Updated NIA M&E indicators: Ecosystem Services theme

Final versions for use by NIAs, update 28th March 2014

- ES01_C: Measure of extent of land managed to maintain and/or enhance landscape character
- ES02_C: Length of public rights of way (PROW) and permissive paths created and/or improved
- ES03_C: Condition of historic environment features
- ES04_C: Access to natural greenspace and/or woodland
- ES05_S: Area of habitat supporting pollinators
- ES06_R: Contribution to water quality
- ES07_R: Contribution to carbon storage & sequestration
- ES08_P: Area of more sustainable agricultural production
- ES09_P: Percentage of woodland in active management

Indicator: ES01_C: Measure of extent of land managed to maintain and/or enhance landscape character

Indicator: ES01_C	Measure of extent of land managed to maintain and/or enhance landscape character
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Cultural services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicator shows the contribution of NIAs action to maintaining and improving the landscape character within the NIA area. Using a process indicator in this case is necessary as changes in landscape can be slow and incremental and it is assumed that land being managed to maintain / enhance its character will, in time, result in enhanced landscape character across the NIA area. Land being managed to maintain or enhance landscape character it is a proxy measure for the outcome of improved landscape character. This process indicator should be seen in the context of longer-term vision / goals relating to landscape in the NIA, and this can be reported through narrative text to accompany the measure of extent of land managed to enhance landscape character.
Units	Hectares (ha), Linear Kilometres (km) or Sites depending on the nature of the action type. Ideally, reporting should be as hectares (ha). Habitats for which sites are appropriate include ponds. Linear habitats (e.g. river and hedgerows) can be reported in km.
Relevance to Government indicators	None
Existing data for establishing baseline	
Relevant dataset(s)	Existing Landscape Character Assessments (LCAs). LCA guidance highlights types of information/data sets useful for desk study, including: geology; landform; soils; vegetation; trees and woodland; land use; and settlement patterns. The current guidance dates from 2002. An update version is currently in preparation, to be available 2014/15 Revised National Character Area (NCA) profiles also contain valuable information in their key facts and data sections, which complements that in the LCA guidance and cite more up-to-date sources in terms of landscape change and the features, habitats, urban and infrastructure influence on landscape.

Source(s) of data *(contact details or hyperlink)*	Sources of information are listed in LCA guidance (Box 4.1, page 22): http://publications.naturalengland.org.uk/publication/2671754?category=31019 Landscape Character Assessment case studies: http://www.naturalengland.org.uk/ourwork/landscape/englands/character/lcn/resources/lcaresources/lcacasestudies.aspx. (note this web address will be changing to http://www.naturalengland.gov.uk/ourwork/landscape/englands/character/lcn/resources/lcaresources/lcacasestudies.aspx. by July 2014) For NCA information, profiles and data see: http://www.naturalengland.org.uk/publications/nca/ (Note this address will be changing to http://www.naturalengland.gov.uk/publications/nca/ by July 2014) Countryside Quality Counts (http://www.naturalengland.org.uk/ourwork/landscape/englands/character/cqc/) provides context from historic surveys (1999-2003) for reporting and assessing both the magnitude and the direction of landscape change for each NCA, using four categories: maintained, enhancing, neglected, or diverging. This may provide an appropriate classification for indicating reporting change.
Spatial coverage	Various
Temporal coverage	Various
Planned updates	Various
Data collection method *(estimate, survey, monitoring)*	See existing LCA and LCA guidance and NCA data / information
Accuracy of data	Various
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Local measures of the extent of land managed to enhance landscape character can be established by the NIA partnership in relation to an LCA. If an LCA does not already exist for the NCA area, then one will need to be undertaken (see LCA guidance). A 1:25,000 base map for the LCA would ensure a high level of detail, although 1:50,000 may be appropriate for NIAs of larger area. It is expected that in many cases LCAs will exist (e.g. AONBs, National Parks etc). Where not it is suggested that only NIAs who have the resource to complete such an assessment should select this optional indicator. The data for this analysis is the action records that are targeted at landscape enhancement. This may be partially recorded within the BARS2 recording system, (through recording the actions on landscape features such as boundary features, woodland planting etc).

	The spatial and temporal coverage should include the whole of the NIA and be repeatable annually to support effective monitoring.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	Dependent on the local measures established, data may be sourced from national or local datasets that are the subject of on-going data collection or may need to be collected by the NIA partnership.
Methods for data collection	Annual monitoring of local measures of the extent of land managed to enhance landscape character, as established by the NIA partnership in relation to the LCA. This is based on the categorisation within the LCA of land management that has positive and explicit management for landscape objectives (e.g. AONB, National Trust land). Calculate the area (extent) or, if chosen, the feature numbers that are managed for landscape enhancement purposes.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	Date of the LCA and extent of land within the LCA managed for landscape enhancement. If an existing LCA is unavailable then one will need to be undertaken
Methods for calculating indicator values	Dependent on the local measures established. Generally, this will be based on the GIS area assessment of land parcels that are managed for landscape enhancement. LCA can be used to determine the landscape units within which positive landscape management is occurring. Additional areas that are added to the management for landscape will provide the basis for update. **Note:** this indicator is *not* proposing the updating / completion of annual LCAs in the NIA area, rather it is a process indicator of the extent of land being managed to enhance / maintain it landscape character. Records of these measures should be reported on in the context of the LCA baseline and longer-term visions / goals for landscape character in the LCA.
Responsibility for calculating indicator values	NIA partnership
Reporting	

Online reporting	Local measures to be established by NIA partnership (some may relate to other indicators, e.g. Total extent of habitat).
	• Baseline figures for measures of extent
	• Figure for measures of extent updated annually
	• Narrative: relating extent of measures in context of progress towards longer-term (5, 10, 20 year) vision or goals for landscape enhancement.
	• Caveats relating to:
	  ○ Likely accuracy of the baseline
	  ○ Changes in the baseline
	  ○ Likely gaps in knowledge of annual changes in total extent (e.g. arising from an inability to monitor private landholdings).
	
	Note that **data entered as 'annual figure' in each**

	reporting year should be for that year only, and not cumulative. Cumulative figures will be calculated by summing individual year data.
Interpreting	
Interpretation *(inc linkage to other indicators)*	LCAs bring together many landscape attributes (e.g. semi-natural habitats, historic features, terrain, settlement and development, boundaries and woodland and agricultural pattern. As such, there are many potential links with indicators in the themes relating to biodiversity, ecosystem services, and social and economic benefits and contributions to well-being. Areas outside the NIA, may be relevant where actions enhance the landscape setting of the NIA (i.e. within the inter-visibility area).

Indicator: ES02_C: Length of public rights of way (PROW) and permissive paths created and/or improved

Indicator: ES02_C	Length of public rights of way (PROW) and permissive paths created and/or improved
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Cultural services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	Contributions to improving the network of linear routes for walkers, cyclists and horse-riders *as part of the NIA programme*. By recording change over time in the length of public rights of way and permissive paths created or improved this indicator is seeking to understand how the NIA programme is helping to improve access to the natural environment. This is a proxy measure for changes in cultural ecosystem services associated with access to and interaction with nature (e.g. through leisure activities such as walking) based on the assumption that an increase in the number / length of public rights of way and/or their quality will encourage and enable more people to use them.
Units	Kilometres
Relevance to Government indicators	N/A
Existing data for establishing baseline	
Relevant dataset(s)	The local (highway) authority Definitive Map and Statement together form a document which is the legal record of all known Public Rights of Way (PROW) and, as such, is the most accurate source of available information (excluding permissive routes and area access). Information on the range of permissive paths (including towpaths, cycle tracks, permissive routes offered by a range of land managers, including local authorities) available from OS map (1:25000 scale) or local highway authority. The Rights of Way Improvement Plan (sometimes merged with the Local Transport Plan) is a major source of information on where local networks could be improved.
Source(s) of data *(contact details or hyperlink)*	NIAs should contact relevant local authority/ies relating to the appropriate Definitive Map/s and Statement/s for the NIA area. Defra hold a combined PROW dataset (2008), although it is not updated. Natural England will provide a summary of length of PROW for the 12 initial NIAs based on this dataset in order to help with establishing baseline. It may be that this dataset is updated and becomes available for release in the future.

	Information on permissive paths created under agri-environment schemes (Countryside Stewardship (CSS), Environmentally Sensitive Areas (ESA)) can be viewed at: http://cwr.naturalengland.org.uk. Natural England hold a 2010 spatial dataset of permissive paths created under CSS and ESA, this is not currently available for release but Natural England will provide summary statistics for the 12 initial NIAs based on this dataset in order to help with establishing baseline. It may be that this dataset will become available for release in the near future. Local Access Forum (established to advise local authorities and others locally on matters relating to access). See: http://www.naturalengland.gov.uk/ourwork/access/laf/.
Spatial coverage	Local highway authorities maintain comprehensive spatial coverage of PROW. Natural England (NE) holds data on permissive paths created under CSS and ESA. Other data on permissive paths typically only provide partial coverage within the local authority.
Temporal coverage	Variable: Local authorities maintain the rights of way data, but data is not consolidated on a regular basis.
Planned updates	Rights of Way Improvement Plans are to be updated every 10 years. The first versions were produced by December 2005. Each local highway authority will have a different date for when it must review the plan. Definitive Map and Statement (which is in paper form) may not be up to date and Modification Orders may be in processing and consolidation of the Definitive Map is only periodic. Ordnance Survey data shown on the 1:25000 scale maps is only updated on sheet revision – although the new path data layer Integrated Transport Network (ITN) Layer records Urban Paths Theme is on a more frequent update cycle as part of the OS MasterMap.
Data collection method *(estimate, survey, monitoring)*	Seek guidance from the local highway authority on the most authoritative data. There is no common protocol, although many local authorities now maintain an unofficial digital version of the Definitive Map and Statement which provide GIS data and may include permissive routes (not part of the Definitive Map and Statement).
Accuracy of data	Data on condition and accessibility are not routinely collected. A number of PROWs are not recorded on the Definitive map and may be under investigation for evidence to demonstrate that the route exists and with what rights for walkers, cyclists, horse-riders and other users.
Additional/new data for establishing data and monitoring change	
Relevant additional/new data	NIA partnerships should record the length of linear route where work has been undertaken by organisations within the NIA partnership as part of the NIA programme, in one of five distinct classes of improvement: 1. Create new PROW (footpaths and bridleways) 2. Upgrade footpaths to bridleways 3. Create permissive routes 4. Improve accessibility of PROW 5. Improve accessibility of permissive paths

	'Improvement of accessibility' here is assumed to be upgrading the condition or access level (e.g. less abled access) If NIAs wish to record the length of route made more accessible by their works of linking existing routes (creation or improvement) this can be assessed by evaluating the additional length of existing route made accessible by this creation/improvement. Actions by others within the NIA area but outside the NIA partnership may also affect the records if collected from local authority sources. Data should only reflect those actioned by the NIA partners.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	NIA partnership
Methods for data collection	On-site or map-based measurement of length of route created, upgraded or improved, or the additional length made accessible by gap filling actions.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	Indicator values will need to be calculated for the first report in April 2013. This should be zero at the start of the NIA programme – (rather than total quantity within the area as the start of the NIA programme)
Methods for calculating indicator values	Measure length of route where improvements / creation of paths have been made by NIA partner actions *as part of the NIA programme*. NIAs reporting the length of route made more accessible as 'added value' (i.e. where a short length of path creation/improvement may grant access to a currently unconnected route thereby increasing the overall accessible length) can calculate this from the existing PROW/route data. If this improves access partially outside the NIA boundary the full length should be included.
Responsibility for calculating indicator values	NIA partnership
Reporting	
Online reporting	Annual data should be entered into the following relevant fields in the online reporting system (as applicable): 1. Length of new PROW (footpath and bridleway) created 2. Length of footpath upgraded to bridleway 3. Length of permissive route created 4. Length of improvement to accessibility of PROW 5. Length of improvement to accessibility of permissive paths. Add a new feature to the online reporting tool to record the length of route that has been made more accessible ('added value') with units as km. Add a note to the caveats if necessary to clarify the calculation methods. Note that **data entered as 'annual figure' in each**

	reporting year should be for that year only, and not cumulative. Cumulative figures will be calculated by summing individual year data.
Interpreting	
Interpretation *(inc. linkage to other indicators)*	Care is required, as the recorded length of PROW and permissive paths improved may not be a fair reflection of all that is happening within the NIA. Whilst the indicator provides a measure of length of route where improvements have been made, it does not necessarily reflect the 'added value' of such improvements (which can be optionally reported within the online tool). Small changes can make a big difference to accessibility in terms of connectivity of the path network.

Indicator: ES03_C: Condition of historic environment features

Indicator: ES03_C	Condition of historic environment features
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Cultural services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicator shows the management of threats to historic environment features 'at risk' within the NIA. This indicator will be relevant to all NIAs that have a specific programme of activities with the objective of protecting or enhancing historic environment features. Measuring change in the number of historic environment features at risk will help with understanding of the extent to which the NIA programme helps to reduce risks to historic environment features, although in many cases it may not be possible to attribute with certainty that changes are a direct result of NIA activities. This is a proxy indicator for cultural ecosystem services, based on the assumption that a reduction in the number of historic environmental features at risk will protect (and possibly increase) the benefits these features provide for local people.
Units	Number of features
Relevance to Government indicators	English Heritage (EH) key performance indicator (KPI) to reduce the number of 'at risk' designated historic environment assets by 25% over the period 2011-2015 (from joint DCMS/Defra/DCLG funding agreement KPI for EH).
Existing data for establishing baseline	
Relevant dataset(s)	Heritage at Risk (HAR) datasets: • Updated 2010 HAR GI layer showing condition **rating of Scheduled Monuments** plus their 'principle vulnerability' (also available as Excel table) • 2010 **Registered Parks and Gardens** showing high risk assets (also available as an Excel table) Selected Heritage Inventory for Natural England (SHINE) HLS agreements: • HLS historic environment features and feature condition (This information is not currently available as a spatial dataset but may become so in the future) • HLS options relating to the historic environment. **Note:** The Environmental Stewardship Scheme will be closing to new applicants in 2014. Use of agreement data from the New Environmental Land Management Scheme

	(NELMS) will need to be considered once more information is available although the data and approach to calculation are likely to be similar.
Source(s) of data *(contact details or hyperlink)*	EH. Contact Vince Holyoak, Head of Rural and Environmental Advice, English Heritage (email: Vince.Holyoak@englishheritage) (Scheduled Monument and Registered Parks and Gardens data are available from http://services.english-heritage.org.uk/NMRDataDownload/). Selected Heritage Inventory for Natural England (SHINE) – undesignated historic environment features which have been identified by local authority historic environment services as being significant and worthy of management under Environmental Stewardship. The SHINE database is accessible from: http://www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp and at http://www.myshinedata.org.uk/ Natural England will provide summary statistics of Scheduled Monuments at Risk for the 12 initial NIAs based on this dataset in order to help with establishing baseline. NE Environmental Stewardship option point data is available to download from Natural England http://www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp Area figures are available within the attribute data. Historic environment options can be extracted. Natural England will provide summary statistics for the 12 initial NIAs to 2015 based on this dataset for all options.
Spatial coverage	1. National dataset of HAR designations and condition data 2. National datasets of HLS historic environment information
Temporal coverage	1. HAR dataset -based on 2010 data 2. HLS data – on-going updates.
Planned updates	1. EH provides updated outputs in October each year to remove elements where risk has been removed, based on data analysed in May of that year. 2. HLS option point data available annually
Data collection method *(estimate, survey, monitoring)*	Site survey
Accuracy of data	1. Annual HAR statistics should be assumed to be verified and accurate. 2. HLS agreements should be assumed to be accurate.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Change in the presence or condition of historic environment features within the NIA from HAR and HLS datasets.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	1. EH is responsible for updating HAR based on 'received information'. 2. NE maintains data on option uptake within HLS agreements. Natural England will provide summary statistics based on historic environment option uptake within ES agreements annually for each of the 12 initial NIAs to 2015. Additional data collection could be undertaken by NIA partners and other local group surveys.

Methods for data collection	1. HAR features - EH HAR condition checklist. 2. HLS features - NE Farm Environment Plan condition survey guidance; EH monitoring guidance notes for wetlands and other features not covered by Farm Environment Plans.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	April 2012
Methods for calculating indicator values	1. National dataset of HAR designations and condition data can be cut to NIA boundaries. 2. National datasets of HLS historic environment information can be cut to NIA boundaries. Natural England will provide summary statistics based on historic environment option uptake within ES agreements annually for each of the 12 initial NIAs to 2015.
Responsibility for calculating indicator values	1. HAR features - EH. 2. HLS features - NE.
Reporting	

Online reporting	The following data can be entered in relevant fields in the online reporting system:
	• Baseline and annual figures for the numbers of heritage features 'at risk' in the following categories:
	  ○ Scheduled Monuments
	  ○ Registered Parks and Gardens
	  ○ Undesignated historic environment features as identified through Selected Heritage Inventory for Natural England (SHINE).
	  ○ HLS historic environment options.
	
	Caveats relating to the extent to which the number of HLS historic environment features 'at risk' is a fair reflection of what may be happening to the wider resource of undesignated features.
	
	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc linkage to other indicators)*	Care is required as the indicator does not take account of information on the location of undesignated features included in the Local Historic Environment Record, which is held by local authorities. NIA partnerships are welcome to record, separately under this indicator, the numbers of undesignated heritage features 'at risk'. The indicator does not explicitly relate to actions by the NIA partnership, but the narrative will need to establish the relationship with the conservation objectives and Business Plans of the NIA. There are potential links to 'Local measures of extent of land managed to enhance landscape character' and other indicators of cultural services.

Indicator: ES04_C: Access to natural greenspace and/or woodland

Indicator: ES04_C	Access to natural greenspace and/or woodland
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Cultural services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	Extent of accessible natural greenspace (ANG) and/or woodland within the NIA. Percentage of population in the NIA with access to natural greenspace and/or woodland, as defined by the Accessible Natural Greenspace Standard (ANGSt) or Woodland Trust's Woodland Access Standard (WASt) categories. Measuring changes in the extent of ANG and the percentage of population with access to natural greenspace an woodland is an indirect or proxy measure of the impact the NIA programme is having on improving access to nature and thereby increasing the level and range of ecosystem services in the NIA (through more opportunities for local people to use and enjoy their local environment and thus benefit from it). It is an indirect / proxy measure as other factors may also improve access, and also that increasing the opportunity to access the natural environment does not necessarily mean that people will act on that opportunity. **Note:** Successful use of this indicator requires the use of GIS mapping / analysis, and it is recommended that NIAs identify a partner or local authority who is able to provide GIS expertise to assist in developing this indicator.
Units	Hectares (area meeting ANGSt and WASt) as percentage of total land area managed by NIA partners) and percentage (of population).
Relevance to Government indicators	None
Existing data for establishing baseline	
Relevant dataset(s)	Datasets of the extent of ANG. Accessible Natural Environment data sets which Natural England owns (*) or is licensed to use: • CRoW Open Access land (various categories)* • Registered Common land* • Country Parks* • Local Nature Reserves* • National Nature Reserves* • RSPB reserves • Accessible woodland (belonging to the Forestry Commission and Woodland Trust) • Accessible National Trust Land • Registered Village Greens,

	• Millennium Greens and Doorstep Greens* • Cemeteries and church yards. • Access provided by ES and HLS* • Historic parks and gardens (although these are not necessarily accessible) • National Trails • Public Rights of Way Existing ANGSt analyses. Woods for People (WfP) dataset. Existing WASt analyses.
Source(s) of data *(contact details or hyperlink)*	ANG: Natural England (NE) provides many national rural GIS datasets drawn together from various sources such as Forestry Commission (FC), National Trust, etc. via its data download http://www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp and more information on NE data and licensing is available here: http://www.naturalengland.org.uk/publications/data/default.aspx ANGSt analyses: Many ANGst analyses have already undertaken around the country and may be available from local authorities and local record centres, and NIAs are encouraged to contact these (it is suggested to try green infrastructure, forward planning or greenspace/open space leads). NE owns or is licensed to use a number of Accessible Natural Environment datasets. GIS datasets for some of these can be accessed and downloaded from Natural England DataShare Environmental Open Data page. (http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml) Additional datasets are also available for contractors or partners working under a MoA with Natural England. See http://www.naturalengland.org.uk/publications/data/giforcontractorspartners.aspx for data request process. For more information contact Rachel Penny, Senior Specialist, Health and Accessible Natural Environment, Natural England (Tel: 01245 284747; email: Rachel.Penny@naturalengland.org.uk). WfP and WASt analyses: Ian White, GIS Manager, Woodland Trust (Tel: 01476 581111; email: ianwhite@woodlandtrust.org.uk).
Spatial coverage	ANG: coverage of rural areas is good, but coverage of urban areas is more varied. ANGSt analyses: usually carried out as part of green infrastructure strategies, PPG17 Open Space strategies, Local Plan preparation etc. Some regional/sub-regional analyses have also been undertaken. Note: ANGSt analysis requires analysis of data within a 10km buffer of an NIA to

	include the furthest distance threshold included in ANGSt. WfP: aims to provide as comprehensive an inventory of accessible woodland across the UK as possible. WASt analyses: county and district/borough.
Temporal coverage	ANG: various ANGSt: various WfP: began in 2002 WASt analyses: 2004 and 2009
Planned updates	ANG: various. No national dataset / analysis currently. WfP: updated annually
Data collection method *(estimate, survey, monitoring)*	ANG: various GIS datasets, mapping and analysis ANGSt: method explained in Natural England (2010) *Nature nearby -accessible natural greenspace guidance* (NE265) http://publications.naturalengland.org.uk/publication/40004. WfP: relevant organisations are asked to give details of woodland with public access, which they own, manage or know about. Public and voluntary bodies with large woodland holdings or those with responsibility for particular areas are targeted. Woods are also included that are supported by FC grant aid aimed at making improvements to access. The map is updated in a GIS, previously using the National Inventory of Woodland and Trees and, as from 2012, the new National Forest Inventory. The extent of each area of accessible woodland is saved as a 'polygon'. WASt: method explained in Woodland Trust (2010) *Space for people: targeting action for woodland access* http://www.woodlandtrust.org.uk/mediafile/100083906/space-for-people.pdf. Data are available but need 'cutting' to NIA boundaries. **Note:** Successful use of this indicator requires the use of GIS mapping / analysis, and it is recommended that NIAs identify a partner or local authority who is able to provide GIS expertise to assist in developing this indicator.
Accuracy of data	ANG. Good accuracy of rural data, though extent of urban data varies, criteria of definitions of naturalness and accessibility can be variably interpreted ANGSt: interpretation of the terms 'naturalness' and 'accessibility' can vary slightly WfP: increasingly comprehensive.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	ANG: changes in the extent of ANG records. No national dataset/analysis currently. WfP: changes in the extent of accessible woodland.

Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	ANG: various but may need to be supplemented by NIA partnership, particularly in urban areas. WASt: Woodland Trust/FC may be able to supply data cut to NIA boundaries subject to staffing resource. NIA partnerships may contribute.
Data collection method	Updated ANG / WASt data will need reprocessing in GIS environment to provide new ANGSt / WASt figures.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	Greenspace: subject to availability of ANG datasets or existing ANGSt analyses. Baseline is based on the calculations undertaken by Natural England in 2013. Woodland: April 2012
Methods for calculating indicator values	In order to establish baselines use: • Existing ANGSt and/or WASt analyses where relevant, or • NIA to undertake ANGSt analyses, and/or • WfP datasets to undertake WASt analyses. Repeat such analyses to monitor change. As noted above this indicator requires GIS analysis, and NIAs should identify a partner (or other external expertise) who can assist in the use of GIS.
Responsibility for calculating indicator values	ANGSt: to be carried out by NIA partnerships WASt: NIA partnerships (it may be feasible to get support from Woodland Trust/FC).
Reporting	

Online reporting	The following baseline and annual data can be entered in relevant fields in the online reporting system:
	
	• Area of accessible natural greenspace and/or woodland within the NIA
	• Percentage of population in the NIA with access to natural greenspace and/or woodland, as defined by ANGSt and/or WASt categories
	• Caveats relating to:
	  ○ Likely gaps in knowledge of ANG and woods
	  ○ Variation in interpretation of the terms ‘naturalness’ and ‘accessibility’ in relation to ANGSt.
	
	Maps showing the extent of the NIA meeting the various Accessible Natural Greenspace and/or Woodland Access Standard categories can be uploaded.
	
	Note that **data entered as ‘annual figure’ in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc linkage to other indicators)*	Requires some care with interpretation, particularly with the concept and explanation of distance thresholds. There are potential links with NIA indicators relating to: • Measure of extent of land managed to enhance landscape character • Length of PROW and permissive paths created and/or improved • Number and social mix of visitors to NIA sites • Level of outdoor recreation in the local community. As noted above this indicator requires GIS analysis, and NIAs should identify a partner (or other external expertise) who can assist in the use of GIS. GIS can also be valuable for other indicators with a spatial element. More information on ANGSt can be found on the NE website: http://www.naturalengland.org.uk/regions/east_of_england/ourwork/gi/accessiblenaturalgreenspacestandardangst.aspx

Indicator: ES05_S: Area of habitat supporting pollinators

Indicator: ES05_S	Area of habitat supporting pollinators
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Supporting services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	Total extent of priority habitats supporting pollinators and how their extent changes over time. The role of native plant communities in providing pollinators with food and structure for reproduction is a 'supporting service', whereas the role of ecosystems in transferring pollen from male to female flower parts is a 'regulating service' (see http://pdf.wri.org/esr_definitions_of_ecosystem_services.pdf). NIA partnerships may also wish to develop a related indicator under the 'Regulating services' sub-theme. Measuring the change in extent of habitat supporting pollinators is a proxy indicator for the ecosystem services the pollinators provide, based on the assumption that an increase in these habitats will increase the number / range of pollinators.
Units	Hectares
Relevance to Government indicators	Links with: • England Biodiversity 2020 Indicator 2. Extent and condition of priority habitats • UK Biodiversity Framework Indicator C3. Status of threatened habitats
Existing data for establishing baseline	
Relevant dataset(s)	The national Priority Habitats Inventory (PHI), collated by Natural England from a wide variety of national and local data sources, currently provides the best available national datasets for priority habitat distribution and extent. Comprehensive habitat mapping to OS MasterMap standards and Integrated Habitat Survey (IHS) or equivalent standard classification exists for some areas, from which it is possible to extract / translate to Priority Habitat classes.
Source(s) of data *(contact details or hyperlink)*	Priority Habitats Inventory available from Natural England DataShare Environmental Open Data page. (http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml), Natural England have agreed to provide each of the 12 initial NIAs with analysis of the area of each priority habitat within

	their NIA for each year of the 3 year programme to 2015. These can be submitted as the NIA report on habitat extent or NIAs can use local data if they wish Local Record Centres – habitat maps informed by various survey methods to appropriate classifications to identify priority habitat types.
Spatial coverage	1. Priority Habitats Inventory: a 'single habitat layer' for England based around OS MasterMap land parcels. 2. Phase 1 maps and local records normally relate to individual counties.
Temporal coverage	1. Priority Habitats Inventory: a version date for inventory layer further details can be found in files associated with the inventory when downloaded 2. Local maps – varied dates, some are maintained on an on-going basis. (See note in caveats related to temporal change)
Planned updates	1. Priority Habitats Inventory: NE intends to accept updates to the 'PHI and to re-publish at least annually. A feedback form is included when the PHI is downloaded. Locally available data can be submitted through this route to offer updated information. This should include data on species constancy and frequency across the site. 2. Local maps are often maintained by local record centres – e.g. Habitat Mapping Framework data.
Data collection method *(estimate, survey, monitoring)*	1. Priority Habitats Inventory is an interpreted product derived from analysis of a range of data sources of varying coverage and confidence in relation to confirming the habitat presence. These include Farm Environment Plan survey data, SSSI survey data, phase 1 and some NVC survey data. Metadata description associated with the PHI contains further detail. Collection methods are described in the Data Description and in 09042013_Single_Habitats_Layer_Final_Report_RDA.pdf included within the data download. 2. Local habitat maps – now typically mapped to OS MasterMap standards and using IHS classification, and some integrate to the National Vegetation Classification.
Accuracy of data	1. Priority Habitats Inventory has inconsistencies and does not always contain the best available local information. The PHI does not contain information on all priority habitats. 2. Other sources depend on the adopted standards.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Changes to the boundaries of priority habitats, which may arise from re-survey, habitat loss/degradation, or restoration / creation. A feedback form is included when the PHI is downloaded from the Data Store to allow for updates to be submitted to NE.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	NIA partnerships (data may also be collected by others in association with local record centres, national initiatives or on an *ad hoc* basis). Natural England are developing a method for submission of updates

Methods for data collection	Priority Habitats Inventory: NIA partnerships should send any required updates to the PHI to NE with supporting evidence. A feedback form is included when the PHI is downloaded from the Data Store. Locally available data can be submitted through this route to offer updated information for the inventories. This should include data on species constancy and frequency across the site. Additionally an NE contract ending in March 2014 is intending to produce a standard methodology and advice aimed at helping anyone survey to confirm the presence, extent and condition of priority habitat. This will offer a best practice model for gathering and submitting evidence to update the PHI. Actions that restore and create priority habitat may be recorded in BARS2 however this focused on activity reporting rather than outcomes so cannot be directly used to update the PHI. Activity is indicative of change, not but not definitive. Local habitat maps may be updated by resurvey and mapping changes. The HLU Mapping Tool (HCC/NE) (https://media.readthedocs.org/pdf/hlutool-technicalguide/latest/hlutool-technicalguide.pdf and https://github.com/HabitatFramework/HLUTool) can facilitate updates to the OSMM structured datasets (e.g. Habitat Mapping Framework data). It is important to retain the original versions to allow mapping of change over time.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	Priority Habitats Inventory: April 2013 – but note that PHI is a combination of past inventory data and the source records do not reflect extents in 2013 in most cases.
Methods for calculating indicator values	NIAs will need to define locally which habitats contribute to the area of habitat supporting pollinators. Calculate the total extent of the selected priority habitats from spatial data in the PHI by 'cookie-cutting' to the NIA boundary. If local habitat maps are used the NIA may need to translate the mapping classification to the equivalent priority habitat classification. Other habitat and other priority habitats not currently included in the PHI data may be added.
Responsibility for calculating indicator values	Priority Habitats Inventory: Natural England have agreed to provide each of the 12 initial NIAs with analysis of the area of each priority habitat within their NIA for each year of the 3 year programme to 2015. This will be provided via the NIA Huddle Best Practice Network annually in advance of the reporting deadline (https://defra.huddle.net/huddleworkspace/default.aspx?workspaceid=16609188) These can be submitted as the NIA report on habitat extent or NIAs can use local data if they wish. Any local analysis would need to be carried out by the NIA partnership

Reporting	

Online reporting	The following data can be entered in relevant fields in the online reporting system:
	
	• A baseline figure for total extent
	• A figure for total extent updated annually
	• Caveats relating to:
	  ○ The PHI only includes 24 priority habitats out of 40 total terrestrial and freshwater priority habitats. One of these is "Deciduous Woodland" which comprises all BAP woodland which have not been distinguished. In addition to these 24 the PHI includes 3 non-priority habitat classifications/attributions.
	  ○ Likely accuracy of the baseline (e.g. what can be deduced locally about potential misattribution of habitats and from information in files associated with the PHI when downloaded
	  ○ Changes in the baseline, e.g. arising from publication of the single habitat layer Likely gaps in knowledge of annual changes in total extent (e.g. arising from an inability to monitor privately landholdings).
	
	In addition to priority habitats, NIA partnerships are also welcome to record, separately under this indicator, other features that support pollinators (e.g. nectar mix plots).
	
	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc linkage to other indicators)*	Care is required, as the recorded total extent of a may not be a fair reflection of reality, due to inconsistencies and incomplete coverage of all the priority habitat types. The originating data is of varied dates and mapping standards. PHI data does not include all relevant priority habitats (as it currently incorporates 20 habitats of the 40 defined). It is recognised that it is not just priority habitats that support pollinators, so if these are included within the mapping sources notes should be added to the Caveats section in the online tool. Updates to the PHI (in relation to corrections) are likely to introduce significant change to the areas represented in the inventory. Change in areas represented as a result of actual gains or losses of habitat are likely to be much less significant and hard to deduce. The PHI is currently the only data source available across all 12 initial NIAs (and across England) and the NIAs should actively engage with its use and update. However, as the development of the PHI is in the early stages the NIAs have the option to submit their own extent calculations as reports against this indicator (these may be more accurate) as an alternative to the PHI if they have the

	information available. The PHI should be used as a (proxy) fall-back where these is no alternative. Note that the sources of data have minimum mappable units (typically of 0.5 ha in PHI). Where habitat extents change due to actions are below these thresholds they will not appear in the record. Changes in extent may reflect changes in knowledge rather than actual changes. This may have wider implications as the indicator has potential links with all indicators within the biodiversity theme and links directly to NIA indicators of: • Area of habitat supporting pollinators • Contribution to water quality • Contribution to carbon storage and sequestration where the extent of habitat is used as a proxy indicator for ecosystems services. This indicator differs from that in B02_H: *Extent of areas managed to restore/create habitat* which maps actions as 'being managed to restore or create priority habitats' whilst this indicator includes existing extent across the NIA

Indicator: ES06_R: Contribution to water quality

Indicator: ES06_R	Contribution to water quality
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Regulating services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicator shows the contribution of management actions focussed on reducing negative impacts of land management upon water quality. This is primarily based on the contribution of the extent of habitats and land management approaches to water quality (e.g. in terms of providing 'buffer strips' to block sediment, nutrients and pollutants reaching watercourses). It is assumed that conservation actions and control measures can have a positive, mitigating effect on water quality through reducing sources, modifying pathways or reducing impacts on water quality.
Units	Dependent on indicator approach selected: 1. Area of habitats contributing to water quality 2. Measures of water quality deteminands 3. Export coefficients
Relevance to Government indicators	Links to UK Biodiversity 2020 indicators: B7. Water quality; D2. Biodiversity and ecosystem services (other).
Existing data for establishing baseline	
Relevant dataset(s)	• Priority Habitats Inventory • National Forest Inventory (NFI, 2011) • Phase 1 maps and other local land cover data • Recorded habitat actions by the NIAs (through BARS) • Farm Environment Plans (FEPs) • Digital Terrain Models (DTM) where export models are run.
Source(s) of data *(contact details or hyperlink)*	• Priority Habitats Inventory from Natural England DataShare Environmental Open Data page. (http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml) Natural England have agreed to provide each of the 12 initial NIAs with analysis of the area of each priority habitat within their NIA for each year of the 3 year programme to 2015. • NFI (2011) shape files and associated metadata and method statements can be downloaded at: http://www.forestry.gov.uk/website/forestry.nsf/byunique/INFD-8EYJWF • Some Local Records Centres, may hold land cover maps

	• NIA bespoke habitat mapping / FEPs and records of habitat conservation actions. • Catchment Sensitive Farming (http://www.naturalengland.org.uk/ourwork/farming/csf/cgs/catchments.aspx) schemes are a further source of potential data (and possible joint reporting where NIA is contributing to CSF actions), particularly within Priority catchments which indicate priority measures / actions that contribute to water quality within catchments. • Digital Terrain Models (DTM) for use in export models (to calculate flow direction and sources and sinks) are widely available including lower resolution (OS OpenData) to commercial products such as NEXTMap. LiDAR data is probably too detailed at the NIA level scale.
Spatial coverage	• Priority Habitats Inventory: a 'single habitat layer' for England based around Rural Land Registry parcels. • NFI: includes all woodland larger than 0.5ha and wider than 20m and records Interpreted Forest Types and Interpreted Open Areas • Phase 1 maps and local land cover records: normally relate to individual counties. • NIA specific mapping and FEPs related to the agreement farms and the local conservation actions. • National coverage of lower resolution terrain and commercial products.
Temporal coverage	• Priority Habitats Inventory: a version date for inventory layer further details can be found in files associated with the inventor when downloaded • NFI, 2011: based on Ordnance Survey colour 25cm orthorectified digital imagery flown between 2002 and 2009. In general, the photographic images should have been no older than 3 years at the time of creating the digital map. • Phase 1 maps and local land cover records: various • Mapped NIA actions (recorded in BARS) along with operational status, FEPs related to the HLS agreement dates. • DTM data - NextMap data is 2001-2003 and not likely to have changed significantly at this scale and for bare earth model.

Planned updates	• Priority Habitats Inventories: from April 2013, NE intends to accept updates to the PHI and to re-publish to re-publish at least annually. A feedback form is included when the PHI is downloaded. Locally available data can be submitted through this route to offer updated information. This should include data on species constancy and frequency across the site. • NFI: updated on a regular rolling program utilising change detection software as well as new planting information. • Phase 1 maps and local land cover records: *ad hoc* and infrequent updates. • Dated records of habitat conservation actions that contribute to water quality, reported annually through BARS.
Data collection method *(estimate, survey, monitoring)*	• Priority Habitats Inventory: detailed information on each habitat is an interpreted product derived from analysis of a range of data sources of varying coverage and confidence in relation to confirming the habitat presence. These include Farm Environment Plan survey data, SSSI survey data, phase 1 and some NVC survey data. Metadata description associated with the PHI contains further detail, and in associated files when downloaded. • NFI: Ordnance Survey MasterMap features are used where the woodland boundary on aerial photography is coincident with or within 10m of the perceived woodland edge. As well as differentiating by Interpreted Forest Type, open areas in woodland are mapped as Interpreted Open Areas. • Phase 1 maps and local land cover records: various
Accuracy of data	Priority Habitat Inventory: Has inconsistencies and does not always contain the best available local information. The PHI does not contain information on all priority habitats.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Changes to the boundaries of habitat(s), which may arise from re-survey, habitat loss/degradation, or restoration/creation. This indicator does not just relate to priority habitats. A feedback form is included when the PHI is downloaded from the Data Store. Locally available data can be submitted through this route to offer updated information for the inventories. This should include data on species constancy and frequency across the site.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	• Priority Habitats Inventory: NIA partnerships (data may also be collected by others in association with local record centres, national initiatives or on an *ad hoc* basis). NE will update the PHI layer based on NIA inputs (and other inputs) • NFI: Forestry Commission • Phase 1 maps and local land cover records: various

Methods for data collection	Priority Habitats Inventory: NIA partnerships should send any required updates to the PHI to NE with supporting evidence. A feedback form is included when the PHI is downloaded from the Data Store. Locally available data can be submitted through this route to offer updated information for the inventories. This should include data on species constancy and frequency across the site. Additionally an NE contract ending in March 2014 is intending to produce a standard methodology and advice aimed at helping anyone survey to confirm the presence, extent and condition of priority habitat. This will offer a best practice model for gathering and submitting evidence to update the PHI. NIAs should evaluate the options for models based on partnership experience and context – to seek expert guidance.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	April 2013
Methods for calculating indicator values	The calculation will depend on the approach chosen by the NIA. Process models proposed include: Psychic and Scimap (http://www.scimap.org.uk/) (open source) which are available for national runs and indicate diffuse pollution (fine sediment and nutrient) risk areas within catchments. Comprehensive models have been run for some locations. Ecosystems service models proposed include: Invest, Aries. WaterWorld, LUCY / POLYSCAPE. Model runs (on a repeat basis) with updated land use / network connections etc will be needed to re-run models. EcoServ-GIS (uses a combination of slope, soils, distance to river etc. in GIS). However, it does not include any measure of farming intensity. In addition, the DURESS (BESS programme) is developing an ES for water quality GIS model. It is difficult to recommend a single model for the NIAs as it will depend on existing capacity, available data but these are complex models and simpler tools such as Ecoserv-GIS (which is based on land cover based export coefficient) may offer the simpler approach to initial calculation. If based on the export coefficient modelling the area of habitat types can be translated to the contribution to water quality (e.g. in terms of nutrient loading). If based on a full export model the approach would use the contribution to water quality based on changes in land use influence on the export. Land cover data would need to be updated and the models re-run. High quality land cover base data and digital terrain model is also required in order to calculate the flow directions and the sources and sinks in the process models. This determines the potential effectiveness of any buffer strips based on extent, type and position within the watershed system.

Responsibility for calculating indicator values	NIA Partnership – and is likely to require expert input. Approaches may require expert assessment of the level of contribution to water quality, based on habitat and location (e.g. functional assessment). Options for NIAs to work together in order to better understand and calculate this indicator. Potential for NIAs to all use the same group of external experts to calculate it.
Reporting	

Online reporting	It is anticipated that the following data would be entered in relevant fields in the online reporting system:
	
	• A baseline indicator value
	• An annual indicator value
	• Caveats relating to model uncertainty and data uncertainty. The latter will include:
	  ○ Likely accuracy of the baseline figure (e.g. what can be deduced locally in relation to habitat extent about potential misattribution of habitats etc
	  ○ Changes in the baseline (e.g. arising from publication of the 'single habitat layer')
	  ○ Likely gaps in knowledge of annual changes in total extent (e.g. arising from an inability to monitor privately landholdings).
	
	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.

Interpreting	
Interpretation *(inc linkage to other indicators)*	Further expert guidance may be needed to implement modelling based approaches, based on defining appropriate datasets, functional classifications of land cover, and co-efficients. It may be feasible to make modifications to the coefficients based on expert opinion on the relative influence of habitat condition classes (subject to the availability of condition data). Advice on the role of actions and mitigations methods for reducing the effects of diffuse pollution are available (e.g. Mitigation Measures – User guide 2011 Defra WQ0106 - http://www.adas.co.uk/LinkClick.aspx?fileticket=vUJ2vlDHBjc%3D&tabid=345). Contribution to water quality may not be restricted to actions on priority habitat, so this needs interpretation if only PHTs are selected. If NE is updating PHI data to correct errors the impact on the baseline data needs to be considered and potentially re-run.

Indicator: ES07_R: Contribution to carbon storage & sequestration

Indicator: ES07_R	Contribution to carbon storage & sequestration
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Regulating services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	Contribution of extent of priority habitats to carbon storage and how it changes over time (i.e. sequestration).
Units	Tonnes of carbon stored and sequestered per year per unit area of NIA/habitat. or Extent (area in hectares) of habitats that contribute to carbon storage and sequestration.
Relevance to Government indicators	Link to UK Biodiversity 2020 indicator: D2. Biodiversity and ecosystem services (other). Ecosystem service indicators under development within Defra Biodiversity 2020: a strategy for England's wildlife and ecosystem services Indicators 2013 – that shortlists 'carbon stock'.
Existing data for establishing baseline	
Relevant dataset(s)	• The national Priority Habitats Inventory (PHI), collated by Natural England from a wide variety of national and local data sources, currently provides the best available national datasets for priority habitat distribution and extent. • Phase 1 maps and local records
Source(s) of data *(contact details or hyperlink)*	• Priority Habitats Inventory available from Natural England DataShare Environmental Open Data page. (http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml). Natural England has agreed to provide each of the 12 initial NIAs with analysis of the area of each priority habitat within their NIA for each year of the 3 year programme to 2015. • Local Record Centres – habitat maps informed by various survey methods to appropriate classifications to identify priority habitat types.
Spatial coverage	• Priority Habitats Inventory: a 'single habitat layer' for England based around OS MasterMap land parcels. • Phase 1 maps and local records: normally relate to individual counties.
Temporal coverage	• Priority Habitats Inventory: a version date for inventory layer further details can be found in files associated with the inventor when downloaded

	• Local maps – varied dates, some are maintained on an on-going basis. (See note in caveats related to temporal change)
Planned updates	• Priority Habitats Inventory: NE intends to accept updates to the 'PHI and to re-publish at least annually. A feedback form is included when the PHI is downloaded. Locally available data can be submitted through this route to offer updated information. This should include data on species constancy and frequency across the site. • Local maps are often maintained by local record centres – e.g. Habitat Mapping Framework data. If only using the change in habitat extents this does not need to be mapped and calculation can be applied to spreadsheet data.
Data collection method *(estimate, survey, monitoring)*	• Priority Habitats Inventory is an interpreted product derived from analysis of a range of data sources of varying coverage and confidence in relation to confirming the habitat presence. These include Farm Environment Plan survey data, SSSI survey data, phase 1 and some NVC survey data. Metadata description associated with the PHI contains further detail. Collection methods are described in the Data Description and in 09042013_Single_Habitats_Layer_Final_Report_RDA.pdf included within the data download. • Local habitat maps – now typically mapped to OS MasterMap standards and using IHS classification, and some integrate to the National Vegetation Classification. .
Accuracy of data	Priority Habitats Inventory has inconsistencies and does not always contain the best available local information. The PHI does not contain information on all priority habitats. Other sources depend on the adopted standards.
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Changes to the boundaries of the selected priority habitat(s), which may arise from re-survey, habitat loss/degradation, or restoration/creation. A feedback form is included when the PHI is downloaded from the Data Store. Locally available data can be submitted through this route to offer updated information for the inventories. This should include data on species constancy and frequency across the site. Habitat conservation actions recorded within BARS2 Peat soils (e.g. UK soils observatory (Allan Lilley - James Hutton Institute)) Environmental Information Data Centre (EIDC) portal has good peat data, but possibly subject to usage restrictions.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	NIA partnerships (data may also be collected by others in association with local record centres, national initiatives or on

	an *ad hoc* basis).
Methods for data collection	Priority Habitats Inventory: A feedback form is included when the PHI is downloaded from the Data Store. Locally available data can be submitted through this route to offer updated information for the inventories. This should include data on species constancy and frequency across the site. Additionally an NE contract ending in March 2014 is intending to produce a standard methodology and advice aimed at helping anyone survey to confirm the presence, extent and condition of priority habitat. This will offer a best practice model for gathering and submitting evidence to update the PHI. Local habitat maps may be updated by resurvey and mapping changes. The HLU Mapping Tool (HCC/NE) (https://media.readthedocs.org/pdf/hlutool-technicalguide/latest/hlutool-technicalguide.pdf and https://github.com/HabitatFramework/HLUTool) can facilitate updates to the OSMM structured datasets (e.g. Habitat Mapping Framework data). It is important to retain the original versions to allow mapping of change over time.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	April 2013
Methods for calculating indicator values	Measures of carbon sequestration would be established through application of a series of coefficients derived from the literature that relate to the habitats and potentially their condition. The model would require differences in carbon flux between different habitat types to be defined and the carbon benefit of converting 'x' ha of one habitat type to 'y' ha of another estimated. Details of the evidence for sequestration rates associated with different habitats are included in Natural England (2012) *Carbon storage by habitat: Review of the evidence of the impacts of management decisions and condition of carbon stores and sources* (NERR043 http://publications.naturalengland.org.uk/publication/1412347). An example is the EcoServ-GIS tool (from Durham Wildlife Trust) which has incorporated this functionality and used land cover and translated it into tonnes of carbon based on a coefficient (as described above). This type of pre-prepared tool is likely to be the most accessible for NIAs with less GIS capacity or alternatively the change can be calculated within spreadsheets. Tasks to calculate the indicator: • Derive areas of different habitats / land cover • Reclassify the land cover classification to the habitat classification used by the coefficients data. • Include habitat condition classes if these are available and there are coefficients for these classes • Apply the coefficients which may be as simple as

	multiplying the area in hectares by the rate of sequestration in tonnes per year – within a GIS or externally as an Excel table. The advantage of the former is that it will allow the spatial distribution of this ecosystem service to be plotted throughout the NIA and to show which areas are important for it In terms of the habitat data chosen, the level of detail will be determined by the availability of suitable coefficients. For example, the NE report (NERR043 described above) has coefficients for broad habitats. Therefore, even if the habitat layer were spatially (and thematically) more detailed, the habitat classes themselves would require aggregation to a higher level in order to assign the carbon storage and sequestration rates.
Responsibility for calculating indicator values	NIA partnership but possibly needing some support from other NIAs with expertise / external experts. Natural England has agreed to provide each of the 12 initial NIAs with analysis of the area of each priority habitat within their NIA for each year of the 3 year programme to 2015. This will be provided via the NIA Huddle Best Practice Network annually in advance of the reporting deadline (https://defra.huddle.net/huddleworkspace/default.aspx?workspaceid=16609188) These can be submitted as the NIA report on habitat extent or NIAs can use local data if they wish. Any local analysis would need to be carried out by the NIA partnership.
Reporting	

Online reporting	It is anticipated that the following data would be entered in relevant fields in the online reporting system:
	
	• A baseline indicator value
	• An annual indicator value
	• Caveats relating to model uncertainty and data uncertainty. The latter will include:
	  ○ Likely accuracy of the baseline figure (e.g. what can be deduced locally in relation to habitat extent about potential misattribution of habitats and from information in files associated with the downloaded inventory data (e.g. local assessment / expert opinion of the percentage of the NIA area that NIA partners consider is accurately covered by PHI data).
	  ○ The PHI only includes 24 priority habitats – out of 40 total terrestrial and freshwater priority habitats. One of these is “Deciduous Woodland” which comprises all BAP woodland which has not been distinguished. In addition to these 24 the PHI includes 3 non-priority habitat classifications/attributions.
	  ○ Changes in the baseline (e.g. arising from publication of the PHI)
	  ○ Likely gaps in knowledge of annual changes in total extent (e.g. arising from an inability to monitor privately landholdings).

	Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data.
Interpreting	
Interpretation *(inc linkage to other indicators)*	It is recognised that habitat condition may have a significant impact on the contribution of the extent of priority habitats to carbon storage and sequestration. However, while the NE report (NERR043) does provide some rates for different habitat conditions, it is not intended that the model will take account of habitat condition. Updates to the PHI (in relation to corrections) are likely to introduce significant change to the areas represented in the inventory. Change in areas represented as a result of actual gains or losses of habitat are likely to be much less significant and hard to deduce. PHI data may have updates in addition to those developed by NIA actions and modifications and corrections to the baseline classification may affect the analysis of trends.

Indicator: ES08_P: Area of more sustainable agricultural production

Indicator: ES08_P	Area of more sustainable agricultural production
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Provisioning Services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	The total area of land within the NIA area covered by 'priority options' in Environmental Stewardship (ES) agreements. This indicator is a proxy measure as it will also cover actions that are not NIA activities. It is also a proxy / indirect indicator of provisioning ecosystem services, based on the presumption that an increase in the area within the NIA covered by 'priority options' will lead to greater environmental benefits being achieved and thus an increase in ecosystem services.
Units	Hectares
Relevance to Government indicators	England Biodiversity 2020 Indicator 22a. Area of land in agri-environment schemes UK Biodiversity Framework Indicator B1a. Area of land in agri-environment schemes.
Existing data for establishing baseline	
Relevant dataset(s)	Environmental Stewardship Option point data – Natural England
Source(s) of data *(contact details or hyperlink)*	Environmental Stewardship option point data is available to download from Natural England http://www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp. Area figures are available within the attribute data. Natural England will provide a summary statistics for the 12 initial NIAs to 2015 based on this dataset.
Spatial coverage	Environmental Stewardship data available by NIA geographic boundary.
Temporal coverage	A version date for the latest dataset is provided with download (see sources of data above).
Planned updates	Updates are supplied annually
Data collection method *(estimate, survey, monitoring)*	Boundaries of ES agreement maps are digitised by Natural England and quality assured by comparison with aerial photographs, the Rural Payments Agency's (RPA) Integrated Administration and Control System (IACS) database, and digital copies of legacy scheme agreement maps. Final versions are approved by each landowner and copies returned to the RPA.
Accuracy of data	Accuracy is that of OS MasterMap where boundary has been cloned, i.e. relative accuracy is +/-1.2m at 1:2,500 scale over a length of 200m.

Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	The area of land within the NIA covered by 'priority options' under ES agreements (Entry Level Stewardship – ELS, Organic Entry Level Stewardship – OELS, Uplands Entry Level Stewardship – Uplands ELS, and Higher Level Stewardship – HLS). Priority options should be selected by NIA partnerships with reference to their objectives for the NIA and agreed with Natural England locally, so that the options may be promoted, as appropriate. The Environmental Stewardship Scheme will be closing to new applicants in 2014. Use of agreement data from the New Environmental Land Management Scheme (NELMS) (http://www.naturalengland.org.uk/ourwork/farming/funding/developments.aspx) will need to be considered once more information is available, although the data and approach to calculation will be similar.
Responsibility for data collection *(e.g. NIA partnerships or potentially to be taken on by NE or EA)*	Natural England
Data collection method	As above
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	April 2012
Methods for calculating indicator values	The digital point dataset needs to be 'selected within the NIA boundaries using a GIS and the area totals for each option calculated from the option area values provided in the attributes.
Responsibility for calculating indicator values	Natural England has agreed to provide each of the 12 initial NIAs with analysis of the total area of each option within their NIA for each year of the 3 year programme to 2015. This will be provided via the NIA Huddle Best Practice Network (https://defra.huddle.net/workspace/16609188) annually in advance of the reporting deadline.
Reporting	

Online reporting	The following data can be entered in relevant fields in the online reporting system:
	
	• A baseline figure for area in each priority option under:
	  ○ Higher-level/targeted schemes
	  ○ Entry-level type schemes
	• A figure updated annually for area in each priority option under:
	  ○ Higher-level/targeted schemes
	  ○ Entry-level type schemes
	• Caveats relating to:
	  ○ The total area of land in 'priority options' under ES in relation to the total area of land under ES. In addition to 'priority options' in ES agreements, NIA partnerships are also welcome to record, separately under this indicator, other voluntary measures.

	Natural England and Ordnance Survey copyright would need to be acknowledged in reporting.
Interpreting	
Interpretation *(inc linkage to other indicators)*	This indicator links to interpretation of indicators under the biodiversity theme where conservation action records uploaded by the BARS team contribute to indicators and may help to inform measures of habitat connectivity. There are also links to the sub-theme on 'Leadership and influence'. This dataset covers all agreements; it will include all actions selected by the NIA on biodiversity objectives including those actions not attributable to the NIA. Data does not take into account any land in classic schemes – e.g. Countryside Stewardship. NIA partnerships may wish to consider also recording: *The area of land under ES as a percentage of the total area of agricultural land within the NIA.* A static baseline for the latter could be determined from relevant land cover if an appropriate dataset is available across the NIA. Appropriate data would have full coverage of the area, classes for semi-natural and agricultural cover classes and of appropriate date (i.e. close to the commencement of the NIA programme). The indicator is based on the presumption of ecosystem services benefits from land management options. These outcomes may only be achieved over time. Note that vector data of the HLS boundaries are not available and thus the areas selected may not all coincide to fall within the NIA boundary.

Indicator: ES09_P: Percentage of woodland in active management

Indicator: ES09_P	Percentage of woodland in active management
Version date	25th February 2014
Theme	Ecosystem services
Sub-theme	Provisioning Services
Sub-theme category	Core
Indicator category	Optional
Indicates *(what is the indicator intended to indicate)*	This indicator shows the contribution to provisioning services as percentage of woodland in active management (including the Public Forest Estate) within the NIA area. This indicator also records extent of woodland (hectares) as loss of woodland could increase the percentage of woodland in active management. This indicator is a proxy measure as it will also cover actions that are not NIA activities. It is also a proxy / indirect indicator of provisioning ecosystem services, based on the presumption that an increase in the percentage of woodland in active management within the NIA will lead to greater environmental benefits being achieved and thus an increase in ecosystem services.
Units	Percentage: of woodland under active management Hectares: total area of woodland
Relevance to Government indicators	England Biodiversity 2020 Indicator 22b. Area of forestry land under certified sustainable management schemes. UK Biodiversity Framework Indicator B1b. Area of forestry land certified as sustainably managed. A subset for each NIA of Forestry Commission England's (FCE's) performance impact indicator of the same name.
Existing data for establishing baseline	
Relevant dataset(s)	1. Boundaries of 'Woodland in management' performance indicator. 2. Total extent of woodland recorded on the National Forest Inventory (NFI).
Source(s) of data *(contact details or hyperlink)*	'Woodland in management' performance indicator shapefiles and associated metadata can be downloaded at: http://www.forestry.gov.uk/forestry/infd-8g5bya#2 Contact: Spatial Analyst, Forestry Commission England, 620 Bristol Business Park, Coldharbour Lane, Bristol, England, BS16 1EJ (Tel: 0117 906 6000) NFI shapefiles and associated metadata can be downloaded at: http://www.forestry.gov.uk/forestry/infd-8g5bya#3 or a copy can be requested on CD from national.forest.inventory@forestry.gsi.gov.uk

Spatial coverage	'Woodland in management' performance indicator: all woodlands in England included in schemes fulfilling criteria for inclusion. NFI for England: includes all woodland larger than 0.5ha and wider than 20m.
Temporal coverage	'Woodland in management' performance indicator: available from 1 April 2011. NFI, 2011: based on Ordnance Survey colour 25cm orthorectified digital imagery flown between 2002 and 2009. In general, the photographic images should have been no older than 3 years at the time of creating the digital map.
Planned updates	'Woodland in management' performance indicator is updated on a quarterly basis. The NFI is updated on a regular annual rolling program utilising change detection software as well as new planting information.
Data collection method *(estimate, survey, monitoring)*	The Rural Land Register, in combination with OS Survey MasterMap (OSMM), is used to map England Woodland Grant Scheme (EWGS) boundaries. Grant types included in the indicator are: • Woodland Creation Grant (WCG) -all WCG paid under EWGS. • Woodland Management Grant (WMG) -all schemes < 5 years old at the end of the indicator update period. • Woodland Planning Grant (WPG) -all schemes < 10 years old at the end of the indicator update period. • Woodland Improvement Grant (WIG) -all schemes < 5 years old at the end of the indicator update period. • Farm Woodland Premium/Scheme (FWP/S) -all schemes <30 years old at the end of the indicator update period. • Felling Licence Applications (FLA) -all licences < 10 years old at the end of the indicator update period. • Woodland Grant Scheme Mk3 (WGS3) that has been within contract at some point during the 10 years up until the end of the indicator update period. EXCLUDED: Woodland Assessment Grant (WAG), Woodland Regeneration Grant (WRG), Forest Plans, Dedication, WGS2, WGS1. It is acknowledged that other non-grant woodland might also be regarded as being 'in management'.
Accuracy of data	Limited by the minimum mappable units used within the NFI data (0.5ha)
Additional/new data for establishing baseline and monitoring change	
Relevant additional/new data	Updates to the FCE performance indicator 'Percentage of woodland in active management (including the Public Forest Estate)' are published quarterly at http://www.forestry.gov.uk/datasetsanddownloads Areas of plantings outside the woodland grant schemes can be collected and reported by the NIA.
Responsibility for data collection	FCE The EWGS indicator is a proxy for the full extent of woodland in appropriate management as some plantings outside grant schemes may be excluded. These additional classes can be recorded and included in the calculations by the NIA. If NIAs contribute separate information from local actions ensure

	that these are not duplicating records from Forestry Commission analysis.
Data collection method	As above For 'non-grant' plantings collection would be through mapping of the extent of managed woodlands / plantings. Integration into the calculations would need the national data.
Calculating and presenting indicator	
Baseline date for 12 initial NIAs	April 2012
Methods for calculating indicator values	FCE's 'Woodland in management' performance indicator and NFI digital datasets need to be overlaid on one another and 'cookie-cut' by the NIA boundaries using a GIS. From this it is possible to calculate the area of woodland and the percentage of woodland 'in management' in the NIA. Note that the NFI data is not updated between the annual reporting, so that the percentage of woodland in management may not represent the updated area of woodlands from recent plantings. If the NIA wishes to add the non-grant or specific exclusions then the calculation will need to be run by the NIAs who would need access to the national data for their area. This need not be run in a GIS, but separate spatial analysis will help with interpretation. Add the non-grant woodland area to the agreement woodland extents, and represent as a percentage of all woodland within the area.
Responsibility for calculating indicator values	FCE will be making available the 'Woodland in management' indicator map, alongside the NFI map on the FC Data Download website at http://www.forestry.gov.uk/datasetsanddownloads. Natural England has agreed to perform the necessary calculations for NIA areas for the 12 initial NIAs to 2015.
Reporting	

Online reporting	The following data can be entered in relevant fields in the online reporting system:
	• A baseline figure for the percentage of woodland in active management
	• A figure updated annually for the percentage of woodland in active management.
	• Area of woodland within the NIA (ha), annual figure.
	• Caveats relating to:
	  ○ Differences in the minimum mapping unit for EWGS and NFI, which mean that the indicator values cannot take into account woods less than 0.5ha or 20m width, which will include some woods within EWGS of 0.25-0.5ha or 15-20m width.
	  ○ Differences in the baseline arising from woodland losses and maturation of newly created woodland. In addition to the percentage of woodland in active management calculated from inclusion in grant schemes,
	
	NIA partnerships are also welcome to record, separately under this indicator, other woodland regarded as being 'in

	management'. Note that **data entered as 'annual figure' in each reporting year should be for that year only**, and not cumulative. Cumulative figures will be calculated by summing individual year data. Forestry Commission copyright and usual terms of use would need to be followed and acknowledged.
Interpreting	
Interpretation *(inc. linkage to other indicators)*	Reporting will be influenced by exclusions from national data e.g. Woodland Assessment Grant (WAG), Woodland Regeneration Grant (WRG), Forest Plans, Dedication, WGS2, WGS1. It is acknowledged that other non-grant woodland might also be regarded as being 'in management' and therefore the indicator may under-represent the potential actions by NIAs (and others) to enhance woodland management. Management of woods entered into the EWGS must comply with forestry regulations, the UK Forestry Standard and associated Forestry Commission Guidance. However, unlike the UK Biodiversity Framework Indicator B1b (Area of forestry land certified as sustainably managed), this indicator does not specifically consider the percentage of woodlands under certified sustainable management schemes, as the Forest Stewardship Council is only able to provide national figures, and is neither able to supply figures for each NIA nor digital boundary data. Calculation is currently based on a percentage of the woodland, but does not record the extent of the woodland included in that calculation. Thus a loss of woodland could increase the proportion of woodland within management. This revised protocol proposes addition of this extent information. Note that the indicator assumes that the woodland is wholly within the NIA, but other indicators of biodiversity [*Extent of habitat managed to improve its condition*] and [*Extent of areas managed to restore/create habitat*] are based on BARS filters that may either 'overlap' or be 'within' the NIA boundary. Although the protocol suggests that the NIA could record 'separately under this indicator, other woodland regarded as being '*in management'*, there is no basis for this within the calculation methods (i.e. area of woodland is represented as a percentage of the total woodland within the National Forest Inventory) which would need advice in order to add this data to the single % figure, or whether to record it separately (i.e. as area of additional woodland in management outside of grant schemes).