewables	DONG Energy	✓	✓
Bob	Coates	Commercial fishing		✓	✓
Helen	Craven	The Wildlife Trusts		✓	✓
Kirk	Crimlisk	Commercial fishing		✓	✓
Katie	Critchley	Environment Agency		✓	✓
Marcus	Cross	Offshore renewables	Scottish Power Renewables	✓	✓
Tania	Davey	Humber INCA			✓
Andries	de Boer	Intl.commercial fishing (NL)	VisNed	✓	✓
Andrew	Finlay	The Crown Estate		✓	✓
Jon	Green	Northumberland IFCA		✓	✓
Andy	Hammon	English Heritage		✓	
Rachel	Hanbury	MMO		✓	✓
Mike	Hardy	Northumberland IFCA		✓	✓
Kit	Hawkins	Offshore renewables	Centrica Renewable Energy Ltd	✓	✓
Neal	Hill	Royal Yachting Association		✓	✓
Roger	Hipwell	Commercial fishing	Orford & District Inshore Fishermen's Assoc.	✓	✓
John	Hiskett	Norfolk Wildlife Trust		✓	✓
Tony	Hogg	Recreational sea angling		✓	✓
Gordon	Jackson	Recreational sea angling		✓	✓
Trevor	Jameson	StAP Chairman		✓	✓
Chris	Jenner	Offshore renewables	Mainstream Renewables	✓	
Ana	Jesus	JNCC		✓	✓
Tom	Jeynes	Associated British Ports		✓	✓

Name		Sector / organisation		Day 1	Day 2
Mike	Jones	RSPB		✓	✓
Martin	Kitching	Northern Experience Wildlife Tours		✓	✓
Paul	Lane	North East IFCA		✓	✓
Aisling	Lannin	Natural England		✓	✓
Paul	Learoyd	Lincolnshire Wildlife Trust		✓	✓
Maeve	Lee	Durham Heritage Coast			✓
Steve	Lowe	Northumberland Wildlife Trust		✓	✓
Jan	Lupton	MMO		✓	✓
Tom	Manning	Natural England		✓	✓
Neil	Robinson	MMO		✓	✓
Jill	McCormick	Environment Agency		✓	✓
Cliff	Morrison	Seafood Processing	Food & Drink Federation	✓	✓
Robin	Neale	Recreational sea angling	Angling Trust (Yorkshire)	✓	✓
Ian	Paterson	Natural England		✓	
Maria	Phipps	The Wash and North Norfolk European Marine Site			✓
Nigel	Proctor	Recreational sea angling	Angling Trust	✓	
Helen	Quayle	RSPB		✓	✓
Bill	Rigby	Marinet		✓	✓
Sandy	Ritchie	Commercial fishing	Anglo-Scottish Fishermen's Association	✓	✓
Dale	Rodmell	NFFO: Commercial fishing	National Federation of Fishermen's Organisations	✓	✓
David	Scrowston	Tata: Communications		✓	✓
Jim	Stephenson	Commercial fishing		✓	✓
Kirsten	Smith	North Sea Wildlife Trusts	North Sea Coastal & Inland Wildlife Trusts	✓	✓
Jez	Sooben	MMO		✓	
Ben	Southerland	Commercial fishing		✓	
Rob	Spray	Marine Conservation Society		✓	✓
Doug	Stewart	Gardline: Environmental consultancy		✓	✓
David	Swift	Recreational sea angling		✓	✓
Jenny	Thomas	Cleveland Potash		✓	
Jaap	van der Vis	Intl.commercial fishing (NL)	VisNed	✓	✓
Antony	Viera	Intl.commercial fishing (Fr)	CRPMEM Nord Pas de Calais / Picardie	✓	✓

Name	Sector / organisation		Day 1	Day 2
Pim Visser	Intl.commercial fishing (NL)	VisNed	✓	✓
Tim Watson	Marinet		✓	
Les Weller	Recreational sea angling	Amble Sea Angling Club & Northern Federation of Sea Angling Societies	✓	✓
Ralph West	Commercial fishing	Overstrand Parish Council & Shoreline Management Committee	✓	✓
Steven Williamson	Commercial fishing / processing	Lynn Shellfish	✓	✓
Jessica Woo	Eastern IFCA		✓	✓

Regional Hub meeting venues and dates were as shown below in Table A3.8.

Table A3.8 Regional Hub meetings – locations and dates

Round of meetings	Regional Hub	Location	Date(s)
First round	NE	South Shields	16.03.10
	YH	Scarborough	18.03.10
	EE	Lowestoft	25.03.10
	LE	Boston	30.03.10
Second round	YH	Scarborough	09.06.10
	NE	South Shields	11.06.10
	LW	Kings Lynn	15.06.10
	EE	Lowestoft	17.06.10
Supplementary	YH	Scarborough	21.07.10
Third round	EE	Lowestoft	12.10.10 & 13.10.10
	LW	Boston	14.10.10 & 15.10.10
	YH	Scarborough	19.10.10 & 20.10.10
	NE	Blyth	21.10.10 & 22.10.10
Fourth round	YH	Scarborough	18.01.11 & 19.01.11
	NE	South Shields	20.01.11 & 21.01.11
	EE	Lowestoft	25.01.11 & 26.01.11
	LW	Kings Lynn	27.01.11 & 28.01.11
Fifth round	NE	South Shields	21.03.11
	YH	Scarborough	23.03.11
	LW	Boston	25.03.11
	EE	Lowestoft	30.03.11
Sixth round	YH	Scarborough	12.04.11 & 13.04.11
	NE	South Shields	04.05.11 & 05.05.11
	EE	Lowestoft	10.05.11 & 11.05.11
	LW	Kings Lynn	12.05.11 & 13.05.11
Supplementary	EE/LW	Lowestoft	29.06.11

StAP meeting dates were as shown below in Table A3.9; all meetings of the StAP were held in York.

Table A3.9 Dates of Stakeholder Advisory Panel (StAP) meetings

Meeting number	Date(s)
1.	20.04.10
2.	22.06.10
3.	18.08.10
4.	18.11.10 & 19.11.10
5.	07.02.11
6.	06.04.11
7.	25.05.11
8.	04.07.11

Annex 4 A summary of MCZ network development

A4.1 Introduction

A summary of the development of the Net Gain MCZ network is given below as Figure A4.1. An outline of the network development through its earlier iterations is provided in the following sections.

A4.2 The First Iteration

First Iteration production

The First Iteration Report was submitted to the SAP in June 2010. Work at the second round of Regional Hub meetings (immediately preceding the production of the First Iteration Report) focused only on considering areas for protecting broad scale habitats (EUNIS Level 3); associated discussions were based on restricted data (intertidal habitat data were absent) which were, in some cases, felt to be of low quality. There was no information on detailed inshore fishing activity, and concern was expressed by stakeholders over the accuracy and value of the Vessel Monitoring System (VMS) data that were used to help identify areas of potential socio-economic impact. In addition, discussions were held in the absence of detailed information on features' sensitivity to various pressures and on the activities that may give rise to such pressures.

Consequently, the outputs from the mapping work and planning undertaken across the four Regional Hubs could not be taken as being representative of possible MCZs. They were considered only as Broad Areas of Interest (BAIs), which may (or may not) be used by the Regional Stakeholder Group as the basis for discussion in subsequent meetings. In addition, as no overall group consensus was reached in plenary, specific examples of BAIs had no agreed level of consensus associated with them.

Notwithstanding the above, the second round of Regional Hub meetings concluded with stakeholders generally reacting very positively to the mapping work that they were presented with. It was also beneficial to introduce our stakeholders to the use of Marxan as a means of initiating discussions on site identification[37].

First Iteration outputs

Over the four Regional Hub meetings a total of 127 individual suggestions for sites were made. Following the Regional Hub meetings the boundaries of each site were digitised from the acetates used in the meetings. In the absence of a full plenary discussion, all sites were amalgamated resulting in a series of 26 individual areas, which were carried forwards as BAIs. The amalgamated BAI sites are shown as Figure A4.2.

Each of the individual site suggestions produced in this round of Regional Hub meetings had a level of 'contention' (high, medium or low) associated with them. These levels of contention are shown in the accompanying figure as red (high), amber (medium) or green (low) shading within each constituent site.

[37] Marxan outputs were presented to the Regional Hub members, although their use in the planning process was optional. Inputs to Marxan included the UK SeaMap 2010 v2 Broad Scale Habitat data and the maximum adequacy targets from the ENG. Fishing intensity, as inferred by Vessel Monitoring System (VMS), logbook and EU vessel register data, provided from 2007 (compiled and provided by Cefas under contract MB0106), was used as an activity (or 'cost') dataset; Marxan was operated so as to optimise its outputs by avoiding areas of such activity. When running the Marxan software current MPAs were positively selected ('conserved'), whilst Round 1 & Round 2 offshore renewable sites were de-selected ('excluded'). In these initial runs a uniform 5km^2 (hexagonal) grid of planning units was applied to the whole of the Net Gain project area.

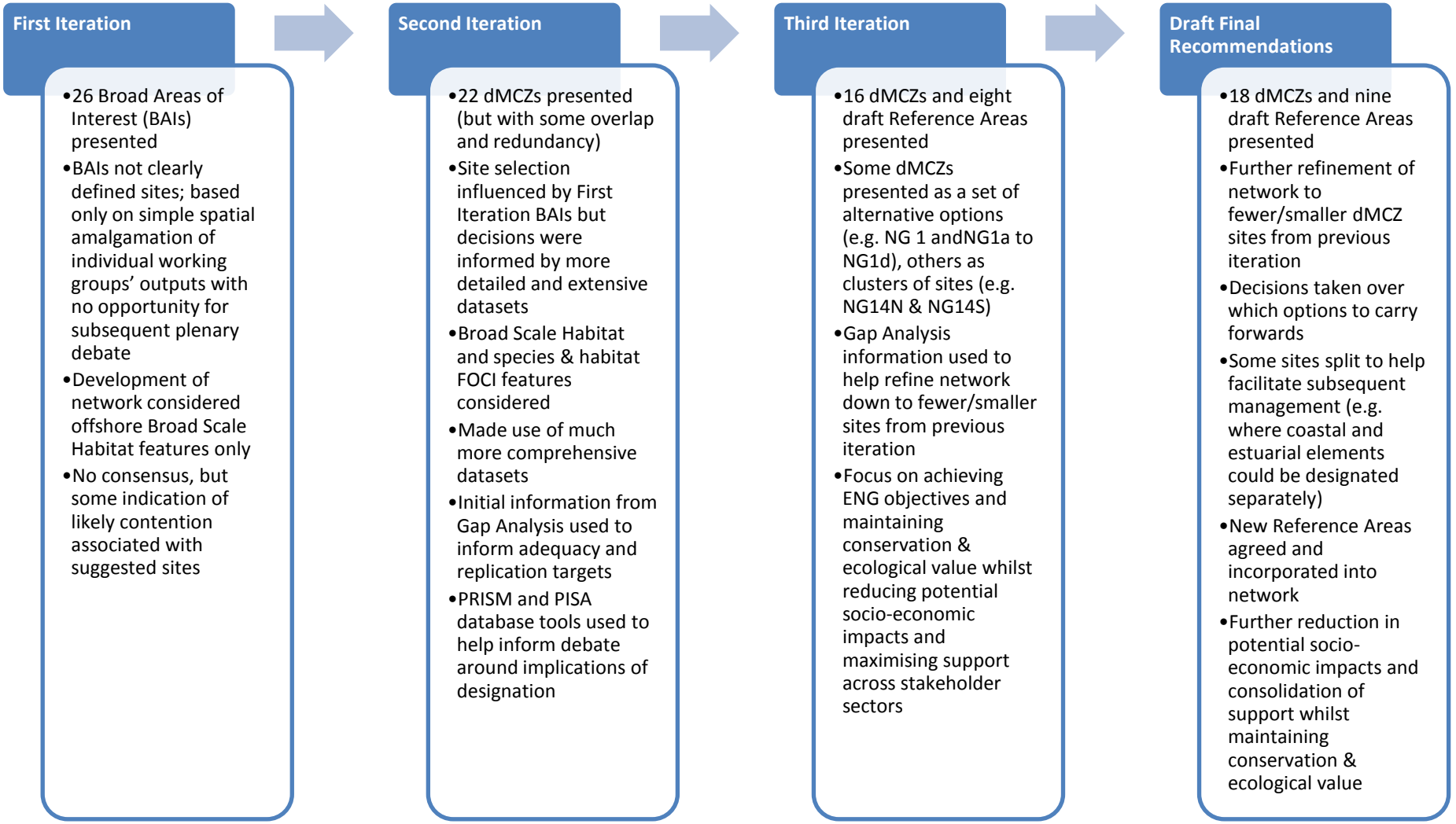


Figure A4.1 Summary of development of Net Gain MCZ network

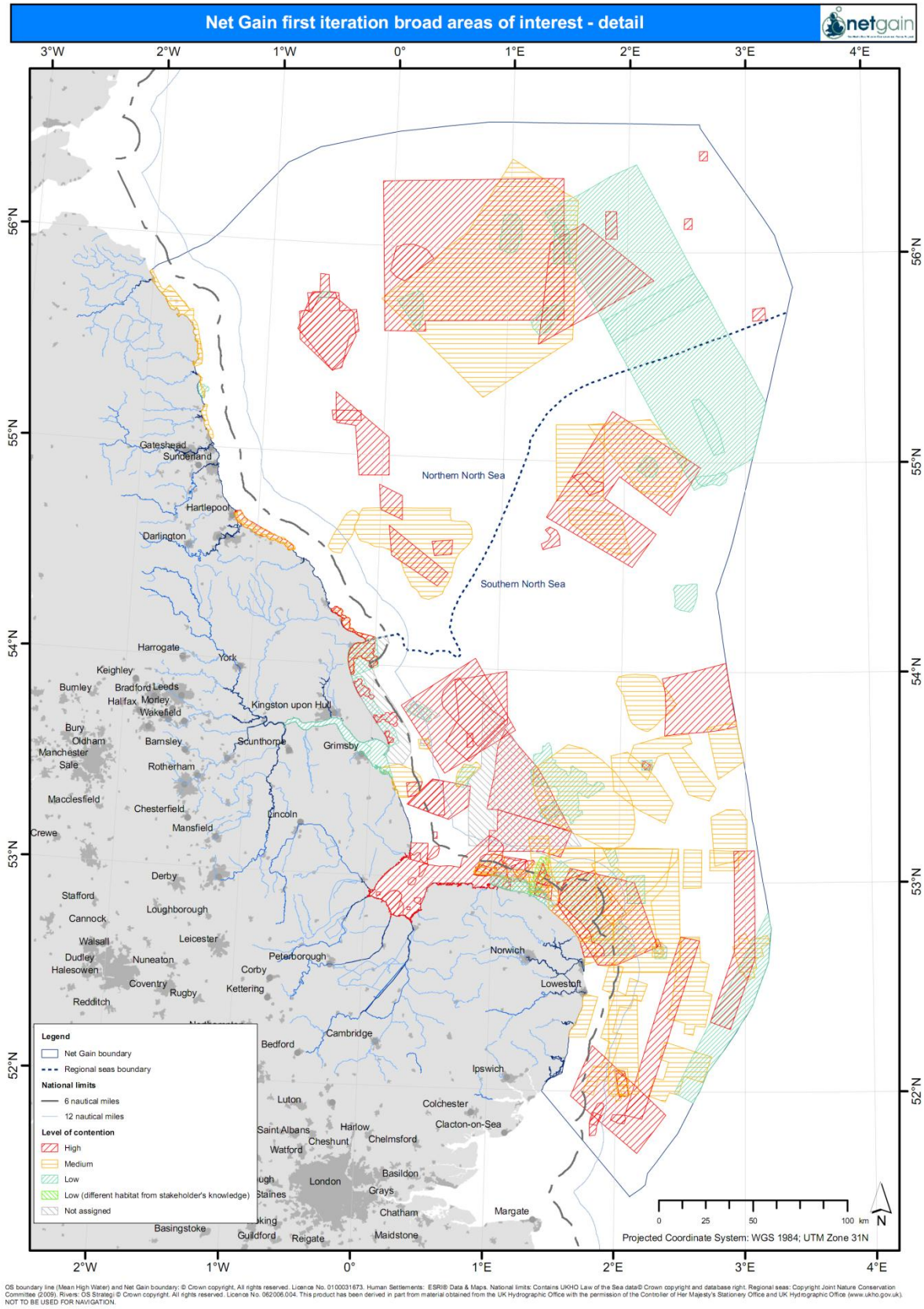


Figure A4.2 Distribution of BAIs derived from second round of Regional Hub meetings and presented in First Iteration Report

A4.3 The Second Iteration

Second Iteration production

The Second Iteration Report was submitted to the SAP in October 2010. It was developed from the outputs of the third round of Regional Hub meetings. In turn, the work done in these Regional Hub meetings was based, in part, on the previously developed BAIs.

The limitations of the BAI network was acknowledged from the outset (e.g. the restricted nature of the data that underpinned the sites and the lack of opportunity to discuss the suggested sites in plenary). For these reasons, there was a reluctance to place any significant credence on the BAIs, although they may have been used to help focus attention on potential areas for consideration.

Second Iteration outputs

The outputs reported in the second Iteration Report covered a total of 22 draft MCZs (dMCZs) together with a number of BAIs (see Figure A4.3). These dMCZs were the first substantive set of sites that had been generated using (near) complete habitat and FOCI data (as well as further ecological information, such as data on Areas of Additional Ecological Importance) and for which there had been a consensus view of support following the sites' discussed in plenary.

There were no clear debates or plenary records around the 'loss' of BAIs identified in the First Iteration Report. The identification of dMCZs was based on a number of factors.

The delivery to the Project by the SNCBs of early results from the Gap Analysis meant that more realistic adequacy targets could be produced for the range of broad scale habitat. Although these results were to be subsequently revised the development of targets helped provide focus to discussion.

Second Iteration network development

In attempting to meet these targets attention was naturally focussed on areas that had been identified by more than one group in the previous round of meetings (i.e. the areas of greatest overlap shown in the BAIs from the First Iteration Report – see Figure A4.4). The debate around possible site locations was also augmented by the extended datasets that were available (including Fishermap data, more robust habitat and FOCI data and information on AAEI).

Some of the sites presented in the Second Iteration Report overlapped each other and hence there was a degree of redundancy in the overall network. This situation arose due the identification of separate sites by more than one Regional Hub; these sites turning out to be overlapping once the outputs from the individual Regional Hubs were combined.

As noted above, work that was done for the Second Iteration focused on the 'better' sites from the First Iteration Report with the concomitant loss of previously identified BAIs that offered less to the developing network. However, the generic nature of the outputs from the First Iteration Report means that it is not possible to identify specific 'sites' that were lost from the network at this stage (no definitive sites were proposed in the first Iteration Report and, in any case, the lack of plenary debate on individual sites meant that boundaries were imprecise).

For the purpose of this report therefore, detailed discussion on network development will take the network of dMCZs outlined in the Second Iteration Report as its baseline.

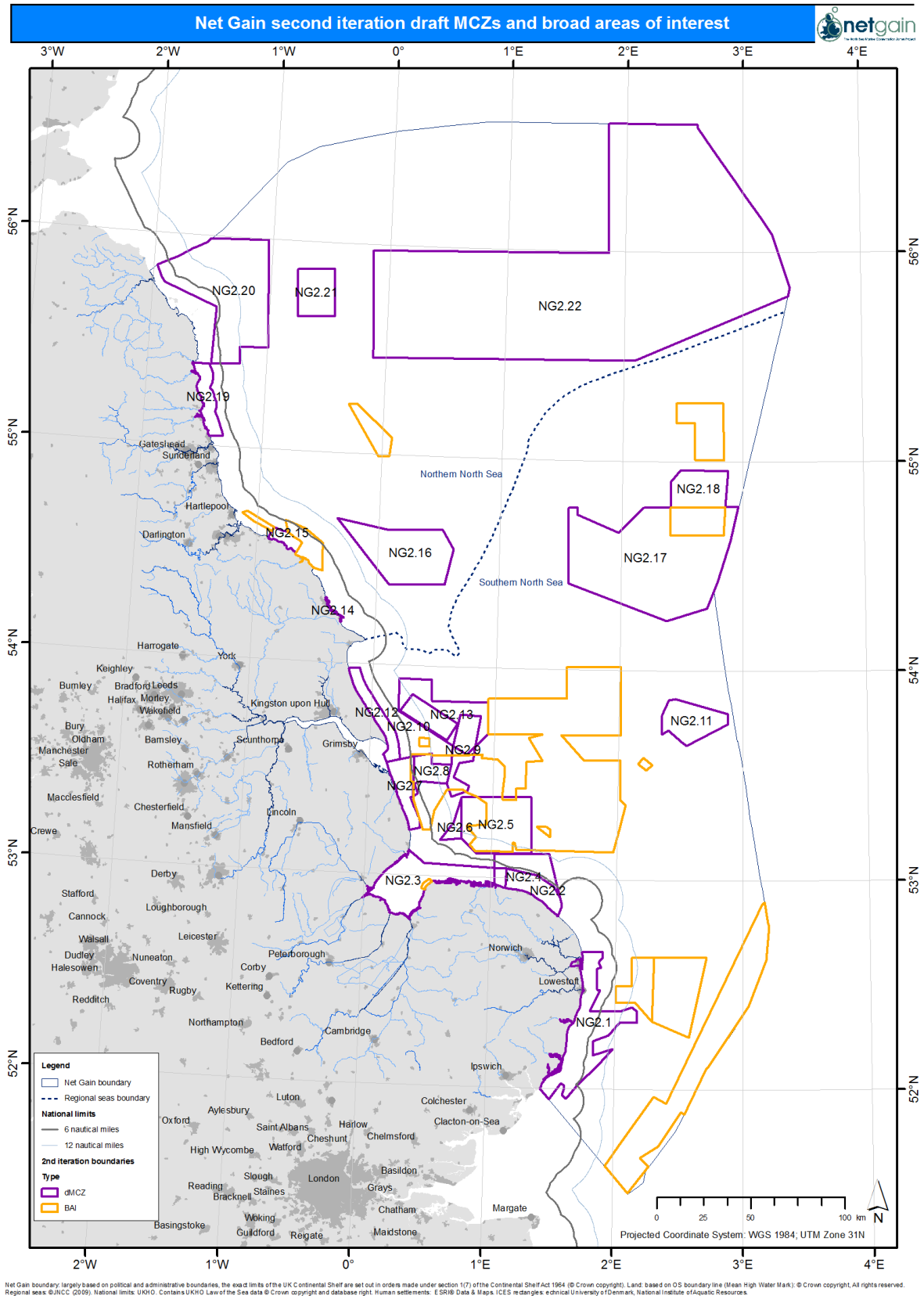


Figure A4.3 **Distribution of dMCZs and retained BAIs derived from third round of Regional Hub meetings and presented in Second Iteration Report**

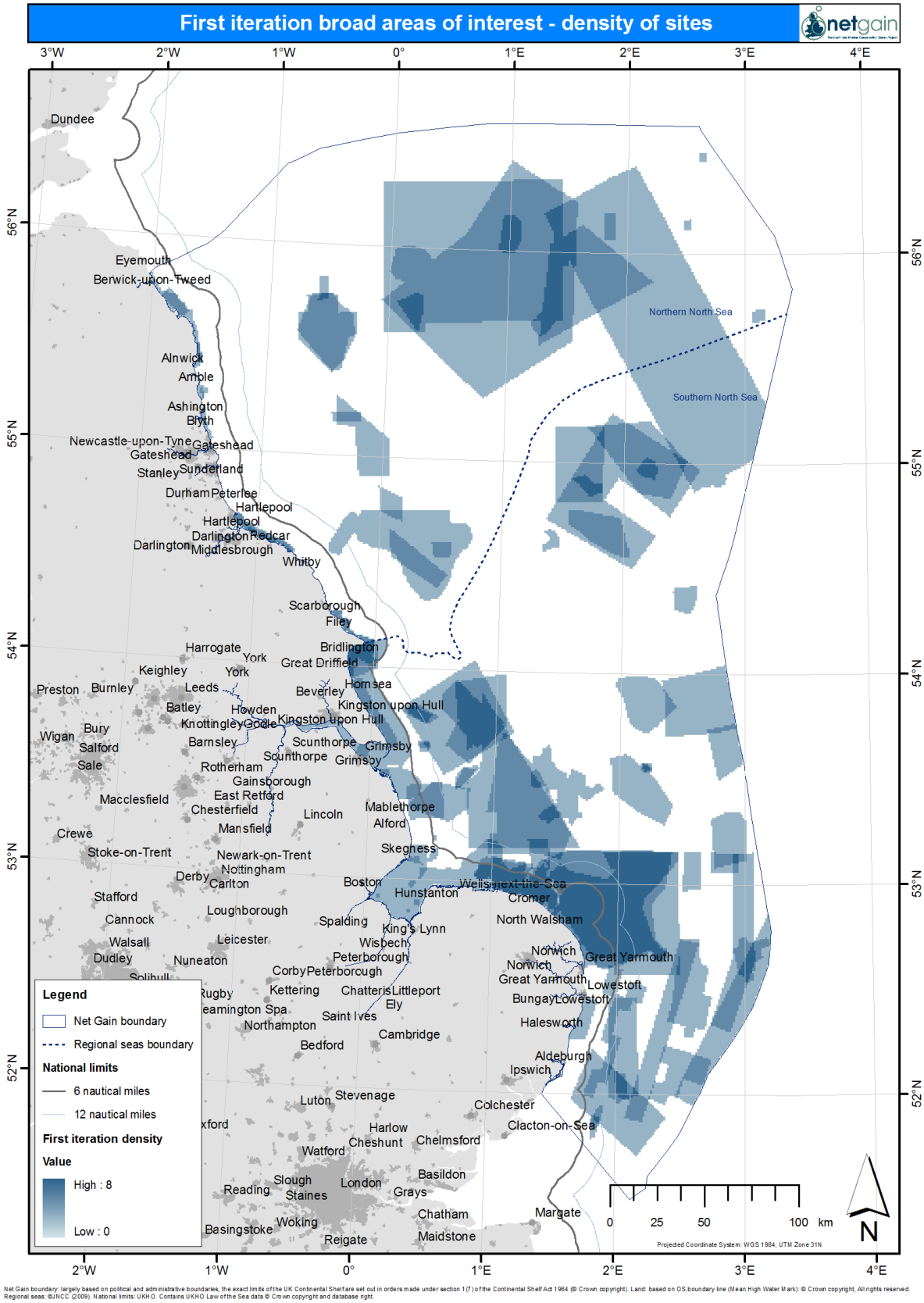


Figure A4.4 **Distribution of BAIs presented in First Iteration Report showing 'frequency of selection' for overlapping areas**

A4.4 The Third Iteration

Third Iteration production

The Third Iteration Report was submitted to the SAP in February 2011, and put forward a total of 16 dMCZs (see Figure A4.5) with a good level of support from the RSG.

Third Iteration outputs

When existing MPAs are taken into account, the draft network of dMCZs presented a good balance of sites across the project area, with sites well distributed well in both inshore and offshore areas. As was seen at the Second Iteration, offshore sites tended to cover larger areas than inshore sites; a reflection of greater targets for those offshore broad scale habitats which occur in larger, more homogeneous patches compared to the smaller discrete patches of the intertidal broad scale habitats.

In terms of connectivity, sites proposed for the protection of EUNIS A1 and A3 habitats were, for their majority, within a distance of 40km of each other, with others being within 80km; all sites proposed for the protection of the other EUNIS habitat types (A2, A4 and A5) were within a distance of 40km of each other.

The network of MPA and dMCZ sites met the ENG requirements for adequacy and replication for most EUNIS level 3 broad-scale habitats. In the few cases where adequacy or replication was not met by the network it was possible to provide an explanatory narrative indicating why the target had not been met (e.g. where the number of occurrences of habitats is low and inevitably limits the option for replication).

Of the 12 low or limited mobility FOCI species listed as present within the Net Gain project area, the replication guideline (at least three replicates) was met for two, and nearly met for at least one more species. One third of species were supported by single records, whilst for one species no records were available. Again, where ENG guidelines could not be met detailed narratives were provided.

Of the 14 FOCI habitats listed as present within Net Gain, the replication guideline (at least three replicates) was met for 11 of them; the reasons for not meeting the guidelines were mainly due to the lack of available evidence (e.g. horse mussel beds and sea-pen and burrowing megafauna communities) or to lack of trust shown by the Regional Stakeholder Group regarding the validity of the data (e.g. mud habitats in deep water). Detailed narratives explaining the reasons why ENG guidelines could not be met were provided.

This iteration also began the process of identifying possible reference areas; a total of 11 locations were discussed in Regional Hub meetings and presented within the developing network. Of these, three fell in the North East Regional Hub; four in the Yorkshire & Humber Regional Hub; three in the Lincolnshire and The Wash Regional Hub; and one in the East of England Regional Hub. It was recognised that additional discussions were required to refine these suggestions (especially as some were alternatives for the same feature) and to find suitable locations for other features. At the February StAP meeting it was agreed that the Net Gain Project should work with the SNCBs to identify possible reference area candidates within existing MPAs as many of the ENG features are contained in their entirety within existing sites.

The developing network configuration included a number of coastal GCR sites and geomorphological features of interest (either in whole or in part) that are listed for consideration within the ENG.

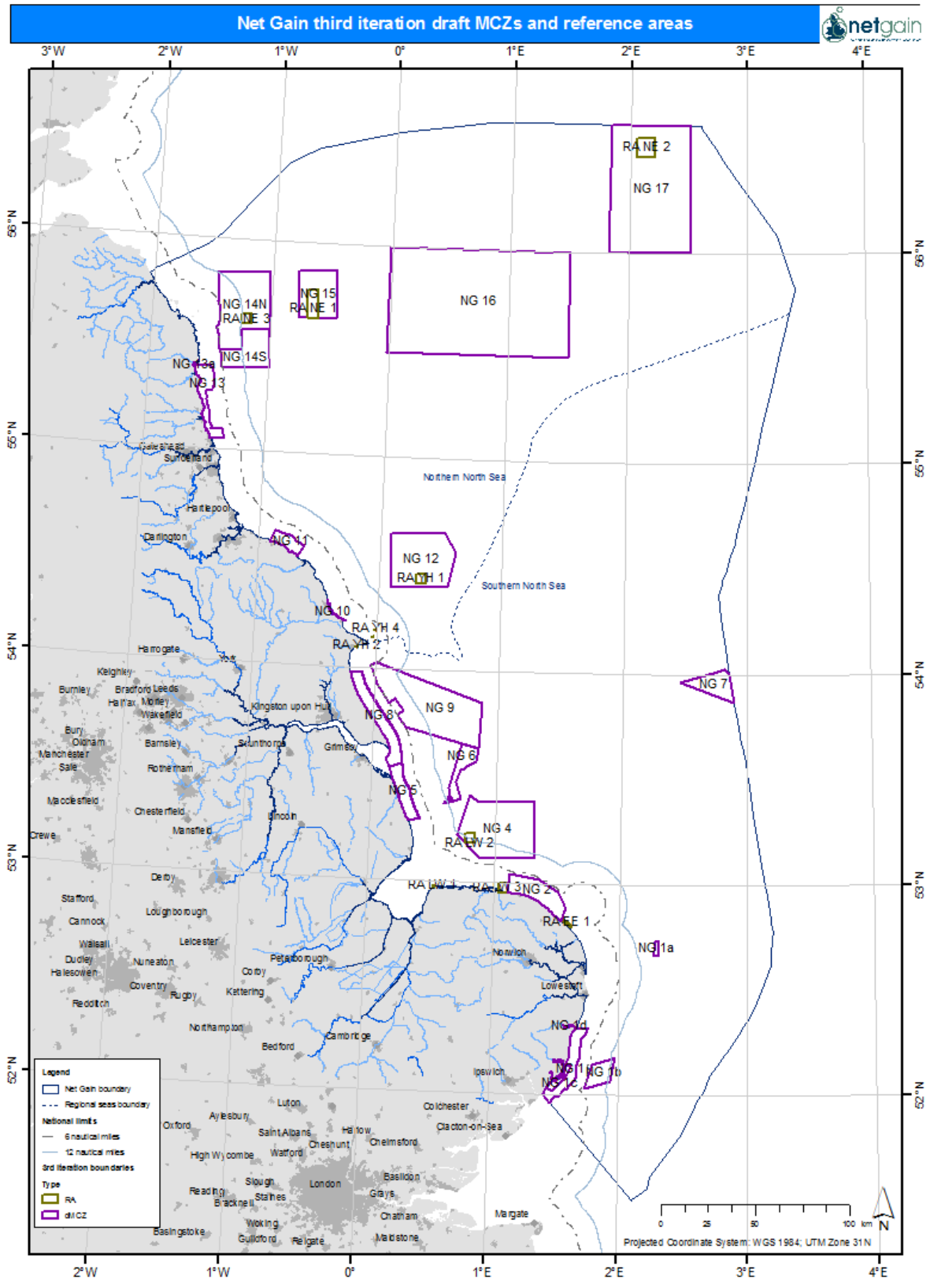


Figure A4.5 **Distribution of dMCZs and Reference Areas derived from the fourth round of Regional Hub meetings and presented in Third Iteration Report**

Third Iteration network development

Analysis of the dMCZs at the Second Iteration showed that the maximum adequacy targets were exceeded for a number of broad-scale habitats. Following receipt of the Gap Analysis information on 13th December 2010 the Project's adequacy targets were revised to take account of the contribution of existing MPAs. With this new information to hand the RSG took the decision to drop the Second Iteration Broad Areas of Interest (BAIs) from further discussions. In the main these BAIs were considered to have a lower ecological value and were more contentious in socio-economic terms.

A number of dMCZs identified in the Second Iteration Report had overlapped with existing MPAs. The Gap Analysis delivered to the Net Gain Project in December 2010 described which features in these MPAs already received protection. On receipt of this information the RSG proposed that sites NG2.3, 2.17 and 2.18 from the Second Iteration should be dropped. A significant portion of the original site NG2.5 from the Second Iteration was retained; although it overlaps in part with the Inner Dowsing, Race Bank and North Ridge SAC, it was understood that the features for which had been proposed do not currently receive protection.

The sites at this stage represented a good consolidation of the remaining dMCZs, particularly off the Yorkshire and Lincolnshire coasts. Most of the dMCZs saw some boundary refinement taking account of feedback from the SAP, StAP, NCS and the wider stakeholder community. A number of sites saw significant modification:

- Two alternatives were proposed to replace NG2.1; the first was a truncated version of the original site, whilst the second was composed of four smaller sites spread over a larger area.
- NG2.11 (which had been originally identified primarily to meet broad scale habitat adequacy targets) was moved north to sit alongside the Outer Silver Pit. This revision provided the same (ecological and conservation) level of contribution to the overall network but RSG felt that it would result in a lower level of socio-economic impact. Its new location would also offer the possibility of linkage with the (Dutch) Cleaver Bank Natura site.
- SAP advice was considered when dividing the large site in the North East Regional Hub (NG2.22) into two smaller sites.

RSG members were reminded of the guidance on setting boundaries during the Regional Hub meetings, and were advised to make them both understandable and enforceable. For this reason, in several cases boundaries were adjusted slightly to better align them to lines of latitude/longitude or to administrative boundaries such as the 3 and 6 nautical mile limits.

Modification of the draft network from the position at the Second Iteration

- A number of sites from the Second Iteration report (NG2.3, NG2.4, NG2.8, NG2.17 and NG2.18), together with all of the BAIs, were dropped from the network
- Several other sites (NG2.1; NG2.5 & 2.6; NG2.7; NG2.9; NG2.10 & 2.13; NG2.16; NG2.19; NG2.10 and NG2.22) had their boundaries altered
- The location of one further site (NG2.11) was altered in its entirety.

Dropped sites

It became apparent from the Gap Analysis, and from input from Natural England at the Regional Hub meetings, that the ENG features for which **site NG2.3** had originally been identified, were effectively covered by the Wash SAC designation (which covers the Wash and the North Norfolk Coast and with which site NG2.3 was coincident). Its retention within the developing network was therefore

unfounded and it was proposed by stakeholders that it be dropped ahead of the production of the Third Iteration Report.

Site NG2.4 was proposed along with NG2.4 by the East of England Regional Hub as possible alternatives to protect the infra- and circalittoral rock features on the eastern limits of the North Norfolk Coast. There was discussion at the Regional Hub meeting over clipping the site boundary for this pair of sites back to the boundary given to the smaller of the two (i.e. NG2.2). Whilst losing an area of the moderate energy infralittoral rock feature a substantial portion of this feature would still be protected (such that the adequacy target was still met and, indeed, exceeded). This move was agreed, and NG2.4 was lost from the network. There was some considerable discussion over the accuracy of the broad scale habitat data in this area and the agreed way forward was seen as a pragmatic balance between following the requirements of the ENG and working with the available data, and ensuring that significant socio-economic costs are not incurred on an unsubstantiated basis.

It was felt that **site NG2.8** did not need to be retained in the dMCZ to satisfy the targets for broad scale habitat adequacy, connectivity or replication. In addition it was understood (following additional input from Natural England) that there were no particular species or habitats of conservation importance present within the site and Natural England had noted that this, in any case, was not the best of example of the broad scale habitat feature(s) it presented. It was noted that, given the network as a whole appeared to have surpassed many adequacy targets and that there could therefore be claimed to be a mandate to reduce the network footprint, dropping this site would be of less significance than dropping alternative areas.

The members of the Regional Hub group agreed, with full consensus, that as the Gap Analysis indicated that the broad scale habitat features at both sites would be adequately protected by the Dogger Bank pSAC neither site **NG2.17 or 2.18** need to be retained in the network of dMCZ sites.

As noted above, the release of the Gap Analysis information and a review of the overall coverage of the dMCZ network as reported in the Second Iteration Report had shown that the maximum adequacy targets were being exceeded for a number of broad scale habitats. Consequently the RSG, at the fourth round of Regional Hub meetings, decided to drop the BAIs that were outlined in the Second Iteration Report from further discussions. As well as being 'surplus to requirement' these BAIs were, in the main, considered to have a lower ecological value and were more contentious in socio-economic terms.

Site boundary modifications

Site NG2.1 was significantly altered following the Second Iteration Report. Considerable feedback was received relating to the extent of the original site and the East of England Regional Hub members suggested a number of options to reduce the potential socio-economic impacts associated with the site and so increase the level of support that the site would enjoy amongst the wider stakeholder community, whilst maintaining the ecological and conservation benefits that it presented. Two working alternatives were agreed upon and presented in the Third Iteration Report: the first of these was a simple reduction of the overall site area (presented as site NG1 in the Third Iteration Report), whilst the other was a set of four smaller independent sites (sites NG1a - 1d) which, together, picked up the key features that had been covered by site NG2.1 from the Second Iteration Report. Although there was a consensus to adjust the site in this way the decision was not unanimous, with NGOs in particular expressing concern over what they felt was a reduction in the value of the network. The Regional Hub consensus view was, nevertheless, that support for the site would be more readily forthcoming and that the ecological interests (as outlined in the ENG) could still be served given the proposed options for restructuring the site.

Sites NG2.5 and 2.6 were presented as separate sites in the Second Iteration Report but were amalgamated into a single site (NG4) in the Third Iteration Report. Given the degree to which broad scale habitat adequacy targets had been met in the Second Iteration, the group modified the eastern boundary of the amalgamated site (to reduce the overall site area). This area was generally lacking in general ecological value and would only provide protection to broad scale habitat features that the group felt were covered (to excess) elsewhere within the network. The group retained the Docking Shoal area and extended the southern boundary to include the Race Channel. The importance of the fishing activity in the western portion of the site was acknowledged but it was noted that the eastern portion of the amalgamated site had less value in this context. Clipping the boundary as suggested maintained the protection for the ecological features of importance. There was the suggestion (with a good level of consensus) that, if possible, more area could be taken from the eastern portion of the site. A new western boundary of the site was also agreed, making use of the northern boundary of the existing Inner Dowsing, Race Bank and North Ridge SAC site – there was high consensus within the Regional Hub meeting for this adjustment. Local knowledge suggested that the area to the east of the Inner Dowsing was a spawning ground for thornback ray (*Raja clavata*). There is some trawling in this area, (but relatively low effort) and there is some potting, to which the features are not likely to be sensitive.

Site NG2.7 was a coastal site extending south from the mouth of the Humber. The original site had consisted largly of subtidal coarse sediment and subtidal sand; these were in surplus within the Second Iteration dMCZ network across the whole of the Net Gain area and so the group had looked to reduce the area of the site. The southern boundary was moved north (partly in response to a strong lobby from the recreational sea angling sector) to Anderby Creek whilst the northern boundary was suggested as being just north of Mablethorpe. It was noted that, within the angling sector, there was a fear of restrictions increasing over time once a site had been designated. In addition, the north-east portion of the site was reduced so that the eastern boundary of the site was coincident with the 3nm boundary. An adequate amount of the relevant broad-scale habitat features were still covered and the site remained viable, despite clipping the boundary in this way. The group responsible for reviewing this site confirmed that they had made use of the additional ecological (biodiversity) information, stakeholder feedback and many layers from the Regional Profile – the amended boundary does not exclude any of the additional ecological benefits associated with the original site. The modified site (after trimming back the north-eastern portion of the site to the 3nm line and moving the southern boundary northwards) was presented as NG5 in the Third Iteration Report.

Site NG2.9 was originally identified in the Regional Hub meetings in relation to the Inner Silver Pit and associated features. The northern portion of the site, as presented in the Second Iteration Report, had considerable overlap with site NG2.13. There was a pragmatic decision by the Lincolnshire and the Wash Regional Hub to amend this northern boundary to align it with Site NG2.13. In addition, as the principal driver behind selecting the area in the first instance was the presence of the Inner Silver Pit geomorphological feature, there was a move to better fit the site boundary around the main area of the feature. Consequently the boundaries of the site were 'pulled in' slightly to better follow the Inner Silver Pit feature and exclude areas that were adjacent to, but outside of, the pit feature. The modified site was subsequently presented as dMCZ NG6 in the Third Iteration Report.

Sites NG10 and 2.13 were coincident, with NG2.10 lying entirely within the boundaries of NG2.13 (and with NG2.13 also overlying part of the original site NG2.9, as discussed above), the aggregated area covering subtidal coarse & mixed sediments. As the site's broad scale habitat features were generally well represented in the wider dMCZ network the group felt able to be flexible with site boundaries. The sites were consolidated within a single boundary, with some boundary changes to accommodate seabird 'hotspots' and areas of ecological importance. The group felt that the new proposed shape would be easier to manage and to enforce and consensus around the table was

reached regarding proposed boundary changes. Where the site lay adjacent to a R2 windfarm (on its western, inshore boundary) a 500m buffer was proposed. On its northern edge the boundary of the site was changed from that agreed at the time of the Second Iteration Report as more advanced planning from R3 windfarm developers suggested that the (previously avoided) area could be incorporated into the site without issue. The revised boundary proposed provided an additional 75km² of habitat and encompasses hotspots for wintering birds and areas of additional pelagic ecological importance. Note that a 'corridor' was maintained between this new consolidated site and the adjacent coastal site (NG8 as presented in the Third Iteration). This corridor, corresponding to the gap between the 3 and 6 nautical mile limits, would allow for limited and legitimate diversification for inshore fisheries (possibly including scallop dredging). It was felt that additional protection of broad scale habitat features that would be gained by 'joining' the two sites was not needed in terms of meeting adequacy targets. In conclusion, Sites NG10 and 2.13 were merged and the boundary altered to extend the coverage of subtidal mixed and coarse sediments and to accommodate seabird 'hotspots' and areas of ecological importance, the resultant site being presented as NG9 in the Third Iteration Report.

Site NG2.16 from the Second Iteration was proposed primarily for the moderate energy circalittoral rock broad scale habitat feature it encompassed. As there was an apparent surplus of this feature represented in the network at the time of the Second Iteration Report, the group amended the site boundary to remove the 'triangle' on the site's western boundary. There was also agreement to redefine the northern boundary to run straight from east to west (to help facilitate simpler future management). There was some discussion over whether the site could be extended southwards to better cover the Flamborough / Helgoland Frontal feature; such a change would, however, take the site into a more heavily fished area, and also into the proposed cable corridor for the Dogger Bank windfarm site and so was not pursued. Following the amendments the site's western and northern boundaries site NG2.16 was presented at the third Iteration as NG12.

Site NG2.19, on the Northumberland coast, was modified by removing the central portion of the eastern edge of the site. After reviewing how the adequacy targets for broad scale habitat features had been met by the network of dMCZs in the Second Iteration the Regional Hub members reduced the overall size of the site by removing an area of moderate energy circalittoral rock. This was done in the central portion of the site – an area which the group suggested as being heavily fished by a range of methods - leaving areas around islands at the northern and southern limits of the site (Coquet Island & St Mary's Island respectively) so maintaining contributions to adequacy, replication and connectivity. Both of these retained areas were thought more likely to be easily managed and were known to be important for birds (especially the area around Coquet Island, which was highlighted as an important tern foraging ground). Whilst it would be on option to designate a reference area for the intertidal underboulder communities habitat FOCI around the St Mary's Island area, it was pointed out that this is a very important area for static gear users (potters) from Blyth and North Shields (who make use of intertidal as well as subtidal habitats in the area). It was felt that, to maintain support for the site it would be necessary to look for an alternative example for this particular habitat FOCI. The group advised that, to help simplify the management of sites, a line needs to be drawn across harbour entrances. Whilst habitats inside would be 'lost' to the MCZ site, management would potentially be made simpler. Such an approach would, for example, impact on the Wansbeck Estuary (where the local coastal saltmarsh and saline reedbed habitat would be 'lost' to the MCZ). This approach would also apply to the Aln Estuary: it was suggested that, to afford protection to specific estuarine habitats in the Aln Estuary, the entire estuary be designated as a separate MCZ. Overall, the site boundaries were adjusted to retain the conservation value of the site whilst reducing contention. The modified site was presented as Site NG13 within the Third Iteration Report, with a separate dMCZ (NG13a) being proposed for the Aln Estuary.

The western boundary of **site NG2.20** abutted the Berwickshire and North Northumberland Coast European Marine Site (which runs from the Alnmouth area northwards to beyond the Scottish

border, and encompasses the Farne Islands). The site had been proposed for a number of broad scale habitat features that, at the time of the Second Iteration Report, were more than adequately covered within the overall network. As there had been significant concerns (a 'strong negative reaction') from the commercial fishing sector - relating to potential pressures on their activities that associated management measures may subsequently bring about - there was consequently a move, whilst retaining the basic ecological value of the site, to reduce the overall size of the site and hence limit any potential socio-economic impacts. The commercial fishing sector noted that, whilst the habitat maps we are working with may indicate certain habitat types, the distribution of subtidal coarse sediment, for example, changes all the time due to the influence of tidal currents. It was suggested that a reference area for subtidal mud may well have to be found in another location as, from local knowledge, it appears that we seem to be looking at a mix of subtidal mud and moderate energy circalittoral rock, and the site may not meet the minimum viability requirements.

A 'hotspot' of pelagic productivity coincident with an important area for seabirds was understood to be located immediately adjacent to the south/south-east of the proposed (smaller) site. Although some stakeholders suggested that the site be extended to include this area (which was coincident with a subtidal mud broad scale habitat feature not represented elsewhere in the network, and which was related to the Farne Deeps glacial feature) this was opposed by the commercial fishing sector who felt that it wasn't appropriate to designate the area purely for pelagic features. This particular area of great interest (and value) to the commercial fishing industry, especially the nephrops fishing sector, and to Scottish fleets. Other sectors were uncomfortable with omitting the area that was shown as being of higher pelagic activity, and were concerned that a concession was being made to the commercial fishing sector to the detriment of ecology. Ultimately an uneasy compromise was developed between these positions by proposing to extend the south-east portion of the site to cover the water column in the area of increased pelagic ecological importance, but without any broad scale habitat designations, whilst retaining the northern portion of the site for its broad scale habitat features. In addition, the western boundary of the site was moved eastwards, to leave a clear space between this site and the existing EMS that lies along the coast. Overall, the revised site still presented a good mosaic of habitats. As the broad scale habitats at the site were over-represented in the network as a whole the group had looked to reduce the overall site size, maintaining the coherence of the network and to continue to contribute to attaining the ENG targets, whilst taking socio-economics into consideration. The revised site was presented as Site NG14N in the Third Iteration Report, with the additional area of high pelagic productivity to the immediate south being presented as NG14S.

Site NG 2.22, as presented in the Second Iteration Report, was very large (nearly 16,000km^2) and had been identified primarily to help satisfy the adequacy target for the subtidal sand broad scale habitat feature. The original site provided over 15,500km^2 of subtidal sand, more than 7,000km^2 of which fell outside of the Dogger Bank pSAC. A revised Gap Analysis, which accounted for the contributions made by the Dogger Bank pSAC and other MPAs, suggested that at the time of the Second Iteration Report, the dMCZ network had exceeded the adequacy target for the subtidal sand feature by c.7,250km^2. As a consequence it was decided to significantly reduce the area of site NG2.22. As there was the possibility that other sites in the network would also be reduced in size to account for the revised position outlined by the Gap Analysis, the site was only reduced by c.5,000km^2.

To help guide this process information on fishing intensity from international fleets, and on seabed infrastructure (pipelines and cables), was used. As the central portion of site NG2.22 appeared to be more intensively fished and to have a higher density of infrastructure in place it was decided to drop this area from the site, with the consequence that the original large site was subdivided into two smaller sites (the westernmost of which encompassed the Swallow Hole geomorphological feature). Pelagic importance data was reviewed but it was concluded that this area was not particularly important from a pelagic productivity standpoint. The prospect of further reducing the area of the

two ‘new’ sites was discussed and it was proposed that a further reduction of 50%, to reduce potential impacts on benthic fishing activity whilst maintaining adequacy, connectivity and replication in the overall network should be considered. It was noted that the pelagic fishing activity overlay currently shows minimal pelagic activity across the two areas. Consequently it was agreed to trim both sites further, maintaining an adequate contribution to meeting the ENG targets whilst taking into account the potential impacts on the commercial fishing sector. The Swallow Hole feature was left within the north western boundary of the westernmost site but needed to be captured in its entirety (it was suggested that the western boundary of the site be shifted to 10’ west of the Meridian to accommodate this). It was also suggested that the eastern boundary of the easternmost site be brought in by approximately 5km.

The two separate sites that were derived from the original NG2.22 were presented as NG16 (the western site) and NG17 (the eastern site) within the Third Iteration Report.

Site relocation

Site NG2.11 as proposed in the Second Iteration Report was an offshore site selected for its subtidal coarse sediment, subtidal sand, sands and gravels. However it was felt that this site was less than ideal from a socio-economic perspective (there had been specific objections from the commercial fishing sector) and this, along with the concerns of other seabed users, prompted the Yorkshire & Humber Regional Hub to move the site to a different location to reduce potential impacts whilst retaining its conservation benefits. Overall the site was reduced in size by around 50% but the coverage of its subtidal coarse sediment broad scale habitat was retained to ensure that adequacy and connectivity were both achieved and maintained. It was noted that the original site had been chosen, in part, for its sediment ridges. The ‘new’ site location scored highly as regards its importance for bird foraging (a slight increase in the site’s value as bird foraging and wintering areas) whilst having a potentially lower impact on commercial fisheries.

As part of its repositioning, the site was tailored along it northern edge against the edge of the Outer Silver Pit feature. Inclusion of a portion of the Outer Silver Pit feature within a revised site boundary was considered but it was pointed out by the commercial fishing sector that this would be highly contentious as the area is heavily fished (not only taking place in the deep water of the Outer Silver Pit itself, but also on the edges or outer margins). The relocated site was presented as NG7 in the Third Iteration Report.

A4.5 The Draft Final Recommendations

Draft Final Recommendations production

The Draft Final Recommendations Report was submitted to the SAP on 1 June 2011. The development from the Third Iteration Report to the Draft Final Recommendations was generally focused on further refinement of the network and, with the exception of Reference Areas, did not introduce new sites to the network.

The fifth round of Regional Hub meetings was delivered through March 2011. The Marine Management Organisation was invited to present to members at this round of meetings, allowing them to introduce their marine spatial planning work area and to facilitate stakeholder engagement in that process. In addition, work was done to refine the dMCZs from the Third Iteration Report, making amendments required to meet the ENG and consider feedback received from the last meeting.

The sixth and final round of Regional Hub meetings were delivered in April and May 2011. This round of meetings was intended to deliver two main outcomes:

- to ground truth the vulnerability assessment tables and develop draft conservation objectives for the dMCZ features; and
- to progress Reference Areas following recommendations made in the April StAP meeting.

The format of these hubs was different to previous ones in that the entire meeting was held in plenary with discussions focusing on each site in turn. Hub members were given the option to attend one or both days depending on if their interests lay in the inshore or offshore area.

Draft Final Recommendations outputs

Net Gain's Draft Final Report included a total of 18 dMCZs and nine Reference Areas (which all had a good level of support from the RSG) plus a further three Reference Areas that required further survey work to be undertaken or additional clarification over the exact location of the features that were intended to be protected (see FigureA4.6).

It should be noted that the assessment of adequacy that was undertaken within the Draft Final Report was based on an updated version of the Gap Analysis (which was received May 26th 2011), together with the revised broad scale habitat data (version 7). Obviously, the adequacy of the network may have been adversely affected by the release of these new/revised data. However, as these data were released to Net Gain after the opportunity for discussion with stakeholders had passed, any of the issues that arose could not be meaningfully addressed through stakeholder dialogue.

Adequacy targets for most broad scale habitats are either met or exceed maximum requirements, with the exception of A5.3, subtidal mud. Although adequacy for this broad scale habitat was achieved in the 3rd Iteration Report, the effects of using the revised data and the updated Gap Analysis (which effectively increased the total extent of this feature across the Net Gain project area) resulted in the amount present within dMCZs now falling below the new minimum target.

A similar situation affected A5.4, subtidal mixed sediment, where new data received meant that, following the final May hubs, we were placed in a position where this coverage of this broad scale habitat within the the proposed network fell short of the minimum target by approximately 160km². The new habitat data included in version 7 altered the habitat composition of site NG 9 from being almost all subtidal coarse sediment to roughly half subtidal coarse sediment and half subtidal mixed sediment.

Representativity for broad scale habitats was met for all features with the exception of A3.3, low energy infralittoral rock, and A6, deep-sea bed (for which there is not a viable patch size with the Net Gain Project area). Representativity for A3.3, low energy infralittoral rock, may have been met as it is a feature that is currently designated within three separate SSSI's that fall within the Net Gain boundary, however spatial data to support the features presence was not available.

Replication targets were met for all broad scale habitats with the exception of the two features above. In addition, the feature A5.5, subtidal macrophyte-dominated sediment, was short of one replicate due to the lack of spatial data that was available to the project.

Of the 12 low or limited mobility FOCI species listed as present within the Net Gain Project area, representativity was met for four species that are either protected in MPAs or had been included as features in dMCZs. The replication guideline (at least three replicates) was met for two species, the lagoon sand shrimp (*Gammarus insensibilis*) and the starlet sea anemone (*Nematostella vectensis*), and was nearly met (one more replicate was required) for the ocean quahog (*Artica islandica*). For the species where replication targets were not met the general reasons for this included:

- instances where only single records were available (previous SAP advice being not to designate for species based on single records);
- instances where the data available were associated with man-made structures, SAP advised against designating for such species occurrences;
- inaccuracy of information (data available provided records that were on land); or
- instances where there were simply no data available to support site designation (e.g. for the lagoon sea slug, *Tenellia adspersa*).

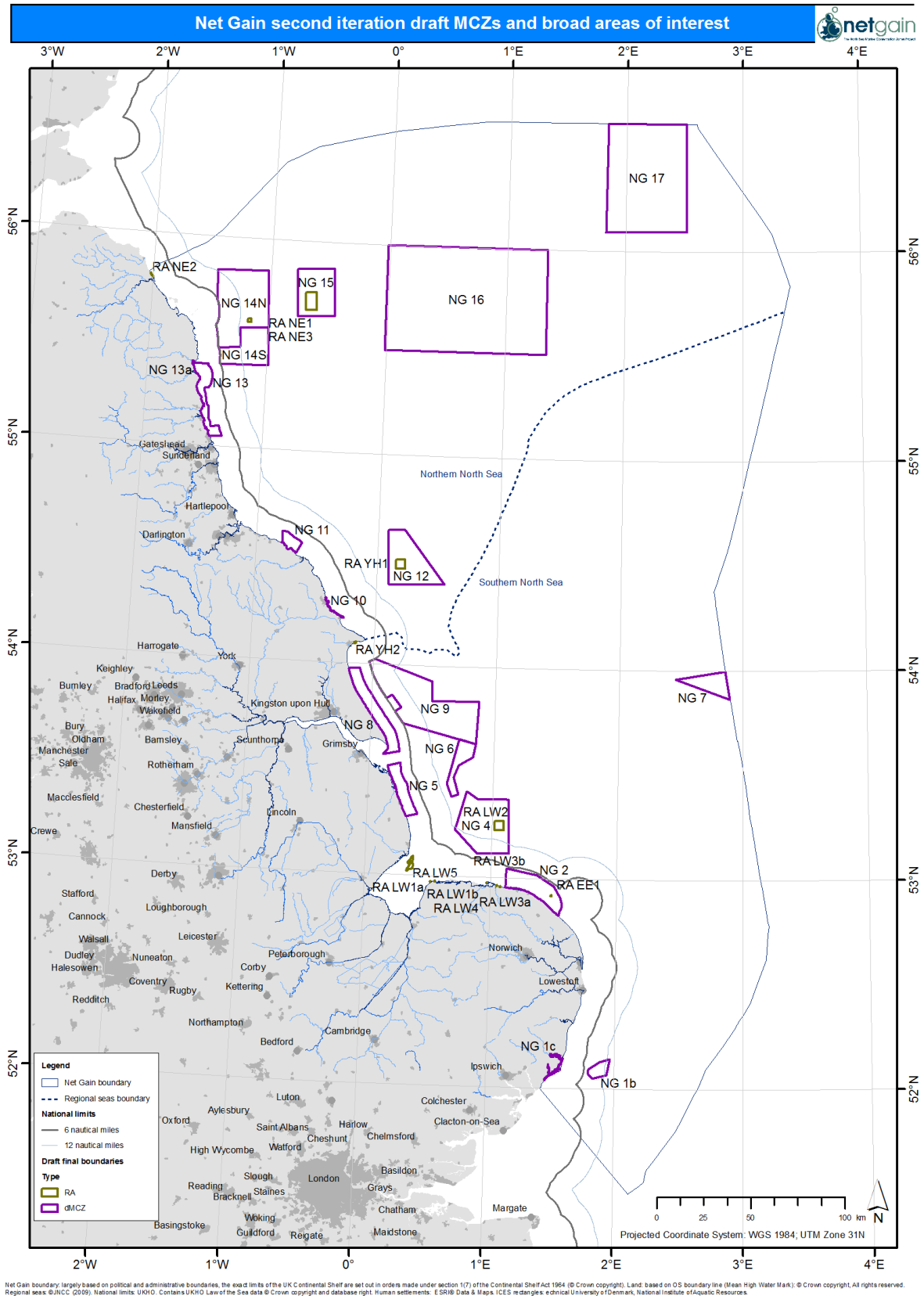


Figure A4.6 **Distribution of dMCZs and Reference Areas derived from fifth and sixth rounds of Regional Hub meetings and presented in Draft Final Recommendations Report**

Of the 14 FOCI habitats listed as present within the Net Gain project area, representativity was met for all habitats except two, and the replication guideline (at least three replicates) was met for nine habitats (and nearly met for an additional two habitats). The reasons for not meeting the guidelines for all habitat FOCI mainly centred around a lack of available evidence (e.g. horse mussel beds and sea-pen and burrowing megafauna communities) and a lack of trust shown by the Regional Stakeholder Group regarding the validity of the data (e.g. mud habitats in deep water).

Draft Final Recommendations network development

The network of dMCZs presented in the Draft Final Report was effectively a refinement of the network from the Third Iteration Report. Several sites (NG1, NG1a, NG1d and NG14S) were dropped from the network described in the Third Iteration Report, whilst boundary amendments were made to all remaining sites except for NG2, NG10 and NG15.

Dropped sites

Following the Third Iteration Report a number of discussions were held at the Regional Hub meetings regarding the relative merits of site NG1 versus sites NG1a, 1b, 1c, and 1d.

During discussions at the Regional Hub in March 2011 the commercial fishing sector pointed out that the area covered by site NG1 is extremely contentious; there is a very high level of benthic trawling (with a relatively high number of local vessels operating within the 3nm limit), and there is still insufficient differentiation between gear types in terms of understanding the potential impacts of activities (pressures) on features. It was also noted that the alternative protection offered by the four smaller sites (i.e. NG1a, 1b, 1c, and 1d) provided for the same habitats, but had a lot less (socio-economic) impact. It was pointed out that, at the overall project scale, the dMCZ network was 'over target' for the principal broad scale habitats (across the network as a whole, representation of both subtidal mixed sediments and subtidal mud exceeded the minimum adequacy targets, whilst subtidal sand exceeded the maximum adequacy target) although it was noted that this was understood to be a good fish spawning area.

The RSPB were keen to progress discussions around an area previously identified by the NGOs for its biodiversity importance. This area, referred to as 'Hotspot 26', was coincident with a BAI presented in the Second Iteration Report in the extreme south-east of the Net Gain Project area. A site in this area would address many of the requirements of the project – it provides examples of similar broad scale habitat types and is also an area of additional ecological importance and is understood to be a spawning area for species of commercial fish.

The commercial fishing pointed out that the Regional Hub had already worked to meet the broad scale habitat targets and suggested that the data in the area is coarse and that the spawning grounds are effectively protected by other kinds of designation or management which are already in place.

After some lengthy debate the group achieved consensus not to take Hotspot 26 forward for further discussion unless it was subsequently found to be required. In addition, consensus was also confirmed over dropping NG 1 as a single site and focusing instead on the four smaller proposed sites NG 1a, 1b, 1c and 1d.

At the subsequent Regional Hub meeting (May 2011) the RSPB opened discussions with a request to reinstate the original site NG1 within the network. They referred to the response from the SAP to the Third Iteration Report, which advised inclusion of this area based on its overall ecological benefit, and impressed on the group the merits of having a continuous coastal strip, viewing it as a last opportunity to optimise the AAEI of the site before boundaries were finalised.

However, it was also acknowledged that there had been more controversy surrounding site NG1 (than NG1b) and that a consensus had been reached. Whilst SAP advice had been to maximise ecological benefit it also recognised the need to minimise economic costs and to have broad stakeholder support. The RSPB recognised this need to balance ecology with socio-economics, but were dissatisfied with the process, believing that un-quantified socio-economic issues were being used to determine site characteristics.

Notwithstanding the above, the earlier decision to drop site NG 1, focusing instead on the four smaller proposed sites NG 1a, 1b, 1c and 1d, was upheld.

It was pointed out in Regional Hub discussions that **site NG1a**, which had been originally suggested for the contribution made to the overall network by its subtidal mud broad scale habitat feature, was located in the corner of the Haisborough, Hammond and Winterton SAC. The site had been presented in the Third Iteration Report to compensate for an area of the same habitat feature that would be lost from the network if site NG 1 was dropped. It was asked whether, as it provided an isolated example of the habitat type in this Hub area, it should also be considered in order to help support the connectivity principle. However, it was pointed out that the connectivity principle applies at the EUNIS level 2 classification – i.e. it would apply to all subtidal sediment types and the specific sediment type (mud/ sand/ mixed/ etc.) was not a consideration in this context.

The offshore renewables sector suggested that management measures for the protection of subtidal sediments would be in place for the SAC anyway. The commercial fishing sector commented that the lower adequacy target for the subtidal mud broad scale habitat feature had been achieved at the time of the Third Iteration Report. In addition, as the area lies in international waters, it can be (and is) fished by a number of different fleets. Whilst it was understood that this may make management (if it is required) more difficult it was acknowledged that this, in itself, did not constitute a reason not to designate.

Notwithstanding the above, the Regional Hub reached a consensus view to drop site NG1a, a view reiterated in the subsequent meeting.

When discussed in the Regional Hub it was highlighted that full data for **site NG1d** (the Blyth estuary) was lacking. The Environment Agency noted that their data on smelt suggests that there are alternative options such as the Alde/Ore estuary (covered by site NG 1c). The group achieved consensus (reconfirmed in the May 2011 meeting) to drop site NG 1d from the network.

The possible inclusion of **site NG14S** within the network proved to be extremely divisive. Whilst the northern portion of the site (NG14) had support, the southern portion (NG14S) did not have consensus. SAP advice following the Third Iteration Report had been to not discount the southern portion of the site (NG14S) they had also advised that pelagic value is not a prima facia reason for designation and that it is necessary to have benthic habitat features designated to underpin each site.

As regards the value of the site in the context of the overall network, it was noted that adequacy targets for broad scale habitat types would be met even without including the contribution made by NG14S. Similarly, its exclusion from the network would not adversely affect attainment of the replication targets. However, it was noted that site NG14S is of very high pelagic ecological importance according to the JNCC data layer and it was suggested that advice from the SAP had said that discussions on NG14 had shown a lack of clarity on ecological value and that the site should be maintained for both its BSH and the AAEI.

At the Regional Hub meeting, there were two clear positions; those who were in favour of putting the southern portion of the site (NG14S) forward for recommendation and those who were against. It was noted that there was the risk of the southern portion being excluded from the network for socio-economic reasons, not ecological considerations and it was suggested that losing NG14S from the network would undermine its overall value.

The commercial fishing sector argued that even though the fishing industry had gone more than halfway and had agreed to over 1000km² of draft MCZ, there was still a call to designate what are the most important fishing grounds in the area. The sector had not welcomed the inclusion of site NG14 (adjoining, immediately to the north) but had compromised, recognising its ecological importance. However, continued pressure to also designate NG14S would result in a loss of support for the more northerly site NG14.

In conclusion, whilst there was still a general consensus for support for the northern portion (site NG14) the inclusion of the southern portion of the site (NG14S) would only be achieved without the consensus support of the group. It was also noted that the continued support of the commercial fishing sector for the northern portion of the site (NG14) would be contingent on the commercial fishing sector not being subjected to management controls because of the area of moderate energy circalittoral rock within the site.

There was no consensus to include NG14S within the network and so, despite its apparent high pelagic value, it was dropped as the project delivered the Draft Final Recommendations Report.

Site boundary modifications

As part of the discussions around the future of sites NG1, 1a, 1b, 1c and 1d, two sites were retained, though slightly modified. These sites, NG1b and NG1c, are discussed below.

Site NG1b had been identified for its potential contribution of its subtidal mixed sediment broad scale habitat feature. Following the Third Iteration Report this feature (at the overall network scale) was comfortably exceeding the lower adequacy target by c.400km^2. At the subsequent (March 2011) Regional Hub meeting it was suggested that, with offshore renewable projects and consents in mind (especially with regard to some major proposed cable corridors), it would be possible for the site boundary to be trimmed to reduce its potential impact whilst retaining its ecological benefit. This view was seconded by the offshore renewables sector, and the commercial fishing sector also commented that they would be pleased to reduce the size of any sites. In addition to the cable routes, an aggregate interest lies along the southern boundary of the site. It was suggested that a buffer could be applied to the southern boundary of the site to reduce conflict with (and hopefully negate the need for additional management of) the adjacent aggregate extraction activity.

The RSPB wondered whether, rather than reduce the size of the site, it would be possible to move the site in its entirety; a concern was expressed that continued clipping of site boundaries may lead to a loss of connectivity across the network. Whist there was some debate within the Regional Hub meeting regarding moving the site in its entirety there was a consensus to keep the site in its current location. There was, however, also a consensus to reduce the size of site NG1b. In line with this consensus view the area of the site was reduced by cutting back its northern and south-western boundaries, making allowance for proposed cable corridors and the adjacent aggregate interests.

It was agreed at the May 2011 Regional Hub meeting that **site NG1c**, the Alde/Ore estuary, should be retained as an MCZ option, although the group questioned its value for highly mobile species such as smelt and eel. The group was reminded that the Environment Agency had previously advised that estuarine habitats have strong benefits, particularly for the highly mobile species. It was noted that management measures will be important to consider further down the line and that the Impact Assessment will help to inform this. Subsequently the Environment Agency were able to present information to support the retention of smelt as a feature, but were content to see eel dropped.

The majority of the broad scale habitat feature within site NG1c was subtidal mixed sediment; at the time of the Third Iteration Report the project had met its target for this feature (with contributions from elsewhere in the Net Gain area) so there was no imperative to designate for broad scale

habitat ENG features. The site as a whole contains a number of protected areas, including two SACs, one SPA, one SSSI and one Ramsar site.

It was suggested that the subtidal part of the Orfordness geological feature be protected under the designation. It was noted that the site boundary presented in the Third Iteration Report was overly cautious to allow room for the feature to change, but should have been drawn closer to the shore.

The commercial fishing sector noted that the town of Orford owns a significant portion of the Alde/Ore site; management measures would potentially have a massive impact and that site designation and management would ultimately need to be discussed with the town's representatives.

A number of other sites in the network (NG4, NG5, NG6, NG7, NG8, NG9, NG11, NG12, NG13/13a, NG16 and NG17) were also modified to a greater or lesser extent. In the case of sites NG4, NG9, NG12, NG16 and NG17 boundary movement was in response to the attainment of revised adequacy targets for broad scale habitats. As the areas of broad scale habitats covered by the sites could be scaled back, without adversely affecting the intrinsic conservation value of the sites or adequacy of the overall network, the potential socio-economic impacts (mainly on the commercial fishing sector, but also considering marine aggregates and offshore renewables) at these sites could be reduced and the overall level of support increased. Boundary changes were discussed and agreed in plenary debates at the Regional Hub meetings during March and May 2011. Further discussions were held on the possibility of moving NG12 to incorporate the Flamborough-Helgoland frontal feature. The Regional Hub members struggled with an alternative location given uncertainty over the position of the front and socioeconomic interests to the south of the current site position.

The northern boundary of site NG5 was moved southwards, and the southern boundary of adjoining site NG8 was moved northwards, to leave a clear space across the mouth of the Humber estuary. This area was recognised to be ecologically depauperate and, given the high level of economic activity in the area, it was felt prudent to drop this small localised area from the proposed network of dMCZs.

The south western portion of the boundary of site NG6 was modified to better reflect its relation to adjacent aggregate extraction licences and activity.

The northern boundary of site NG7 was shifted slightly southwards to avoid conflict with intensive fishing activity around the Outer Silver Pit area.

The south-eastern boundary of site NG11 was shifted north-westwards to align with the existing no-trawl zone.

Finally, the common boundary between sites NG13 and 13a which lies across the mouth of the Aln estuary was shifted slightly westwards (further into the estuary) to help facilitate site management at these two sites post-designation.

Annex 5 Bibliography of project outputs

Outputs produced during the course of the Project are listed below.

Table A5.1 Outputs from Regional Hub Meetings

Report	URL
Net Gain (2010) Regional Hub Report - NE Regional Hub Meeting 1 (16.03.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - YH Regional Hub Meeting 1 (18.03.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - EE Regional Hub Meeting 1 (25.03.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - LW Regional Hub Meeting 1 (30.03.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - YH Regional Hub Meeting 2 (09.06.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - NE Regional Hub Meeting 2 (11.06.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - LW Regional Hub Meeting 2 (15.06.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - EE Regional Hub Meeting 2 (17.06.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - YH Regional Hub Meeting 2b (21.07.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - EE Regional Hub Meeting 3 (12.10.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - LW Regional Hub Meeting 3 (14.10.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - YH Regional Hub Meeting 3 (19.10.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) Regional Hub Report - NE Regional Hub Meeting 3 (21.10.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - YH Regional Hub Meeting 4 (18.01.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - NE Regional Hub	http://www.netgainmcz.org/clickchart.php

Meeting 4 (20.01.11)	
Net Gain (2011) Regional Hub Report - EE Regional Hub Meeting 4 (25.01.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - LW Regional Hub Meeting 4(27.01.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - NE Regional Hub Meeting 5 (21.03.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - YH Regional Hub Meeting 5 (23.03.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - LW Regional Hub Meeting 5 (25.03.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - EE Regional Hub Meeting 5 (30.03.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - YH Regional Hub Meeting 6 (12.04.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - NE Regional Hub Meeting 6 (04.05.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - EE Regional Hub Meeting 6 (10.05.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report - LW Regional Hub Meeting 6 (12.05.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Regional Hub Report – LW/EE Regional Hub Meeting 7 (29.06.11)	http://www.netgainmcz.org/clickchart.php

Table A5.2 Outputs from StAP Meetings

Report	URL
Net Gain (2010) York StAP Meeting 1 (20.04.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) York StAP Meeting 2 (22.06.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) York StAP Meeting 3 (18.08.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) York StAP Meeting 4 (18.11.10 & 19.11.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) York StAP Meeting 5 (07.02.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) York StAP Meeting 6 (04.07.11)	http://www.netgainmcz.org/clickchart.php

Net Gain (2011) York StAP Meeting 7 (25.05.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) York StAP Meeting 8 (04.07.11)	http://www.netgainmcz.org/clickchart.php

Table A5.3 Reports submitted to the Science Advisory Panel

Report	URL
Net Gain (2010) 1st Iteration Report (30.06.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2010) 2nd Iteration Report (29.10.10)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) 3rd Iteration Report (28.02.11)	http://www.netgainmcz.org/clickchart.php
Net Gain (2011) Draft Final Report (01.06.11)	http://www.netgainmcz.org/clickchart.php

Annex 6 Stakeholder feedback

Note: This Annex is presented as a separate, stand-alone annex to the main report

Annex 7 Additional Reference Areas

This Annex provides information on possible locations discussed for Reference Areas by the RSG but which did not have the consensus support of the Regional Hubs or which did not reach full agreement. Information provided in this Annex is based on minutes from the joint meeting held for the East of England and Lincolnshire & The Wash Regional Hubs (29th June 2011), along with subsequent liaison meetings held with local stakeholders.

Sabellaria spinulosa and biogenic reef

Following advice from the April 2011 StAP meeting, Regional Hub members were asked to try and find a suitable location for a reference area for *Sabellaria spinulosa* FOCI and biogenic reef broad scale habitat within the Haisborough, Hammond and Winterton SAC. There are known (surveyed) locations of biogenic reef within the SAC and the evidence available to Net Gain also shows patches of *Sabellaria* FOCI.

A reference area for these features was discussed in the June 2011 Regional Hub meeting.

Hub members noted that data confidence in this area is low. The Eastern IFCA representative noted that there are some doubts around the data as recent surveys have only found limited patches of *Sabellaria*, and did not find it where it was expected. The Natural England representative noted that further research is being carried out on the extent of the habitat. It was also noted that one of the areas of search was not viable as it has been heavily trawled in the past. The Eastern IFCA suggested that it would be better to wait for more survey data to inform the area of search for this habitat type.

The Hub provisionally outlined a 5km x 5km reference area incorporating both *Sabellaria spinulosa* and biogenic reef broad scale habitat, as shown in Figure A7.1 below.

The Hub members discussed the fishing effort in the SAC and noted that commercial usage drops off as you move further offshore. Commercial fishing representatives noted that they were not happy about making decisions that are important to their sector at such a late stage and with limited data. They suggested that the best course of action is to take the suggested coordinates back to the wider fleet for input.

The Hub members agreed that this reference area could potentially be included subject to the outcome of further discussions to be held with the local fishing fleet.

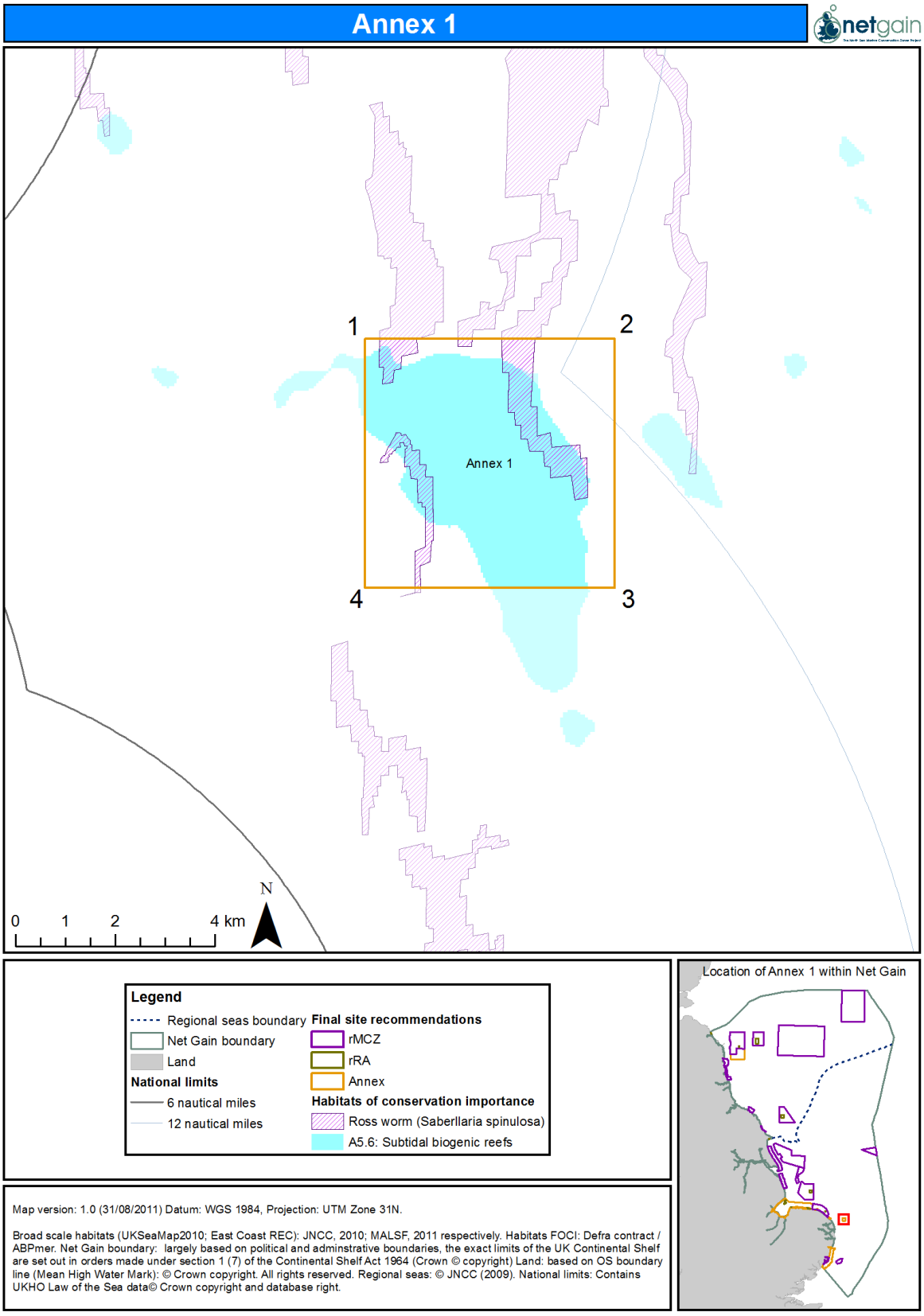


Figure A7.1 **Location of potential reference area Annex 1 for *Sabellaria spinulosa* and biogenic reef**

Liaison Meetings with Local Fishing Representatives

Following the June 2011 meeting Net Gain's senior liaison officer met with commercial fishing representatives from the East of England Regional Hub to gain wider feedback on the suggestions that had been made.

The commercial fishing representatives had sought feedback more widely from the commercial fishermen who are known to fish in the proximity of the proposed reference site (the North Norfolk fishermen, the vice-chairman of the North Norfolk Fishermans Association, Lowestoft fleet).

If designated the site would not affect the majority of the Cromer fishermen. However two fishermen could possibly be affected by the designation of this site. John Davis (the coxswain of the Cromer lifeboat) has fished out of Cromer all his life. He has recently invested in a new vessel with the capability of fishing further offshore and could possibly fish in and around the proposed area. Over the last 15 years he has occasionally fished in and around the proposed area but not on a regular basis. The second fisherman who fishes in the vicinity of this site on an occasional basis is Andy Williamson who launches his vessel from Mundesley.

Although it was felt that, currently, the site would not have a large impact, the North Norfolk Cromer fishermen questioned the need for a 5 x 5km site as, should it be designated, (with newer more modern vessels possibly purchased to enable them to fish further offshore) the area proposed would seriously affect and restrict their movements.

The Lowestoft fishermen were opposed to this reference area been put forward as the site is fished approximately 30 to 40 days per year by 10 -12 vessels from Lowestoft (long-lining, targeting mainly skate). Average earnings per day from each vessel in this area range from £1000 to £2000. If this area is designated it would seriously restrict the areas in which the vessels can undertake skate fishing operations as mobile gear vessels already operate in the alternative areas. The designation may result in some degree of displacement, the effects of which could be twofold: gear conflicts between the long-liners and nomadic mobile gear vessels; and conflicts between local fleets operating different gear types.

The local fishing fleet felt that the discussions on this reference area had commenced too late in the project, after the date when it was believed all boundary changes would cease. This had resulted in a loss of faith and trust in the Project's openness and transparency.

Additional information provided by Natural England to the Net Gain team on 4 August 2011:

During the joint JNCC, Natural England and Cefas baseline monitoring survey of Haisborough, Hammond and Winterton cSAC, in field interpretation of multibeam and sidescan sonar in conjunction with Hamon grabs, drop down video and still photography, confirmed the presence of *Sabellaria spinulosa* in the Haisborough Gat reef as mapped in the Haisborough, Hammond and Winterton SAC Site Assessment Document (JNCC and Natural England, 2010). The survey showed the reef extended beyond the existing mapped area and could be classified as Annex I biogenic reef. The same survey also found presence of *Sabellaria spinulosa* to the east of Inner Silver Pit within the Inner Dowsing, Race Bank and North Ridge cSAC, again using the same acoustic and groundtruthing techniques in field analysis found this may also be classified as Annex I biogenic reef. Please note that this is an early in field interpretation of the datasets as they were gathered, and it is expected that further analyses of the data and final reporting due in March 2012 will confirm this (Saunders, 2011, Pers. Comm.).

Blue mussel beds

3rd iteration

During the January 2011 Regional Hub meetings, a reference area for the blue mussel bed FOCI was suggested to the east of rMCZ NG2, off Sea Palling. This site (RA EE1, as presented in the Third Iteration Report) was approximately 6.5km long, 1.2km wide and 0.7km from the coast (see Figure A7.2 below; site delineated by 1-4 at the vertices). This suggested site lies in an area believed to be currently unexploited by the local fishing fleet. Although not unanimous, the Regional Hub members reached a high level of consensus on the inclusion of this feature at the time. It was suggested that the inshore boundary should be 500m offshore to minimise potential disturbance from the Sea Palling water sports centre.

Draft Final Recommendations

During the May 2011 Regional Hub meeting the local fishermen explained that the previously identified area was in fact important for a number of Sea Palling fishing boats exploiting whelk, crab and lobster, and an alternative site was suggested just inside the 3nm within rMCZ NG2. The Eastern IFCA confirmed blue mussel beds to be present in the alternative area, and offered to table survey data. The IFCA added that the mussel bed in this particular area appeared to be well established, with different sizes of mussel present.

The RSPB felt it important to note that it would not necessarily be ecologically beneficial to limit the site of the size to 500m by 500m and that a larger site might have more overall benefit. The commercial fishing sector questioned the need for RA EE1 to be quite so large; Natural England agreed that a reference area currently the size of RA EE1 was over and above what was required by the ENG.

The group discussed the positives and negatives of both the original site (RA EE1) and the newly proposed site within NG2; these discussions are summarised in Table A7.1 below.

Table A7.1 Summary of benefits associated with the alternative locations for the blue mussel beds FOCI reference area

Benefits of original site RA EE1	Benefits of new site *within* dMCZ NG2
• Site is close inshore and so is easy to monitor • The site has already been identified (by Seasearch) and surveyed • Inclusion of the site would increase the overall protected area of the MCZ network	• Supported by existing (IFCA) survey data • Subsequent monitoring would tie in with monitoring for NG2 (reduced costs) • Existing management would support site features (no trawling within the 3nm) • There would be little or no 'edge effects' from commercial impacts – the proposed dMCZ provides buffer around reference area • Would have the support of the commercial fishing sector present (but MMO suggest Net Gain would need to consult the mussel fishermen not in the room)

The Renewable Energy sector suggested that human activities adjacent to RA EE1 might continue right up to the boundary of the site, increasing the level of pressure on the site's features. Natural England shared this view and supported the new proposal for a reference area within NG2, believing

the features present in the reference area would be afforded better protection through its location within an MCZ.

The commercial fishing sector confirmed that fishermen would be able to dredge for mussels right up to the site boundaries of RA EE1, whereas the mussels within dMCZ NG2 are not fished. They also reminded the group that a lot of sea angling goes on in the area around RA EE1. In addition, the activities of the nearby watersports centre at Sea Palling were raised as another potential pressure that would need to be managed should RA EE1 be designated.

In light of the new proposals being discussed, the MCS asked whether it would be possible to extend the eastern boundary of NG2 to include the blue mussel beds north of Sea Palling. Net Gain reported that a 700m patch of the mussel bed was already included in site NG2, but Natural England pointed out that, currently, blue mussel beds were not a designated feature within NG2. Blue mussel beds would have to be specifically designated as a feature in order that a conservation objective is produced and the feature afforded protection.

The RSPB recognised the merits of the new site, but felt the ecological preference would be the original site. Together with the MCS they expressed their support for increasing the size of the site beyond the minimum guideline. By contrast the commercial fishing representatives supported designation of a smaller (minimum sized) site so as to meet the requirements of the ENG whilst reducing potential socio-economic impact. Representatives from the commercial fishing fleet in North Norfolk added that they are slightly uncomfortable that an entire fishery is located in a single dMCZ, but have looked after the area for generations, believe it is in good condition and would like to see the area protected further. The level of support for site NG2 is anticipated to change and will inevitably relate to what management measures are put in place.

Site boundary

There was general consensus to recommend a 500m by 500m site for blue mussel beds within NG2 (shown as RA1 within Figure A7.2, below) although it was noted that this was without the full support of RSPB and MCS who believe the original site would add more ecological benefit to the network. If good examples of subtidal chalk can be found in the same area, then the reference area should be designated for both features.

The site boundary is a 500m x 500m site that covers the highest abundance with an area of blue mussel beds that were surveyed by the Eastern IFCA. The site was set to be landward as much as possible of the 3nm limit, while still maintaining high abundance. Up to the 3nm limit is currently a 'no trawl' area so potential disruption from trawling occurring outside of the 3nm limit would be minimised if not avoided altogether.

June 29th Reference Area Meeting

In advance of the June 29th meeting, the Eastern IFCA provided Net Gain with survey data corresponding to the blue mussel bed within rMCZ NG2. Footage from the survey was shown to the Hub members, and maps demonstrating the density of mussels were presented. However, it was not possible for Eastern IFCA to confirm the sediment on which the beds lie due to the high density of mussels (although a representative from Gardline Environmental, a member of the EE Regional Hub) suggested their survey straddled EIFCAs survey and demonstrated mixed sediments.

The Natural England representative clarified that further guidance had been given to the Regional MCZ Projects confirming that the ENG feature is blue mussel beds on soft sediments rather than on hard substrata.

Discussions returned to the two alternative sites discussed in the May meeting.

MCS noted that the original 3rd iteration site EE1 lies on lighter sediment. The recreational angling representative noted that there is a wide variety of recreational activity in this area, including jet skies, tourism, etc. The commercial fishing industry noted that the proposed inshore area is important for whelk fishing and reminded the group that consensus was achieved on an offshore site at the last meeting.

The Hub members looked at the fishing data in this area in an attempt to seek out alternatives. The commercial fishing representatives noted that they understand that a reference area must be found, but that more work is required and their input is essential. No matter where the zone is placed, further liaison work is required with the local fleet.

The Hub members did not reach full consensus, however agreed to recommend the area within NG2 as the preferred option. However, if the substrate is found not to be soft, then a reference area of 600 x 600m should be located within the alternative inshore area of search.

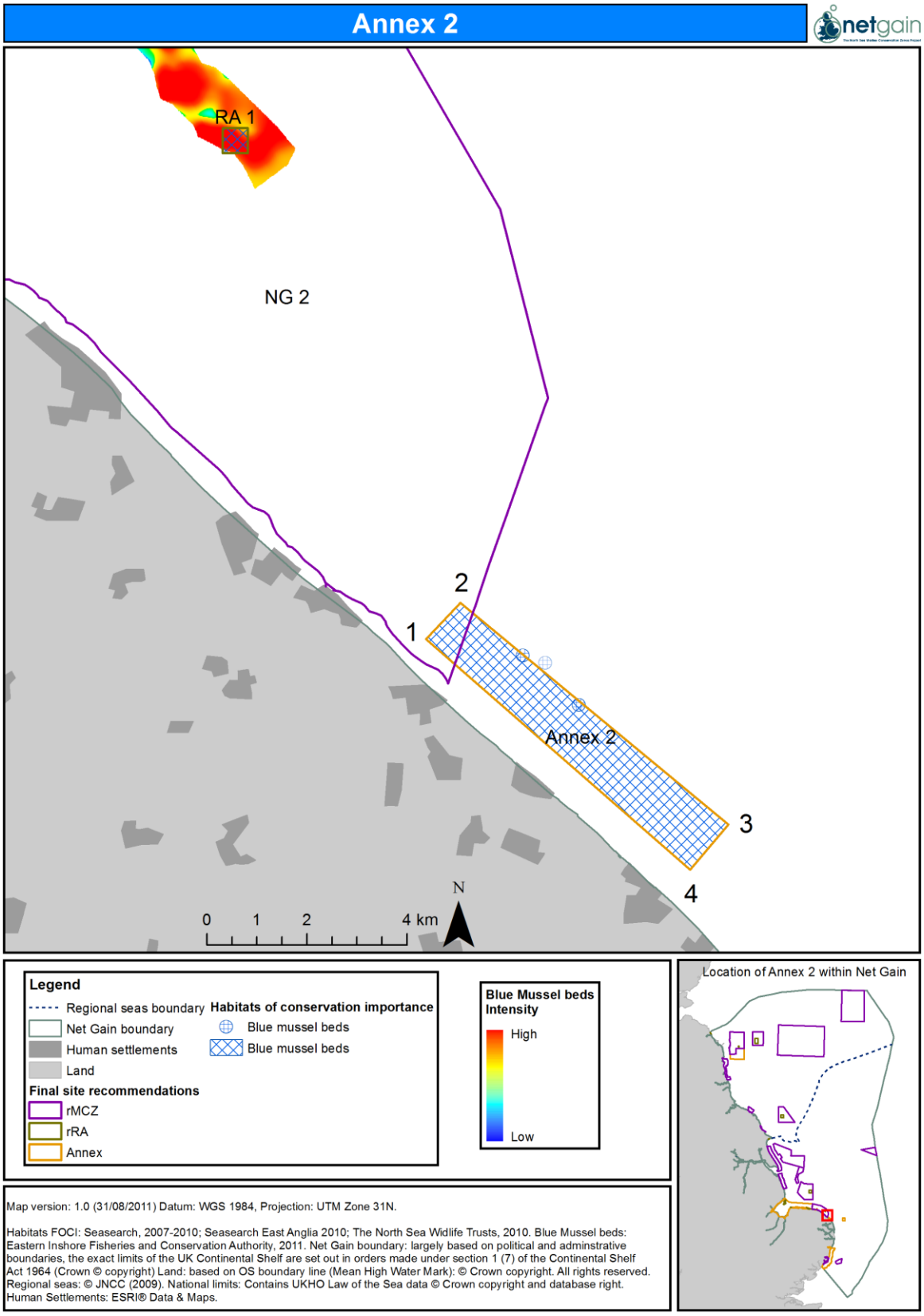


Figure A7.2 Location of alternative area of search for blue mussel bed FOCI reference area

Subtidal Chalk FOCI

During the course of the Net Gain planning process, a number of different sites for a subtidal chalk reference area have been discussed off the North Norfolk coast, without full agreement during the Regional Hubs. The discussions are summarised below.

March 2011

MCS suggested that there is a good 'area of search' for a subtidal chalk reference area between Sheringham and Weybourne, and suggested that there is small area of rugged reef in the locality that could also be protected (see Figure A7.3). The commercial fishing sector highlighted the fact that this area is incredibly important for the local fleet and suggested that there was no way that the commercial fishing industry could support a reference zone in this area. An alternative area of search beyond 3nm was proposed.

In response, the MCS noted that locating a reference area outside the 3nm would have less of an impact, as this area is less intensely fished. However, the representative was not confident of the existence of chalk in this area. The commercial fishing sector informed the group that, many years ago, there were test drillings in the area for a windfarm. As these surveys had shown that the substrate in the area was all chalk and flint, the commercial fishing sector asked whether this was sufficient evidence to support the contention that this habitat was present.

In order to progress discussions further, a representative from Gardline Environmental (a regional Hub member) offered to undertake benthic surveys in the vicinity to determine the existence of chalk.

May 2011

To start discussions, Gardline reported that their survey work had not identified subtidal chalk in the location under discussion in the March Hub meeting. Images from the survey were presented to the Regional Hub, and are reproduced below (as Figures A7.4 to A7.9).

Following this, discussions focused on two potential areas of search (AOS) for a Reference Area, one inshore between Weybourne and Sheringham; the other offshore near West Runton (see Figure A7.3).

The Weybourne – Sheringham AOS was proposed by MCS reiterating that it is the only suitable option based on best available evidence. The Wildlife Trusts noted that there is huge amount of public interest in the conservation in this area (the North Norfolk coast) and that the good collaborative work that is already in place there should continue. The Wildlife Trusts wished to note that they would support the suggestion of the inshore site, where there is a greater degree of evidence as suggested by the MCS.

The commercial fishermen present stated that static fishermen could not accept any reference area within 1½ miles of the coast in this area as it is a prime crab and lobster ground; the fishing industry refuse to give away a piece of this prime fishing ground. Commercial fishermen also wished for it to be noted that they have engaged with the Net Gain process from the start and have given a lot to discussions, making compromises along the way. However, they are not able accept a 600m x 600m reference area in the location proposed by MCS and warned that there would be huge complications for any kind of management. Commercial fishing representatives stated that they object to any reference areas where commercial activity takes place. It is important to note that it is a small-scale fishing industry, with small vessels, operating wooden pots - they already practice sustainable fishing methods. Aside from this, the commercial fishing sector suggested that in terms of recreational

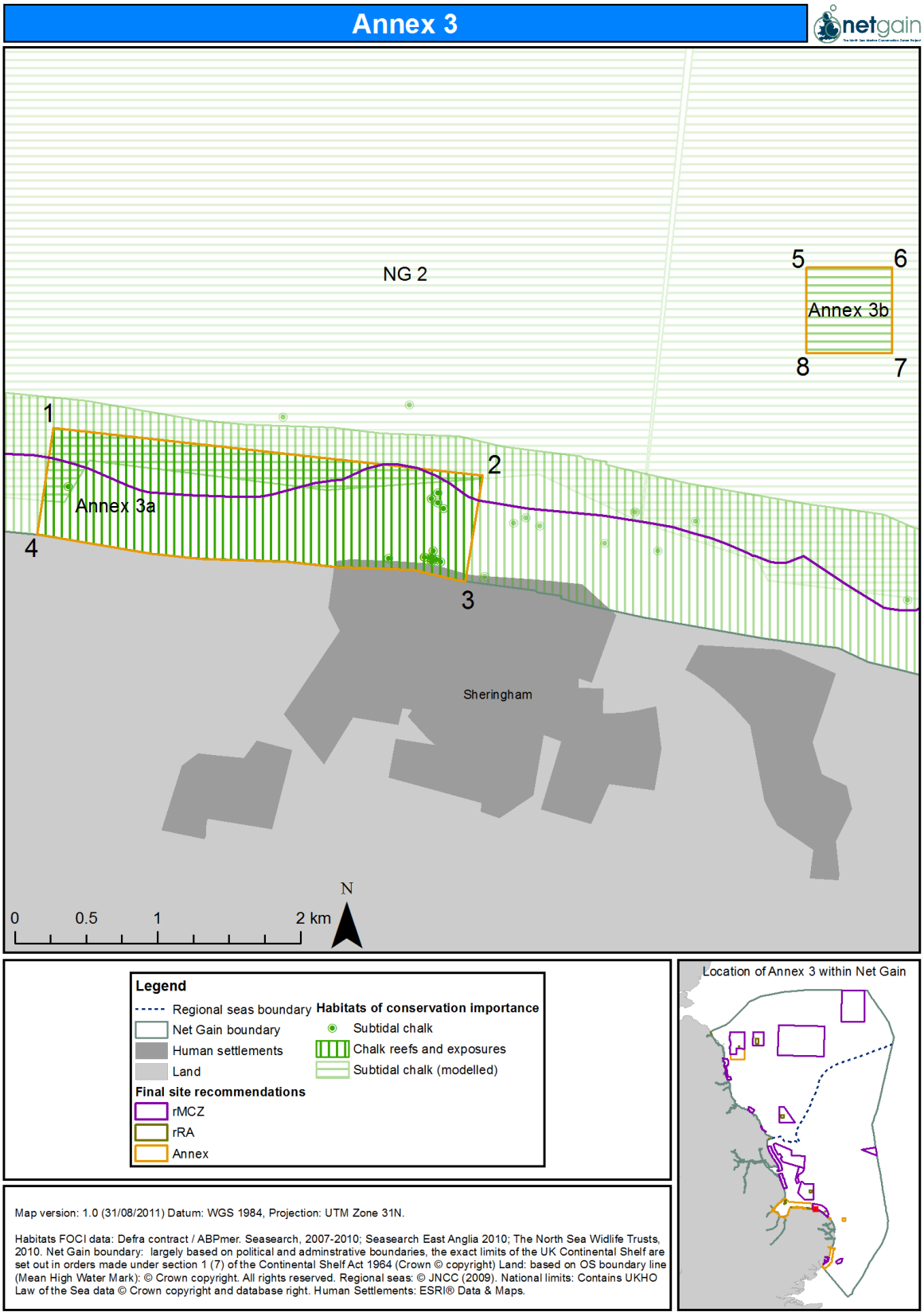


Figure A7.9 Location of possible reference areas Annex 3a and 3b for subtidal chalk FOCI

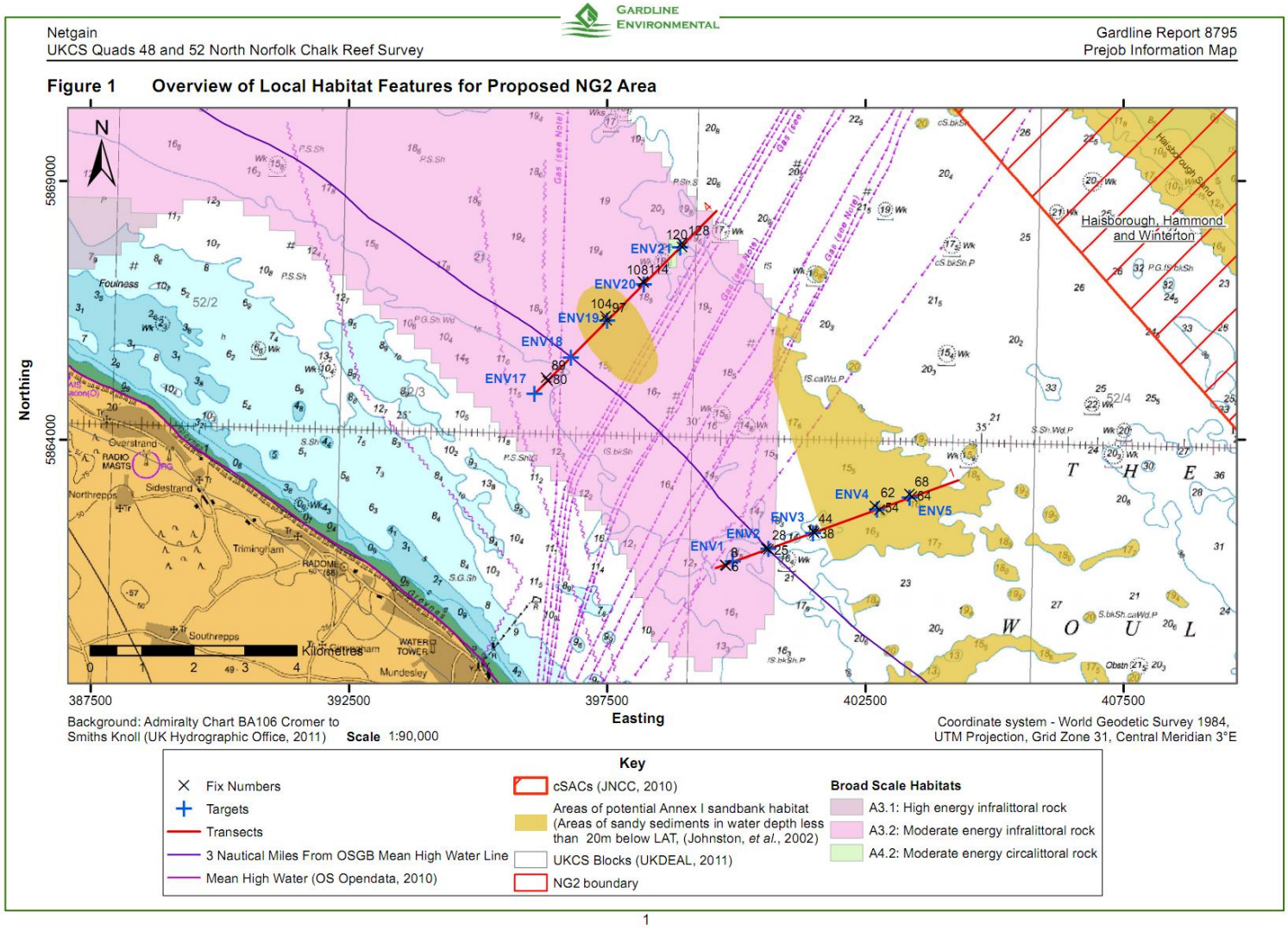
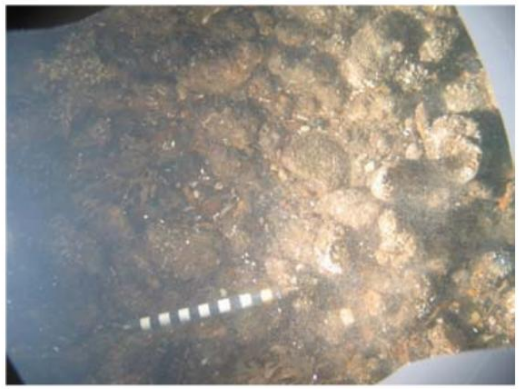


Figure A7.4 Gardline Environmental survey sites

APPENDIX B – SEABED PHOTOGRAPHS



Fix: 6 **Depth:** 20m **Location:** 399808E 5861551N

Fix: 8 **Depth:** 20m **Location:** 399787E 5861568N

Station ENV1 Seabed Photographs

Sediment Description:
Fix 6: Matrix supported small cobbles and gravel.
Fix 8: Matrix supported small cobbles and gravel.

Fauna and Flora:
Fix 6: *Flustra* sp., possible Ascidiacia sp., Cirripedia sp., possible Bivalvia sp.
Fix 8: *Flustra* sp., possible Ascidiacia sp., Cirripedia sp., *Tubularia* sp.

Fix: 25 **Depth:** 22m **Location:** 400622E 5861868N

Fix: 28 **Depth:** 22m **Location:** 400585E 5861895N

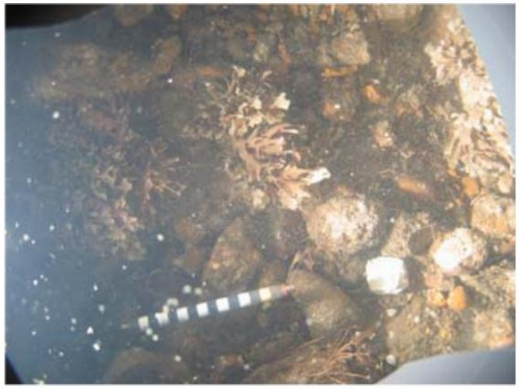
Station ENV2 Seabed Photographs

Sediment Description:
Fix 25: Medium to coarse gravel.
Fix 28: Medium to coarse gravel, possibly with small cobbles.

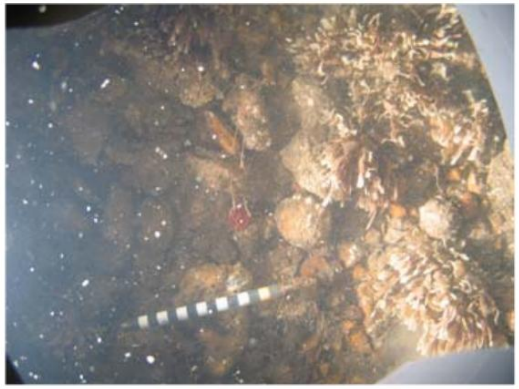
Fauna and Flora:
Fix 25: *Flustra* sp., brown encrustation on substrate, probably Hydrozoa spp., *Tubularia* sp., possible Cirripedia sp.
Fix 28: Extensive brown encrustation on substrate, probably Hydrozoa spp., Ophiuroidea sp., *Tubularia* sp., *Flustra* sp.

Figure A7.5 Images from Gardline Environmental survey (1)

APPENDIX B – SEABED PHOTOGRAPHS



Fix: 38 **Depth:** 16m **Location:** 401516E 5862195N



Fix: 44 **Depth:** 16m **Location:** 401488E 5862219N

Station ENV3 Seabed Photographs

Sediment Description:
Fix 38: Small cobbles and medium to coarse gravel, matrix supported.
Fix 44: Small cobbles and medium to coarse gravel, matrix supported.

Fauna and Flora:
Fix 38: *Flustra* sp., *Tubularia* sp., other Hydrozoa sp., *Necora puber*, Cirripedia sp., possible *Spirobranchus* sp.
Fix 44: *Flustra* sp., *Tubularia* sp., Porifera sp., Cirripedia sp.

Fix: 54 **Depth:** 18m **Location:** 402773E 5862633N

Fix: 62 **Depth:** 18m **Location:** 402686E 5862716N

Station ENV4 Seabed Photographs

Sediment Description:
Fix 54: Sand and fine to medium gravel with numerous shell fragments.
Fix 62: Sand and fine to coarse gravel with frequent shells fragments.

Fauna and Flora:
Fix 54: Possible topshell (Trochoidea sp.).
Fix 62: No visible fauna.

Figure A7.6 Images from Gardline Environmental survey (2)

APPENDIX B – SEABED PHOTOGRAPHS

Fix: 64 **Depth:** 21m **Location:** 403399E 5862898N

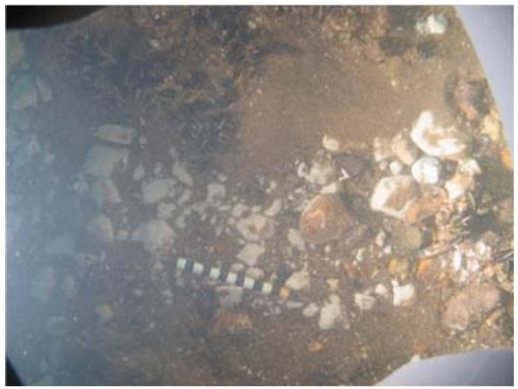
Fix: 68 **Depth:** 21m **Location:** 403352E 5862941N

Station ENV5 Seabed Photographs

Sediment Description:
Fix 64: Fine to medium gravel with numerous shell fragments.
Fix 68: Sand with shell hash.

Fauna and Flora:
Fix 64: No visible fauna.
Fix 68: *Tubularia* sp., probable thecate Hydrozoa spp., possible *Flustra* sp.

Fix: 80 **Depth:** 17m **Location:** 396346E 5865134N



Fix: 89 **Depth:** 17m **Location:** 396317E 5865196N

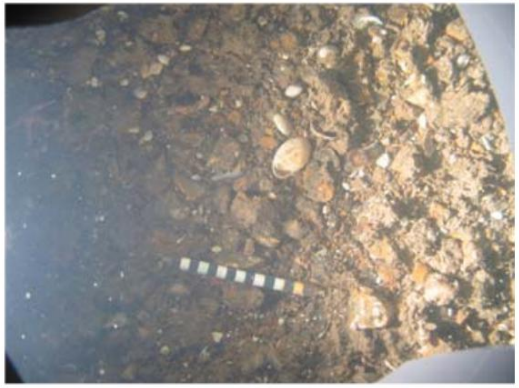
Station ENV17 Seabed Photographs

Sediment Description:
Fix 80: Sand with fine gravel. Possible hard substrate suggested by presence of mussel beds. Occasional shell fragments.
Fix 89: Sand, fine gravel to small cobble sized chalk debris and occasional shell hash.

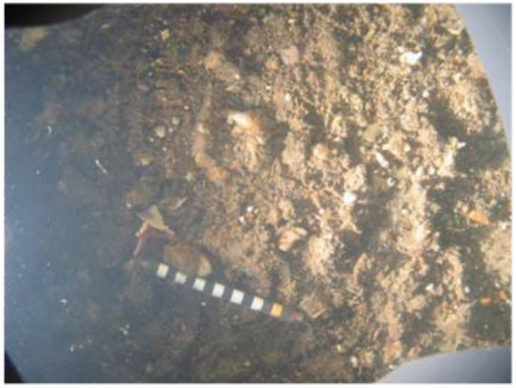
Fauna and Flora:
Fix 80: Probable *Mytilus edulis*, *Urticina* sp.
Fix 89: Probable *Mytilus edulis*, possible Cirripedia sp., brown encrusting material on chalk debris.

Figure A7.7 Images from Gardline Environmental survey (3)

APPENDIX B – SEABED PHOTOGRAPHS



Fix: 97 **Depth:** 22m **Location:** 397490E 5866308N

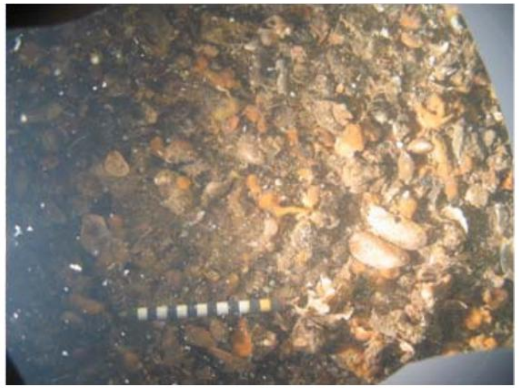


Fix: 104 **Depth:** 22m **Location:** 397470E 5866381N

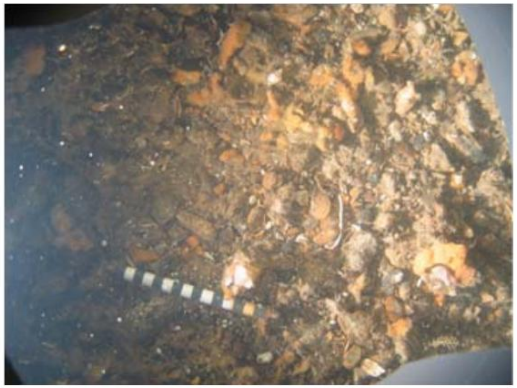
Station ENV19 Seabed Photographs

Sediment Description:
Fix 97: Fine to coarse gravel with occasional shell fragments.
Fix 104: Fine to coarse gravel.

Fauna and Flora:
Fix 97: Possible *Henricia* sp., Hydroza spp., polychaete tubes, possible *Flustra* sp., possible Echinoidea sp.
Fix 104: Hydrozoa spp. including *Tubularia* sp., polychaete tubes, *Henricia* sp., Porifera sp.



Fix: 108 **Depth:** 23m **Location:** 398204E 5867036N



Fix: 114 **Depth:** 23m **Location:** 398189E 5867054N

Station ENV20 Seabed Photographs

Sediment Description:
Fix 108: Medium gravel, possibly with sand and with frequent shell fragments.
Fix 114: Medium gravel with occasional shell fragments.

Fauna and Flora:
Fix 108: Hydrozoa spp., Porifera spp., Cirripedia sp.
Fix 114: Hydrozoa spp., Porifera sp., Flustra sp., Cirripedia sp., possible *Spirobranchus* sp.

Figure A7.8 Images from Gardline Environmental survey (4)

APPENDIX B – SEABED PHOTOGRAPHS

Fix: 120 **Depth:** 24m **Location:** 398954E 5867721N

Fix: 128 **Depth:** 24m **Location:** 398954E 5867795N

Station ENV21 Seabed Photographs

Sediment Description:
Fix 120: Sand with fine to medium gravel, shell fragments and hash.
Fix 128: Sand with fine to medium gravel, shell fragments and hash.

Fauna and Flora:
Fix 120: Hydrozoa sp., keelworms, possibly *Spirobranchus* sp., Porifera sp., Cirripedia sp.
Fix 128: Cirripedia sp., Hydrozoa sp.

Figure A7.9 Images from Gardline Environmental survey (5)

human activity, there would be huge issues as it is unlikely that these sea users would pay attention to signage.

Natural England discussed the implications of water depth and wave energy. The Natural England representative noted that deep water does have advantages, with potential for a higher diversity of chalk assemblages. It was also noted that it is important that the support of the commercial fishing industry is vital to this process. It was highlighted that higher growth rates in species can be a by-product of highly protected areas. There can be benefits to commercial fishing, but their support to this process is vital.

The commercial fishing representatives suggested while completely opposed to having any reference areas, if they must, they would support only the suggestion for the site that is further offshore, and suggested an appropriate area for chalk at West Runton and Eastern Hill/Sheringham. In response, the Environment Agency noted that there are operational outfalls at this location.

The MCS representative noted that fishing also continues outside the 1½ mile and urged the fishing representatives not to view the prospect of a reference area as a pure loss. Existing scientific evidence has shown that marine reserves can have huge benefits for the fishing industry.

The Port Authority representative noted his concern that we are too far into the process and to start defining boundaries that will affect people's livelihoods with little time, low representation and questionable data would be a mistake. The English Heritage representative noted that she was of the opinion that to place a reference area in the inshore area would be doing a great disservice to the fishermen who have engaged with this process from the outset. If this habitat can be found offshore, she would support the suggestion to place the reference area here instead.

It was not possible to reach consensus on the subtidal chalk reference area in the time available.

Liaison Meetings with Local Fishing Representatives

Net Gain's senior liaison officer met with commercial fishing representatives from the East of England Regional Hub following the June 29th meeting to gain wider feedback on the suggestions.

One local fisherman and Regional Hub member reiterated that, after speaking to local fishing communities, the inshore area of search has no backing from any of the North Norfolk fishermen from Wells to Cromer. This area is a very profitable fishing area for the North Norfolk coast vessels which are small artisanal fishing vessels and which are (because of the size their vessels) already restricted on where they can safely fish. The alternative area of search, approximately 1¼nm offshore (at a mark just west of the red port-hand buoy off West Runton) could possibly meet approval.

Annex 8 Regional Stakeholder Group Terms of Reference & Named Consultative Stakeholder details

Regional Stakeholder Group ToR

1. Responsibilities of the Regional Stakeholder Group

1.1 The Net Gain Regional Stakeholder Group is comprised of a Stakeholder Advisory Panel and four Regional Hubs. It is the collective responsibility of the Regional Stakeholder Group to make MCZ recommendations to Government by 1st June 2011. The Stakeholder Advisory Panel and Regional Hubs will have different roles in the recommendation process as outlined in these Terms of Reference.

1.2 The RSG will work within the following parameters:

- Date by which recommendations have to be submitted to Natural England and JNCC (1st June 2011).
- The regional MCZ project boundaries which have been delineated by the MCZ Project.
- Net Gain will need to plan with adjacent projects (Balanced Seas and the Scottish MPA project).
- The location and features of existing and proposed Marine Protected Areas (Special Areas of Conservation, Special Protection Areas, Ramsar and SSSIs).
- In accordance with the Ecological Network Guidance and other guidance from Natural England, the JNCC, the Science Advisory Panel and other economics and social science experts
- The Terms of Reference. These Terms of Reference have been developed with advice from RSG members with agreement from the Net Gain Regional Project Board. Should any future amendments to these Terms of Reference be necessary it will be done in consultation with the RSG and members will be notified in writing.

2. Membership of the Regional Stakeholder Group (RSG):

2.1 Membership will include representatives of groups and organisations with a range of possible interests in MCZs and who are able to speak on behalf of those groups or organisations.

2.2 It will not be possible to have every individual stakeholder group represented on the RSG so members should do all possible to actively represent and liaise with their stakeholder sector as a whole outside the meetings to ensure everyone's views and concerns are raised. Between meetings, members supported by the regional and national project teams are expected to liaise with the sector they are representing in order to:

- Provide their sector with updates on the work and must feedback the views of their sector in relation to recommendations developed.
- Provide information on all potential effects of proposed MCZ options. This will include information on the potential for sectors to adapt their activities where necessary to achieve the conservation objectives for features in the proposed MCZs.
- Disseminate information on the MCZ recommendation process and workshop outputs to their sector.
- Act as the point of contact for establishing a two-way dialogue to ensure their sectors' aspirations for the MCZs are represented at workshops. Members should give consideration as to how this is best managed for their particular sector.

2.3 All effort should be put into ensuring that the same people attend each meeting. A deputy may be nominated but it is the responsibility of the RSG member to fully brief the deputy on progress prior to any meeting attended. If deputies attend they too will operate within these Terms of Reference.

2.4 Members should engage positively in the process and the meetings associated with it.

2.5 At least one member from each Hub will act as a representative on the StAP for transparency and accountability and contribute there on behalf of all Hub members and (clearly separated) their own sector.

2.6 StAP members should be knowledgeable about the wider sector that they are representing and should have an awareness/understanding of other sectors engaged in the Net Gain process.

2.7 To support stakeholders who may find attendance difficult, Net Gain has a stakeholder remuneration policy (available on request).

2.8 Where appropriate, Net Gain staff will join in and contribute to sessions and discussions in an advisory role.

3. Operation of Regional Stakeholder Group Meetings

3.1 Meetings will take place as appropriate and possible during each of the main 'iteration' stages of the national MCZ recommendation process.

3.2 Apart from during the first round, meetings will be timetabled and located as fully as possible with the agreement of RSG members and appropriate notice will be given.

3.3 Members are expected to have read papers circulated and be appropriately prepared. This will be complemented by Net Gain circulating material with appropriate time for reading and preparing.

3.4 All present will contribute as fully and openly as possible (while respecting, for example, commercial confidentiality). Members must be willing to listen, understand, communicate and respect other members.

3.5 All will be treated as equal 'in the room' and all views will be respected.

3.6 To encourage free expression in meetings, no comments made or noted will be attributed to any particular person, group or organisation, except in particular and agreed circumstances, e.g. for clarity in the record.

3.7 Decisions will be reached by consensus. When they arise, insurmountable differences of view will be clarified and recorded (including attribution where necessary).

3.8 The facilitation team and Net Gain staff will aim to note all key points correctly. Members need to help by ensuring all possible correctness at the time.

3.9 Smaller, task-focused sub-groups may be needed from time to time in order to carry forward any work of the RSG between full meetings of the Hubs/StAP.

3.10 The facilitation team and Net Gain staff will do all possible to support RSG members in their role.

3.11 Full reports will be made from each meeting and circulated to all participants (and any sending apologies) as soon as possible after meetings. As appropriate, short, summary reports may also be produced. Reports will be sent in the most appropriate format for each RSG member.

3.12 It is the responsibility of each member to check the meeting minutes for accuracy and raise any concerns as soon as possible with the Project Manager. If additional information is requested to

be included within the report after an event, it will be included but clearly differentiated as 'post event'.

3.13 Final and agreed reports will be available to anybody via the project website and/or on request.

3.14 Regional Hub meetings will be organised and run by the facilitation team on behalf of Net Gain and all Hub members. They will suggest and manage agendas based on an understanding of what the group has requested, what is necessary at that particular stage and what is feasible to cover in the agreed time. The facilitation team will not take a view on issues under discussion.

3.15 Stakeholder Advisory Panel meetings will be organised and run by the Net Gain team and Chaired by Trevor Jameson. They will suggest and manage agendas based on an understanding of what the StAP has requested, what is necessary at that particular stage and what is feasible to cover in the agreed time. The Net Gain team and Trevor Jameson will not take a view on issues under discussion.

4. Communications

4.1 All members agree to work together to ensure that communication of the RSG's business to any others is clear, consistent and accurate and in no way attributes views, ideas, information etc. to any other individual, group or sector. In this spirit, all members agree:

- not to talk on behalf of the RSG unless mandated to do so;
- to notify the Project Team in advance of any intention to communicate widely[38] on Net Gain and the RSG's business so that communication opportunities can be coordinated and maximised;
- to use existing forms of words or other agreed text where possible to describe the RSG's business in their own communications;
- to make the RSG aware of inaccurate communication or reporting by others, so that the RSG's view(s) can be clarified;
- and that the Project Team has the mandate to manage urgent communication issues on behalf of the RSG, for example responding to media requests etc and may call upon members of the RSG for further information or support.

4.2 Net Gain may produce Summaries and Press Releases on RSG events. These should, where appropriate, be shared with RSG members. However, as timescales are such that it may not be possible to share drafts of these with all RSG members all care will be taken to respect the outcomes of the events.

4.3 In the same context, it is understood that some RSG members, and/or their organisations, may wish to produce their own Press Releases and so forth. Similar care and respect for the process, for others and for confidentiality will be expected in these.

5. Regional Hubs Role and Remit

5.1 Four Regional Hubs have been established in the Northeast, Yorkshire and Humber, Lincolnshire and The Wash and the East of England. The Regional Hubs do not however operate within fixed boundaries; whilst planning in each Hub will focus on the Hub area, members will have access to information on the entire project area to facilitate interpretation of the ENG.

5.2 The overall objectives behind the formation and operation of the Hubs are to:

[38] For instance, speaking at a conference or mailing their sector or organisation

- engage with regional and local communities of interest (stakeholders) who may be impacted by the recommendations;
- ensure that all stakeholder interests are understood and considered;
- access stakeholders' experience and knowledge;
- maximise areas of agreement;
- acknowledge and clarify areas of outstanding disagreement;
- establish and maintain an open and transparent working process including information sharing, reporting and communication.

5.3 The Hubs will plan:

- The location, size and shape of MCZs.
- The features to be protected within the MCZs.
- The conservation objectives of the MCZs.
- An assessment of environmental, economic and social impacts of the proposed regional MCZs, presenting the results in a formal impact assessment document.

5.4 As work develops to suggest specific locations for MCZs, additional representatives with relevant local interest may be invited to join the Regional Hubs. They will be fully briefed and be required to operate within these Terms.

6. Stakeholder Advisory Panel Role and Remit

6.1 The Net Gain team will collate outputs (maps, feedback and commentary) from the Regional Hubs during each iteration to pass to the Stakeholder Advisory Panel.

The Stakeholder Advisory Panel will support the Regional Hubs in the planning process by considering the collated outputs and will:

- Provide suggestions for how additional sites might be included in the network to better achieve the ENG criteria. It is anticipated that discussions will be of particular importance for offshore sites recognising the collective expertise of StAP members in the offshore area.
- Provide advice and feedback on how amendments could be made to proposed sites in adjacent Hubs to better achieve ENG criteria such as connectivity.
- Provide advice to the Hubs where there are any inconsistencies or insufficiencies in meeting the ENG.
- Ensure fairness across the Regional Hubs by checking that each Hub is aware of the emerging network and advise where additional sites may need consideration so that the ENG criteria of replication and Representativity are met across the whole of the project area
- Ensure consistency in the approach being taken across the Regional Hubs.
- Advise on sectoral issues which extend beyond or cross over individual Hub boundaries.
- Consider the feedback from Named Consultative Stakeholders. To ensure a consistent approach, StAP members will make recommendations to the appropriate Regional Hub on how to incorporate Named Consultative Stakeholder comments during the subsequent round of planning. The Regional Hubs will have access to all comments for information.
- Provide data to inform the ongoing impact assessment, and advise on all potential effects of proposed MCZ options across the whole Net Gain project area. This will include information

on the potential for sectors to adapt their activities where necessary to achieve the conservation objectives for features in the proposed MCZs.

- Advise on cross boundary issues between Net Gain and other regional MCZ projects and the Scottish MPA Project.

6.2 The Stakeholder Advisory Panel will not

- Duplicate the planning process undertaken at the Regional Hubs.
- Alter the outputs of the Regional Hubs. Only comment and feedback will be provided to the Regional Hubs to inform the subsequent round of planning. The regional profile will be used to facilitate the StAPs discussions and inform their advice.

6.3 The Stakeholder Advisory Panel will

- Maintain an overview of the progress being made at the Regional Hubs.
- Advise the project team whether the right people, organisations or sectors are being involved at the right time.
- Have a good representation from different sectors and allow those sectors which have an interest in more than one regional MCZ project or Net Gain Regional Hub to maximise the efficiency of their input.
- Support the Chair in signing off the recommendations of the Regional Stakeholder Group for submission to the SAP and JNCC & Natural England

7. Links between the Regional Hubs and Stakeholder Advisory Panel

7.1 In summary, this is about working together to recommend to Government Marine Conservation Zones that have the widest possible support and are based on the best available evidence.

7.2 Although each Regional Hub will work on proposals for MCZ sites, only one collated suite of MCZs will be presented to the StAP and SAP for the whole of the Net Gain project area at each iteration.

7.3 It is the responsibility of the Regional Hubs to do all possible to ensure that their proposals presented to the StAP and SAP are sound and supportable.

7.4 The Stakeholder Advisory Panel may raise questions and seek amendments in order to ensure appropriate consistency across the 4 Regional Hubs and to satisfy the ENG.

7.5 Amendments, recommendations, queries or concerns raised at the StAP about Regional Hub proposals will be returned to the Hubs for consideration. The Hubs will take such feedback seriously in light of the collective responsibility of the Regional Stakeholder Group in submitting sites which satisfy the ENG and contribute to an ecologically coherent network in accordance with 1.2.

7.6 In the event that the Hubs choose not to take account of the StAP's advice they must articulate very clearly the reasons for not doing so to the StAP at each iteration.

7.7 It is essential that the Chair of the StAP can sign off the final recommendations on the 1st June 2011 with agreement from the StAP members. It is the Chairs role to make sure that any outstanding concerns or objections from the Regional Stakeholder Group are logged and included int he final recommendation report. In light of this:

- The final recommendations passed to the StAP will include a consensus log of any outstanding objections from the Regional Hub members at the final iteration.

- Should any of the StAP members have outstanding objections or concerns with any of the final recommendations, this too will be recorded in the consensus log which will accompany the final recommendations on June 1st 2010.

7.8 Each Hub will be kept up to date with progress and outcomes from the other Hubs and the StAP via Net Gains website and communications.

Named Consultative Stakeholders

- What is a Named Consultative Stakeholder?

Named Consultative Stakeholder (NCS) status has been set up by the regional Marine Conservation Zone (MCZ) projects to allow regional, national or international stakeholders who may not be able to resource attendance at Regional Stakeholder Group (RSG)[1] meetings to play a less intensive role in the development of MCZ recommendations.

At key stages they will be asked for their views on the MCZ recommendations being developed by the RSG and their comments will be recorded and fed into the planning process. However, the stakeholders in this category would be giving up their direct role in the development of MCZ recommendations.

- Status of NCS

NCSs will have a formalised status, and are acknowledged as being a key maritime stakeholder in the development of MCZ recommendations. They will be able to provide information to the RSG in relation to their specialised knowledge and comment on work emerging from the RSG.

- How do you become an NCS?

Any stakeholder can apply for NCS status on a RSG, but there is a formal application process.[2] The application process is designed to ensure that any organisation granted this status is genuine, that new memberships can be formally recorded and that there is a clear understanding of the role that they will play. NCSs will be required to show that they are a representative of a stakeholder group with an interest in a particular region that does not have representation on the RSG already. If an NCS wishes to become a full RSG member, they would be required to make a formal application through the Project Manager.

- Communications

NCSs will be given a briefing of their role and will be given copies of the Ecological Network Guidance Summary, stakeholder handbook or manual and a link to appropriate online resources. They will be offered the opportunity of an induction session to ensure that they have a complete understanding of the MCZ recommendation process and their role in it. NCSs will be sent copies of the RSG meeting reports, but would not be invited to comment on the contents. Communications between NCSs and the RSG will be handled through the Regional Project Teams.

- Role of NCSs in the planning process

NCSs would be asked to respond, within a specific time scale, by a specific request from the RSG that will be sent through by the Regional Project Team. At a minimum this would happen at the three points (July 2010, November 2010, March 2011) at which a set of draft sites (an iteration) are sent through to the Science Advisory Panel (SAP)[3]. NCSs would not be able to lobby or present their thoughts to the RSG in their own time and way.

NCSs will have the opportunity to comment on the iterations, either on specific sites and/or whole network options. All responses will be sent to the Project Teams who will process, collate and

structure them for the next RSG meeting. All NCS responses will also be made available in their entirety for the next RSG. The NCS responses will be considered by the RSG to see if the NCS's comments can and/or should be accommodated. If not, the NCSs will be offered the opportunity to record their disagreement, and at the appropriate time they will be asked whether they can approve or live with a particular site (or network), and if not to explain why. These comments will be recorded in the final report, along with equivalent objections from any members of the RSG for a particular site or network option.

There are two mechanisms by which an NCS can comment on the iterations:

1. Through a template (see example below); and

2. Through the MCZ Project interactive map

The template form will be used to help structure the responses from NCSs. An example is provided below, but it is expected that this will be adapted by the Regional Projects as the process moves forward, to ensure that the questions that need answering at a particular point in the project are addressed.

Due to the large number of inputs that are coming to the Project Teams it will not be possible to provide a tailored narrative for each NCS as to how their responses were used. However since all of the deliberations undertaken by the RSG are made available in a detailed report; these will be sent to NCSs so that they can see how their responses were used at subsequent meetings.

Annex 9 Process feedback

Introduction

At the second Large Group Meeting (July 2011) stakeholders were asked to provide feedback on the wider process followed by the Net Gain Project in developing MCZ recommendations. To facilitate the collation of stakeholders' views and comments a four-page questionnaire was produced, as shown overleaf. Each delegate was asked to complete a copy of the questionnaire at the end of the Large Group Meeting.

The completed questionnaires were subsequently analysed by expressing the stakeholders' indication of attainment as a score (scaled from zero to ten).

Frequency plots were produced to show the distribution of scores against each section of the questionnaire.

The results are shown below; where comments were made, these are reproduced below the frequency plots. For clarity, each comment is preceded by the score that was given by the stakeholder.

Feedback on the Net Gain MCZ Process

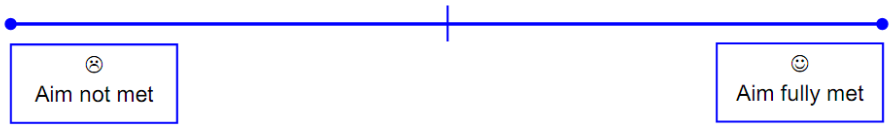
This form provides members of Net Gain's RSG (i.e. the Hubs and the StAP) with an opportunity to provide feedback about the process, when considered against its original parameters and aims.

The original parameters and aims for the process, as outlined within the 'Regional Stakeholder Group Terms of Reference' and the 'Principles for Successful Marine Conservation Zones' both of which were developed and agreed at the outset of the engagement process, can be summarised as setting up and running a process whereby:

1. A representative group of regional stakeholders (the RSG) are tasked with drawing up proposals for a regional MCZ network, following a set of ecological design guidelines (the Ecological Network Guidance).
2. There is a structured, coherent and transparent process that allows the RSG to:
   - build up a knowledge base and an understanding of the issues;
   - explore potential solutions to these issues;
   - have a central role in planning the MCZ network;
   - have a process of negotiation and resolution of conflict between differing needs and interests.
3. There is good decision making to identify the optimum location for MCZs and the decisions [on the recommendations put forward] are taken by stakeholders.
4. The process and final recommendations emerging from it are understood by a wide range of stakeholders, especially those who will, or are likely to be impacted by the advent of an MCZ network. This includes stakeholders who have national, regional and local interests.
5. The best available data is used.

A. Please give your views on how far each element of this process was met – please indicate by placing a mark along the line between 'not met' and 'fully met'

1. A representative group of regional stakeholders (the RSG) drew up proposals for a regional MCZ network, following a set of ecological design guidelines (the Ecological Network Guidance).



Comments / Rationale

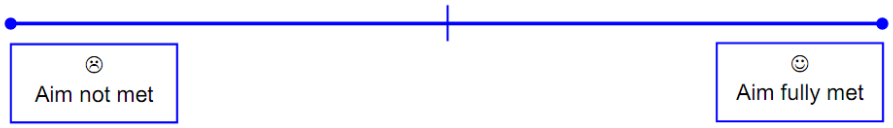
2. There was a structured, coherent and transparent process that allowed the RSG to:
   - build up a knowledge base and an understanding of the issues;
   - explore potential solutions to these issues;
   - have a central role in planning;
   - have a process of negotiation and resolution of conflict between differing needs and interests.

Comments / Rationale

3. There was good decision making to identify the location for MCZs and the decisions were taken by stakeholders.

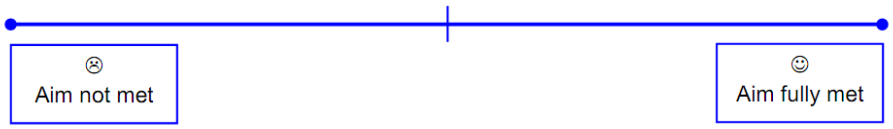
Comments / Rationale

4. The process and final recommendations are understood by a wide range of stakeholders, especially those who will, or are likely to be impacted by the advent of an MCZ network. This includes stakeholders who have national, regional and local interests.



Comments / Rationale

5. The best available data were used.



Comments / Rationale

B. Any other comments that you want to make about how the Net Gain Marine Conservation Zones process delivered on the aims set for it at the outset?

Feedback on the Net Gain MCZ Process

C. How do you rate the support given to you as stakeholders by the Project Team?

Comments / Rationale

D. How do you rate the value and contribution made by meeting design and support? You may wish to differentiate between work done with and without independent facilitators.

Work done with independent facilitation support:

Work done by Net Gain *without* additional support:

Comments / Rationale

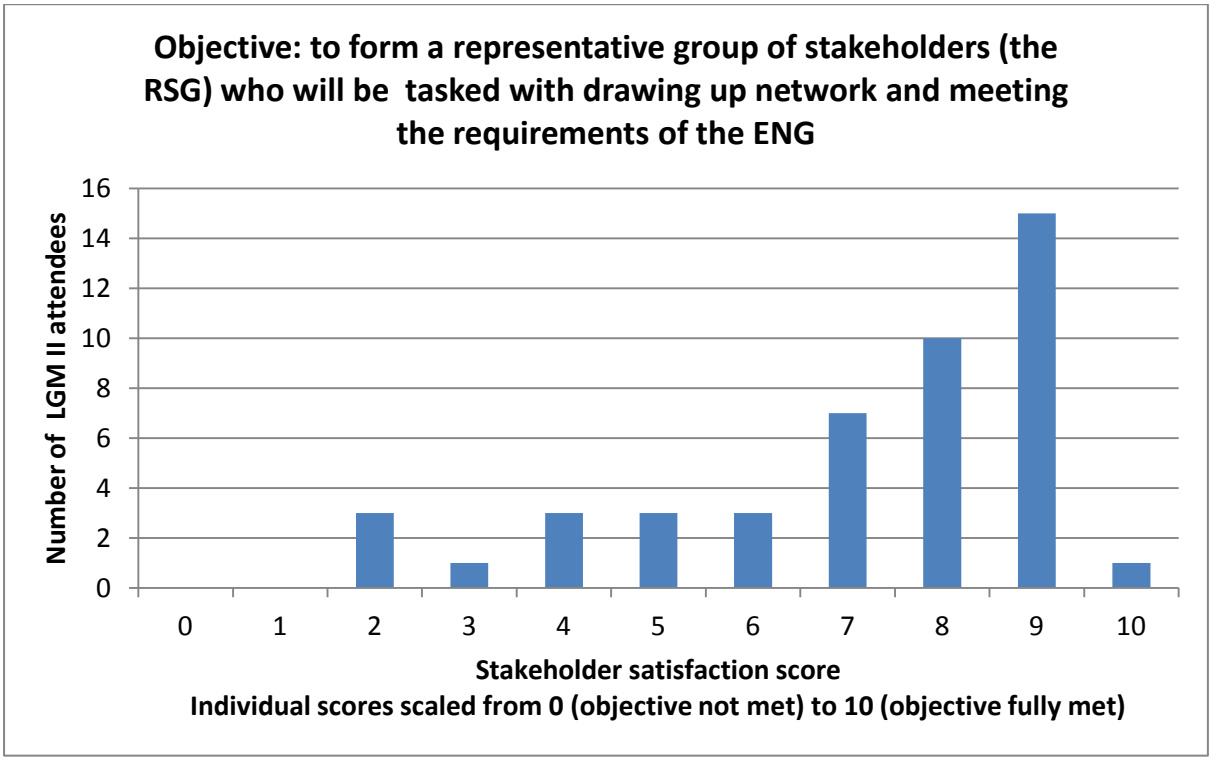
NAME: (optional)

Thank you for your feedback

Please leave your completed form on your table or hand to the facilitation team

Section A - Stakeholder views on how far each element of the process was met

Question 1 - A representative group of regional stakeholders (the RSG) drew up proposals for a regional MCZ network, following a set of ecological design guidelines (the Ecological Network Guidance).



(2.5) - Lack of data to consider FOCI. Ecology never real focus. Target and Socio-economic basis. Little ability to incorporate AAEI. Ecological data mainly available in March. Boundaries set in Oct. Inability to provide adequate consideration to GCR due to lack of Geological expertise. Limited ability to get ecological view forward due to high socio-economic number of stakeholders & teams economic drive.

(2.3) - Significant and early focus on socio-economic impacts distracted from ecological importance. ENG not always followed.

(7.6) - Appeared to be a struggle at times.

(6.9) - The group does seem to be representative. From my attendance at Hull 19 & 20 July the Net Gain team made the ENG accessible & enabled the stakeholder to draw up proposals.

(5.3) - Lack of time. Lack of valid information.

(7.7) - We got involved far too late. International fisheries.

(4) - ENG never justified/benefits explained effectively. SE interests not given adequate guidance.

(6.1) - Some conservation/ENGOs not included in the meetings.

(5.2) - ENG needed more explanation/elaboration for some stakeholders. Some interests under-represented, either by design or accident. Mobile gear fishing interest in particular.

(7.1) - RSGs asked to make a lot of important decisions in a short time limit with limited and questionable data.

(3.7) - ENG evidence has not always been followed/met.

(6.6) - Sometimes information, scientific and local information is a bit vague.

(3.7) - RSG was more lead by Net Gain than tasked understandable the process is restricted by ENG but there was too much focus on BSH for designation.

(7.9) - Would have been nice to have more offshore fishing interest and oil and gas representation at hub meetings.

(7.7) - Early clear and definitive guidance would have been useful. There was too much appearing "down the line" after considered discussion had been achieved. Not all hub area was considered and we were not allowed to review and propose new sites as a result i.e. Durham Coast.

(7.5) - Although significantly representative, there were still some sections of society that were unreachable. This is no reflection on Net Gains efforts but simply a factor of stakeholder engagement.

(8.1) - No oil and gas operators at this hub? Although I understand oil and gas UK is represented at StAP.

(9.4) - I feel that we have made a fair attempt to establish a balance between socio-economic and geological sites.

(1.7) - ENG took second place to socio-economic factors in too many discussions.

(7.1) - As wider stakeholder group as possible was involved.

(6.1) - Proposals drawn up but not convinced that ENG followed in all aspects.

(7.2) - Reasonably met.

(9.1) - Impressed by the number of stakeholders who were involved in the process - consistency of attendance was the key to this success.

(7.9) - Representation was an issue at the start with too many fishing representatives.

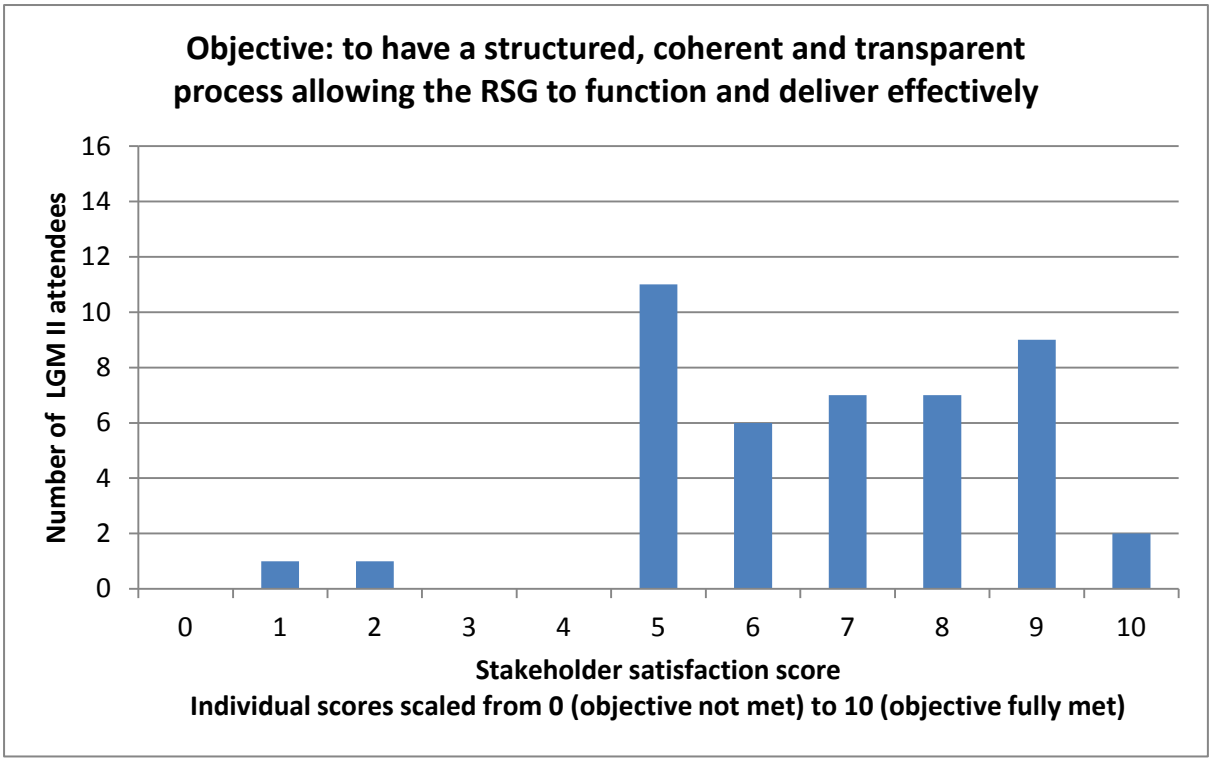
(2.8) - Initial RSG was too biased with regards to certain industry sectors, with adequate representation from key users of the marine environment.

(6.9) - Good range of organisations present but many smaller groups not present - recently spoken with marina owner who was not aware of Net Gain.

(8.9) - The aims and objectives of the ENG were met with the guidance and support of the project team.

Question 2 - There was a structured, coherent and transparent process that allowed the RSG to:

- build up a knowledge base and an understanding of the issues;
- explore potential solutions to these issues;
- have a central role in planning;
- have a process of negotiation and resolution of conflict between differing needs and interests.



(5) - Process of negotiation/resolution favoured socio-economic discussions not ecological needs.

(7) - Process evolved well - improving over time. NG facilitation (rather than) contractors was a good decision.

(7.1) - Very wordy but transparent.

(6.3) - Process well structured. How transparent remains to be seen in terms of final decisions matching stakeholders aspirations.

(7.9) - Best of a bad job.

(5) - We came in too late.

(5) - Consensus by simple numbers. Uneven representation allowed to skew process. SE interests allowed to revise and propose over best evidence. Poor data availability & poor data.

(5.1) - The time constraints met that different stages (especially evidence gathering) were overlapping and therefore at odds with one another. Evidence base and gap analysis should have been solid and sorted at the outset before the process with RSGs.

(7.3) - The team have done an excellent job considering the scope of the project and the number of potentially difficult situations along the way.

(No score given) - Lack of time has not allowed the process to take account of the likely impacts that would occur in order then to refine proposals. Transparency is as good as the meeting record for decision making at the hub level.

(5.5) - Facilitation & resolution very good. The process has been hindered/frustrated by a lack of timely guidance and apparent "shifting goalposts" with regards to sites being suggested on a conditional basis, only to find assumptions were incorrect.

(6.9) - Took a while to agree that a RA was in fact a "no take zone"

(No score given) - The process has been rushed. The knowledge base would have benefited from more time being spent on it and more expertise from stakeholders and other groups being used at earlier stages.

(6) - Well run by Net Gain staff.

(10) - 100%

(1.9) - Background information was given at meetings i.e. knowledge base was not comprehensive from the beginning. There was a lot of confusion about what was happening at the beginning of the process. Time was the biggest issue for this process.

(7.7) - Sometimes not possible to build a robust knowledge base due to time constraints.

(7.7) - SAP advice appears to have been dismissed where socio-economics were conflicted - we had the impression that biology/geology was the driver and that socio-economic issues were considered at hub level.

(7.6) - Limited time was available for exploring potential solutions. The time allocated to the boundary setting and site recommendations was necessary before these discussions. The short remainder did not give time for broader management discussions.

(8.9) - The fishing industry should have been looked as not just a stakeholder but one of the key participants in making the project work - they are the ones out in the North Sea and can monitor activities - could there be incentives to the fishing industry to help police MCZs?

(1.1) - CONFLICT RESOLUTION - Process design allowed derailment of any proposed MCZ on economic grounds.

(5) - Negotiation and resolution of conflict to minor extent - great play made at hubs for collecting the different opinions, but resolution of conflict beyond the RSG remit?

(6.1) - Net Gain tended to present consensus as agreement, whereas this often hid strong disagreements that minority of stakeholders will continue to hold.

(7.2) - Some repetitive feedback acknowledged but most met.

(5.2) - Process was confusing at the start but as things became clearer the process speeded up. Early meetings were a bit repetitive but I appreciate it was a steep learning curve.

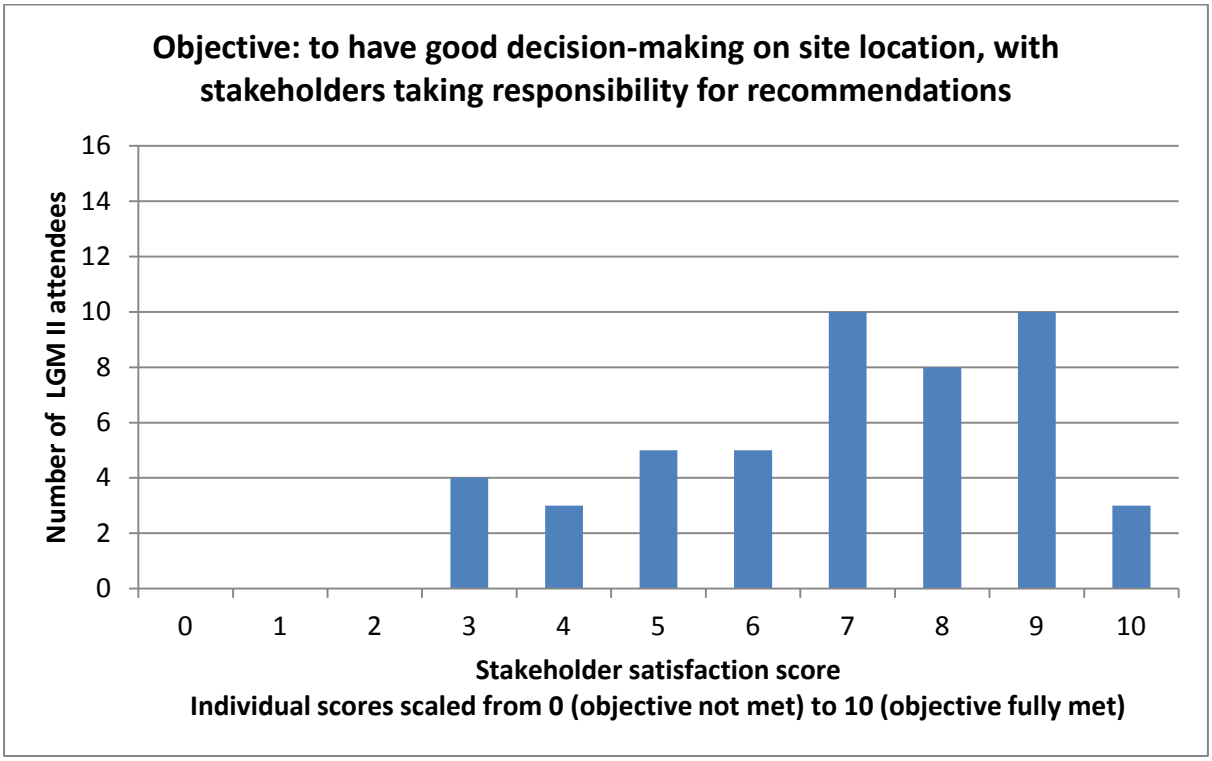
(5.1) - On the whole, the process allowed the shaping of the MCZs, but the lack of involvement by certain sectors at an early stage led to undue bias with site selection.

(6.1) - The process was rushed and all potential sites not considered reviewed at later stage.

(8.9) - The project worked well to deliver understandings of issues and solutions to problems on their own and by working in partnership with key stakeholders such as Natural England, the MMO and other stakeholders.

(No score given) - No score given but 'Aim not met'. Not my sector! (international commercial fishing)

Question 3 - There was good decision making to identify the location for MCZs and the decisions were taken by stakeholders.



(2.8) - Decisions were mostly taken by stakeholders, moreover Net Gain team regularly drove process in specific directions. "Good decision making" depends on evidence base. Ecological evidence was often poor and late arriving, e.g. post site boundary definition.

(5.6) - Note comment on socio-economics versus ecology. Good engagement and discussion.

(7.3) - Same guidance & steering given.

(7.7) - Seems as if evidently to be the case so far.

(7.7) - As we were forced into having MCZs you have to make the best of it.

(5) - I do not agree with the method. All stakeholders vote equal, but some have their livelihood at stake with "free riders" deciding on it.

(5) – Socio Economics Driven.

(8.3) - Generally positive discussions and progress within the hubs. However presentation favoured "organised" interests especially commercial developers - more time needed to build relationships and thorough representation amongst smaller groups, individuals so that decisions reflected not just those present at the meetings but also the wider stakeholder community.

(7.3) - We will have to wait and see what happens with DEFRAs final designation. Decisions were generally made by stakeholders.

(5) - In some instances decisions have been taken against those who would be impacted with those impacted regarded as a minority in other cases a better level of consensus has been achieved.

(3.6) - Lack of information at appropriate times, logical application of knowledge, uncertainties and time led to some site identification being arbitrary and unlikely to subsequently be justifiable.

(6.8) - Decisions were made by stakeholders, although vested interests often took precedence over best evidence and even common sense.

(7.2) - All decisions were basically agreed on. No decisions were made if someone was deeply against it.

(3.3) - The locations of MCZs have been predominately determined by socio-economic considerations. Feedback (from SAP & stakeholders) has not always been used to inform good decision making.

(5.6) - Sometimes factual information is a bit scarce.

(4.4) - Again RSG semi lead to make decisions; consensus was usually reached under pressure.

(5.8) - Despite constant lobbying, time was not made available to reconsider areas and this left our part of the network unbalanced. Hub members did offer to make extra time to consider sites on Durham Coast, for instance.

(6.9) - Socio-economic issues were balanced against possible features that could be designated and rolled into one decision making process.

(3.6) - When lines were drawn on maps, it came across as a little tight on time.

(2.9) - Making MCZ decisions based on sector views from the start rather than ecological as it is impossible to involve people and not expect them to lobby for their concern right from the beginning.

(7.7) - After careful consideration good decisions met.

(7.3) - The decision making was as good as it could be given (a) limitations in data set (b) wide range of interests from stakeholders. However it is recognised the choice of areas for designation may not have chosen the most robust scientific bio-diverse areas.

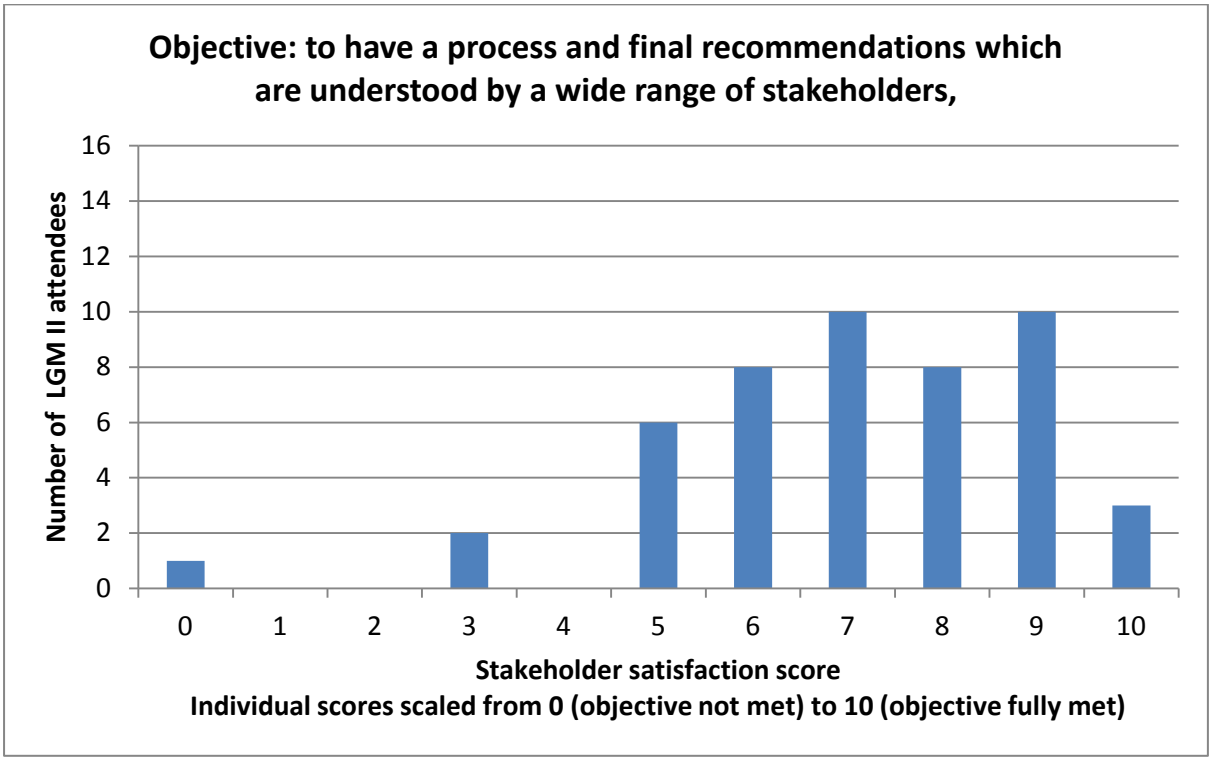
(5.5) - Decision making taken by stakeholders, but not necessarily good decision making!

(6.6) - No overall consensus, but acceptance generally good.

(8.7) - The project team facilitated a good balance between ecological and socio-economic considerations.

(No score given) - No score given but 'Aim not met'. Not my sector! (international commercial fishing)

Question 4 - The process and final recommendations are understood by a wide range of stakeholders, especially those who will, or are likely to be impacted by the advent of an MCZ network. This includes stakeholders who have national, regional and local interests.



(6.7) - Regularly explained by Net Gain team. Clarity still required in final iteration documents regarding site boundaries/features of sites.

(9.4) - Good reports and Large Group Meeting.

(6.5) - Yes.

(No score given) - I do not know if they all do fully understand.

(6.5) - Fishermen will not act until it is too late.

(5.8) - Too condensed in the end. I would have wanted more time - summer is also holiday period.

(5) - Difference between MCZ and RA. I fully misunderstood. Partial liaison officers.

(6.6) - Hard to tell with certainty, but I think awareness of the project in general - and specifically the process and outcomes is limited to regional and local interests for many groups - except perhaps commercial interests which are aware nationally too.

(5.9) - Still slight ambiguity surrounding the conservation objectives of each site and the management objectives that will be needed to achieve them.

(3.5) - There remains a lack of clarity over how conservation objectives/management implications are determined and evidenced in the final report and applied for the IA. Lack of certainty suggests applying max/min scenarios in order to inform minister's decision. Little opportunity for stakeholders to sign off final report.

(7.6) - The next steps must be made fully clear so stakeholders don't feel disenfranchised as subtle changes are made. Management measures should have either more information/time or been left wholly alone for the Public Authorities to deal with.

(5.9) - Too much emphasis on giving information out online. Not everybody goes online everyday. Newsletters are few and far between.

(7.1) - Some stakeholders are still confused about the terminology. There is still confusion over certain decisions/future management but these are not the fault of Net Gain.

(5.8) - Agreed.

(0.3) - Through process not all recommendations were met largely ignored.

(7.9) - Widely understood by stakeholders directly involved - unsure how this has been communicated back to wider sectors.

(5) - International interests appear to override the process and make it unstable and unenforceable.

(6.9) - Despite the team's best efforts I believe there are people who did not engage and lack of understanding of the finer issues. Those stakeholders involved mostly have a good understanding.

(6.4) - Fairly well understood by stakeholders attending hubs but will be more difficult with wider body of stakeholders, some of whom (e.g. common rights holders) feel excluded. This isn't something that would have been easy to deal with as they always feel excluded!

(8) - Aims met.

(8.9) - Yes.

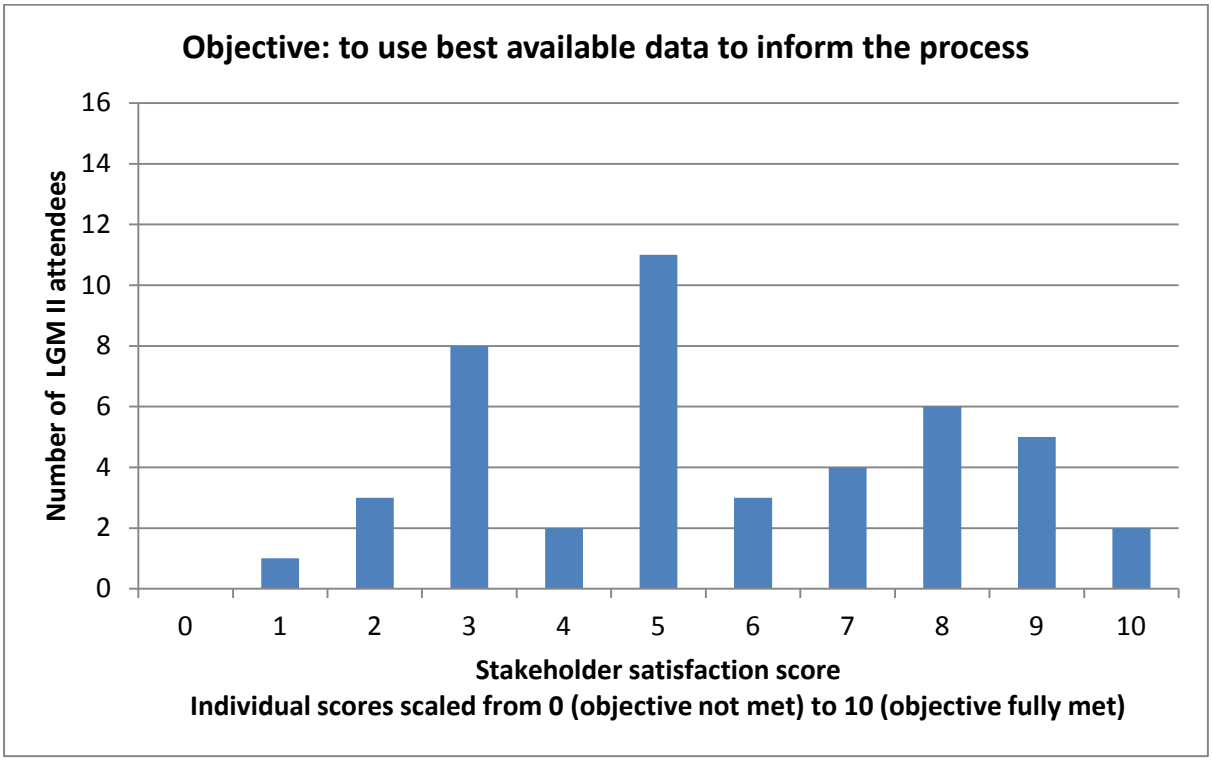
(6.4) - Process & recommendation understood, but there does seem to be an inevitability regarding the location of sites.

(5.3) - Many still express doubt in the whole process. Some do not trust recommendations.

(6.9) - Some stakeholders still have misconceptions despite best efforts of the project team to clarify them.

(5) - What does "recover" actually mean? 10-15 vessels, 3-4 months per year is too much for a conservation objective "recover"? We fear that "recover" means "RA" for certain activities.

Question 5 - The best available data were used.



(2.9) - Data often late in the process. Ecological data not prioritised & so did not drive site identification. REC data was not used when initially available. Was used eventually but caused rushed discussions.

(3.1) - Some material given not used to its full, particularly AAEI.

(3.5) - Not always correct data. Best available is not enough when important decisions are concerned.

(5) - Really don't know but probably not as process/project timetable too quick.

(7.3) - Would have preferred to use more Admiralty charts.

(No score given) - Majority of data was not acceptable, available or introduced too late. Whole process was rushed!!

(No score given) - Unknown - not involved in this.

(7.1) - The best available data may have been used but there were general concerns about the quality of the data in a number of areas.

(2.7) - Often ignored in favour of anecdotal and speculative suggestions.

(6.3) - In many cases there is likely to be better data available that would have been revealed if there had been an appropriate pre-consultation period allowed for data gathering. Lots of issues with data undermined confidence in entire process given its importance in setting targets (especially BSH) as well as decision making.

(6.8) - I am not sure of the extent of the data that is available. I think the team did an admirable job in bringing together a large amount of data.

(5) - Not aware whether better data sets are available. It is not clear how reliable some datasets are.

(5.4) - Some data came too late for appropriate use.

(3.7) - Data confidence has marred the process. Although not Net Gain's fault. However, supplied data has not always been brought forward in time to inform quality decision making.

(5.3) - Not enough local knowledge and experience being used when offered. Data being used was taken as gospel.

(2.9) - Ecological data has not been fully utilised. AAEI has been used to determine between some sites but ecological data was not fully used to create the network upon which decisions were being made thus undermining the process.

(5.7) - Agreed. Although some data was vague.

(2.3) - Data was somewhat inaccurate at places. Maps were too large to focus in on smaller habitats.

(7.7) - REC data could have been incorporated a little earlier.

(5) - Some data seemed to be deficient/coming in too late which has made decision making difficult. Could result in significant changes once proposals/designations are made and surveys are done.

(4.5) - Some data provided not utilised. Process too rapid to ensure data gaps fully addressed. Where were the geologists?

(8.4) - Efforts were made to use best available data but quality and timescale issues did hamper efforts.

(9.3) - Although "best" available data was used "eventually" there are still many "holes" in that data which hampered the selection of best sites.

(9.3) - Maybe better to phrase the question as "The only available data was used".

(3) - The best available data were not good enough. BSH maps, in particular, gave a false sense of security from which to build on.

(4.3) - A lot of useful data came in too late to be fully incorporated into MCZ boundaries.

(4.9) - Throughout question marks over reliability of sea bed data.

(7.7) - There is still some debate on the quality of a lot of the data.

(No score given) - Data inadequate.

(2) - Data to inform decisions was particularly poor for RA8.

(5) - Probably true but even the best data not often trusted.

(7.2) - The GIS and data officers provided stakeholders with the best evidence, however there were issues around big datasets coming late into the project.

(No score given) - I don't know!

Section B - Any other comments that you want to make about how the Net Gain Marine Conservation Zones process delivered on the aims set for it at the outset?

The process has been difficult for ecological representatives to engage in. The team have favoured the socio-economic argument and regularly ignored the ecological view in order to wrap up discussions. Ecological data has not driven the process and resulted in ecological sites unprotected. Info/comments from ecological reps regularly not recorded or recorded incorrectly hence need to now discuss why sites included are worth including in terms of ecology. Has created good links with stakeholders and hopefully will go some way to promote local stewardship.

Over emphasis on achieving full consensus when in fact only a small number of stakeholders disagreed.

Lot of decisions taken by people who did not have local knowledge or experience of the MCZ area.

No, but all experience and a wealth of information will be lost. Does DEFRA start with a new in-experienced team??

Possibly erred on the side of revisited discussions and decisions to be seen to be all inclusive of all stakeholders, final meeting (LGM) could have been a single day. Probably a mistake to suggest a final celebration in September which most won't be able to attend to justify - should have been during the LGM.

Its a start but previously compromised. By allowing non-evidence based suggestions not having best evidence and information process is open to protest. NG staff too often involved in "summarising" data down, choosing easy options.

Probably the best done in the time available but ultimately a bottom-up approach requires much more time to bed in and better data at the outset in order that the outcomes be truly the best possible achieving the aims set.

The outputs are admirable given the time frame and delays in guidance etc. The process on a national level has been hindered/undermined by a lack of quality evidence. I have felt for the RPs at times, having had this handicap!

Very disappointed the SAP has **again** questioned the 200m boundary. This was designed and consensus agreed at hub meetings and on several occasions. The SAP should have questioned this months ago NOT when we can no longer influence the outcome.

It has been raised on numerous occasions that one particular area of the coast (NE) was not covered by MCZs and this was (apparently) constantly overlooked. Promises to review it were never fulfilled.

Net Gains approach has allowed socio-economics to be considered from the outset and as such many impacts of the network have been minimised as far as possible.

On the last afternoon the Dutch delegation shared the practice which they have implemented - setting up areas with one of 4 options for fisheries management: 1, No take 2, Business as usual 3, Restriction of certain activity 4, Restriction - but allowing "low impact" alternative practices. This would only be an option for all or a large proportion of the whole Net Gain area but it is a pity there was no chance to discuss this earlier in this process.

Needed more time. Guidance & clarification came too late - consistently. I would also comment that Net Gain has served to hugely improve our capacity to undertake work in this area, to provide a network with stakeholders, to highlight issues and opportunities and to justify our input into marine work. This may <u>not</u> otherwise have occurred.

Net Gain have done an excellent job at being a group that supports and aids stakeholders. This is reflected in the high level of consensus for sites.

Thought the meetings were very good in the second half of the project. A lot of stakeholders contributed consistently to the process which is a great credit to the project team.

Timescale too short. Denial of discussion/questions during presentation not helpful! - quite the opposite.

Net Gain have been under more pressure than other 3 projects due to 1) Size of region and four separate hub groups to co-ordinate. 2) Facilitating the meetings, organising meetings as well as delivering project. 3) Poor weather at Xmas delaying outputs. This has made this project more challenging. However Net Gain should be applauded for overcoming these issues.

Well intentioned, but too aspirational. No real consideration for the financial and programme implications of designations.

Review process must start early. Ground truthing required now.

The project team did very well to ensure continued and staged progress from the start of the process through to the final recommendations and kept the process on track within a different timescale.

My general comment is in the feedback form of the last iteration report. But I feel I had the opportunity to explain the main issues of my sector too late. Boundaries are fixed, conservation objections choosen - what can I do now?

Section C - How do you rate the support given to you as stakeholders by the Project Team?

(0.6) - NGO reps regularly made to feel a nuisance. Early in the process facilitators segregated NGO staff from the rest of the stakeholders (June 2010 YH Hub) Info/data repeatedly not used despite willingness to help/assist the team in their role eg of data collection as a result now need for last minute meetings to discuss ecology of dMCZs

(7.9) - Very supportive & helpful.

(7.3) - Plenty of notice about meetings - thanks Steve. Helen very good with arrangements for the day. Very impressed with documents/summary of site features & activities for draft final MCZ network.

(10) - 100%

(9.8) - The team could not have done more both at the meetings and between meetings.

(8.3) - Liaison officers did a superb job, same as others.

(No score given) - Not a stakeholder.

(10) - 100%

(7.7) - Data team good. Liaison poor - never interviewed despite requests.

(8.9) - Project team were excellent.

(8.3) - Good support from project team but process has not recognised need for specific sectoral support.

(8.6) - They have been excellent.

(5) - Hindered, again by delayed guidance.

(7.1) - Every comment and objection was listened to and taken into account.

(5) - The project team have been incredible but have sometimes not appeared to value input from all stakeholders equally.

(9.4) - Well nobody's perfect!

(1.9) - On the day support at hubs was only ok.

(7.9) - Very helpful, usually, although as staff team shrank it became more difficult to make contact at times. Steve Barnard, in particular deserves a pat on the back. At times, other team members seemed to be biased by their background leading to lack of objectivity during facilitation.

(9.8) - Near perfect!

(10) - 100%. Well run stakeholder days.

(No score given) - Very good.

(9.7) - Very good team - worked well together. Good communication with all the stakeholders.

(8.5) - Good considering resource issues.

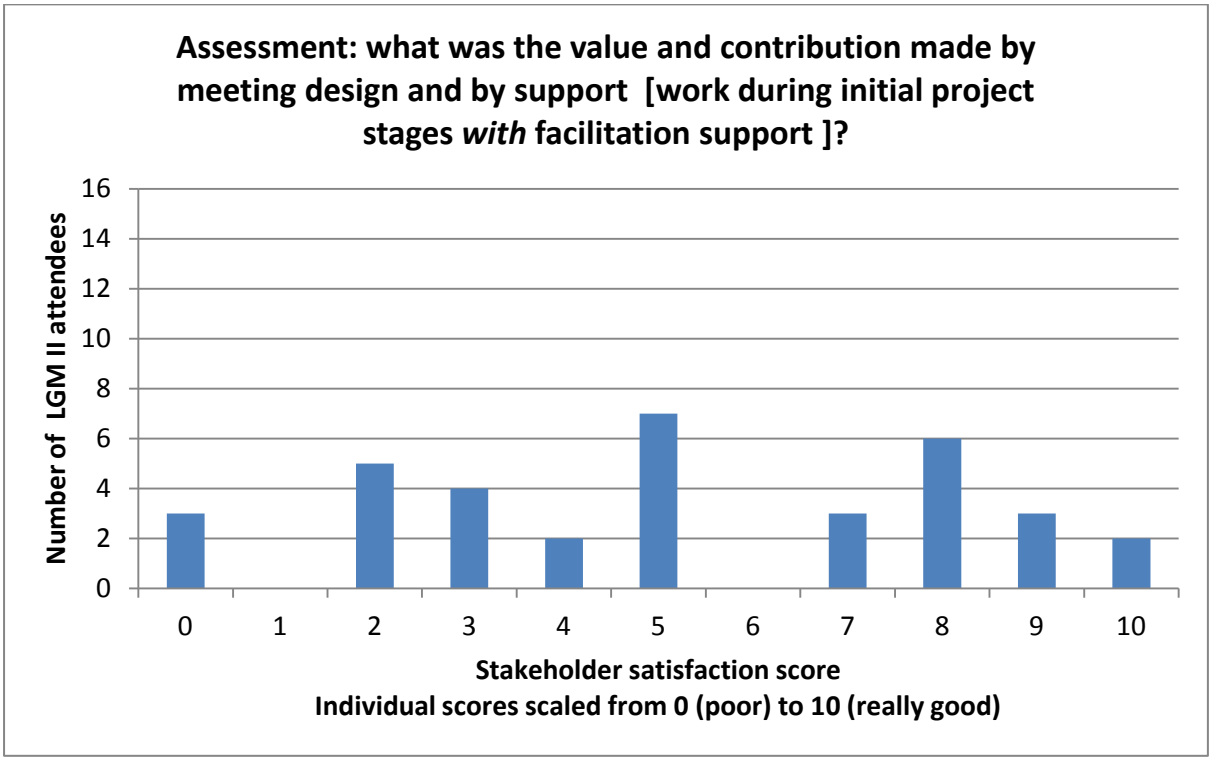
(9.1) - Project team are very good.

(7.9) - All the team have been knowledgeable and approachable.

(9.3) - Excellent level of support directly from the project team, by phone, in person and through the Net Gain website and letter/email notifications.

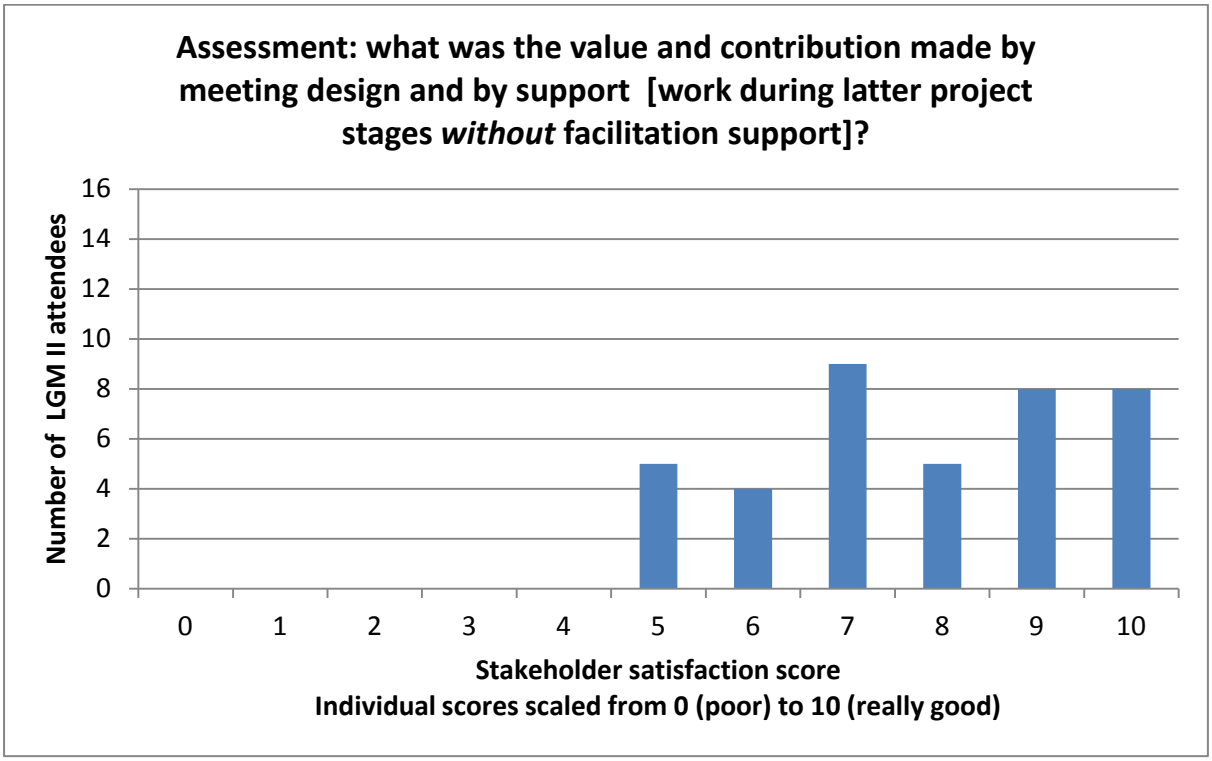
Section D - How do you rate the value and contribution made by meeting design and support? You may wish to differentiate between work done with and without independent facilitators.

Part 1 - Work done with independent facilitation support



Comments relating to these assessments are combined with those from the second part of this question: they are provided with the analysis given in the next section.

Part 2 - Work done by Net Gain without additional support



NOTE - In the following comments, scores relating to Part 1 (work done with independent facilitation support) are denoted by [ext]; scores relating to Part 2 (work done without additional support) are denoted by [NG]

(0 [ext] and 5.5 [NG]) - Facilitators were awful & caused friction among the stakeholders. NG team better but regular difficulties with liaison officers from specific sectors facilitating groups and misreporting or driving discussions in a particular manner/direction.

(4.7 [ext] and 9.6 [NG]) - Initial meetings with "professional" facilitator was not conductive to allowing RSG to progress to decision making, more driven into it. Net Gain facilitators = Excellent. Well done.

(1.9 [ext] and 8.7 [NG]) - Jo and Steve - Excellent facilitators.

(No scores given) - Sorry cannot formulate a comment or view on this.

(0.3 [ext] and 9.5 [NG]) - We could not have done this with the independent facilitators.

(8.7 [ext] and 6.9 [NG]) - Now the team had to concentrate on the process and content. Just content would have been better!

(No scores given) - Unknown.

(0 [ext] and 6.1 [NG]) - Tragic waste of time. 1st round wasted totally due to poor facilitation scheduling etc. Poor - did not allow best use of SAP & StAP

(2.9 [ext] and 9.8 [NG]) - Good design and support as team were dedicated and able to build up a good relationship with stakeholder groups.

(4.1 [ext] and 8.3 [NG]) - I think the key thing is building trust between the team and the stakeholders which obviously takes time. The first stages of a project are always going to be difficult with/without independent facilitators.

(No scores given) - Not part of the hubs when independent facilitation occurred. In house facilitation compared to other MCZ projects has been as good or better. Last meeting not as well planned for those who need to work across more than one hub. Also concerned about creating a conservation manifesto for additional measures. Surprised we have not looked into management implications i.e. what happens given a management scenario?

(1.6 [ext] and 7 [NG]) - Facilitated meetings were a flop. In house steering has been very good. Impartiality and a level approach has been evident throughout.

(No score [ext] and 6.5 [NG]) - Better when enough people can work in groups and answer a variety of questions.

(8.1 [ext] and 7.9 [NG]) - Have enjoyed the process and am amazed so many different interests could be drawn together as has been achieved by the Net Gain team.

(No score [ext] and 5.1 [NG]) - Good facilitation in a difficult situation.

(No scores given) - Difficult to assess the difference between the two. Stakeholders became better at working together as the process went on.

(No score [ext] and 8.9 [NG]) - Only attended the last session.

(1.9 [ext] and 6.9 [NG]) - Better group involvement where "gentle touch" facilitation occurred (post independent). Many stakeholders have indicated it would have been welcomed if site location could have been revisited i.e. Durham Coast (especially after GAP analysis).

(2.2 [ext] and 9.2 [NG]) - Unfortunately the facilitators originally employed were not suitable or knowledgeable enough to manage and run meetings. However, the Net Gain team proved to be excellent facilitators, Jo in particular, but all the team members.

(8.5 [ext] and 8.3 [NG]) - Both were good.

(No scores given) - No score given but both scored as 'Good'

(5 [ext] and 9.8 [NG]) - Think the meetings were much more constructive without the independent facilitators.

(3.6 [ext] and 5 [NG]) - Clearly the team having to facilitate themselves has added to the challenge. Stakeholders tend not to like the facilitation.

(No scores given) - On the whole, well organised but a fundamentally flawed process due to lack of data and parochialism.

(9.9 [ext] and 9.6 [NG]) - As I missed the first hub meeting I may have missed some information, also a legend of abbreviations would have helped to understand proceedings.

(9 [ext] and 8.9 [NG]) - The Net Gain team performed very well at meetings that involved difficult discussions around site decisions and this was done successfully by the project team without the need for independent facilitators.