

Managing geological specimen collecting: guidance

Rocks, fossils and minerals are part of our natural heritage and form an important scientific and educational resource. Through understanding the relationship between rocks, fossils and minerals we have been able to demonstrate how the Earth has changed and continues to change. This understanding has allowed us to find the natural resources we depend on, such as water, fossil fuels, metals and building stones and show how the environment around us works. This guidance is for site managers who have to consider management of geological specimen collecting. It provides advice on developing appropriate approaches to managing collecting in different situations and may also be of interest to geological specimen collectors. See also the guidance and case studies in TINs112 to 119 and TIN127.

Collecting in context

Geology is essentially a field-based science. The ability to record field observations and collect specimens has enabled us to understand the processes that influence our natural environment. Collecting geological specimens is as important to today's geologists as it was to the pioneering geologists over 200 years ago. Collecting rocks, fossils and minerals is enjoyed by many people and can provide an inspiring experience of the natural world.

The available collecting resource is, however, finite and only through adopting a responsible approach to collecting will it remain available for future generations to experience, study and enjoy. The need for collecting and the management of collecting should be carefully considered on a site by site basis. Collecting can threaten a site, but in most cases, if undertaken responsibly, is a tool for positive management.

This note sets out simple principles for responsible collecting and provides guidance on how to manage geological specimen collecting

in different situations reflecting the available resource, its importance and different collecting pressures.



Examples of fossil and mineral specimens: a, trilobite *Calymene*, b, *Gryphea* and belemnites, c, green fluorite, and d, pyrite

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This note does not review previous collecting practice. The complexities of collecting issues have been discussed elsewhere, for details see the reference section below.

TINs 112 to 119 and TIN127 provide case studies and guidance on managing specific resources and types of collecting.

Collecting should be seen in the context of wider threats to geological conservation. Rocks, landforms and natural processes are subject to a range of threats, which unless deflected or managed, will result in serious loss or damage to some of our most important geological sites (Prosser and others, 2006).

Significant threats to geological sites can include:

- Loss of geological exposure through burial under coastal protection schemes, landfill or other developments, such as housing.
- Loss of geological exposure as a consequence of vegetation encroachment.
- The removal of irreplaceable features such as caves, landforms or finite deposits of fossils or minerals through quarrying.
- Damage to geomorphological features or processes, for example, as a result of coastal protection or river management schemes.

Managing collecting

Responsible collecting

The guidance in this TIN assumes collectors adopt responsible collecting. The principles of responsible collecting can be found in TIN112.

The collecting resource

Different sites present different challenges in managing collecting. It is important to adapt the management approach to the available collecting resource and the potential pressure from collecting. Sites vary from an extensive and regularly renewed collecting resource (such as a rapidly eroding coastline) through to a non-renewable finite resource (such as a mine spoil tip).

Responsible collecting may contribute to successful site management. The available collecting resource, the nature of the material

being collected and the likely pressure from collecting will all have a bearing on the approach taken to managing collecting. To aid site management, sites can be grouped into three main categories (Prosser and others 2006):

- exposure or extensive;
- integrity; and
- finite.

Exposure or extensive sites

These contain geological features which are relatively extensive beneath the surface. The basic principle is that removal of material does not cause significant depletion of the resource, as new material of the same type is being freshly exposed replacing what has been removed. Collecting can be an important part of site management, particularly where specimens might otherwise be lost.

Integrity sites

These are all geomorphological features and are often more sensitive than exposure sites. The recognition that damage to one part of a site may adversely affect the whole site is important.

Finite sites

These contain geological features that are limited in extent so that removal of material may damage or destroy the resource. In some cases, the features may be unique and irreplaceable. The basic management principle is to permit responsible scientific usage of the resource while conserving it in the long-term.

Zoned sites

In many cases the same site may contain a range of extensive and finite elements. For example, a disused quarry containing an extensive stratigraphic interest would be classified as an exposure or extensive site, but localised mineral veins within the same site would have a finite classification. While removal of rock material would be unlikely to result in any damage to the stratigraphic interest (as more equivalent material should be uncovered), removal of mineral vein material could result in partial or complete loss of that interest feature.

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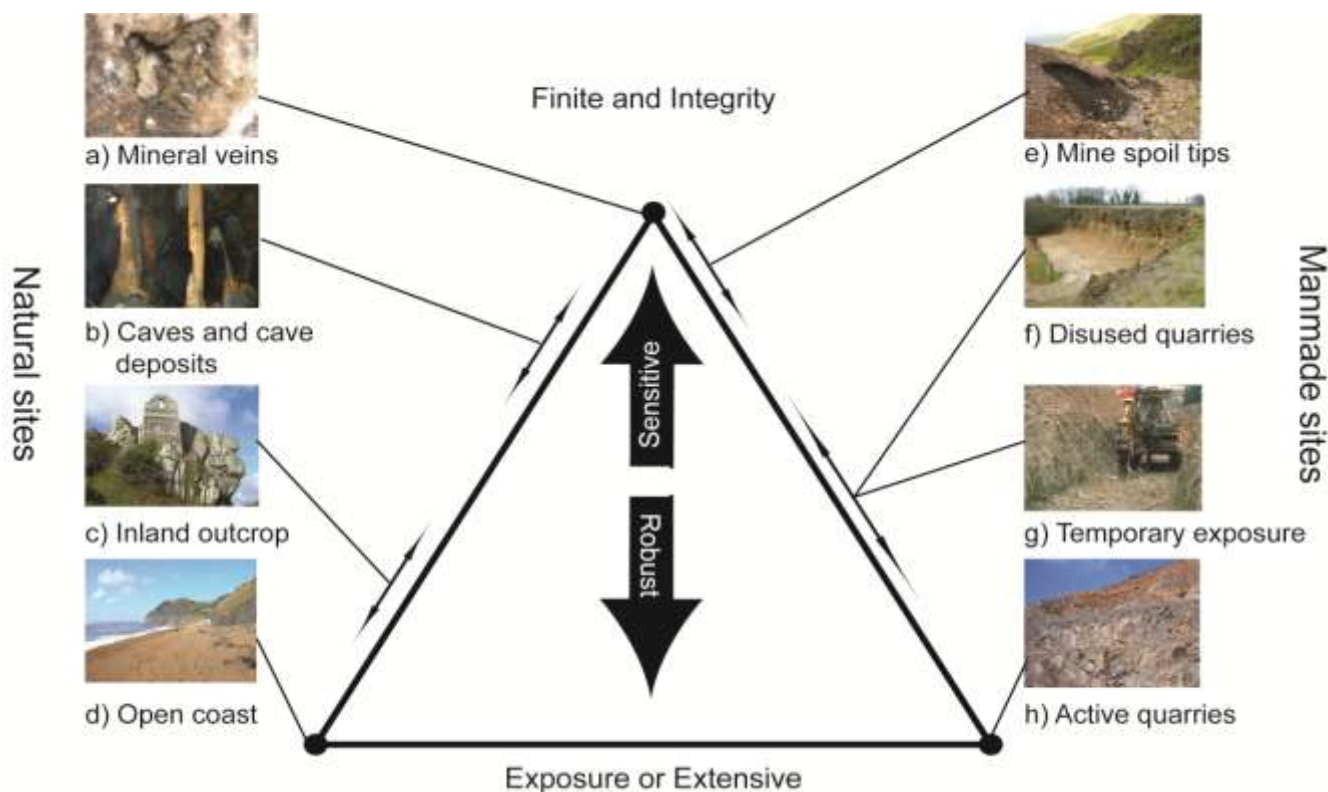


Figure 1 Examples of a range of sites subject to collecting

Sites vary widely in their sensitivity to collecting. In general: a and e show finite sites which are sensitive to collecting; b shows an integrity site which is sensitive to collecting; c, d, and h show exposure sites which are less sensitive to collecting and; f and g show sites that may be finite or exposure depending on the nature of the excavation and the resource.

Management approaches

Three broad approaches have been developed to help guide decisions on collecting management in terms of sustainability and practicality. These are:

- open collecting;
- open-managed collecting; and
- controlled collecting.

In all cases the principles of responsible collecting apply and it is important to involve landowners in agreeing the management approach.

Open collecting

Open collecting is most appropriate on a site that is regularly renewed such as an eroding coast, where the geological resource is extensive and can withstand a wide range of collecting pressures. Collecting can be a very

important part of site management as specimens may simply be lost to erosion.

Open collecting is adopted on sites where the threat from collecting is low and management of collecting is not needed; it would be impractical and not controllable. For open collecting the basic principle of responsible collecting is advocated and there is no need for additional management.

Case studies

For an example of open collecting see TIN127 the Charmouth case study.

Open-managed collecting

Open-managed collecting is most appropriate where parts of a site are more vulnerable and a more restrictive approach may be appropriate.

This may be in a disused quarry or where there is a particular collecting interest that would deplete part of the geological resource.

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Open-managed collecting may involve developing a site-specific code of practice, identifying areas where collecting may need to be more carefully managed or only undertaken under certain circumstances. Open-managed collecting is recommended where some form of management is needed in addition to promoting responsible collecting.

Case studies

For examples of this approach see the guidance on caving TIN113 and rock coring TIN116 and the case studies for Caldbeck Fells TIN127, parts of Charmouth TIN114, parts of Whittlesey TIN117 and Wren's Nest TIN118.

Controlled collecting

Controlled collecting is recommended where there is clearly a finite resource and where collecting, if uncontrolled, would quickly damage and remove the resource (such as a small mineralized vein outcrop or a limited fossil horizon).

To instigate controlled collecting it is important to be able to effectively control access, for example, through secure fencing and the presence of on-site wardening.

Case studies

For examples of this approach see the caving guidance in TIN113 and the case studies of Caldbeck Fells TIN127, Fowlmead TIN115, parts of Whittlesey TIN117 and Writhlington TIN119.

Zoned collecting management

Note, the approach to managing collecting may not fall exclusively into any one category for any one site. Sites are often complex and may have both extensive and finite elements, both common and rare specimens, or several owners who prefer different management approaches. In these cases a mixed or zoned approach to managing collecting may be needed.

Zones of open, open-managed and controlled collecting may all be found on the same site. These may be defined on a map, through site-specific collecting codes or by-laws and managed through site wardening or physical barriers preventing access to parts of the site.

Case studies

For an example of this approach see *Collecting geological specimens* case studies: Caldbeck Fells TIN127, Charmouth TIN114, Whittlesey TIN117, Wren's Nest TIN118.

Deciding the right management option

To help decide the best management option a series of questions can be asked, which are outlined in Table 1 below, together with an explanation of the relevance of the question and discussion of a range of potential answers.

Summary

Different sites present different challenges in managing collecting. It is important to adapt the management approach to:

- the available collecting resource;
- the nature of the material being collected;
- the potential pressure from collecting: and
- any legal requirements.

Sites vary from an extensive and renewed collecting resource (such as a rapidly eroding coastline) through to a non-renewable finite resource (such as a mine spoil tip) which will require differing management approaches.

Landowners and site managers, as well as collectors, have roles in agreeing the management approach.

Whilst recognising the important role that collectors can play in advancing geological science, it is also important to conserve sites for future geologists to study and reinterpret. The key is to promote collecting that is appropriate to the site.

Three broad approaches have been developed to help guide decisions on collecting management; open, open-managed and controlled collecting.

All collecting activity should follow the principles of responsible collecting. See TIN112.

References

For further information on the complexities of collecting issues see the following references that have further details listed below:

- Bassett and others (2001);
- Norman, (1992);
- Crowther & Wimbledon, (1988);
- Townley, (2003); and
- Bevins, (1993).

Bassett, M.G., King, A.H., Larwood, J.G., Parkinson, N.A. & Deisler, V.K. eds. 2001. *A Future for Fossils*. Cardiff: National Museum of Wales, Geological Series No.19.

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Townley, H. ed. 2003. *Mineral collecting and conservation – hammering out a future?* Proceedings of a one-day conference in Salford, 16 April 2003. English Nature Research Reports, No 505. URL: <http://publications.naturalengland.org.uk/publication/62076> [Accessed April 2012].

Webb, D., Townley, H., Hinde, A. & Poll, J. 2009. Out of sight – but not out of mind. *Earth Heritage*: 32, 8-9.

Further information

Natural England Technical Information Notes are available to download from the Natural England website: www.naturalengland.org.uk. In particular see:

- TIN112: *Managing geological specimen collecting: responsible collecting*
- TIN113: *Managing geological specimen collecting: caves*
- TIN114: *Managing geological specimen collecting: Charmouth case study*
- TIN115: *Managing geological specimen collecting: Fowlmead Country Park case study*
- TIN116: *Managing geological specimen collecting: rock coring*

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- TIN117: *Managing geological specimen collecting: Whittlesey Brick Pits and King's Dyke Nature Reserve case study*
- TIN118: *Managing geological specimen collecting: Wren's Nest case study*
- TIN119: *Managing geological specimen collecting: Writhlington case study*
- TIN127: *Managing geological specimen collecting: Caldbeck Fells case study*

For further information contact the Natural England Enquiry Service on 0300 060 0863 or e-mail enquiries@naturalengland.org.uk.

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Coast World Heritage Team) has been central to the ongoing development of this approach to managing collecting. The approach has been refined from discussion of the experience for a range of situations as shown by the diversity of case studies and we would like to thank all those who provided information for or comments on the case study examples.

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Table 1 Questions to help decide the right management option

Question	Explanation	Answer(s)	Notes
The nature of the site – is the site extensive (exposure) and regularly renewed or limited in extent (finite or integrity)?	Extensive coastal sections or active quarries can produce significant quantities of material that is regularly renewed. In contrast, finite sites (such as mine spoil tips) or integrity sites (such as a cave) are likely to be more vulnerable and easily damaged by collecting.	<ul style="list-style-type: none"> • Exposure / extensive – favours open collecting. • Finite/ integrity – strongly points towards controlled collecting. 	Exposure sites may have elements which are finite and require a zoned approach to managing collecting.
The nature of the interest – are specimens common or rare? What is their scientific value?	For most locations rock samples would be considered as common. However, the same site may also yield both common and rare fossils or minerals and the collecting approach for these may need to be adapted accordingly.	<ul style="list-style-type: none"> • Common – favours open collecting. • Rare – favours open-managed or controlled collecting. • Scientifically important – may favour open-managed or controlled collecting. 	Some sites will be complex and have a combination of all these types and therefore may require a zoned approach to managing collecting.
Nature of collecting – is there collecting pressure?	Different sites will be subject to different collecting pressures. For example, some sites may have large numbers of visitors interested in collecting; some sites may be subject to targeted collecting of high quality specimens.	<ul style="list-style-type: none"> • Yes – suggests some form of open-managed or controlled collecting. • No – suggests open collecting. 	This can be complex. Sometimes extensive sites can be subjected to intense collecting pressure at certain localities whilst the majority of the site is unaffected. Specimens of high aesthetic, monetary or scientific value can all lead to heightened collecting pressure.
The process of exposure – are the processes that uncover material predictable or unpredictable?	If predictable, perhaps a planned excavation such as road construction or quarrying, then collecting can be carefully planned and undertaken. If the process is unpredictable such as an eroding coast then it is more difficult to plan recovery of geological specimens.	<ul style="list-style-type: none"> • Predictable – favours open-managed or controlled collecting. • Unpredictable – favours open collecting. 	The process of exposure has a strong bearing on the practicality of managing collecting.
Timescale – is the collecting opportunity long-term or short-term?	Short-term could be a temporary excavation, such as road construction, long-term could be a permanent exposure, such as an extensive coastal cliff, that is naturally eroding.	<ul style="list-style-type: none"> • Short-term – favours open-managed or controlled collecting. • Long-term - favours open collecting. 	Timescales strongly influence management options. Short-term collecting opportunities often need careful planning. Bringing together collectors and specialists can maximise what is collected and scientific gain.

Table continued...

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Question	Explanation	Answer(s)	Notes
The nature of access – is collecting controllable?	Could access be controlled by fencing a sensitive area or by provision of on-site wardens?	<ul style="list-style-type: none"> • Controllable – if you can control site access then open-managed or controlled collecting are viable options. 	No matter how desirable, it may not be practical or achievable to have a controlled collecting approach where a site cannot be made secure or be effectively wardened.
Site ownership – is it straightforward or complex?	Sites with complex or multiple ownerships may present a range of issues over agreeing the type of collecting allowed and the future ownership of any specimens collected.	<ul style="list-style-type: none"> • Straightforward – favours open-managed or controlled collecting (if required). • Complex – favours open collecting where a responsible collecting approach is sufficient (and there is clear agreement with owners over collecting). 	Where ownership is complex a zoned approach may be required reflecting different ownership needs.
Collecting skills – what level of skill, knowledge and experience is needed to expertly collect the specimens?	Is a high level of skill required, or is there a high level of knowledge needed to ensure specimens are collected appropriately with the right level of recording?	The level of collecting skill must be considered within all types of site management.	This is relevant across all collecting approaches. For example, collecting belemnites can be straightforward but collecting a vertebrate fossil from the same site would require specialist skills and knowledge.
What is the level of museum or researcher interest in collected material?	Establishing links with the research community is important, particularly where there is potential research interest in the specimens collected.	Specific research projects may lead to a period of open-managed or controlled collecting on a site which is otherwise suitable for open collecting.	
Are there any legal requirements associated with the site?	Some sites may have designated interests with additional legal requirements, or may have established by-laws that need to be considered.	If yes - these need to be appropriately assessed and taken into account when deciding management options.	