

Minerals and the Natural Heritage in Scotland's Midland Valley

Natural Heritage Management



SCOTTISH
NATURAL
HERITAGE



**Minerals and the
Natural Heritage in
Scotland's Midland
Valley**

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Section 1. Introduction



Sand and Gravel - Dolphington, South Lanarkshire.

The relationship of mineral workings to a major recreational resource - here the Pentland Hills - is a major factor in determining the significance of landscape character and visual impact.

The use of finite mineral resources and the environmental implications of the extractive process is central to SNH's specific remit and its overall interest in sustainable development. Mineral extraction, and in particular opencast working or quarrying and its associated infrastructure, has arguably the greatest range of impacts upon natural heritage interests of any form of development. The significance of these impacts is often a product of the scale, and of the irreversible and long-term nature of many surface mineral developments. Such mineral development is capable of impacting on all natural heritage interests, given the potential to affect sites of nature conservation and of geological or Earth heritage value, landscape character and the wider enjoyment of the countryside. It can also result in indirect or widespread disturbance, for example, dust pollution and impacts on surface and groundwater can have environmental impacts well beyond a site boundary.

The impacts of mineral working in Scotland have concentrated in the Midland Valley given the number and density of quarries producing opencast coal and aggregates (sand and gravel and crushed rock). In recent years concerns as to individual and cumulative impacts have increased as pressure for additional or extended workings has accelerated in this area. These pressures result in part from the privatisation of the coal industry and the continuing upward demand for aggregates. The latter arising despite an increased proportion of total demand being met through recycling and the use of secondary aggregates.

In response to these concerns, a Minerals Steering Group and associated Working Group were formed comprising Advisory Services (AS), Area and National Strategy (NS) staff to consider SNH's approach to mineral related casework across the Midland Valley. This document presents the results of that project. It contains a number of datasets and guidance and is intended primarily for use by SNH's Area Officers. The guidance explains the content and potential use of the

datasets and also contains considerable advice to Area Officers on the process of assessing individual mineral proposals. The document and some of the datasets will also be available to SNH's external customers including Planning Authorities, mineral operators and other interested parties.

SNH's Minerals Policy

SNH's policy position on mineral development is contained in PGN 94/8 "Mineral Extraction and Use" which in turn reflects PGN 93/1 "Sustainable Development and the Natural Heritage". Although mineral extraction is seen as an inherently unsustainable activity in that it diminishes the availability of resources for future generations, SNH recognises that extraction is essential for the supply of construction materials. The associated PGN 94/1 "The Energy Industry" also recognises the need for a continuing supply of fossil fuel, while seeking to encourage greater reliance on renewable energy sources. The degree to which extraction is consistent with sustainable development is, to some extent, a judgement on whether the impacts on natural heritage resources are justified by the material benefits. SNH Policy therefore aims to increase the sustainable nature of mineral usage by reducing the quantities used and the permanent impacts of the required extraction. To encourage a more sustainable approach to mineral development SNH therefore seeks:

- to increase the efficient use of minerals, in particular through the greater use of recycled or secondary aggregate and the use of renewable energy;
- to steer mineral development away from the most sensitive locations in terms of the care and enjoyment of the natural heritage interests;

Hard Rock - Collace, Perthshire. Quarries for crushed rock aggregate are often particularly prominent and long-term in duration.



Opencast Coal - St Ninians, Fife.
Opencast coal extraction may remove derelict or contaminated land, including former mineral workings. Screening from major routes such as motorways may be dependent on land outwith the application site. Operations may also have the potential to affect the quality and levels of surface and ground water in neighbouring areas. All these matters were considerations at St Ninians.

- to ensure that natural heritage impacts are fully considered in the determination of the extent, nature and location of extraction. This should include consideration of cumulative impact on natural heritage interests arising from the concentration of mineral developments.
- to minimise the impact of mining as it takes place and to maximise the quality of the natural heritage on completion of extraction. This will require restoration of the quality of sites, as far as possible, on completion of extraction and protection of other natural heritage interests. It will also require maximisation of opportunities to enhance and create natural heritage interests, including long term habitat and landscape enhancement and the provision of new or improved facilities for recreation and access. This in turn will require the use of robust planning conditions and legal agreements and the identification of mitigatory and compensatory benefits within appropriately detailed restoration, after-use and after-care proposals and the identification of adequate funding to ensure their implementation .

SNH's particular policy position on opencast coal development and the natural heritage will be contained in forthcoming policy guidance, a draft of which is attached as Appendix 1.





Purpose of Guidance

This document seeks to aid the above approach in relation to opencast coal and aggregate extraction within the Midland Valley by providing data and guidance with which to assess the sensitivity of the different natural heritage interests to mineral development. It is designed for Area Officers to use when:

- responding to consultations or enquiries from Planning Authorities, landowners and mineral operators on specific development proposals (including the terms of conditions and Agreements attached to planning permissions, and the scope of, and information for, associated Environmental Statements).
- providing inputs to Planning Authorities and associated joint committees regarding the preparation of Development Plans which seek to identify areas of constraint or search for mineral development and to establish relevant land-use policies.
- influencing the decisions on the future investment programmes of the minerals extraction industry.

It also provides the minerals industry, Planning Authorities and other regulatory bodies (e.g. SEPA and Water Authorities), and other interested parties (e.g. local communities, interest groups and non-governmental organisations) with the basis for SNH's interest in and its comments upon development proposals and policy matters.

Although this document is concerned with the extraction of coal and aggregates within the Midland Valley, the principles contained in the guidance are applicable to other forms of mineral development and to locations outwith the study area. The boundaries of the Midland Valley (i.e. that part of Scotland contained between the Highland Boundary Fault in the north and the Southern Upland Fault in the south) are shown in Figure 1 and on the attached maps (Figures 2 - 13).

Sand and Gravel - Mountcastle, Fife.

The mobile machinery and fixed plant, with associated storage areas, contribute to the overall impacts on landscape character and potential disturbance through noise and pollution.



Opencast Coal - East Lothian.
Opencast coal production is primarily a function of demand from the power generation industry and often results in the long-term working of a wide area as sites are extended.


Scope of the Guidance

As part of its work, the Minerals Steering Group purchased datasets of the known coal and aggregate reserves within the Midland Valley from the British Geological Society (BGS). The Group's original intention was to overlay this data with "sensitivity maps" for each of SNH's main areas of interest (Earth heritage, nature conservation, landscape character and recreation and access), and thereafter produce a set of maps or a single combined map to indicate within the Midland Valley where mineral development would be likely to result in high, medium or low impacts. While indicative sensitivities within the Midland Valley have been identified for individual Earth heritage sites, and for certain nature conservation interests, it was not possible to produce equivalent data or maps for landscape character or for recreation and access. Data and guidance is however provided to aid the assessment of the sensitivity of all four natural heritage interests to specific development proposals. Future work may extend this guidance, particularly with regard to landscape character.

This document therefore contains two principal elements:

- An introduction to the sensitivity maps and other strategic datasets available to Area Officers via LGF (Local GIS Facility) (Section 2).
- Guidance as to the issues pertinent to each of SNH's four areas of interest when responding to Planning Authorities and operators. This guidance for Area Officers includes a recommended process for assessing individual mineral development proposals utilising the above datasets and other sources of information (Sections 3 and 4).

FIG 1.
Midland Valley of Scotland

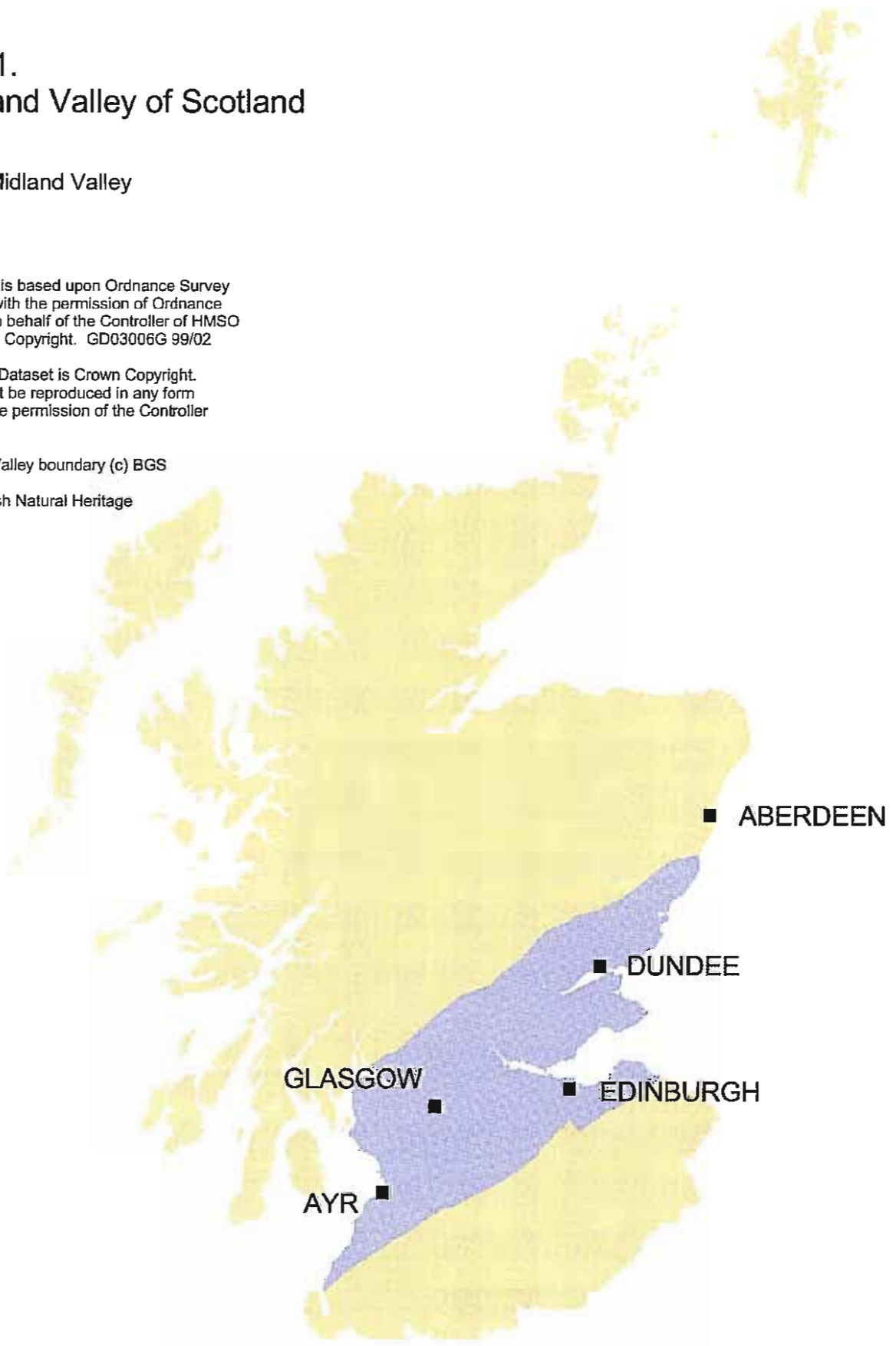
 Midland Valley

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Section 2: Sensitivity Maps and Strategic Datasets

Maps and Datasets

The sensitivity maps and strategic datasets prepared by the Working Group are described below.

Sensitivity Maps and Strategic Datasets

Mineral resource

For the purpose of the project, resources suitable for the extraction of opencast coal and aggregates define the mineral resource within the Midland Valley (Figures 2 - 4). The data provided by BGS for coal and hard rock are based on 1:50,000 solid geological map coverage. It includes all known coal deposits that BGS consider may be targeted by operators, namely those within the Limestone Coal Formation and the Lower/Middle Coal Measures. Table 2 of Appendix 2 lists and ranks the rock types used to define the hard rock aggregate reserve (i.e. those types likely to be suitable for the production of crushed rock). Sand and gravel data are derived from three different sources in the BGS database. Table 3 of Appendix 2 lists different sand and gravel types by data source and categorises each to give a broad indication in descending order of importance to the extraction industry. Data taken from "summary assessments" (categories 1 & 2) excludes deposits which in BGS's view are unlikely to be targets for extraction. Data from "assessment maps" (category 3) (derived from geological mapping, supported by drilling and sampling) includes most potentially workable deposits of glacial meltwater origin. The third data source (categories 4-7) (derived primarily from geological mapping based on visual observations) should be given the lowest level of confidence, although they may be assessed to be in decreasing order of importance.

The datasets therefore provide indications as to the likelihood of future development pressures for mineral resources. The probability that mineral extraction companies may discover deposits not identified by BGS should not be overlooked.

Earth heritage sensitivity

The dataset illustrated by Figures 5 and 14 identifies the Earth heritage Sites of Special Scientific Interest (SSSIs) and candidate Earth heritage SSSIs (Geological Conservation Review - G.C.R. sites) that coincide with the BGS minerals data. The SSSIs and GCR sites represent the only systematic evaluation available of the scientific interest of the geology of the Midland Valley. Sensitivity values (high, medium, low) have been ascribed to each Earth heritage site within the GIS dataset and are explained in detail in Section 4. In summary they are based on an assessment of the vulnerability of the scientific interest to the mineral operation most likely to affect a given site. For example, the most likely operation within homogeneous dolerite within the Midland Valley sill is quarrying for road stone. This would be unlikely to represent a significant impact upon the overall Earth heritage interest and the sensitivity is consequently considered to be low. Conversely limestone quarrying may involve an area containing unique or rare fossil assemblages. In this case, the Earth heritage resource is more sensitive to the operation, which should be mitigated accordingly. Sand and gravel extraction will often target a complete landform for extraction, in which case the Earth heritage site will have a high sensitivity value. The sensitivities are largely based upon site management information derived from the "blue folder series" Earth Science Site Management Briefs (ESSMB), and upon the experience of Earth Heritage Advisors. As such they are particular to each site.

The dataset can be interrogated on LGF through the individual text files attached to each site (e.g. Figure 14). This site specific information (where available) is also derived principally from information contained in the ESSMB.

Nature conservation sensitivity maps

Three datasets are available which provide indications of the likely sensitivity of the Midland Valley's nature conservation interests to mineral developments. The datasets, which cover the whole of the Midland Valley and are not restricted to those areas underlain by the mineral resource, relate to designated sites of national and international importance, Annex 1 habitats and sensitive species.

- **Designated sites of national and international importance** (National Nature Reserves, SSSIs, Natura sites and Ramsar sites) contained in a separate dataset (Figure 6) should be regarded as constituting a high sensitivity.
- **Annex 1 habitats** - In the absence of comprehensive survey data this dataset (Figure 7) indicates the likelihood of any area containing a habitat under Annex 1 to European Directive 92/43/EEC (otherwise known as the Habitats Directive). The methodology (explained in Appendix 3) is based on an assessment of the Land Cover Scotland 1988 (LCS 88) information, being the only complete dataset for the Midland Valley. It therefore provides an indicative guide to the likely presence of sensitive habitats. The assumption has been made that the impact of mineral development will be related to the likely presence of sensitive habitats and the map equates to the probability of occurrence of Annex 1 habitats. High, medium and low probabilities are therefore assumed to correspond with high, medium and low sensitivity. Confirmation of the presence of an Annex 1 habitat would confirm the high sensitivity of the area or site.

● Sensitive species

Data is currently restricted to vascular plants, bryophytes, lichens, great crested newts sites, red squirrel records and pipistrelle bat roosts, these being the dataset where data is available to at least 1 km square resolution (Figures 8 - 10). The choice of species was governed by the UK Biodiversity Action Plan (BAP) list of priority species and by those protected by legislation (i.e. Wildlife and Countryside Act 1981 (W&CA) and Schedule 2 of the Conservation (Natural Habitats, &c.) Regulations 1994 - otherwise known as the Habitats Regulations). The sensitivity of the species has been defined as follows:

- High-protected by legislation (W&CA and Habitats Regulations)
- Medium- priority species contained in the BAP that are not protected by legislation
- Low-no BAP or statutory species known to be present

Interrogation of the GIS version of the 1 km square dataset allows the species interest(s) of any square to be identified and therefore provides site specific data relevant to an individual proposal (Figures 18 -19). The available datasets are described in Appendix 3. N.B.: Data for other species interest may not be complete for the whole Midland Valley and/or of a confidential nature (e.g. otters and badgers).

Landscape Data

- **Intervisibility** - a dataset has been produced (Figure 11) which indicates, through the density of shading, the degree of visibility of any one 50 metre square within the Midland Valley. This information is currently available as "backdrop" data only and cannot be manipulated, although it can be viewed at varying scales as illustrated in Figures 17 and 18. Further detail as to the precise number and location of "cells" that can view or be viewed from a given cell is however available, where required, from AS Landscape Group. (This data may be extended to cover the whole of Scotland).
- **Areas of Great Landscape Value (AGLV)** - Existing data relating to the designations of Historic Gardens and Designed Landscapes and National Scenic Areas has been augmented through the acquisition and digitisation of AGLVs and other local scenic designations. This data together with delineation of the national Landscape Character Assessment (LCA) dataset is presented as Figure 12.

Recreation and Access Data

Existing data relating to major recreation and access resources within the Midland Valley is presented as Figure 13.

Future Datasets

The following additional guidance and digitised data may be produced or acquired :

- **Application of L.C.A. dataset** - AS Landscape Group is completing guidance for Planning Authorities on the interpretation and use of the national dataset and may commission further work to consider its application to specific types of mineral development within the Midland Valley.
- **Past, present and consented future workings** - the Minerals Working Group will endeavour to obtain data from the mineral industry's trade organisations and local authorities regarding the location of past, present and future surface workings (quarries and opencast coal). Such data will assist the assessment of the potential for cumulative impacts.
- **Inventory of paths** - AS Recreation and Access Group is currently developing a proposal, as requested by Government, to produce an inventory of all existing paths and related facilities for completion by 2001. In the longer term it is expected that the 32 local authorities would be responsible for managing and maintaining the inventory. SNH would expect the inventory to be used as a tool by these authorities and SNH staff. This will augment the existing datasets relating to Regional and Country Parks and strategic routes such as the West Highland Way.

Using the Maps and Datasets

Hard copy summaries of each dataset for the whole of the Midland Valley are included within this document (Figures 2 - 13) as summary reference points. Area Officers should however access the relevant datasets electronically in order to combine or overlay selected sets or to interrogate individual sets at varying scales or in greater depth. Figures 14 - 20 provide examples of such interrogation including illustrations of mineral resource data overlain by other datasets (Figures 15 - 17 and 20), a screen grab of Earth heritage text files (Figure 14) and interrogation of sensitive species data at 1 km squares (Figures 18 and 19). Training and generic guidance on the use of GIS is available on-line and from the LGF team and includes explanation as to the viewing and interrogation of spatial features and tabular data. Area Officers may also obtain assistance in preparing maps from Cartographic Services Branch, Hope Terrace. Assistance with the Annex 1 habitats dataset is also available from John Gibson (N2K Co-ordinator South).

All the above datasets are available to SNH staff. It should be noted however that only those created and owned by SNH may be released in their original format to outside interests, including Planning Authorities. The minerals resource data cannot be passed on while future datasets may also be held under licence only. Discussions are however being held with a range of agencies regarding the sharing of digitised datasets.

Digital (GIS) data should NOT be provided directly by Area Officers to external individuals or organisations. Requests for such data, including species datasets (e.g. vascular plants, great crested newts) should be passed to the Cartographic Manager (Heather Shirra).

Printing out extracts from third party datasets, such as Ordnance Survey and British Geological Survey data, is not allowed under the terms of our copyright agreements. External partners must obtain published context mapping directly from the source, not SNH. Maps (containing SNH data in context) should only be provided to illustrate specific issues surrounding a specific consultation (eg. proposed development, development plan or operational programme). All maps produced for internal or external use must contain a copyright statement consistent with the metadata file for the dataset in question. Cartographic Services Branch can provide maps and assistance to staff, including the preparation of maps for external partners, as appropriate.

Interrogation of these sensitivity maps and strategic datasets will assist Area Officers when inputting into strategic or policy matters and when responding to specific development proposals. For both purposes such interrogation should be combined with analysis of other digitised and non-digitised data referred to in Sections 3 and 4 below (e.g. other designated sites, Landscape Character Assessments, and local recreation and access facilities). In commenting on development plan policies and specific development proposals, Area Officers should also refer to SNH's overall policy approach to mineral developments and to relevant Government guidance contained in National Planning Policy Guidance (NPPGs) and Planning Advice Notes (PANs) (see Appendix 4). The following will be particularly relevant: SNH's PGN 94/8 *Mineral Extraction and Use* and the draft guidance on opencast coal and the natural heritage (Appendix 1); NPPGs 4 and 16 *Land for Mineral Working and Opencast Coal and Related Minerals*; and PAN 50 *Controlling the Environmental Effects of Surface Mineral Workings* and its associated Annexes, as well as NPPG 14 *Natural Heritage*. An associated PAN on the natural heritage is under presentation, as is a PAN on the restoration of mineral workings.

Development Plan Inputs

Development Plans (Structure Plans, area based Local Plans and Mineral Subject Local Plans) are likely to contain both general landuse policies and the identification of preferred areas, areas of search or areas of constraint. Area Officers should reflect the above policy guidance and the general principles which underlie the guidance for all four areas of interest contained in Sections 3 and 4 when contributing to the preparation of Development Plans; and should particularly encourage Planning Authorities to formulate general policies which:

- contain an overriding policy framework which seeks to reconcile mineral development with the pursuit of sustainable development. This could include identifying landbank requirements based on assumptions as to increased rates of recycling and the use of secondary aggregates, particularly given the possible introduction of an aggregates tax.
- seek to identify and maximise the opportunities for natural heritage enhancement and creation, as well as protection and maintenance
- adopt an approach to development which sequentially seeks to avoid environmental impacts by protecting important environmental resources from development and thereafter minimise and then compensate for environmental disbenefits.
- address potential cumulative impacts; the need for Environmental Assessment and detailed restoration, afteruse and aftercare proposals within a planning application; and the means of assuring restoration on a "worst case" basis
- encourage operators to enter discussions with SNH prior to, as well as during the design and environmental assessment of a proposed development.

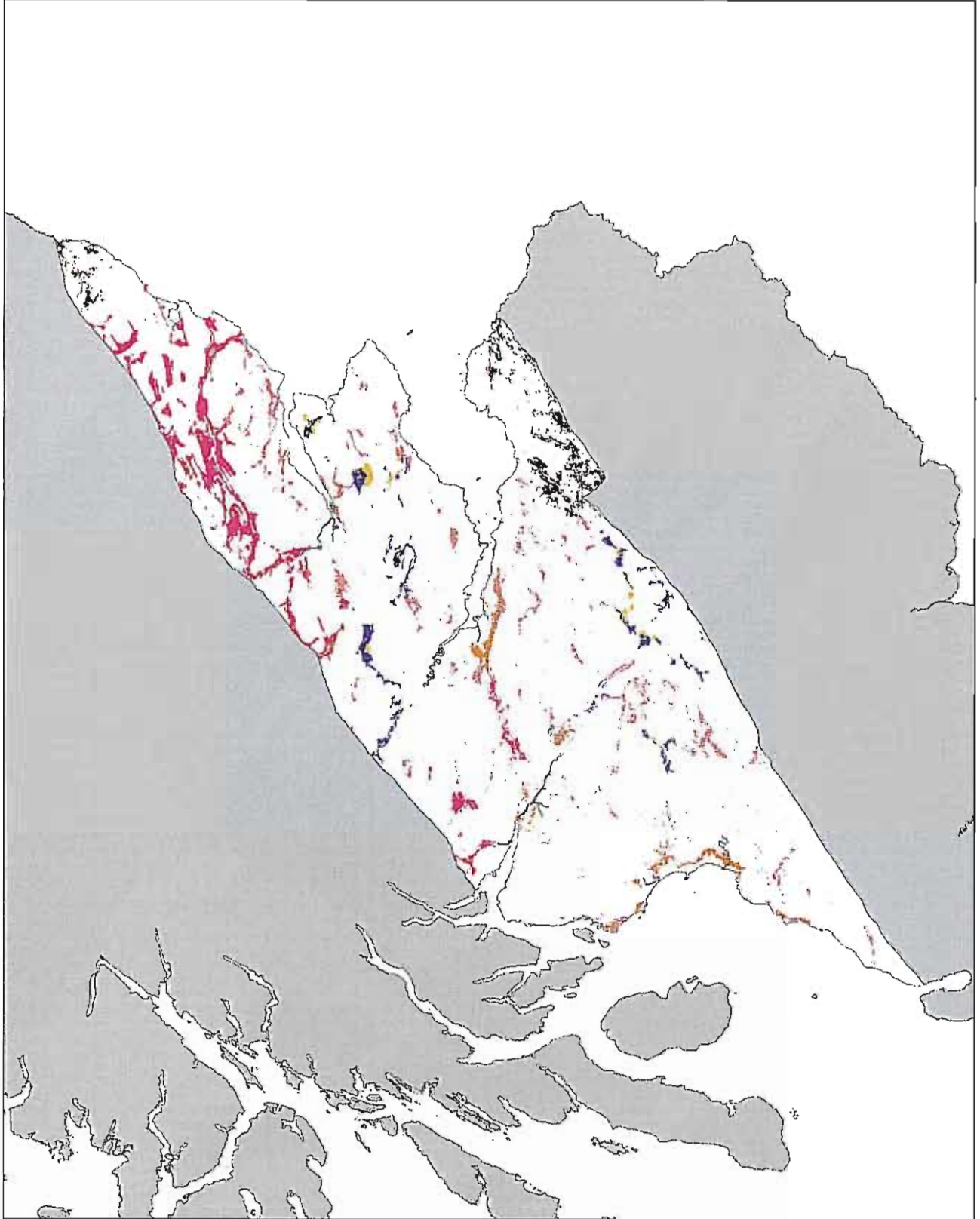
The identification of specific areas (e.g. areas of search) should reflect environmental carrying capacity and be informed by the range of datasets, notably the data relating to Earth heritage and nature conservation sensitivity, and by the appropriate Landscape Character Assessment (LCA). Use of LCAs in development plans is an evolving concept, with pioneering work having been undertaken by Clackmannanshire Council following preparatory work by David Tyldesley and Associates (*Clackmannanshire Opencast Mining Study 1998*). SNH will issue advice to Planning Authorities on this matter during 2000.

Recent examples of both general and area based policies are contained in East Ayrshire Council's Opencast Coal Subject Plan (finalised 1999), Scottish Borders Council's Minerals Subject Local Plan (draft 1998) and Clackmannanshire Council's Supplementary Advice Note on Opencast Coal Mining (March 1999), as reflected in the Clackmannanshire and Stirling Structure Plan (consultative draft March 1999).

Further advice should be obtained from relevant AS staff at the various stages of a Plan's preparation.

FIG 2.
Sand and Gravel

- Glacial meltwater deposits
- Glacial meltwater deposits, locally overlain by till in the Kelvin Valley; also raised marine deposits
- Glaciolacustrine deltaic deposits
- Gravelly deposits
- Other
- Potentially workable sand and gravel in continuous spreads, chiefly of glacial meltwater origin, locally overlain by till
- Raised marine or glaciomarine deposits
- Sandy deposits



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FIG 3.
Solid Geology

- Carboniferous Trachytic Lavas (East Lothian)
- Carboniferous and Permian Lava Formations and All Vent Agglomerates
- Devonian Lava Formations
- Limestone Coal Formation
- Lower Coal Measures (and Coal Measures Undivided)
- Lower Limestone Formation
- Middle Coal Measures
- Midland Valley Quartz-Dolerite Sill Complex
- Other
- Other Intrusive Bodies
- Stinchar Limestone
- Upper Limestone Formation

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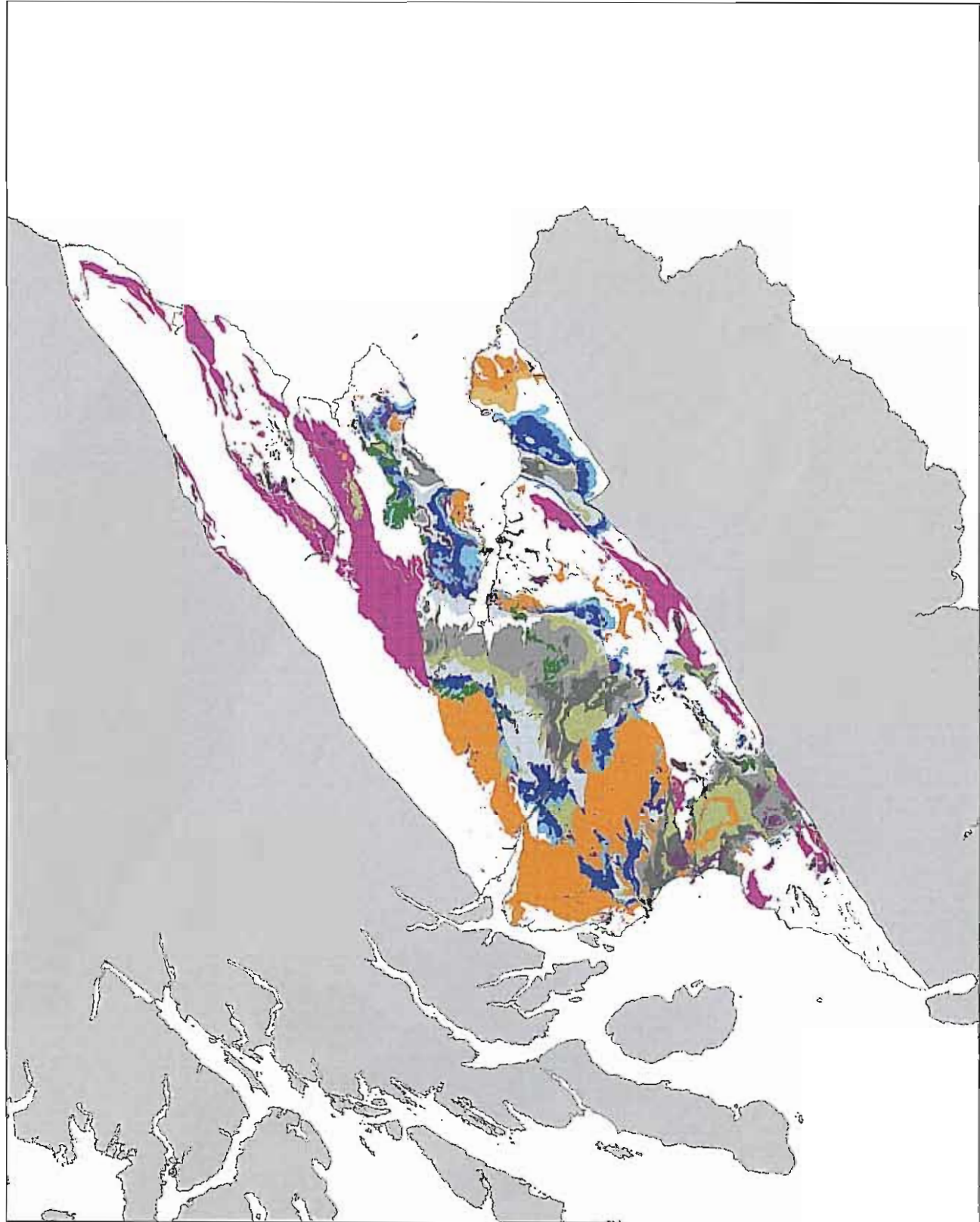
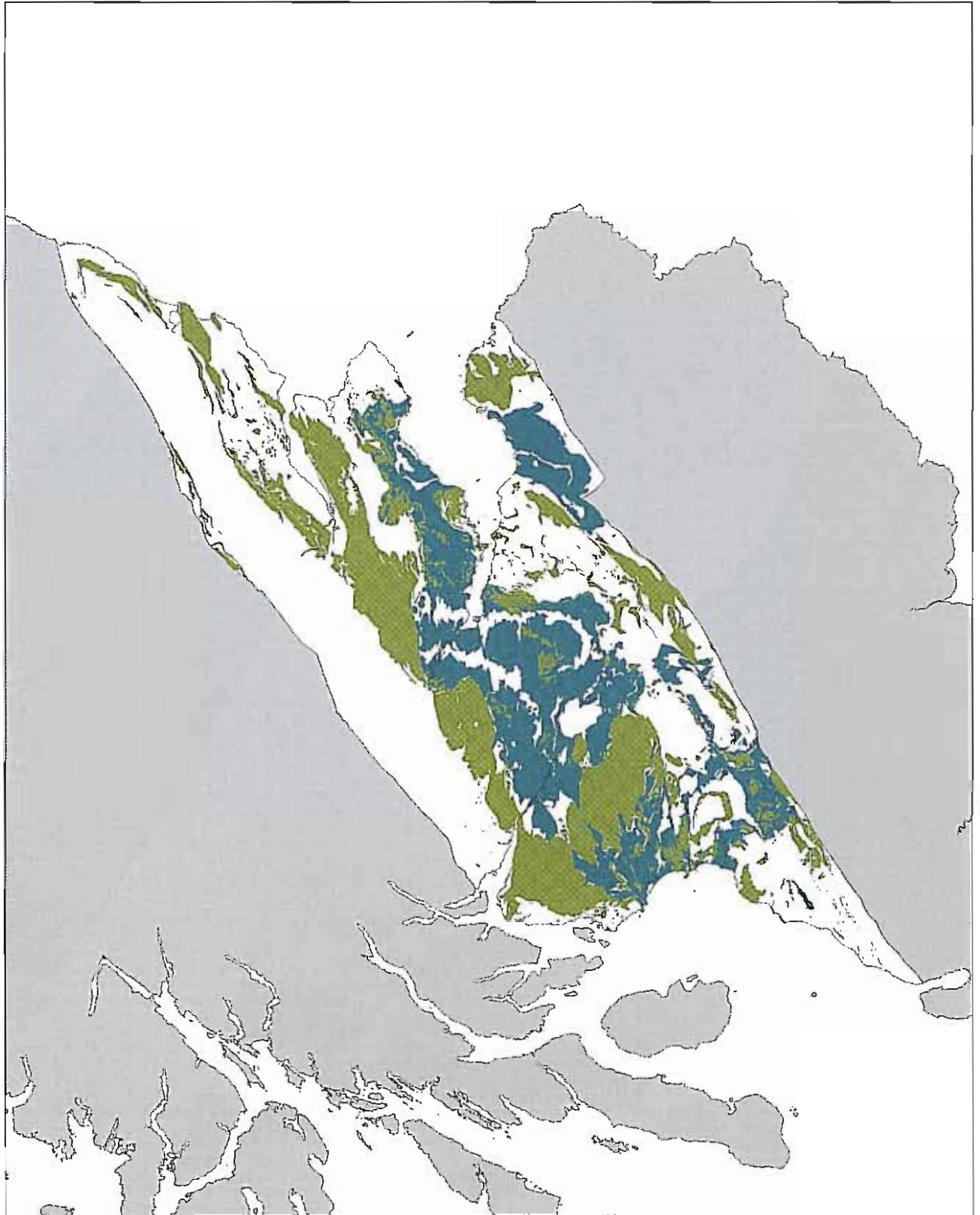


FIG 4.
Solid Geology: Summary

Coal
Hard Rock





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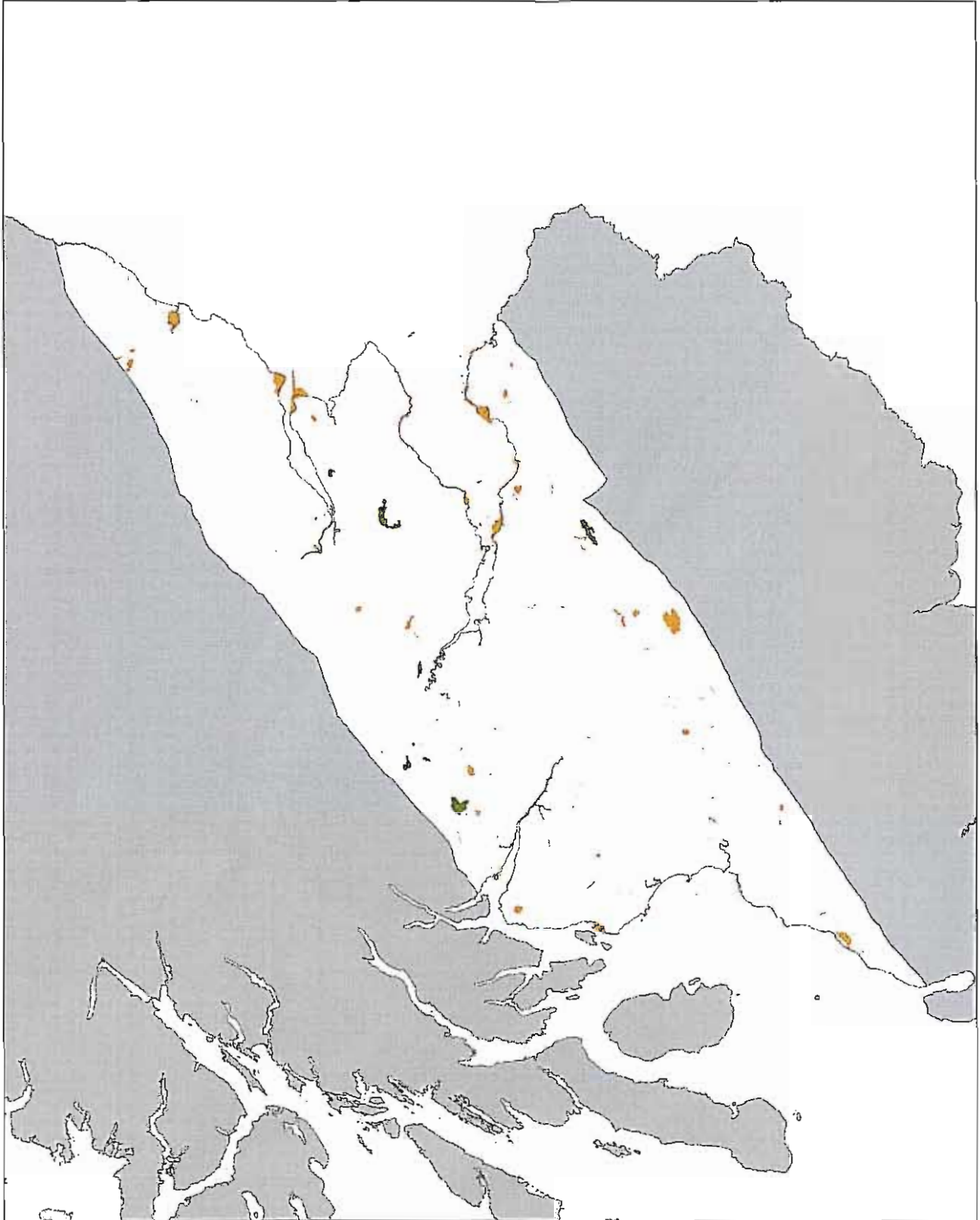
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FIG 5.
Earth Heritage Sites

-  Geological Sites of Special Scientific Interest
-  Geological Conservation Review (GCR) sites



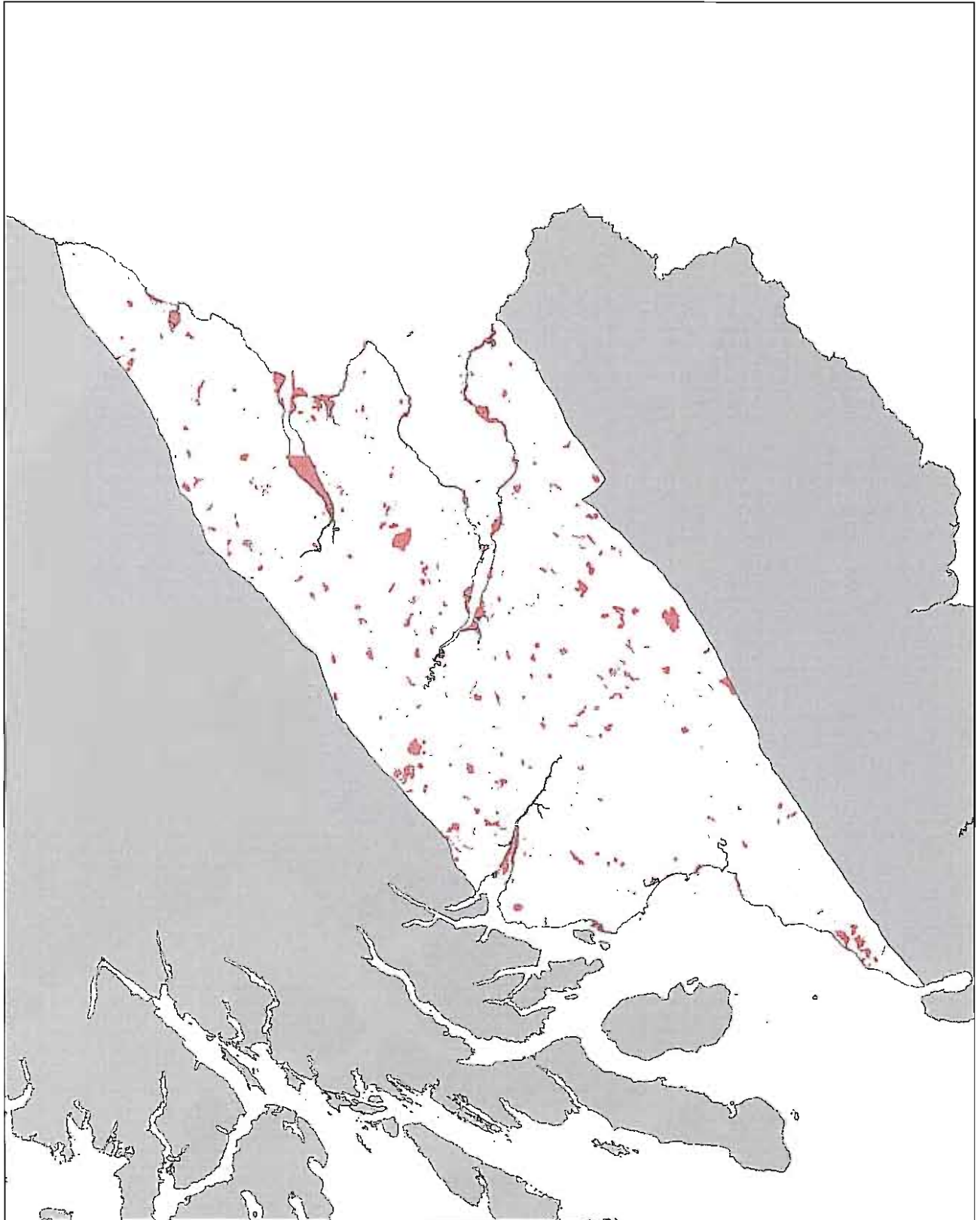
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FIG 6.
**Designated Nature
Conservation Sites**

Designated Sites. Sites shown are a combination of several separate datasets: Sites of Special Scientific Interest, candidate Special Areas of Conservation, Ramsar Sites, National Nature Reserves and Special Protection Areas.
(Additional Natura sites are being considered by the Scottish Executive)



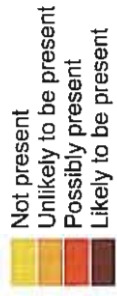
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FIG 7.
Potential Natura Annex 1
Habitats



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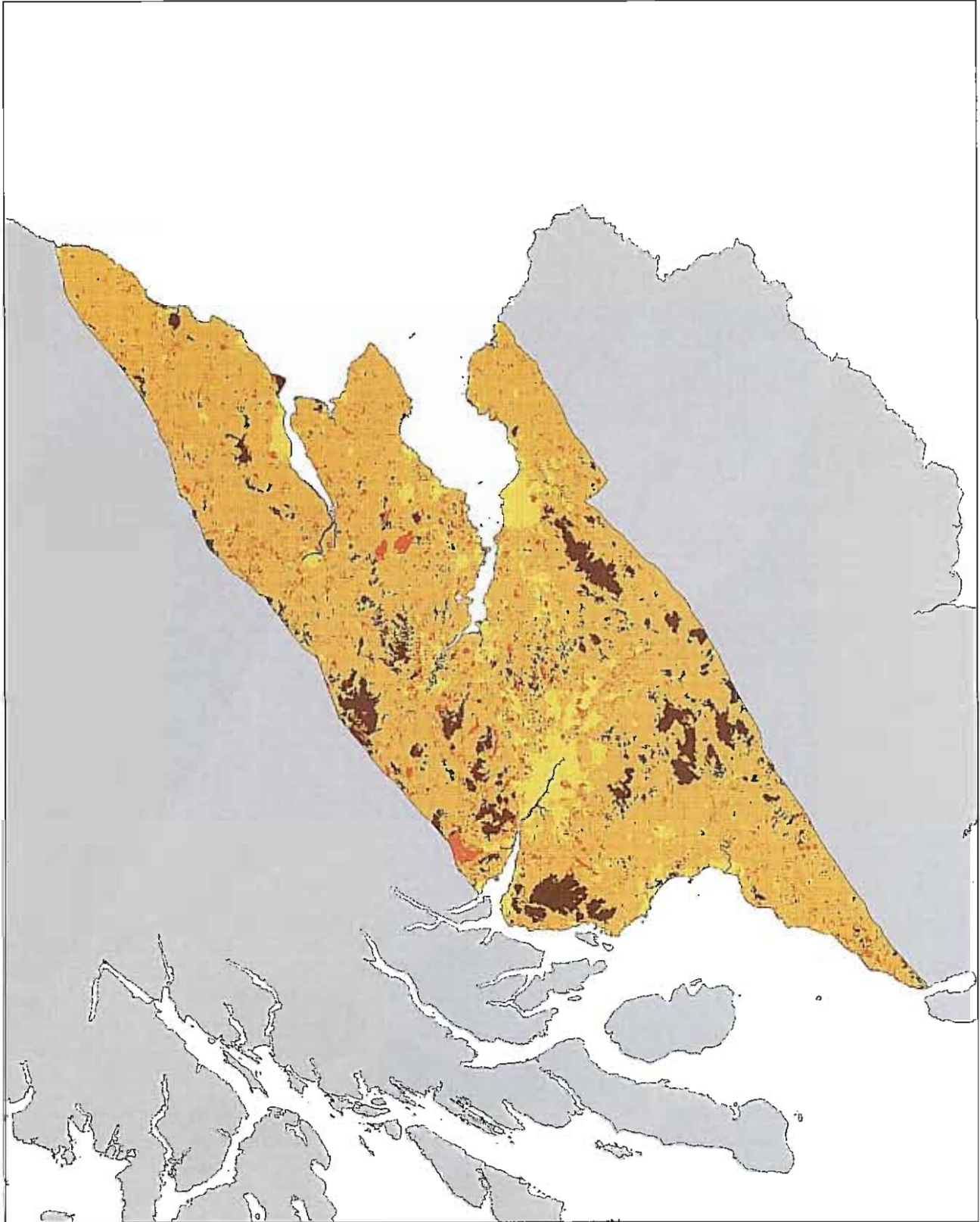
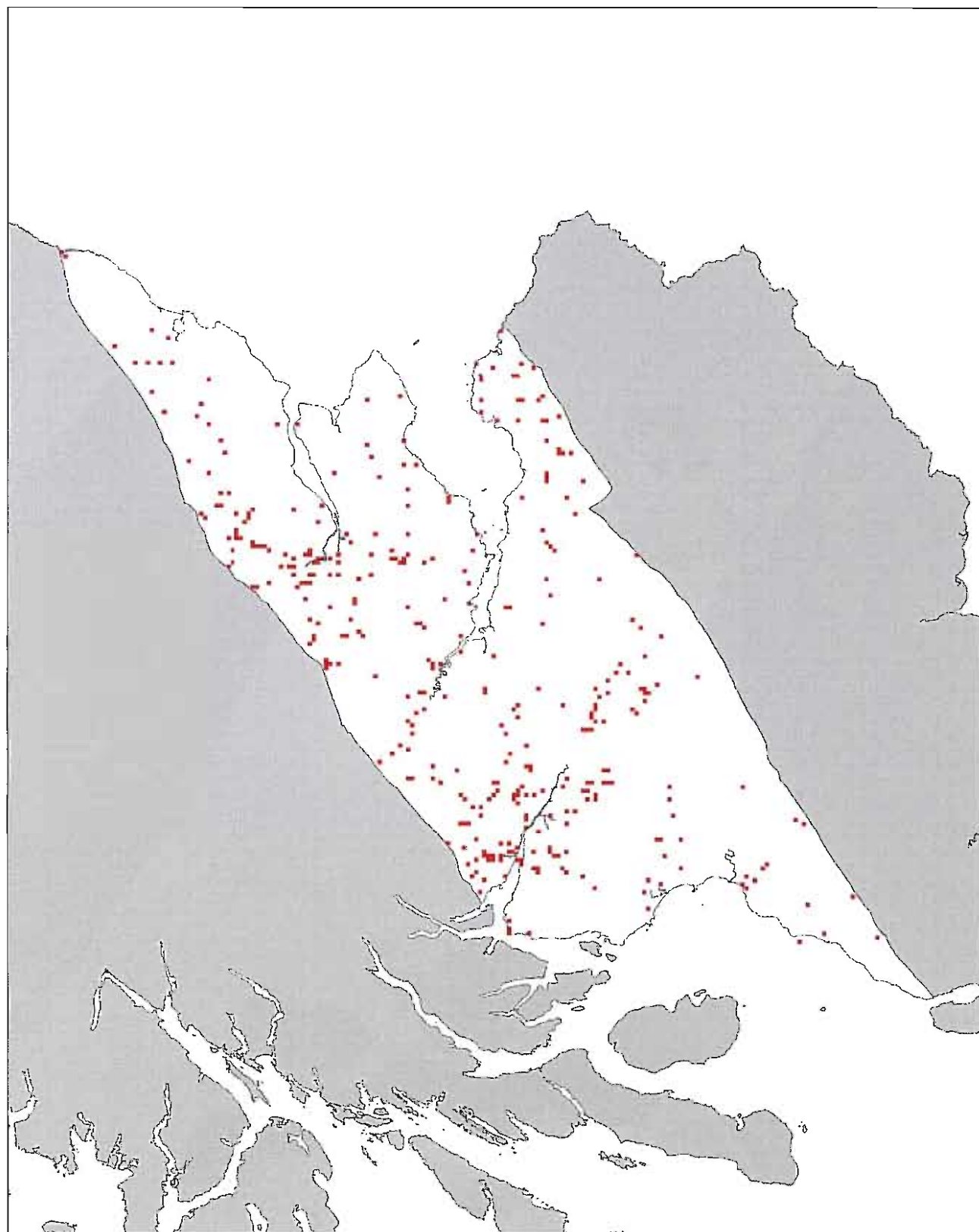


FIG 8.
Distribution of Species
contained in Schedule 2
of the Habitats Directive

■ European Species Present



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FIG 9.
Distribution of Species
contained in Wildlife and
Countryside Act 1981

■ W&CA Species Present

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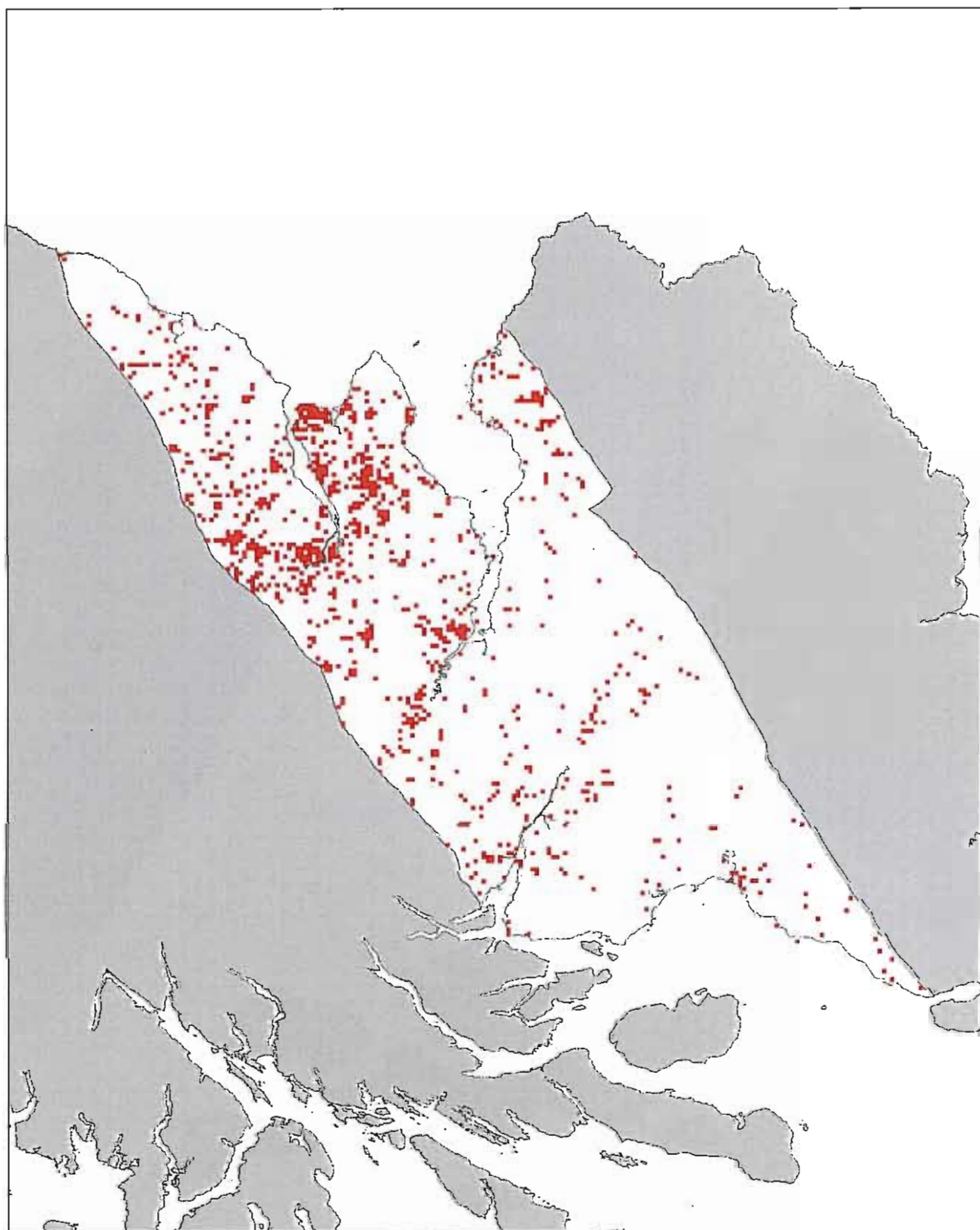
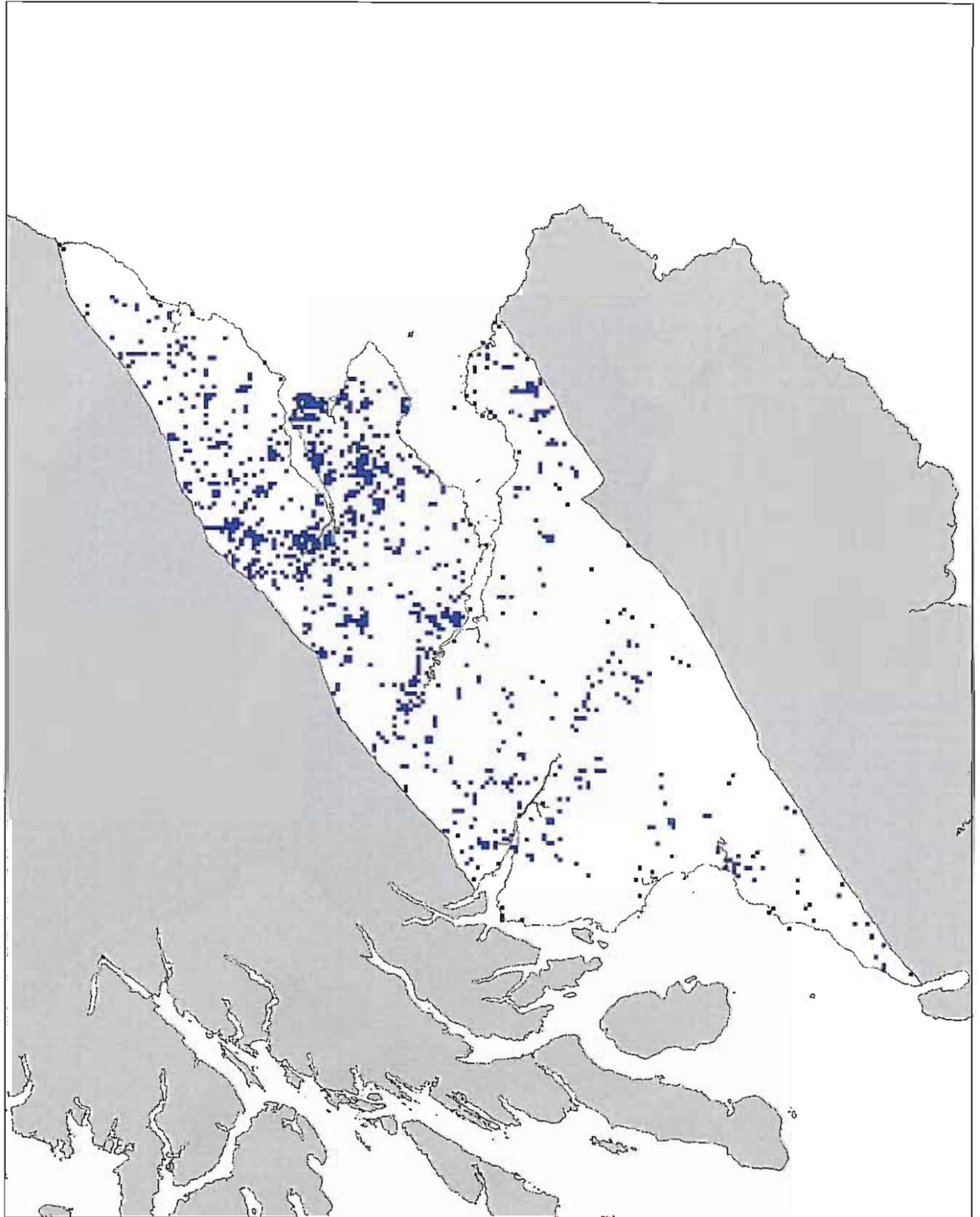


FIG 10.
Distribution of Species
contained in the UK
Biodiversity Action Plan



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FIG 11.
Intervisibility within the
Midland Valley

Darker areas are more visible

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Midland Valley boundaries (c) BGS
(c) Scottish Natural Heritage

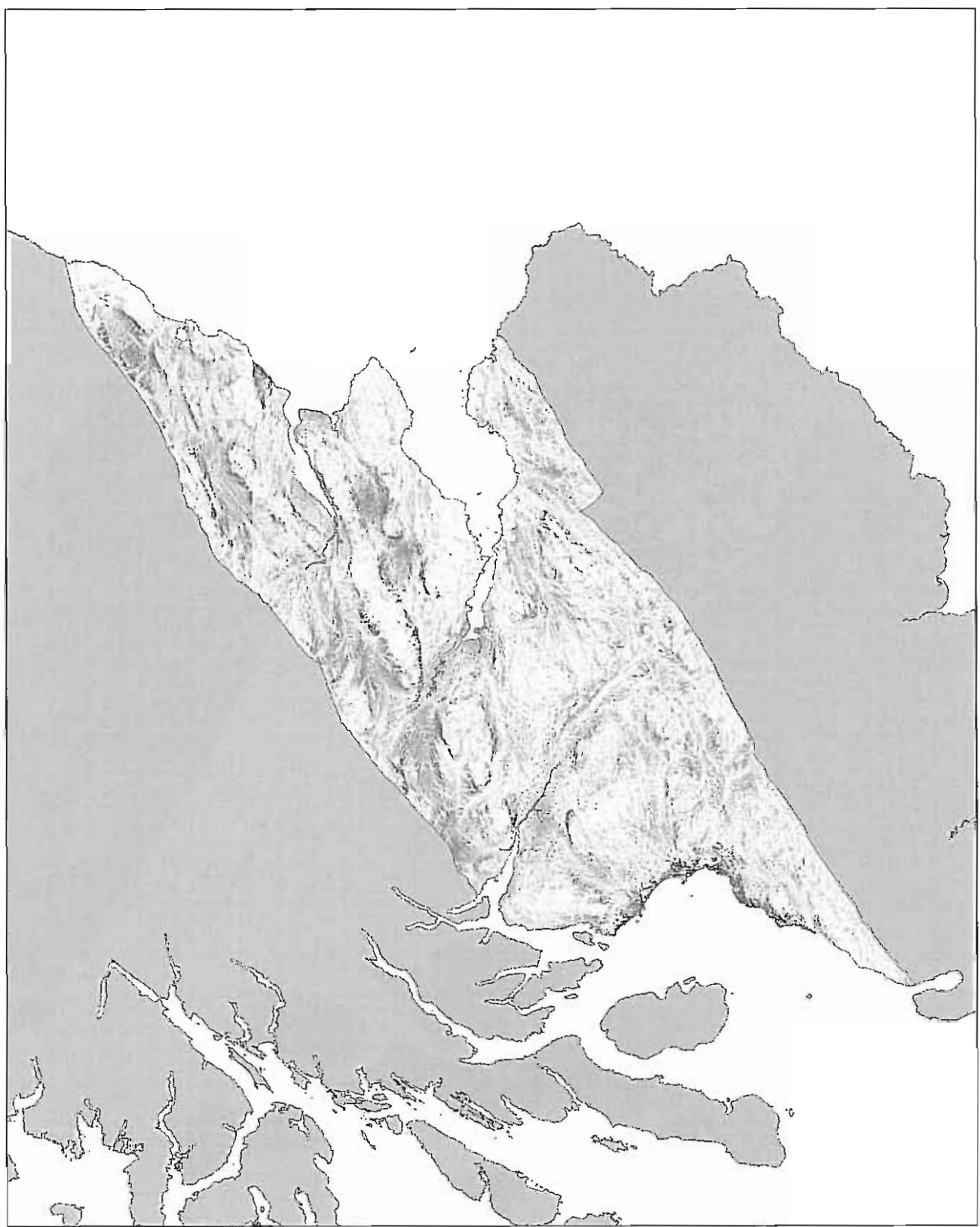
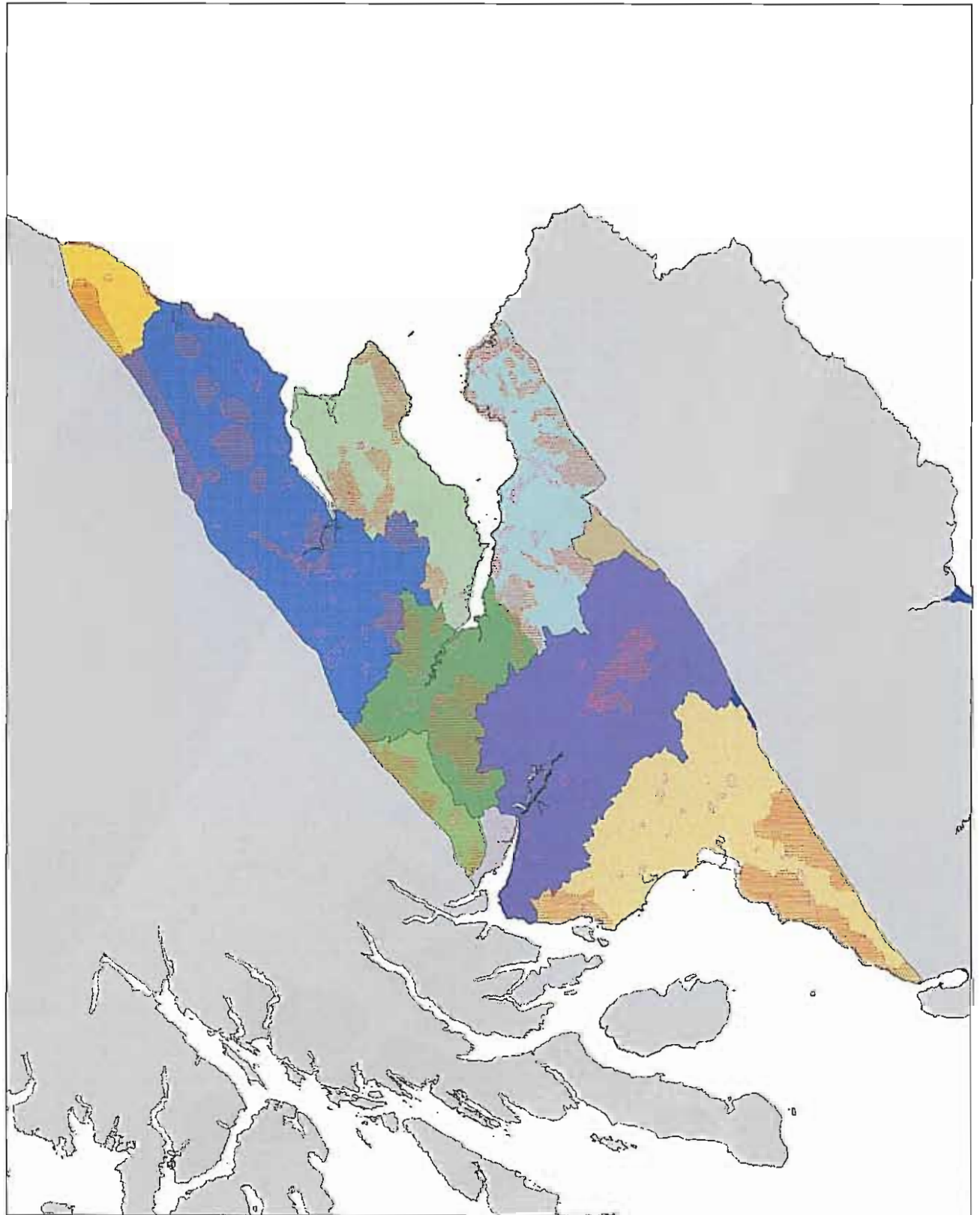


FIG 12.
Landscape Character
Assessment Study Areas
and Major Landscape
Designations



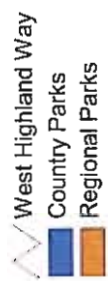
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Midland Valley boundary (c) BGS

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FIG. 13
Major Recreation and
Access Resources



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Regional Parks are (c) The Scottish Office
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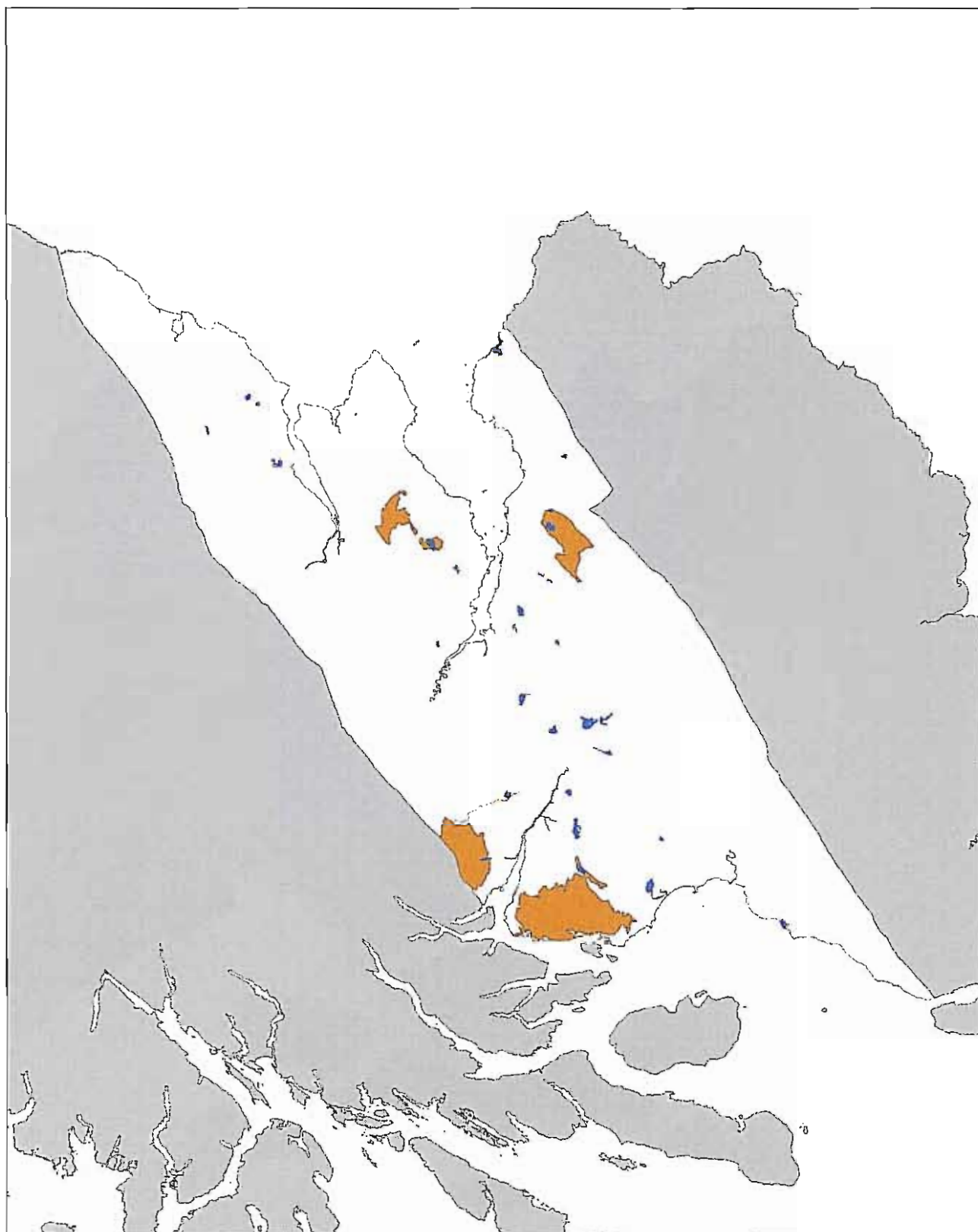


FIG 14.
 Earth Heritage Sites - Sample "Screen Grab"

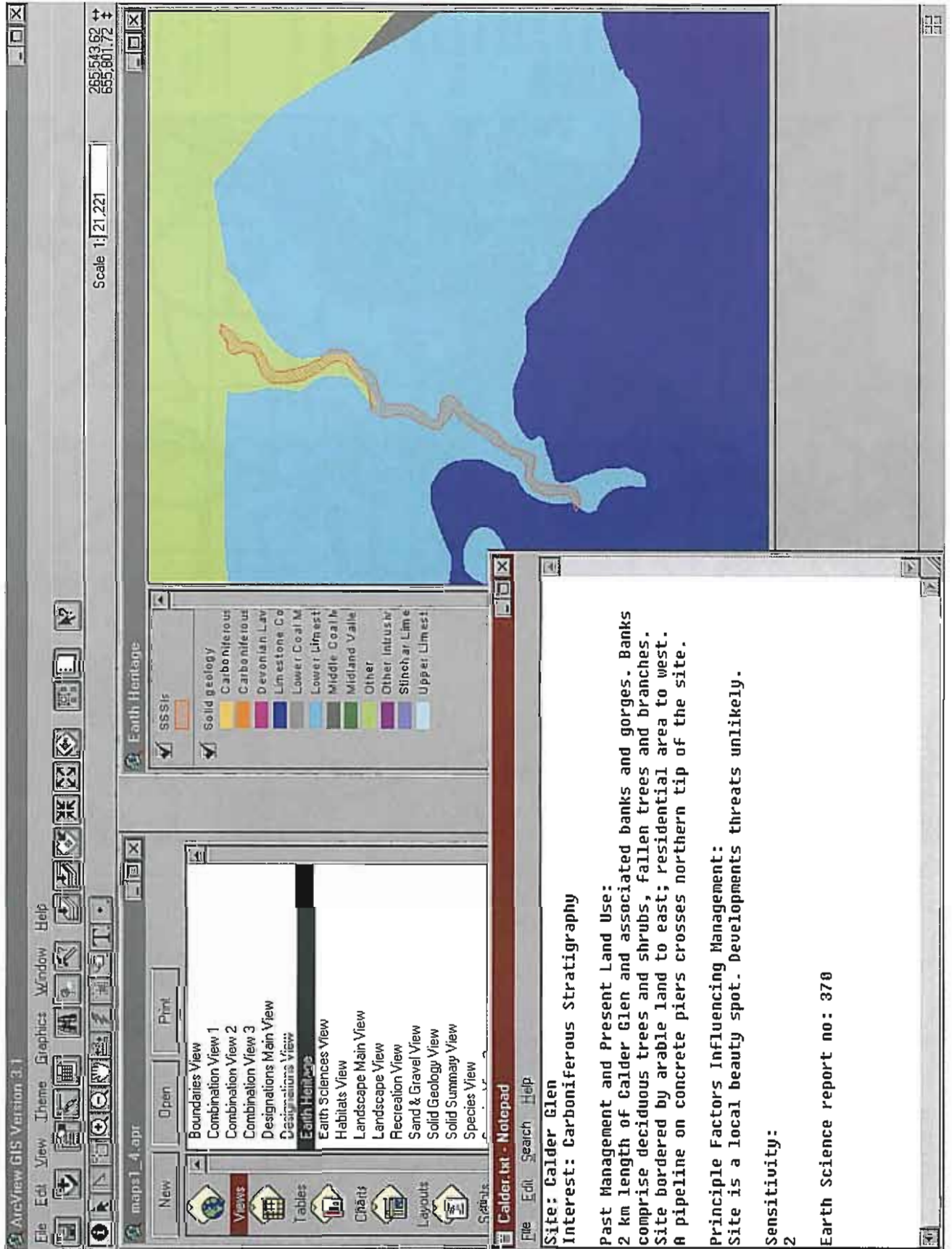


FIG 15.
Sample Overlay (Sand and Gravel, SSSI, SAC with OS)

- Sand and Gravel
- Glacial meltwater deposits
- Glacial meltwater deposits, locally overlain by till in the Kelvin Valley; also raised marine deposits
- Glaciolacustrine deltaic deposits
- Gravelly deposits
- Other
- Potentially workable sand and gravel in continuous spreads, chiefly of glacial meltwater origin, locally overlain by till
- Raised marine or glaciomarine deposits
- Sandy deposits
- Sites of Special Scientific Interest
- Special Areas of Conservation

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Sand & Gravel (c) BGS
 (c) Scottish Natural Heritage

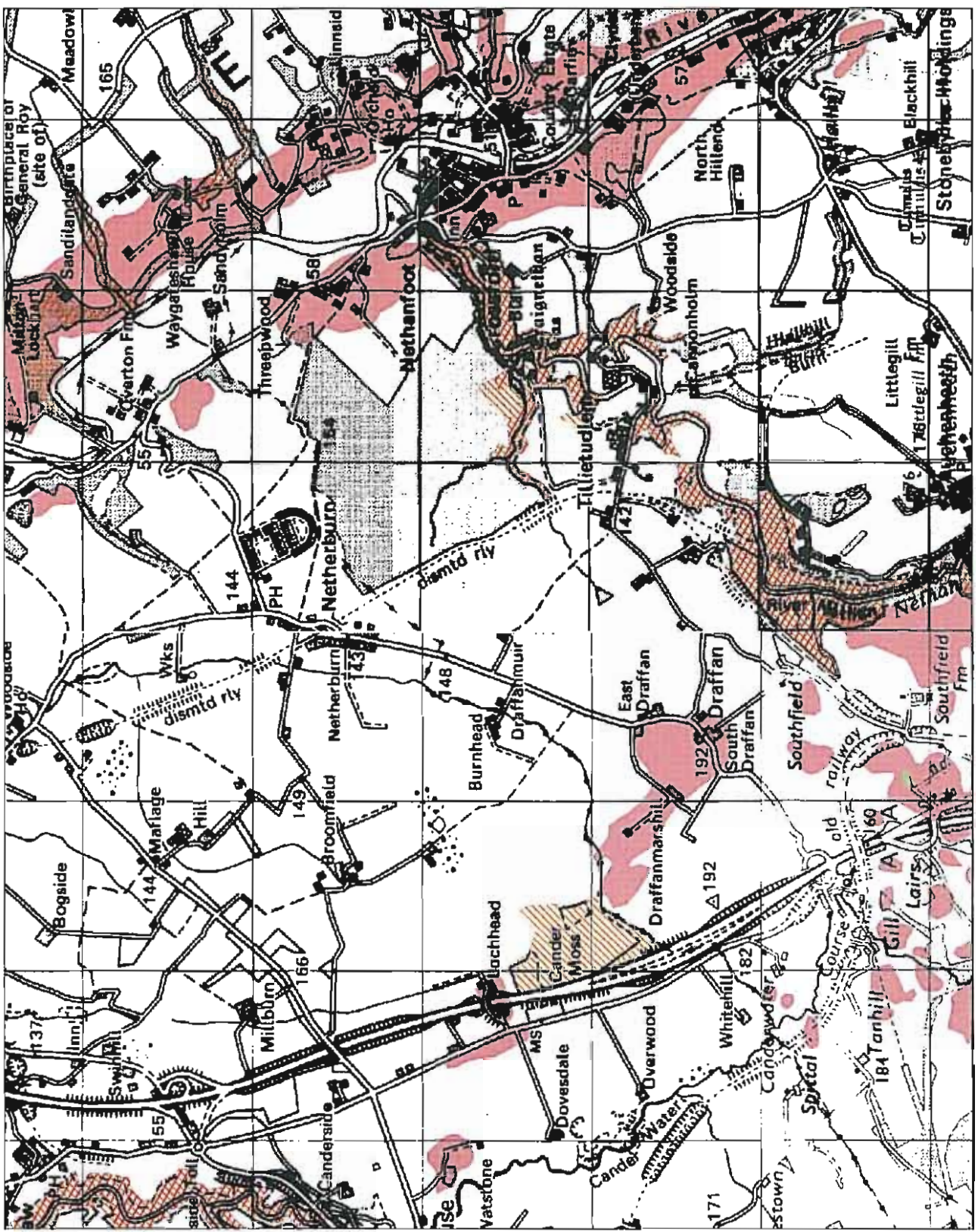
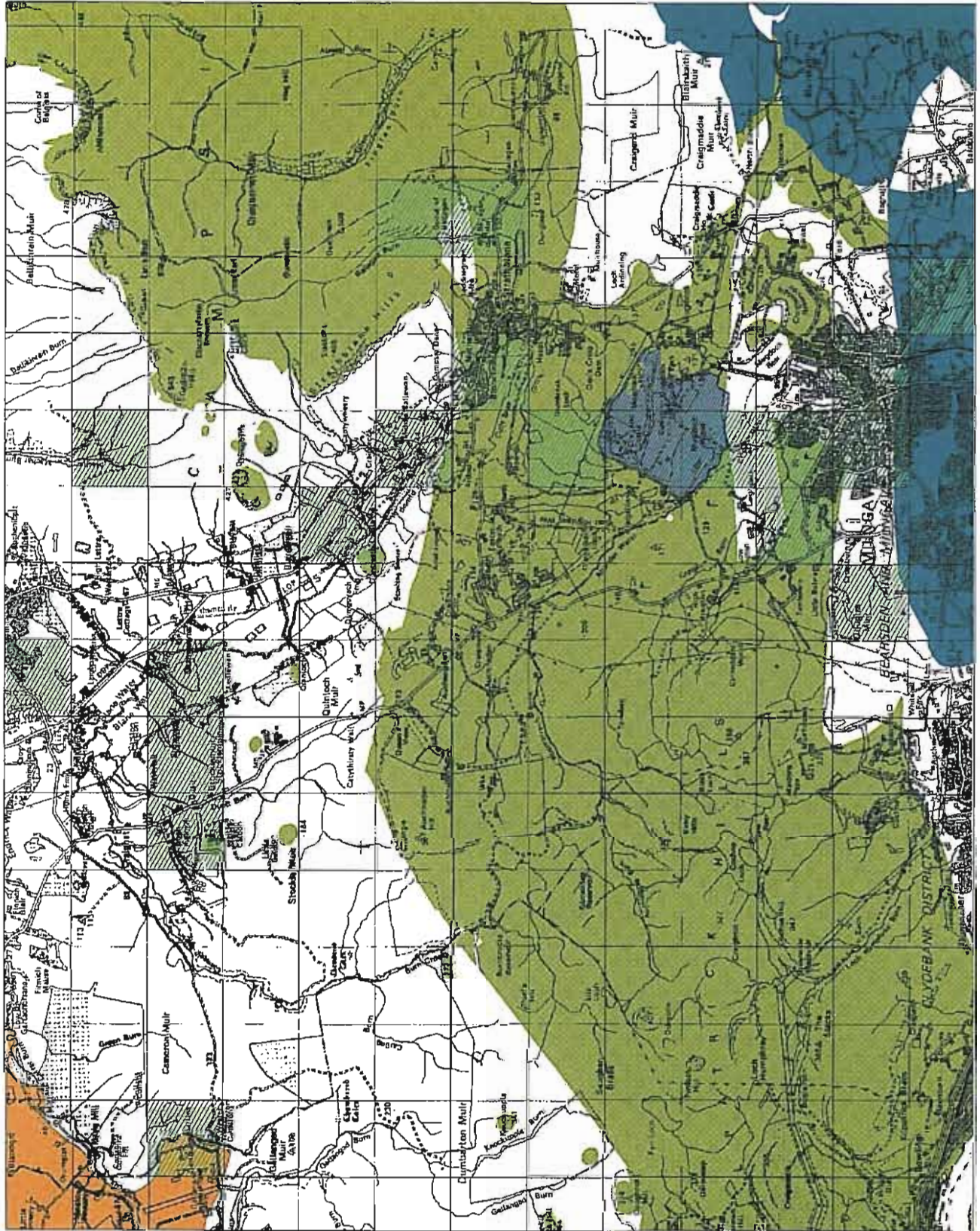


FIG 16.
**Sample Overlay (Solid
 Geology Summary, Major
 Recreation and Access
 Resources, Biodiversity
 Action Plan Species with OS)**



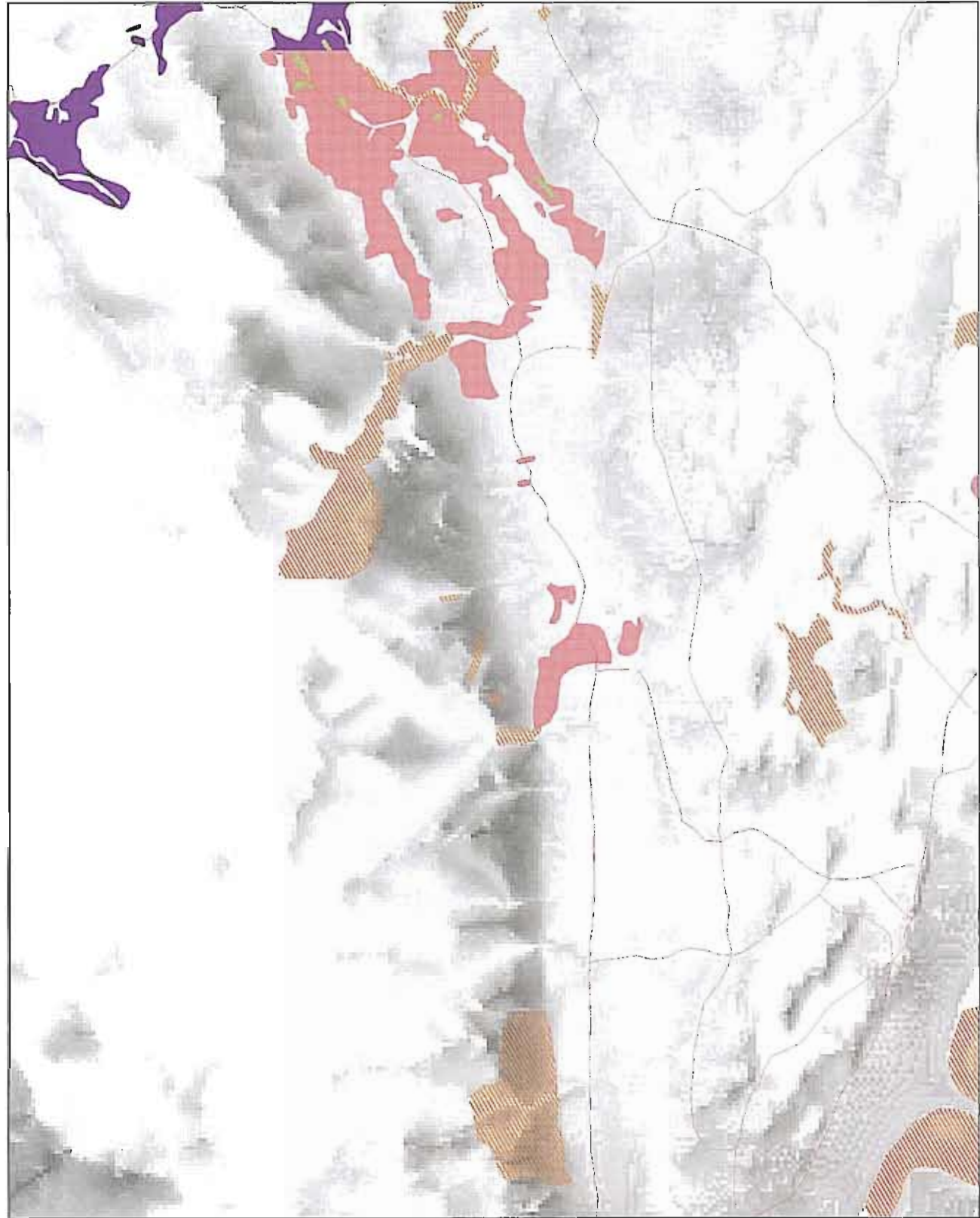
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









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Regional Parks are (c) The Scottish Office

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FIG 17.
Sample Overlay with
Intervisibility Backdrop



-  Sites of Special Scientific Interest
- Roads**
-  A road
-  B road
- Sand and gravel**
-  Glacial meltwater deposits
-  Glacial meltwater deposits, locally overlain by till in the Kelvin Valley; also raised marine deposits
-  Glaciolacustrine deltaic deposits
-  Gravelly deposits
-  Other
-  Potentially workable sand and gravel in continuous spreads, chiefly of glacial meltwater origin, locally overlain by till
-  Raised marine or glaciomarine deposits
-  Sandy deposits

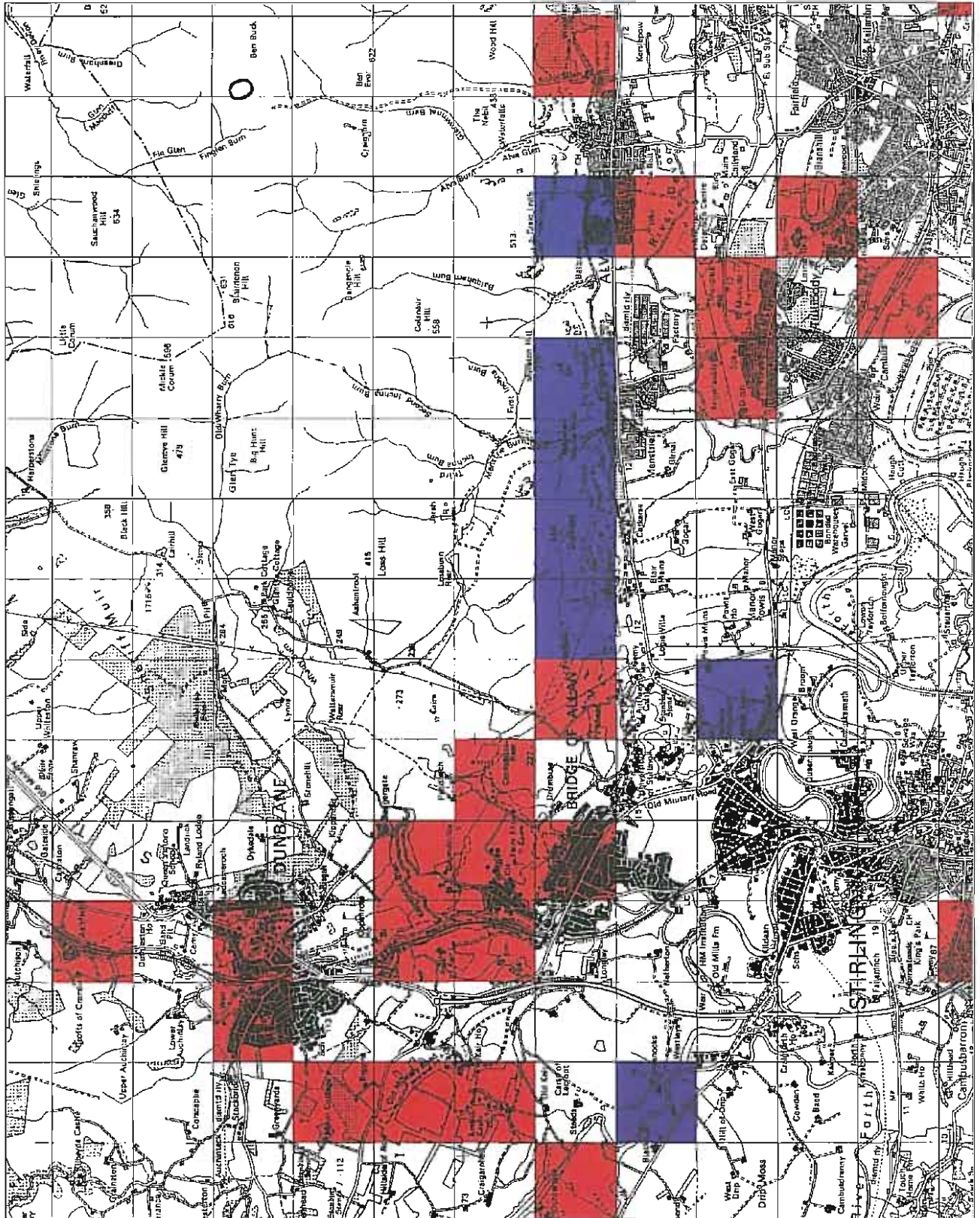
Intervisibility data: Darker areas are more visible

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Intervisibility data (c) MLURI
Sand and gravel (c) BGS
(c) Scottish Natural Heritage

FIG 18.
Species Data - Sample
Interrogation (with OS)

- European Species
- Wildlife & Countryside Act Species
- Biodiversity Action Plan Species



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FIG 19.
Species Data - Sample "Screen Grab"

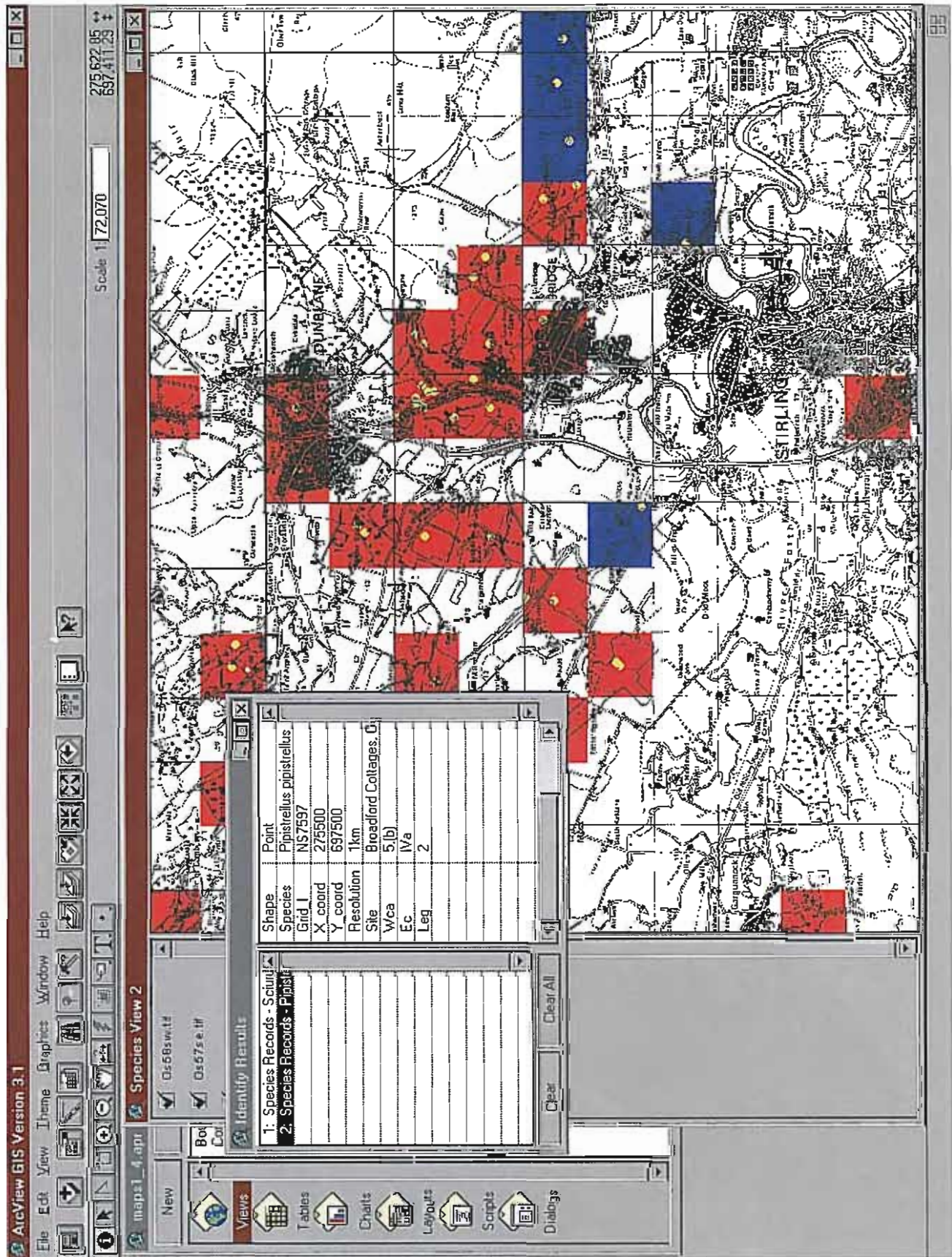
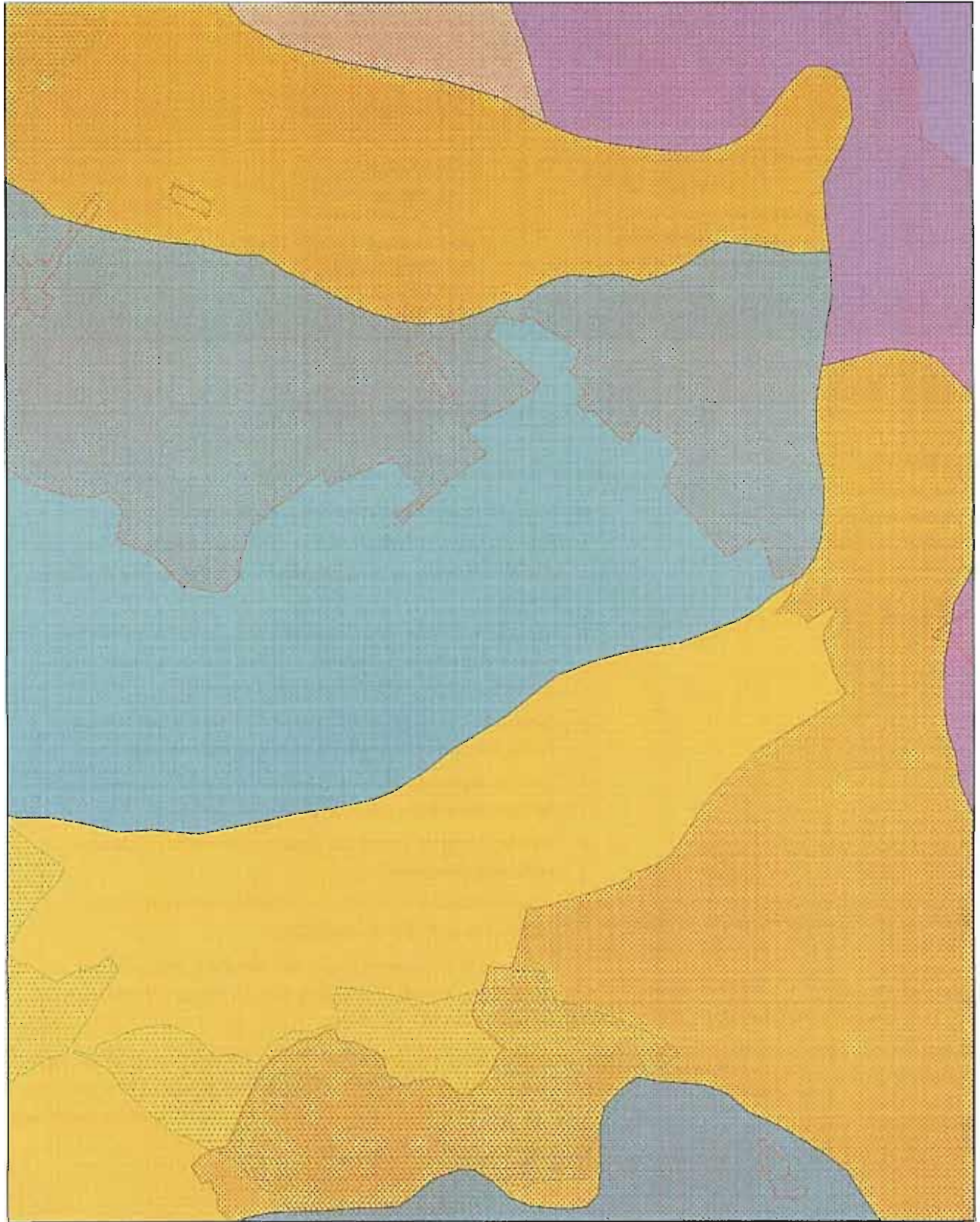


FIG 20.
Sample Overlay (LCA
Character Types, Major
Landscape Designations)



Lothian Landscape Character Assessment

- Coastal Margins
- Lowland Hills and Ridges
- Lowland Plains
- Lowland Plateaux
- Lowland River Valleys
- Upland Fringes
- Uplands

Major Landscape Designations

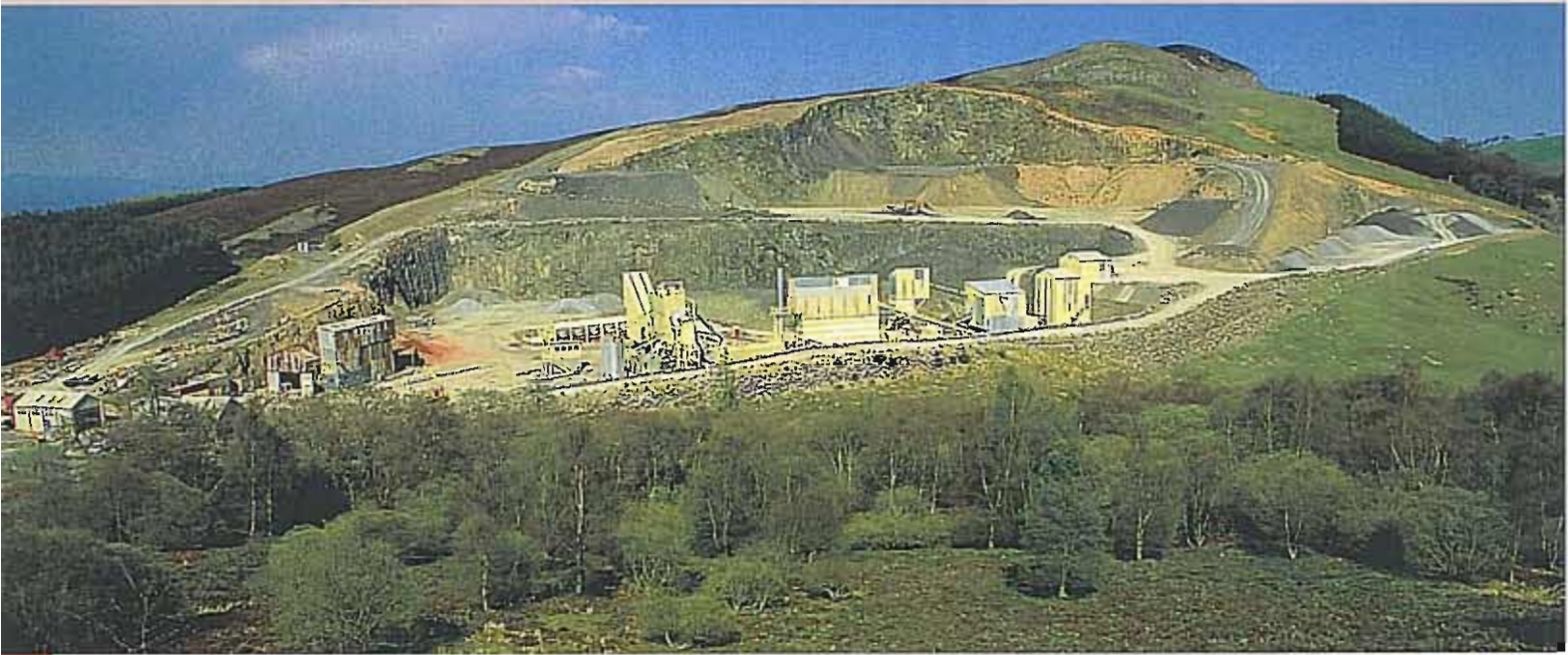
- Historic Gardens & Designed Landscapes
- Areas of Great Landscape Value

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Section 3: Assessing Natural Heritage Sensitivity to Development Proposals



Hard Rock - Dunsinane, Perthshire. Crushing and processing operations add to the scale and nature of the impacts.

Natural Heritage Impacts

The principal impacts on SNH's areas of interest are:

- loss or damage to Earth heritage interests
- permanent loss of habitats through extraction and short or long term disturbance to species through noise, dust and severance of wildlife corridors
- damage or disturbance to the quality and quantity of surface and ground water through diversion, pollution or reduced water levels (i.e. hydrological and hydro-geological impacts)
- damage to soil quality resulting from soil stripping and storage, inadequate restoration techniques and operational pollution
- loss, damage or disturbance of habitats and wildlife in adjoining or connected areas (e.g. through air or water pollution)
- short or long term damage to landscape character and special landscape characteristics
- visual intrusion from workings, overburden, soil bunds, plant, heavy vehicles (on and off site) and lighting
- severance of recreational access and adverse impact upon the enjoyment of the countryside (e.g. from viewpoints, footpaths, parks, visitor attractions)

Mineral developments can however affect SNH's four main areas of interest in different ways, often raising very different issues and responses, as summarised below. Additional information on these impacts is contained in the supplementary guidance in Section 4.

Impacts on the four natural heritage interests arising from mineral development

Earth Heritage

Earth heritage conservation is closely associated with the extractive industry. In the UK, approximately 30% of Earth science sites are the result of some form of human impact, e.g. road cuttings, pits, quarries. Consequently the approach to Earth heritage conservation often differs to that of other natural heritage issues. For example, quite often active hard rock quarries are considered a benefit to the Earth heritage interests, as they provide a source of fresh, ever-changing exposures, a view which may sit uneasily beside landscape or ecological concerns. Similarly restoring mineral workings to original contours is often considered detrimental to the Earth heritage interest, a view that may contrast with that of landscape objectives.

Nature Conservation

Nature conservation encompasses a wide variety of habitat and species interest ranging in importance from international and national down to the regional and local level. These interests are not only present on designated sites but also outwith such sites in the wider countryside. Indeed some species of national and international importance are more likely to be found outwith designated sites. The nature conservation interest maybe a habitat, a wide ranging species or a species that depends on a specific type of habitat. With such a wide range of interests and significance and with a wide range of potential impacts from mineral development it is extremely difficult to generalise about their effects on wildlife. However there are habitats and species in the Midland Valley of high sensitivity resulting from their international and national status.

Landscape

Landscape character, and in particular its natural beauty and amenity will often be changed by mineral operations. The significance of these changes depends on the nature, scale and duration of the proposed development, the type of landscape and views that may be affected and the number of people who may see the changes. Mineral operations go through a series of phases such as site preparation, operation, restoration and aftercare. Changes to the landscape and views will vary according to the phase, and often within each phase.

There is now a widely adopted and systematic approach to the assessment of these changes. This is described in *Guidelines for Landscape and Visual Impact Assessment (GLVIA)* which is jointly published by the Institute for Environmental Assessment and the Landscape Institute (1995). Reference copies of this have been sent to every Area Office. The guidance contained below and supplemented in Section 4 reflects the key recommendations and basic approach contained in the GLVIA.

Recreation and Access

Recreation and access interests require a different approach again in the assessment of the implications and significance of mineral developments. Such proposals can clearly result in the loss of opportunities for recreation in an area, but usually only for the working life of the development. The restoration of the development site can offer significant opportunities to improve and enhance the provision and management of recreational opportunities. Responses should aim to reduce the negative short to medium term impacts, but also to maximise the potential for long term benefits to the recreation and access resource .

The Assessment Process



Earth Heritage - Clasach, Elgin. Quarrying can enhance the Earth heritage value of a site by facilitating production, recording, interpretation and, where appropriate, the creation of important geological specimens.

The guidance contained in the following eight tables explains how these differing issues can be addressed within the process required to assess a specific proposal. This recommended process mirrors that used by members of Advisory Services when assessing proposals from their own perspective (e.g. landscape or Earth science). It is intended to complement the existing guidance contained in SNH's Local Authorities and Environmental Assessment Handbooks, (in particular section D 30 of the former) and to PGNs 98-1 *The Precautionary Principle - A Step by Step Guide* and 99/4 *SNH's Involvement in the Town and Country Planning System*. It is also widely applicable and should not be restricted to mineral developments requiring an Environmental Assessment (EA.), although the majority of mineral proposals are likely to require an assessment under either Annex 1 of the EA Regulations or as a result of a Planning Authority's discretion under Annex 2. There will be instances where an Area Officer will wish to encourage the Authority to exercise such discretion, particularly given the emphasis in NPPG 16 (para 38) that Authorities should exercise their power to require sufficient information to identify the likely impacts of (opencast) operations. The principles of the assessment process should be applied to draft proposals as well as to formal planning applications. The E. A. Handbook explains the advantages to SNH, as well as to Planning Authorities and operators of early dialogue on the scope and content of proposals and associated Environmental Statements.

The advocated process comprises eight steps, summarised in the tables and supplemented by more detailed guidance for each of the four areas of interest in Section 4. It is not suggested that the tables be adhered to rigidly. They are intended as a summary of the general principles and of the individual requirements of the four interests. All five elements of each step being displayed for ease of reference in tabular format.

The eight steps are:

- Understanding the development proposal
- Gathering background information
- Field survey/site visit
- Determining the impacts on each of SNH's areas of interest
- Assessing mitigation, restoration and after-use proposals, including opportunities for the creation and enhancement of natural heritage interests
- Assessing any potential cumulative impact
- Assessing the overall significance of the impacts and making a decision on the overall balance having regard to the impacts and the proposed and potential mitigation and restoration
- Forming a response to reflect that decision

Advisory Services staff can be consulted at any stage of the process, but swift referral well in advance of response deadlines and close co-operation from an early stage between Area staff and Advisory Services, and where appropriate National Strategy and N2K staff is essential. It will often be relevant to seek advice regarding both on and off-site impacts (e.g. impacts on habitats from dust or upon surface and ground water levels and quality, within and outwith the site).

Step 1 - Understanding the Development Proposal

In order to predict the changes that will result from a development it is necessary to understand the basic proposal before visiting the site. This may take time but it is important to build up a clear picture of the development from the planning application or associated Environmental Statement (ES) before examining the site in more detail. More information may be needed from the developer or the Planning Authority and should ideally be requested via the Planning Authority at this stage. It is important that this information relates wherever possible to the content of the planning application and not merely to an ES produced under the terms of the Environmental Assessment (Scotland) Regulations 1999, as amended by the EA (S) Regulations 1999. It is the application and not the ES which will be approved or refused. National guidance on the Regulations is contained in Scottish Executive Development Department Circular 15/1999 and PAN 58 *Environmental Impact Assessment*. In summary an ES is now required under Annex I of the Regulations for all quarries and opencast mining where the surface area exceeds 25 ha and may be required by the Planning Authority under Annex II for smaller mineral operations. Indicative thresholds contained in the above Circular suggest that an ES is likely to be required for all opencast coal proposals, and for other mineral operations for sites over 15 ha in size. This does not preclude an ES from being required for even smaller sites. It should be noted that an ES is merely a tool to assist consideration of the application and is not part of the development proposal itself.

The first broad issues that should be considered are:

- Where is the development located?
- What is the nature of the development (e.g. type of mineral and means of working)?
- What is the duration of the development, and what are the various life stages of the development?
- What is the size and scale of the development?
- Are there any ancillary developments that need to be considered (e.g. buildings, haul roads, power lines etc.) ?
- How is the site accessed?
- What are the off-site impacts (e.g. increased lorry movements and damage to road verges, pollution of ground and surface water)?
- Are there any other past, current or consented developments of a similar nature in the area which may lead to greater cumulative impacts? (see step 6)
- Are there any designations on or relating to the site?

A timetable for preparing a response within the timeframe of the planning application notification and EA Regulations should include time for formulation of a response with the Area Manager/Operations Manager. The continuous process for production of an eventual response from receipt of the application should involve appropriate Advisory Services, National Strategy and N2K staff. Contact should therefore be made with appropriate officers at the earliest reasonable point in the process (e.g. early contact should be made with AS Planning Group where assistance is likely to be required with conditions or Agreements). Relevant sections of any Environmental Statement should also be forwarded to appropriate Advisory Services staff as soon as possible, with confirmation of the required input and deadline.

Step 2 - Gathering Background Information

	Earth Heritage	Nature Conservation	Landscape	Recreation and Access
Further background will be needed to inform both the Area Officer and the various Advisory Service Advisors (landscape, Earth science, planning, recreation and access, nature conservation - e.g. woodlands/ freshwater) about the development. This information will vary for each mineral development and is often contained within an Environmental Statement where one is required. Review any recommendations SNH may have made on the scoping of an ES.	Information relating to Earth heritage should include: Earth Science Site Management Brief Earth Science Conservation Strategy & appendices. Relevant Research, Survey and Monitoring Report Relevant Research Review Series Report. British Geological Survey 1:50,000 series maps GIS data: (a) Earth Science site files (b) BGS 1:250,000 dataset	Information relating to nature conservation should include species and habitat detail for both the site and its environs. Sources of information include: The GIS species and habitats datasets and all other available sources of information, including Area colleagues, freshwater bodies and rivers databases, AS staff, files, RSPB, SWT and other NGOs and any local experts. SEPA regarding any discharge consents which are under consideration and potential hydrological and dust impacts, both on and off site. Fishery Trusts who may be able to supply information on the areas of nature conservation interest that might be affected by a development. Ascertain age of any surveys, records etc. and decide if further survey is required to upgrade information (Appendix 3 lists the range of nature conservation interests). If ES produced, check whether habitats and species of interest likely to be present have been adequately surveyed and obtain appropriate AS specialist advice.	Information relating to landscape matters should include: Landscape Character Assessment (LCA) report relevant to the area and GIS dataset. Special landscape interest information, including GIS dataset of major designations such as AGLV or historic gardens and designed landscapes. Intervisibility data (available from LGF team at Bonnington) Local landscape studies Background information about local history, archaeology, buildings and settlements. Historic land-use data from Historic Scotland.	Information relating to recreation and access should include: Marked footpaths, facilities, viewpoints, points of interest. Local Authority Countryside Recreation and Access Strategy including any audits of the recreation and access resource. Catalogue of Rights of Way. Local Authority Access Officer Promotional material for local access opportunities. Visitor surveys of the site, nearby sites or area. Access and recreation projects supported by SNH grant. GIS data (regional parks, country parks and West Highland Way).
General background information should include: Ordnance Survey maps at 1:50,000, 1:25,000, 1:10,000 scales.				
Local and Structure Plan Policies (including any Minerals Subject Plans).				
Environmental Assessment Handbook (relevant sections relating to each natural heritage interest)				
Local Authorities Handbook (including Section D30)				
Relevant Information and Advisory Notes				
Previous casework history for similar developments				
Aerial photographs				
Information on local projects and initiatives				
SNH GIS Mineral Resource				
Scottish Office Guidance (see Appendix 4)				

Step 3 - Field Survey/Site Visit

It is good practice to visit the site of a proposed mineral development to familiarise yourself with the site and its surroundings. It may be necessary to undertake your own observations and descriptions. This is a relatively straightforward process that may involve the use of checklists and field sheets.

It is important to obtain a "feel" for the development site and its surroundings, particularly when unfamiliar to Area staff. Do not accept the assessments of an application's "supporting statement" or ES without visiting the site.

Earth Heritage

Check the availability of Earth Science Site Management Brief report. Site condition monitoring information may also be available. EA Handbook provides further details of good practice. Consult these sources prior to undertaking a site visit.

Nature Conservation

Check the quality of the vegetation and habitats in the ES on the ground. If an ES is not required - evaluate whether detailed survey work is required of both habitats and species in order to fully evaluate the impact of the development. Communicate this to Planning Authority. Compare any existing survey work or records with the present site condition. If necessary visit the site with the appropriate AS specialist(s).

Check for the proximity of local freshwater to the development as it is often possible for these to be affected outwith the development area (e.g. pollution of surface and ground water and impact upon water table levels). Where toxic chemicals are used or produced during the mining process data should be provided on the porosity of the underlying substrate.

Landscape

Undertake your own landscape observation and description where you are concerned by the quality of this aspect of the application or ES, or where the restoration and mitigation proposals are weak and you wish to strengthen these by making further recommendations. Use checklist and field sheets to help classify the landscape information. Details of good practice can be obtained from the EA Handbook Technical Appendix 1 which should be consulted prior to undertaking field work. Annotated sketches, however rough, or photographs are useful at the stage of assessing a development, monitoring its impacts against those stated or for assessing the extent of restoration or mitigation.

Recreation and Access

Familiarise yourself with the local access provision, the range and type of recreational use of the area and the level of use.

Step 4 - Determining the Impacts on SNH's Areas of Interest

Earth Heritage

Establishing the nature and extent of the impacts likely to occur from a proposed mineral development will require very specific approaches to each of the 4 areas of interest.

The adjoining columns provide a summary for each interest. Further detail is contained in supplementary Section 4.

A final assessment of the overall significance of these impacts (Step 7) is only possible once the impacts have been identified and considered in the context of the proposed and potential mitigation and restoration (Step 5).

Impact is dependant upon:

- Earth Science site type.
- Nature, scale, character and location of mineral workings.
- Nature of mitigation, restoration and after-use proposals (see Step 5).

All three elements are explained in detail in Section 4. The key issue is to determine the site type. Is it an exposure or integrity site?

Nature Conservation

By this stage it will be possible to list the interests on and adjacent to the development site and define those interests that will be affected in some way.

The importance of each interest should be identified using the species and habitats datasets and other sources of information. Each should then be assessed for sensitivity to the development. Impact on hydrology and of dust, both on and off site should be considered. This should be carried out in conjunction with the appropriate AS staff. If significant adverse impacts are identified then Area staff, in conjunction with AS staff should consider whether there are any suitable mitigation measures that could be carried out (Step 5). If an ES has been produced SNH's determination of the impacts should be compared to that in the ES to confirm if all adverse impacts have been identified.

Landscape

Area officers need to identify the related but individual concepts of both landscape and visual impact. Landscape impacts are on the fabric and character of the landscape and are concerned with:

- The physical landscape components (such as trees and land-form).
- Landscape character.
- Special landscape interest such as designation.

Visual impacts are the affects on people of the changes in views through intrusion or obtursion and whether the ability to appreciate the view has been improved or reduced.

The iterative process for assessing landscape and visual impacts includes four phases or elements:

- Identification of the landscape physical features affected.
- Identification of the landscape character and its key characteristics and the impact upon this character.
- Identification of acknowledged special interests and the possible need for consultation with other parties such as Historic Scotland and the Garden History Society.
- Identification of the visual impacts i.e. changes in available views of the landscape and the likely effect of these changes on people (receptors).

The detailed issues involved in each phase are explained in section 4.

Recreation and Access

Utilise the understanding and assessment of the recreational use of the area gained in the previous steps to identify the impacts of the development proposed. Area Officers should aim to identify:

- The recreation resource facilities which would be physically lost during the working of the site. These need to be reinstated during restoration (Step 5).
- Elements for which temporary provision needs to be made during the working life of the site, e.g. the diversion or provision and signing of alternative routes.
- Elements adjacent to the site which the development will impact upon and which will require mitigation (see Step 5).
- The impacts of the restoration proposals on the future recreational use of the site and surrounding area. Look for opportunities for enhancing the recreation facilities in the restoration programme (see Step 5).

Step 5 - Assessing Mitigation, Restoration and After-Use Proposals

Mitigation

In general, the purpose of mitigation is to reduce as far as possible the potential environmental impacts of the mineral development. Different strategies of avoidance, reduction, remediation and compensation should be assessed for each of the major impacts of the development. Further advice is contained in D9 of the E. A. Handbook.

The following issues should be considered with respect to each of the 4 interests:

- Is mitigation possible and can the operations or phasing be redefined, modified or relocated to reduce impacts? Have options such as alternative designs or site layouts been considered by the developer?
- Have all the major adverse impacts been considered for mitigation? Do the proposals adequately mitigate against the most significant impacts at each operational stage of the development proposal e.g. setting up, extraction, decommissioning, post-development etc. (many mitigation proposals, especially planting are not immediately effective and may only come into effect as the development reaches its final phase)?
- Are there adequate details of how the mitigation measures are to be implemented, monitored maintained and managed and are these measures feasible?

Earth Heritage

In most cases it is possible to mitigate impacts upon a site of Earth heritage interest. The degree of mitigation is dependent upon the nature of the Earth heritage, the site type and scale of operation. Robust geological features, for example a section through a homogeneous intrusive body, require very little mitigation other than continued access during the life-time of the workings. More sensitive sites may require the safe-guarding of part of the site during the operation through the use of a Conservation Section (see "restoration" below). This Conservation Section will need to be built into and clearly delineated within proposals. Guidance from the Earth Science Site Management Brief (if available), or an Earth Science Advisor may be required. In circumstances where the interest is extremely vulnerable to the proposed mineral development, mitigation may not be possible and an outright objection may need to be considered.

Nature Conservation

If the sensitivity of interests and significance of impacts are not correctly identified within the application or ES then any proposed mitigation will be flawed and is unlikely to be acceptable to SNH. Each interest at each site has to be considered individually since the significance of impact depends on the sensitivity of the receptor and the degree of impact. The significance of impact will influence which type of mitigation - avoidance, reduction, remediation or compensation - is considered necessary. Area Officers should consider any resulting benefits from restoration or enhancement proposals. It is important to provide comments on the efficacy of mitigation measures even if SNH intends to object to the proposal. If long term on-going management work is required is there flexibility to implement changes during the proposal? Area staff in consultation with AS should assess the extent to which the proposal would be acceptable in the event of mitigation failing. In such a case SNH should seek alternative mitigation and/or object. Area staff should consider how the mitigation measures can be guaranteed during the life of the planning permission and the degree of control SNH would require in order to safeguard particular nature conservation interests.

Landscape

Mitigation is considered in detail on page 54 of "Guidelines for Landscape and Visual Impact Assessment" (GLVIA). In seeking to provide an appropriate fit within the physical landscape, mitigation measures should address the following:

- Can other infrastructure such as the processing plant, be relocated to reduce the visual or landscape impacts?
- Will mitigation be effective? (e.g. will planting commence prior to development and form suitably mature advance screening?)
- Are mitigation measures designed to suit the existing landscape character and do they respect and build upon the key landscape features as identified by the appropriate Landscape Character Assessment?
- Is the use of screen bunding appropriate? Could it be designed as a permanent landscape feature?

Recreation and Access

Mitigation proposals should aim to reduce, as far as possible, the impacts of the development on the recreation and access facilities and opportunities within **both** the development site **and** the adjacent area. Mitigation measures should be designed to:

- Minimise the loss of recreation and access facilities as far as possible.
- Offer alternative provision (diversions) or arrangements (signage and information).
- Minimise the impact of the developments on off-site recreation use.

Detailed issues to consider are provided in Section 4.

Restoration and After-use

Detailed restoration, after-use and aftercare proposals should be included as part of the planning application.

It is important to consider the effects of any proposed restoration plans upon each of the 4 elements, and to identify the long-term after-use resulting from that restoration and to identify the opportunities that may exist for the creation and enhancement of the natural heritage, as well as its partial or complete reinstatement.

The following issues should be considered:

- Is there satisfactory detail to assess the proposals?
- To what extent do the restoration and after-use proposals replace the loss of natural heritage features (e.g. landscape physical features or species and habitats) and are they appropriate (e.g. new tree planting?)
- Are the restoration proposals appropriate?
- How long is the restoration period and how soon will restoration start after the development has begun? Is there a satisfactory and realistic timescale?
- Do the restoration proposals satisfy local needs or demands? Are there any benefits that can be accrued to local communities e.g. a pond, woodland, improved public access, climbing facilities, environmental education or use by local schools?
- Are there measures in place so that the compliance and effectiveness of restoration measures can be monitored and evaluated by the determining authority?
- After restoration, would there be an improved or detrimental effect on the overall natural heritage interest of the site?
- Is completion of restoration assured in a "worst case" situation (e.g. through an appropriate legal Agreement)

Unsympathetic restoration poses a serious threat. In most circumstances, however, it is possible to derive restoration methods that safeguard the interest. Indeed in many cases through agreement with the operators and Planning Authority, sympathetic restoration can provide an opening for further initiatives, for example environmental education.

The principal consideration with most Earth heritage sites is the requirement for a "Conservation Section" that is appropriate to the interest and takes account of the after-use of the site.

Consider the case for a "Conservation Section" Is it appropriate? Is a temporary or permanent exposure required? What is the nature, scale and location of the Section? Have all the factors been considered? Is an engineered solution feasible? What are the costs and does it represent a cost benefit to the operator? Section 4 provides more detailed guidance on this matter.

It is also important to consider if it is possible to reconcile the Earth science restoration proposal with other nature conservation or natural heritage interests. They may not be wholly consistent or compatible.

The extent of any net benefits resulting from restoration and enhancement proposals should be assessed. Area Officers should also identify opportunities which may exist for further enhancement. Any benefits will be linked to the sensitivity of the existing nature conservation interests and the impact of the development. Distinguish restoration and enhancement from proposals in mitigation for the complete or partial loss of a habitat or species. Restoration gain is only likely to be acceptable where the existing interest is of low value or easily recreated or where the new habitats would produce an acceptable gain. Beware of claims of increased biodiversity with restoration when the gain comprises common species and the loss comprises a few, more valuable species.

Restoration or enhancement for nature conservation often needs to interlink with landscape restoration and may also provide linked gains for recreation and access, and for interpretation where none existed previously. Is sufficient detail provided of the future long term management especially in terms of the mechanisms and finance?

The scale of loss of physical features and the impacts on landscape character from mineral workings may be large. The ability of the landscape to be restored will vary widely. Detailed restoration proposals will be required to mitigate against long-term landscape impact and should be in place before any planning permission is implemented.

Do the proposals reflect the existing landscape character and do they respect and build upon landscape distinctiveness? Is the landscape diversity reduced? After restoration, will the landscape character be enhanced or diminished?

The LCA provides some broad guidelines or key strategic aims in relation to each landscape character type and the proposals for restoration should ideally be in keeping with these principles.

What are the landscape and visual impacts of the restoration period itself (e.g. the replacing of over-burden and top soil)

Do the proposals:

- Fully and adequately consider public access and recreational use of the site and the surrounding area?
- Fully consider recreational provision and management?
- Reinstale, where appropriate, the existing access and recreation resources and facilities?
- Take the opportunity to improve or enhance the quality of the site and surrounding area for recreation?

Detailed questions to consider are provided in Section 4.

Step 6 - Assessing Potential Cumulative Impact

The issue of potential cumulative impact is a complex and contentious one. In the past developers and many Planning Authorities have held that each proposed development should be considered on its own merits and essentially in isolation from other similar developments. The issue is increasingly recognised by a variety of bodies, including the Scottish Executive Development Department and Planning Authorities as a material consideration in the determination of planning applications and as requiring a policy basis in National Guidance and Development Plans.

NPPG 15 *Rural Development* and NPPG16 *Opencast Coal and Related Minerals* are particularly noteworthy in that the former suggests that Planning Authorities could use planning conditions to regulate the cumulative impact of developments, while the latter recognises the issue as a potential material consideration and indeed requires that the Secretary of State (now the Scottish Ministers) be notified of large proposals (more than 500 ha) and where workings greater than 100 ha would be within 5 km of two existing or consented workings.

The issue has a number of facets, and can concern the inter-play between all of SNH's areas of interest. Where Area Officers are uncertain as to how to proceed on this matter consultation with the range of Advisors, including the relevant Planning Advisor, is recommended.

Cumulative impacts may result from a number of situations:

- The interaction or proximity of two or more current mineral workings (not necessarily for the same mineral) or similar developments (e.g. landfill).
- The continuation of a particular working over time through successive extensions.
- The interaction or accumulation of different impacts at one site, affecting a range of natural heritage interests.
- A combination of the above scenarios.

While the individual site, the extension or the specific impacts may be acceptable in isolation they may prove excessive or unacceptable in combination with one or more additional sites, extensions or impacts.

The following issues should be considered in relation to cumulative impact:

- What is the relevant distance between developments?
- What other similar developments are currently in operation, recently completed operation or have consent for future operation?
- How do the phasing of permissions overlap?

As explained in Section 3 above the Minerals Working Group will endeavour to obtain digitised data for the whole Midland Valley which will identify known past, current and consented surface mineral workings. Such information would assist Area Officers in determining potential cumulative impacts.

Earth Heritage

Would the proposal constitute piecemeal development leading to the progressive attrition of the integrity of an Earth heritage site (e.g. glacial landforms)?

Nature Conservation

Consider whether the development contributes to a progressive loss of a habitat type or species within the Local Authority area.

Consider the effect of any loss on the national and local biodiversity action plans; and whether cumulative loss is covered by any Development Plan policies for the wider countryside.

The cumulative impact on the habitat, including fragmentation of the habitat of any statutory scheduled species should also be considered.

What is the extent and distribution of the nature conservation resource at risk?

What past losses have occurred due to mineral development and all types of development?

Landscape

Landscape is a continuous resource and it is therefore important not to view mineral developments in isolation. The location of other developments, how they are experienced and how they relate to the proposed development should be considered (e.g. are they contained within the same view or are they experienced travelling along the same road?).

What is the carrying capacity of the landscape? That is, at what point do successive mineral developments effectively change the character of the landscape?

Recreation & Access

Cumulative impacts are likely to reduce the overall amenity value of an area.

Step 7 - Assessing the Overall Significance of the Impacts and Making a Decision

It will be necessary for Area Officers to consider the significance of various impacts in order to provide some weighting of the advice which is to be provided to the Planning Authority. The EA Handbook Section D8 and Technical Appendices 1-5 covers this subject in detail. In assessing significance reliance should be placed on common-sense and reasoned judgement supported wherever possible by substantiated evidence.

On completion of the earlier stages of the process Area Officers should now address the following:

- What is the sensitivity of each natural heritage interest to the proposed development (high-medium-low).
- What is the likelihood of change occurring to that interest?
- What is the magnitude of change (no change-small-medium-large)?
- Do mitigation, restoration and after-use proposals minimise the impact on each interest to an acceptable level?

Earth Heritage

Particular reference should be made to the sensitivity values contained in the Earth Science dataset, as explained in Sections 2 and 4.

Nature Conservation

The means of assessing the significance of impacts upon nature conservation interests is outlined in Section 4 and reflects the detailed guidance of the EA Handbook. It will normally involve AS staff. If significant adverse impacts are identified then the suitability of mitigation should be explored to see if the development can be made acceptable. If there are no suitable mitigation measures or none that are practical then outright objection should be considered. Where mitigation is possible Area Officers should evaluate the measures proposed and frame the response accordingly. This should include consideration as to how the required mitigation could be best secured in terms of planning conditions or legal Agreements. If significant adverse impacts are unlikely then restoration and enhancement proposals should be evaluated to see if they are sufficient and acceptable. There may be the opportunity to secure more environmental benefit.

It should be noted that some planning applications will follow an iterative process and that this stage may be repeated as a development is modified in response to SNH's initial (and subsequent) views.

Landscape

Detailed guidance is contained in supplementary Section 4 regarding the identification of landscape and visual impacts and the method for assessing the degree of significance with regard to landscape physical components, landscape character, landscape special interest and visual impact. This makes particular reference to the EA Handbook Section D8 and to the GVLIA and its matrix.

Recreation and Access

Detailed guidance in Section 4 indicates the method and issues to be considered in an assessment of the significance of the impacts. In reaching a pragmatic judgement you should take account of:

- The importance of the recreational site or facility in terms of any official designation, management and promotion of the site; visitor numbers, and type of user; and accessibility of the site, particularly to local communities.
- The function and amenity value of the site or facility in the local access context
- The function of the site or facility in the integrity and linking of path networks
- The recreational opportunities provided ("the degree of specialness")
- Specific recreational opportunities which are lost or affected by the development
- The range and accessibility of alternative recreation sites or facilities in the area

Step 8 - Forming a Response

Once the significance of all the impacts affecting natural heritage have been assessed they need to be considered as a whole along with any other relevant factors (described in PAN 99/2 *SNH's Balancing Duties*) and a decision on a response formulated. The Local Authorities Handbook and the Environmental Assessment Handbook (Section E10) provide guidance on the formulation of responses to planning applications including those where an ES has been submitted. Particular reference should be made to Section D30 of the Local Authorities Handbook ("Minerals Planning") and also to PGN 99/4 *SNH's Involvement in the Town and Country Planning System*, Table 1 of which identifies 9 options of response from "no comment" to a full objection. Models for these options are available from your Planning Advisor and will be included in a revision to Appendix V of the Local Authorities Handbook, to be completed during 2000. The guidance and model responses issued by the Natura Project Team will also be relevant where Natura sites are affected by the proposal.

In drafting a response letter to the Planning Authority adequate emphasis should be given to the most important issues of concern to SNH. For example, the loss of physical landscape features may be the most pronounced impact on the natural heritage resource and this should be clearly indicated by the position and emphasis that is given in the response letter. The degree to which the resource is affected and whether it is of local, regional, national or international importance should also be indicated.

Reference should also be made to the extent to which the proposed development accords with any mineral strategy or Subject Plan prepared by or on behalf of the Planning Authority, or to any more general, Local or Structure Plan Policies as well as national planning guidance and policy. Particular attention should be paid to the terms of NPPGs 4 and 16, PAN 50 and its supplementary Annexes and, of course, to NPPG 14. When cumulative issues are a concern reference can be made to the NPPGs 15 and 16 which recognise the material nature of such impacts.

Use of the above process and the early and co-ordinated involvement of a range of Area and other staff (Advisory Services, National Strategy, N2K) should help to ensure that eventual decisions to object or not object, and the terms of those decisions are consistent across SNH as well as being sound and defensible (e.g. at PII). If there are no objections to be made about the principle of the development, comment should be made on the effectiveness of the mitigation and restoration proposals, including consideration of how the site is to be operated and workings phased. There may be further improvements to the mitigation and restoration proposals that can be made, imparting further beneficial effects to the landscape and wider natural heritage interests and it is important not to miss the opportunity to suggest possible conditions or Agreements in the response letter. It may be appropriate in some situations to register an objection unless certain measures are incorporated into conditions or sought through Agreements. Conditions and Agreements could thereby provide a mechanism for securing natural heritage benefits.

When encouraging the Planning Authority to impose conditions it should be borne in mind that these should pass the tests of Circular 4/1998 and be necessary, relevant to the development and the planning process, enforceable, precise and reasonable in all other aspects. Planning Advisors, in combination with the Advisors concerned with specific natural heritage interests can offer help when formulating the required content of conditions. The precise wording is however a matter for the Planning Authority. Area Officers should provide a precise identification of the issues which SNH require the Authority to address. Further details regarding the scope and content of conditions is to be found in Section D23 of the Local Authorities Handbook Section.

Legal Agreements, such as those under Section 75 of the Town and Country Planning (Scotland) Act 1997 and Section 49A of the Countryside (Scotland) Act 1967, are a further way of resolving objections and seeking constructive benefits from a minerals development proposal. They are particularly useful for achieving pro-active measures or financial provisions for monitoring and managing natural heritage impacts including long term management which may require further modification. Suspensive or negative ("Grampian") conditions may also be appropriate where natural heritage interests require mitigation measures to be put in place before development is allowed to commence. The Local Authorities Handbook (Sections E4/5) contains further advice on the use of legal Agreements. Case law is however constantly evolving and further guidance will be issued in forthcoming revisions to the Handbook and should also be obtained from your Planning Advisor.

Following submission of the final response Area Officers may be required to enter discussions with applicants and/or Planning Authorities both prior to and following determination of the application. These discussions are often lengthy and time consuming and may relate to the precise nature of natural heritage concerns, the format of further mitigation or modification suggested by SNH or the terms of conditions and Agreements, and of course participation in a Public Local Inquiry, whether as a result of an Appeal or call-in by the Scottish Ministers.

Section 4: Supplementary Guidance



Hard Rock - Gillies Hill, Stirling.

Earth Heritage

Introduction

The following additional guidance augments that contained in Steps 4 and 5 regarding the impacts on Earth heritage and the concept of a Conservation Section. The overall process reflects that followed by an Earth heritage advisor when assessing Earth heritage impacts resulting from proposed mineral development. Throughout the assessment process an Earth heritage advisor is available to be consulted at any stage; swift referral well in advance of response deadlines is appreciated. Early consultation involving the advisor, developer and Area staff is often beneficial.

Further guidance is available in the references listed in Appendix 4. The guidance contained in Section 3 relates principally to Sites of Special Scientific Interest (SSSI) and Geological Conservation Sites (GCR). The Midland Valley contains Earth science sites - a mixture of SSSIs and GCR sites (candidate SSSIs) - that represent a wide variety of geological and geomorphological interests. These comprise a number of different site types (e.g. active quarries, disused quarries, inland outcrops etc.). As a result, assigning broad guidance to cover all eventualities is difficult. Conservation principles for an active quarry, for example, differ from those of a landform threatened with sand and gravel extraction.

Determining the impacts on the Earth heritage

The guidance which follows examines the conservation principles of different site types. It draws principally upon information contained within the Appendices to *Earth Science Conservation in Great Britain: A Strategy* (copies of which should be available in all Area Offices) and the *Environmental Assessment Handbook*. As explained in Section 2, site specific guidance (where available) is derived principally from information contained in the 'blue folder series' (Earth Science Site Management Briefs) and is provided as text files attached to individual sites on LGF.

Mineral development impact is dependent upon:

- the site type;
- the nature, scale, duration and location of the mineral workings;
- mitigation, restoration and after-use plans.

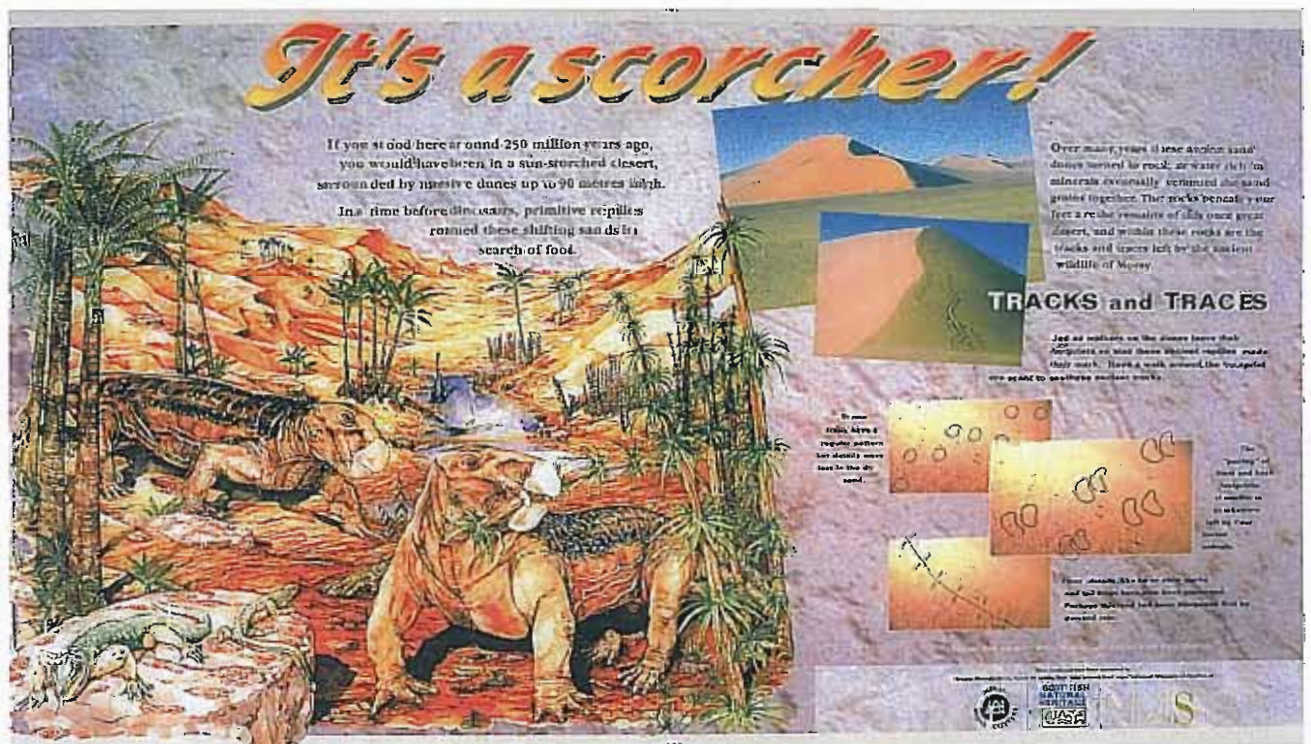
Earth heritage site types

The Earth Science Strategy for Conservation (NCC, 1991) proposed two classes of site type: exposure and integrity sites.

Exposure sites are defined as those sites where the scientific or educational value lies in the exposure of a sub-surface feature. They are particularly valuable where natural exposure is limited. They often provide a window into an otherwise extensive, albeit unexposed, sub-surface feature. For example, lavas represent a good proportion of the geology of East Lothian. Disused quarries within the Garleton Hills SSSI provide extensive exposures of part of this lava sequence. In terms of management, as with many exposure sites, further extraction rarely compromises the interest, and often serves to enhance it.

Integrity sites represent those where the scientific and educational value lies in the fact that they contain and expose finite deposits, such as unique minerals, fossils or

Earth Heritage - Clasach, Elgin. Although this site lies outwith the Midland Valley it is a notable example of an Earth heritage benefit which includes provision of educational exhibits on site and to National Museums, and interpretative material to a nearby footpath.



landforms. If destroyed, the interest of these sites is irreplaceable. An example is Bangle Quarry SSSI (East Lothian). As well as exposing part of the East Lothian lava sequence, the site also exposes an intrusion containing exceptionally well developed crystals of the mineral sanidine. In this case, efforts should be taken to ensure the conservation of the intrusion, whilst allowing extraction of the lavas to continue.

Table 4 of Appendix 2 lists site types together with their associated conservation objectives. The key issues to address are:

- Determine site type. Is it an exposure or integrity site? Note that some sites may contain elements of both.
- What Earth heritage features will be affected? How extensive are they on site? Where do they occur in the site? To what extent will they be affected?
- Are there any unique or special features? Are they likely to be lost? An Earth heritage advisor is available to provide guidance on the national extent of such features.
- Do mitigation and restoration proposals satisfactorily address changes in the exposure of, or access to, the scientific interest? Do they address the potential for off-site damage?

Nature, scale, duration and location of mineral workings

Mineral developments come in all shapes and sizes and may range from a small borrow pit for local road repairs to extensive opencast coal or sand and gravel workings and superquarries. Consequently, it is necessary to consider the likely effects of the nature and scale of the proposed development with respect to the characteristics of the site.

The following considers three general cases:

An opencast coal proposal

Where a site is designated for its sequence of rocks, a stratigraphic site, then the impact of the workings would depend upon the geology of the area and the nature of the operation. If the beds are tilted, it would be necessary to consider how this might effect the conservation of a suitable section following extraction. If, as extraction took place, the section would be lost, then an objection would have to be considered. If, however, the beds are horizontal, it may be that an acceptable replica of the original section may result. In this case, a Conservation Section would need to be built into the restoration plans.

An aggregate (hard rock) quarry

Aggregate tends to be sought in areas that offer a consistent product, both in terms of quality and quantity. Consequently, most areas affected tend to be representative of a particular rock type, or feature, that is otherwise extensive below the surface: an exposure site. There are exceptions. Some quarries contain unique mineral interests, (e.g. Bangle Quarry, mentioned above), while others may expose important contacts with surrounding rocks. Special considerations are required in these cases. Advice is available from the AS Earth Science Group.

The principal rock types targeted for hard rock aggregate in the Midland Valley are listed and ranked in Table 2 (Appendix 2). In most cases, the importance of the quarry lies in the fact that it provides representative exposure. The rock types tend to be homogeneous and additional exposure is often beneficial and rarely compromises the interest.

Where the interest is more complex, e.g. in relation to some of the lava formations, consideration needs to be given to the thickness, lateral extent and dip of the feature. In this way, the assessment is similar to that of a stratigraphic site.

Sand and gravel extraction

In order to assess the effects of extraction it is important to understand the balance, distribution and nature of the interest within a site. For example, a site selected principally for its sediments and stratigraphy may be less vulnerable to mineral development compared to a site selected for its landform interest. In Scotland, landforms composed of sand and gravel were mainly formed as a result of glacial action during the last Ice Age. They are considered to be relict features as they were formed by processes that no longer operate. Consequently, the resource is finite, which cannot be satisfactorily replaced if damaged and, if destroyed, is irreplaceable.

With patterns of landforms, further consideration may need to be given to how they relate to one another, and how the extraction may impact upon the integrity of the landform assemblage taken as a whole.

Sand and gravel extraction can have both positive and negative benefits. New sections exposed for study need to be judged against the potential loss of part of the feature, or reduction in the naturalness of the landform. Essentially, a value judgement is required that utilises all available information in arriving at a balanced decision.

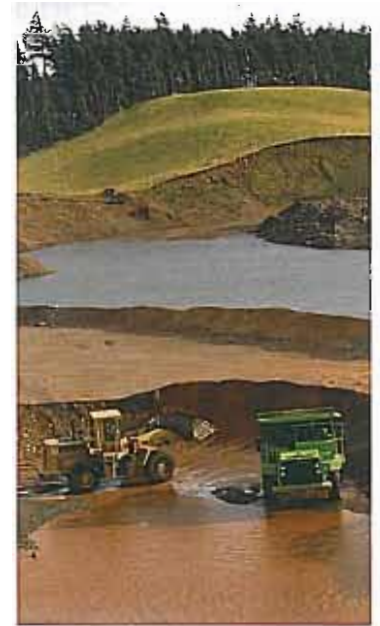
- Does the scale of the operation compromise the interest?
- Are there any positive benefits for the scientific interest? Are there negative impacts? What is the balance between them?

Sand and gravel extraction from rivers and coasts is a separate issue. It impacts on dynamic processes that are currently active which can have significant impacts on and off-site.

A Conservation Section

It is important to consider the requirement for a Conservation Section in order to safeguard sensitive Earth heritage interests during operations and from unsympathetic restoration.

The principal consideration with most Earth heritage sites is the requirement for a Conservation Section that is both appropriate to the interest and takes account of the after-use of the site. The optimum scale of the section will be informed, in the first instance, by the Earth heritage interest. Guidance may need to be sought at this stage from the Earth science advisor to confirm the selection of the most appropriate locality within the site. Other factors to be considered by all parties include:



Sand and Gravel - Mountcastle, Fife.

Extraction may involve working below the water table with hydrogeological and hydrological implications.

- health and safety
- liability
- ownership
- access
- management

Appropriate engineering solutions are available in many cases. Guidance is provided in the Appendices to *Earth Science Conservation in Great Britain: A Strategy*. It should be noted that the Section may require a means of access, particularly if the interest occurs high-up on an exposure.

Where permanent exposure exists, it is important to consider how the Earth heritage interest can be accommodated with the planned after-use for the area, for example:

- natural regeneration
- agriculture
- woodland
- built development
- landfill
- informal or formal recreation

By contrast, permanent exposure, in some instances, may not be appropriate, particularly with respect to sand and gravel sites. A binding agreement with the owner, or operator, to allow the provision of temporary exposures for study purposes may be all that is required (see Gordon, 1996 for further details).

In some cases, a Conservation Section may represent a cost benefit to the operator, e.g. where restoration to contour is no longer required, savings may be made on topsoil. Alternatively, some recommendations may represent a loss of potential earnings, e.g. the loss of fill space (conservation void) in landfill proposals. In all cases, the conservation of the Earth heritage interest needs to be balanced against other natural heritage and socio-economic factors.

The following issues should be considered:

- Is there satisfactory detail to assess the proposals?
- Consider the case for a Conservation Section? Is it appropriate? Is a temporary or permanent exposure required? What is the nature, scale and location of the Section? Have all other factors been considered? Is an engineered solution feasible? What are the costs? Does it represent a cost benefit to the operator?
- Is this a new Section? Does it satisfactorily replace the original?
- What are the access provisions?
- What are the future management issues?
- Is it possible to reconcile the proposal with other nature conservation interests?
- Do the restoration proposals satisfy local needs or demands? Are there any benefits that can be accrued to local communities e.g. climbing, environmental education, use by local schools?
- Are there any measures in place so that the compliance and effectiveness of restoration measures can be monitored and evaluated by the determining authority?
- After restoration is there an improved or detrimental effect on the broader natural heritage interests of the site?

Soil conservation

When soils are removed during mineral development due regard should be given to ensuring that top and subsoil are separated. Mixing the two leads to soil degradation. Soils should be removed and stored separately, according to top and subsoil divisions and soils should be stored in a manner that prevents a decline in quality. Excessive compaction or water-logging affects quality. Useful guidelines are contained in Part IIA of the Environmental Act 1995.

Extraction of sand and gravel at depth may affect soil hydraulic properties. It should be noted that the Agricultural Land Classification may change as a result of these impacts and that a Soil Protection Strategy may be developed for Scotland; a similar strategy is being developed for England and Wales.

Soil replacement should also be carried out in an appropriate manner, with due regard to the soil horizons. Soil displacement to other sites is considered to be an unsustainable practice, and is not recommended.

Following soil restoration, monitoring should be used to assess the impact of the mineral development on the soil functions, e.g. nutrient cycling and hydraulic properties. This will depend upon the end-use of the land following mineral development.

Further advice

Further advice and support in responding to the Earth heritage component of consultations on mineral developments is available from the Earth Science Group. Initial contact John Gordon (0131 554 9797).

Nature Conservation

The following provides supplementary guidance, further to Section 3, regarding assessment of the significance of impacts upon nature conservation interests.

Use of datasets in casework

The species data contained in the digitised datasets, which collates a wide variety of information sources, will be particularly useful when responding to individual items of casework. The probable Annex 1 habitats dataset will provide a broad indication of sensitivity and also serve as an initial check on the likelihood of the occurrence of such a habitat.

The digitised datasets will enable Area staff to identify whether a specific proposal is likely to impact upon any of these habitats or species. The other sources of information identified in Appendix 3 should be used to provide detail of habitats and species not covered by the digitised datasets. Identification of habitat and/or species concerns at this stage will enable advice to be obtained from the appropriate AS advisor on the impact of the development. If a mineral development is proposed for an area indicated to be of high or medium sensitivity for Annex 1 habitats then the presence, extent and quality of the habitat should be assessed. The impact of the development can then be evaluated for its significance.

Steps 1-8 contained in Section 3 should be followed, with reference to the EA and LA Handbooks as appropriate. Information on the evaluation of significance of impact is given below.

Significance of an impact

The significance of an impact depends on the importance of the receptor and the timing, magnitude and duration of the impact. (A receptor is the nature conservation resource that is affected by the impact.) The two strands are linked in determining the impact from SNH's viewpoint, since the sensitivity of a nature conservation interest to mineral development is related to its importance. High conservation significance makes a receptor more sensitive to development per se.

Significance thresholds for an impact are determined from the combination of sensitivity and magnitude, and an example of such a matrix is given below.

Matrix showing determination of description of ecological significance			
Magnitude of Impact	Importance of Receptor		
	National	Regional	Local
Severe	High	High	Medium
Moderate	High	Medium	Low
Slight	Medium	Low	Low

(adapted from SNH Handbook of Environmental Assessment, Appendix 2 figure 2)

The more important the receptor and the greater the magnitude of any changes, then the more likely it is that the changes will have greater significance, for example, a moderate impact on a nationally important habitat or species would be considered to be highly significant. However severe impacts on a locally important nature conservation interest might be considered as having medium significance. AS will be able to provide advice at this stage.

Other uses of datasets

Area staff should utilise the datasets when dealing with general enquiries from potential developers and to indicate at an early stage where proposals have the potential to conflict with areas of nature conservation interest.

They will also provide the basis for advice to Planning Authorities during the preparation of Structure and Local Plans, regarding broad nature conservation sensitivities.

Further advice

Further advice and support in responding to the nature conservation component of consultations on mineral developments is available from a range of advisors within Habitats and Species Branch. Initial contact Dave Batty (01546 603611).

Sand and Gravel - Birnie Loch, Fife.

Wet working offers the potential for restoration to nature conservation, environmental education, and recreation and access purposes - achieved with success here by Pioneer Aggregates Ltd, Fife Sand and Gravel Co and Fife Council.



Landscape

This additional guidance explains in detail the overall process referred to in Steps 4 and 7 to identify the landscape and visual impacts of mineral development and the means by which their significance can be assessed.

Introduction

The process described here and in Steps 4 and 7 reflects that followed by an SNH Landscape Advisor in assessing the landscape and visual impacts of any mineral development. It is widely applicable and should not be restricted to those developments requiring an Environmental Statement (ES) under the Environmental Assessment Regulations. It attempts to provide additional structure and consistency to SNH responses to mineral development applications. It also highlights the information relevant to the assessment of mineral development applications and identifies the help and advice that can be offered by Advisory Services.

Landscape and visual impacts are related but individual concepts. Landscape impacts are on the fabric and character of the landscape and are concerned with:

- The physical landscape components (such as trees and landform);
- Landscape character;
- Special landscape interests such as designations.

Visual impacts are the effects on people of the changes in views through intrusion or obfuscation and whether the ability to appreciate a view has been improved or reduced.

The process of assessing the landscape and visual impacts of a specific development are detailed in this additional guidance note. It is an iterative process, and the order of the following headings is provided for guidance only. A Landscape Advisor can be consulted at any stage of the process but swift referral, well in advance of response deadlines, is essential.

Cases which are particularly likely to benefit from the input of a Landscape Advisor include:

- Those requiring an environmental assessment (see Step 1);
- Where the adverse landscape and visual impacts are considered to be significant, cumulative and/or permanent;
- Where the landscape type concerned is identified in the LCA as sensitive to the proposed development;
- Where the development is contrary to the Development Plan.

Depending on the complexity of the case, it will in most instances be possible to use this guidance note to assess the development and draft an initial response letter, which a Landscape Advisor can then contribute to, as appropriate.

To assist in prioritising casework, and reaching a preliminary view on the relative significance of the landscape and visual impacts, the following key points should be considered:

- Is the proposal located in a sensitive landscape? This is best assessed by consulting the appropriate LCA report and by identifying whether a designated area such as NSA, designed landscape or AGLV is affected;
- Identifying whether the proposed development is contrary to the relevant policies in the Development Plan.

- Is it in an area subject to, or likely to be effected by cumulative impacts of mineral operations (i.e. is it one of a number of existing or proposed developments within an area or along a road corridor, or which are intervisible, which are either new proposals or extensions to existing development, in an area already fragmented, or degraded by existing or previous operations?);
- Are the landscape and visual impacts irreversible or permanent (for example, will the proposed operations permanently diminish or result in the loss of key landscape features, or key characteristics as identified in the LCA)? Is it visible from, and likely to adversely impact on key viewpoints? (These might include, for example, settlements, main roads, railways, public buildings, well used trails or footpath networks);
- Is the total land area affected greater than 25 ha. and would the operations exceed 2 years in duration?
- Would the proposed restoration be ineffective in sustaining, replacing or enhancing landscape character?

If the answer to any of these questions is YES, then the application merits further detailed consideration of the landscape and visual impacts.

Determining the landscape impacts - physical landscape features

The physical components of landscape include landform, drainage, soils, land cover and so on. They can be described with objectivity and the frequency with which they are affected by a development can be determined.

Loss of physical landscape features may be the most significant and long lasting impact of a mineral working and so it is worth giving this detailed consideration.

The EA Handbook (Appendix 1) shows an example fieldsheet outlining how the physical components of the landscape may be assessed in the field. A clearer picture of impact can be obtained by using such checklists and comparing with the proposals at the various life stages of a development.

The following issues should be considered:

- What are the physical landscape features that will be affected? For example, will hedges, dykes or trees be lost? Will landforms be lost, watercourses or waterbodies affected?
- Other habitats, such as woodland or wetland, may not be formally designated, but may nonetheless make a significant contribution to landscape character. To what extent are they affected? How robust are they?
- Are there any unique or special features that will be lost?
- How do any mitigation and restoration proposals address changes in the physical landscape?

Determining the landscape impacts - landscape character

Landscape character is the combination of the physical components and our experience of them. Although each place is unique most areas have broad combinations of key characteristics that are repeated which can be identified as 'landscape character areas'.

The LCA report for the area will provide useful information on the broad context of the site. Eight reports apply to the Midland Valley (Figure 12).

It will often be necessary to also check the landscape character in the field, to verify whether the supporting information is accurate. If a proposed development is of concern, and the information in relation to landscape character is weak, or not covered by the ES (or information in support of the application), then Area Officers should ensure that the Planning Authority are made aware and request further information from the developer.

The following questions should be asked:

- What is the landscape character of the general area as described in the LCA report? What are the key characteristics of the area? What are the forces for change that are identified? How widespread is the affected landscape type in the local and regional context of the report? Is it extensive and recurring frequently or is it localised and rare or unique?
- What is the landscape character of the specific site and what are the key characteristics of the landscape? Does this vary from the application/ES? Is the identification of more detailed sub-areas required?
- What is the condition of the key characteristics of the landscape? How is this influenced by the existing land, vegetation and building management? How far from the perceived optimum condition is this landscape?

Mineral Waste - Dalmellington, South Ayrshire.

Impacts upon landscape character include those from the storage of top-soil, overburden, extracted material and waste.



- Are the key characteristics strong enough to warrant protection, sufficiently weak to require enhancement or restoration or so fragmented that the creation of new features is required?
- What will be the effect of the development on the landscape character of the site? How will the key characteristics of the landscape character be affected?
- To what extent will noise affect the experience of the landscape?

Determining the landscape impacts - special landscape interests

Impacts upon acknowledged special interests such as designated landscapes, scheduled historical sites and nature conservation sites should be considered. Many other interests in the landscape will have no statutory form of protection but will be worthy of further consideration. These include broader cultural associations with the landscape such as references in art or literature, historical landmarks, designed landscapes not included in the Inventory and historical land use patterns and so on.

The following questions should be asked:

- What landscape designations or other designations exist and how do these relate to landscape issues? The site may provide a setting or landscape context to a listed building, for example. What is the impact of the development on the integrity of these designations?
- Can important cultural features be identified from field work, OS maps, aerial photos and so on? What is the impact of the development on these features?
- Is further liaison with other interested parties needed (for example Historic Scotland, Garden History Society)?

*Hard Rock - Kirk O'Shotts, North Lanarkshire.
Close proximity to major communication routes will affect the scale of potential visual impacts.*



Determining the visual impacts

Visual impacts are essentially a sub-set of landscape impacts. They relate solely to changes in available views of the landscape, and the effect of those changes on people's experience of the landscape. The visual impacts of a mineral development may be large and/or long lasting. Assessing the visual impact therefore needs to be approached with care.

It is important to use good sources of baseline information and to carefully consider the information provided by the developer. A range of visibility mapping and visualisation techniques are outlined on page 68 of GVLIA.

The following issues need to be addressed:

- What is the potential visibility (the visual envelope) of the development? (O.S. maps will help to determine this in conjunction with the intervisibility dataset.)
- What will be the key viewpoints of the proposed development? What is the nature of such views - how sensitive or important are the views? What is the distance of such views?
- Who will be affected (numbers and types of views can be quantified)?
- What is the degree of visual intrusion or obstruction that will occur (mass, height, colour etc.)? How much of the view will be affected - measured approximately in degrees? How will the change in seasons affect the visual intrusion?
- What is the resultant impact on the nature of such views?
- Will dust be a potential visual impact (dust has the potential not only to form plumes etc. but to coat surrounding vegetation and landscape features)?

Assessing the significance of impacts

It will be necessary for Area Officers to consider the significance of landscape and visual impacts in order to provide some weighting of the advice contained in a response to the determining authority. The EA handbook section D8 and its Technical Appendix 1 covers this subject in detail. In assessing significance, reliance should be placed on common-sense and reasoned judgement, supported wherever possible by substantiated evidence. There are also various guides or frameworks that can aid a decision.

If Area Officers are unsure of how to proceed, then it may be appropriate to seek help from the Landscape Advisor.

By using the previous guidelines contained in Section 3 and by answering the relevant questions detailed above the resulting information may be distilled to answer the following questions:

landscape physical components:

- What is their sensitivity (high - medium - low)?
- What is the likelihood of change occurring?
- What is the magnitude of change - both adverse or beneficial (large - medium - small - no change)?
- To what extent do mitigation and restoration proposals minimise impact on landscape physical features?

landscape character:

- What is the sensitivity of landscape character (high- medium- low)?
- What is the magnitude of change - both adverse and beneficial (large - medium - small - no change)?
- To what extent do mitigation and restoration proposals minimise impact on landscape character?

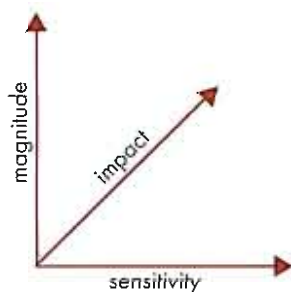
landscape special interests:

- Are there any designated landscapes (national - regional - local - none)?
- To what extent will integrity of designation be compromised (large - medium - large)?
- How important are non-designated features e.g. designed landscapes not on the Inventory of Historic Gardens and Designed Landscapes (high- medium- low)?

visual impact:

- What is the number of receptors (many - some - few)?
- What is the sensitivity of the viewpoints (high- medium- low)?
- What is the scale of intrusion on or obstruction of views (large - medium - small)?
- To what extent do mitigation and restoration proposals minimise visual impact (small - medium - large)?

The degree of impact can be determined from different combinations of sensitivity and magnitude:



Substantial impacts can be a product of high sensitivity or high magnitude.

Moderate impacts result from a combination of medium sensitivity and magnitude, or low sensitivity with high magnitude.

Slight impacts can be a product of low sensitivity or low magnitude.

Mineral Waste - Seven Sisters, West Lothian.
Mineral workings may produce distinctive additions to the landscape character or features of nature conservation value.



The significance of the impact on the landscape physical components, character, special interests and visual impacts can be determined from different combinations of sensitivity and magnitude as shown by the diagram above. Although the criteria for defining sensitivity and magnitude may vary from site to site this method helps to refine the information and provide an assessment of degree of impact in a consistent manner.

Once the degree of impact has been assessed the role of the mitigation and restoration proposals on those impacts should be summarised. Although these may appear to be linked issues it is best practice to first fully establish the degree of impact, then secondly to assess the role of the mitigation and restoration proposals in minimising the impacts.

Further reasoned and professional judgement will now play the final role in forming the final landscape input to the response letter. (Step 8).

Further advice

Further advice and support on responding to the landscape component of consultations on mineral developments is available from Landscape Group. Initial contact Nigel Buchan (0131 554 9797).

Recreation and Access

This additional guidance augments that contained in Section 3, in terms of Steps 4 - 7 regarding the determination of the impacts on recreation and access and the means of assessing mitigation and restoration proposals and the overall significance of the impacts.

Gathering background information

A number of potential information sources will need to be gathered and consulted to enable the nature, pattern and extent of formal and informal recreational use of the development site and surrounding area to be understood. This will subsequently allow the development proposal to be placed and assessed in the context of the local and regional recreation and access resource. The information sources which are likely to be most productive are listed in Step 2.

Field survey and site visit

The field visit should be used to increase the understanding of, and feel for, the current recreational use of the development site and the adjacent area. As part of SNH's remit is to facilitate and encourage opportunities for the enjoyment of the natural heritage, the potential of the site for informal and formal recreation should be considered. Care should be taken to avoid prejudicing future opportunities (e.g. as part of a Paths for All local network) where little opportunity exists for local access within the site. Contact with the Local Authority Access Officer or the Paths For All Partnership for advice may be appropriate. The Local Authority's countryside recreation and access strategy may also provide an indication of the potential recreational uses of a site.

Lochore Meadows, Fife.

The dereliction which resulted from deep and shallow coal workings was successfully treated at Lochore to create a Regional Park containing a mixture of formal and informal recreational and environmental education facilities.



Determining the recreation and access impacts

Mineral developments can clearly impact on the access provision of an area through the loss of sites, facilities and recreational opportunities and the reduction in amenity value of adjacent areas. These impacts can however be time limited, albeit for many years in some projects, provided there is appropriate reinstatement of the existing recreational provision and resource. Moreover, the restoration programme for mineral developments provide a valuable opportunity not only to reinstate the existing access resource, but also to enhance it. When determining the impacts of the development proposal it is therefore important to consider both negative and positive impacts on the existing and potential recreational use of the site and surrounding area.

The following issues should be considered:

- What is the extent, nature and pattern of recreational use in the area?
- What recreational facilities and activities will be affected by the development?
- To what extent are they affected? For example:
 - physically lost
 - reduced in amenity value (visual, noise, dust)
 - subject to visitor safety implications
- Did any of these facilities receive grant aid from SNH and if so, does any maintenance period stipulated as a condition of grant still apply?
- Are there any important access facilities or recreational opportunities which will be lost, actual or potential? For example:
 - access to key sites, points of interest, local landmarks;
 - key linking routes within the local network;
 - a key facility within the area for certain recreation activities e.g. horse riding, cycling;
 - opportunities to assist development of local path networks (i.e. extinguishing potential).
- Will any infrastructure be lost which will affect access and recreation use in the wider area (e.g. a bridging point)?
- How will vehicular access to or from the site by site traffic affect recreational use of the wider area e.g. safety issues from increased traffic on tracks or previously quiet minor roads?
- Users of recreational facilities adjacent to the site must be considered as a distinct category of visual receptor. The pace of recreational activity (walking, cycling and horseriding etc.) is such that the visual impacts may be greater than for other transient groups. The viewing angle and height from a bike or horse should be taken into account where these activities are undertaken. Assessment of visual impact should therefore include consideration of the potential visibility of the development from key recreational facilities in the area, the degree of visual intrusion or obstruction and the extent to which visual impact would reduce the amenity value to a level that the use of recreational facilities may be affected and even stopped altogether (see landscape advice above and in Section 3)?

Assessing the mitigation and restoration proposals

The impacts on recreation and access facilities can be reduced by limiting the loss of linear and spatial recreation resources, providing alternative routes or diversions wherever possible and a commitment to reinstate all facilities in the restoration proposals. Restoration provides a significant opportunity to improve the resource base for recreation and access. In some cases, the development of specific access and recreation facilities could be considered as a prime after use which could satisfy a strategic demand for a particular type of facility.

Mitigation

The following key questions should be considered when assessing the proposed mitigation measures:

- Can the proposals be modified to avoid, or limit, the loss of recreation and access facilities?
- Where footpaths or other popular routes will be lost temporarily, will alternative routes be provided or diversions using other routes signed?
- If a public path under the definition of the 1967 Countryside (Scotland) Act is to be suspended, diverted or extinguished, is the Local Authority aware of the formal statutory procedures in considering this case?
- Can the design be modified to reduce the impacts on the recreation resource in the adjacent area (e.g. temporary bunds to limit the visual impact)?
- Can the phased working and restoration be modified to limit the temporary disruption or loss of recreation/access facilities?
- Will there be adequate signing and information, on and off site to inform walkers of routes which have been closed or diverted due to the mineral working, especially for any routes previously promoted in maps, guides, books and leaflets?
- Has the safety of people enjoying informal recreation adjacent to the site been fully considered (fencing, warning signs etc.)?
- Has the impact of site traffic on access roads also used for recreation (linking footpaths, circular routes) been satisfactorily mitigated, either by a commitment to manage verges to provide a separate walking surface, coupled with an adequate warning or the provision of an alternative walking surface adjacent, or parallel, to the road?

Restoration and after-use

When assessing the restoration proposals, the following detailed issues should be considered:

- Will all the pre-development recreation and access facilities be reinstated?
- Will the restoration proposals improve the quality of recreation facilities (e.g. is the construction specification adequate for the type and level of recreational use)?
- Could the restoration proposal be modified to improve the management of the nature and pattern of recreational use through strategic alterations to the previous line and siting of paths and facilities (e.g. car parks)?
- Do the restoration proposals satisfy local needs or demands for recreation and access ?
- Could the proposals be modified to enhance the provision of recreation and access through the introduction of new facilities (e.g. new footpath links to a local attraction or viewpoint, or a crossing point over a stream)?
- Do the proposals fully take account of opportunities for recreation and access (e.g. provision of space for access routes alongside reinstated field margins, consideration of access in planting schemes etc.) ?
- Could the afteruse be developed to provide for recreation as the prime land use of the restored site (e.g. retention of a water facility created during extraction for use as a recreation resource, a welcoming access area with car park, picnic site, visitor centre etc.) ?
- Will the developer contribute to the maintenance cost of the recreational facilities ?

Assessing the significance of impacts

Assessing the implications and significance of mineral development proposals on the access provision and recreational uses of a development site requires a different approach from that described for Earth science, landscape and nature conservation. Access to the countryside for many informal recreational activities, such as walking, can take place almost anywhere. As a starting point, it is therefore reasonable to assume that there will be some informal recreational use by the public of most development sites. The nature and degree of this recreational use will need to be considered in assessing the significance of any impacts, the appropriate mitigation and the requirements of the site restoration programme.

The impacts on well known and popular recreational sites and facilities which are managed and promoted (e.g. country parks, visitor "honey pots", national and regional walking and cycling routes etc.) are always likely to be significant. Similarly, it is relatively straightforward to assess the impact on a recreational activity which depends on the specific attributes or characteristics of a site for its continuance. If these attributes are lost through a development, then clearly the opportunity to participate in the related activity at that site are also lost to the public. The implications and significance of this loss will be a reflection of the availability of alternative sites within the local and wider area. In reaching a judgement on the significance of the impacts there will be a need to consider the development in the context of the local and regional access resource.

However, the degree of formalisation and use of a site or facility, does not necessarily correlate with the importance of a site for recreation and access, particularly in a local context. Recreational use of the countryside is not restricted to formal managed sites but is dispersed throughout the countryside, existing alongside other land uses. Many informal footpaths are crucial in providing communities with access to the countryside and to the functioning and integrity of the network of local paths. Equally, visitor numbers or participation rates are obvious indicators of popularity of a resource or facility, but not necessarily its importance in a local context. Within a local network of informal paths there will be some routes or specific features, e.g. a bridging point, which provide important links for the creation of attractive circular walking routes and recreation patterns in the whole area. The impacts of the development on recreation and access may therefore extend well beyond the boundary of the development site.

In summary, the significance of a minerals proposal on recreation and access is likely to be a function of:

- The importance of the recreational site/facility, in terms of
 - Any official designation, management and promotion of the site
 - Visitor numbers, type of user
 - Accessibility of the site, particularly to local communities
- The function of the site/facility in the local access context
- The function of the site/facility in the integrity and linking of path networks
- The recreational opportunities provided (“the degree of specialness”)
- Specific recreational opportunities which are lost or affected by the development
- The range and accessibility of alternative recreation sites/facilities in the area

On balance, within the Midland Valley, SNH is likely to attribute greater significance to a mineral development’s impacts on the local recreation and access resource where these affect (presented in no particular order):

- A country park
- A regional park
- A public path or public right of way (claimed or asserted)
- Path networks around settlements
- A regional walking route or cycle way
- Strategically important routes e.g. link routes, with no alternatives
- Key visitor facilities and “honey pot” sites e.g. picnic sites, car parks
- Locally important and well used paths and tracks
- Access to local landmarks and points of interest (waterfalls, viewpoints)
- Any site with well established and promoted visitor use
- Recreation facilities grant aided by SNH

Further advice

Further advice and support on responding to the recreation and access component of consultations on mineral developments is available from Recreation and Access Group. Initial contact Alan Macpherson (Tel: 01224 642863, Ext. 230)

Appendices

1. **Policy Guidance on Opencast Coal and the Natural Heritage - (Draft)**
2. **Earth Science Classifications** -
 - Table 1: Site classification and conservation objectives relevant to mineral development in the Midland Valley
 - Table 2: Hard rock aggregate resources in the Midland Valley
 - Table 3: Sand and gravel classification
 - Table 4: Conservation principles associated with mineral extraction activities
3. **Nature Conservation** -
 - Methodology for Annex 1 habitats
 - Species datasets
 - Nature conservation interests
4. **Further References**

Appendix 1. Policy Guidance on Opencast Coal and the Natural Heritage (Draft)

Individual proposals for opencast working have become increasingly contentious in recent years. In part, this change reflects increased concern over the potential range of economic, social and environmental impacts which such workings can produce. It is also the product of the recent development and further concentration of opencast coal workings in certain parts of Central Scotland. In view of the high public profile and political interest that this industry has attracted, this Policy Briefing provides a summary of SNH's current policy position on opencast coal development.

Key Points

- SNH is concerned that individual opencast workings can produce severe short and long term impacts on natural heritage and informal recreational interests of an area. SNH will therefore oppose opencast proposals which in themselves, or in combination with other such developments, threaten important natural heritage and informal recreational interests.
- SNH recognises that individual opencast developments are also capable of enhancing or creating natural heritage and informal recreational interests, although this requires sensitive and detailed design of the operations and of the required restoration, after use and after care. In line with NPPG 16, SNH will therefore seek to secure that all future opencast workings provide net natural heritage and informal recreational benefits.
- SNH will continue to work with Planning Authorities, operators and other relevant interests in order to direct pressures away from the more sensitive areas and to improve the overall environmental performance of the industry. We therefore wish to be involved in the preparation of Development Plan policies and investment programmes, as well as the design and determination of individual proposals.
- SNH will seek further changes to national policy which: establish a clearer national policy on the future contribution of opencast coal as part of an overall energy policy for the UK; develop a more strategic approach to the planning of opencast development in national planning guidance; and strengthen the requirement for properly planned, implemented and enforced restoration and after-care.

Background

SNH's policy on mineral development recognises that extraction is essential for the supply of construction materials. Our policy on the energy industry also recognises the need for a continuing supply of fossil fuel, while seeking to encourage greater reliance on renewable energy sources. The degree to which extraction and use is consistent with sustainable development is held to be a judgement on whether the adverse impacts on the environment and the natural heritage its supports are justified by the material benefits. SNH's approach is therefore to promote:

- the more efficient use of minerals, in particular through the greater use of recycled or secondary aggregates and in the increased use of renewable energy;
- the location of mineral extraction where least environmental damage would occur; and
- mineral operations which minimise the impacts of mining as it takes place and restore the quality of the site as far as possible on completion of extraction

Opencast development raises particularly difficult issues in terms of finding the right balance between economic and environmental considerations. The principal conflicts between opencast coal extraction and SNH's areas of interest are:

- permanent loss of habitats through extraction and short or long term disturbance to species through noise, dust and severance of wildlife corridors;
- damage or disturbance to the quality and quantity of surface and ground water through diversion, pollution or reduced water levels;
- loss, damage or disturbance of habitats and wildlife in adjoining or connected areas (e.g. through air or water pollution);
- short or long term damage to landscape character, including its natural beauty and amenity;
- visual intrusion from workings, overburden, soil bunds, plant, heavy vehicles (on and off site) and lighting;
- severance of recreational access and adverse impact upon the enjoyment of the countryside (e.g. from viewpoints, footpaths, parks, visitor attractions);
- damage to soil quality resulting from soil stripping and storage, inadequate restoration techniques and operational pollution; and
- loss or damage to Earth heritage interest.

These concerns are exacerbated where there is potential for the accumulation of impacts on the natural heritage as sites are extended or replaced by adjoining workings, where sites are allowed to operate concurrently within a particular area or where the separate impacts from one site combine to produce a significant overall level of impact.

SNH recognises that opencast developments may also produce economic, environmental and social benefits by providing direct and indirect employment, by clearing derelict or dispoiled land and by removing land instability and thereby releasing restored and improved land for beneficial development and infrastructure. The large amount of overburden also provides the opportunity through careful restoration to recreate or improve landscape features while opportunities may also be presented to create and enhance habitats, landscape, recreational access or Earth heritage interpretation.

Since 1997, Government policy on opencast coal has been the subject of extensive reviews, culminating in the release in April 1999 of NPPG 16 "Opencast Coal and Related Minerals". As a result, policy and guidance to Scottish Planning Authorities relating to opencast coal extraction has been considerably strengthened, and there are indications that this is being translated into more robust and restrictive development plan policies, and tighter requirements in terms of the operation and restoration of sites.

While strongly welcoming these developments, we remain disappointed over the continued absence of a clear policy steer on the future contribution of opencast coal as part of an overall UK energy policy. Although the effect of the recent guidance is likely to limit the further development of opencast coal, this approach only provides at best an indirect steer and one in which individual local authorities are left trying to resolve how new applications meet national expectations. In our view, a more strategic approach is still needed nationally in Scotland. This should fully take into account natural heritage and informal recreational interests. We consider that further guidance is also needed to strengthen the requirement for properly planned, implemented and enforced restoration and after-care. This is particularly problematic for areas of peat bog and open moorland where restoration techniques are either unproven or require greater controls.

SNH's Approach to Opencast Coal

Opencast coal workings can have serious environmental consequences, particularly if operations are poorly located, designed and inadequately controlled or financially assured, as has occurred in Scotland in the past. SNH will therefore continue to engage with Planning Authorities as well as with the industry in a continuing dialogue which seeks to:

- steer the industry away from sensitive areas and achieve the highest possible quality of design, operating controls, restoration and after-use.
- encourage the industry to improve its environmental performance by minimising the impacts and maximising the opportunities which opencast development pressures can provide in enhancing and creating natural heritage and informal recreational resources.
- ensure the effective use of planning conditions and legal agreements and financial bonds.

This approach is consistent with the latest Government guidance contained in NPPG 14 *Natural Heritage* and 16 *Opencast Coal and Related Minerals*.

To aid this approach SNH has developed guidance to assist Area Officers when responding to specific development proposals and when inputting to Planning Authorities' development plans and to operators' future investment programmes. It comprises a mixture of datasets, sensitivity maps and narrative. It is likely that further work will be undertaken to extend the relevant datasets and also to expand or update SNH's policy, particularly in light of NPPGs 14 and 16. Technical guidance may also be developed regarding restoration best practise.

References

SNH Board Paper SNH/97/6/7, *Opencast Coal - Review of Planning Policy*

SNH Policy Guidance Notes 94/1, *Sustainable Development and the Natural Heritage*; 93/1 *The Energy Industry*; 94/8 *Mineral Extraction and Use*

Scottish Office National Planning Policy Guidelines 14 *Natural Heritage* and 16 *Opencast Coal and Related Minerals*

Contacts

For further information regarding SNH's policy on opencast coal contact Peter Rawcliffe at 12 Hope Terrace, Edinburgh, EH9 2AS, tel: (0131) 446 2218. Up-dates on the development of SNH planning and technical guidance are available from Ian Anderson at Caspian House, Mariner Court, Clydebank Business Park, Clydebank, G81 2NR, tel: (0141) 951 4488.

Appendix 2. Earth Science Classifications

Table 1: Site classification and conservation objectives relevant to mineral development in the Midland Valley

Classification	Site Types	Conservation Objectives
Integrity Sites	River systems and coasts	Minimise changes, avoid significant interference with natural process and preserve integrity of physical attributes, Composition, structure and visibility of systems and sites
	Other active geomorphological areas or sites	
	Static geomorphological sites e.g. kames, eskers	
	Unique mineral or fossil sites	
	Old mine dumps	
Exposure sites	Inland natural outcrops	Preserve exposures judging changes on their merits and where required enhance the sites.
	Stream sections	
	Exposures in disused quarries	
	Exposures in active quarries	

[Source: Nature Conservancy Council 1990]

Table 2: Hard rock aggregate resources in the Midland Valley

Geological Category	Ranking ¹	Comments
Midland Valley quartz dolerite sill complex	1	Generally continuous resources of good quality aggregate, currently the preferred source of crushed rock in central Scotland
Other intrusive bodies	2	Generally continuous resources of good quality aggregate, and quarried at several localities
Carboniferous Trachytic Lavas	3	Discontinuous resources, providing aggregate of satisfactory quality in appropriate locations, for example in East Lothian
Devonian lava formations	4	Discontinuous resources providing aggregate of satisfactory quality in a few places, in the Ochil and Sidlaw Hills
Carboniferous lava formations and all vent agglomerates	5	Discontinuous resources, formerly extensively used, but rarely nowadays, except for very basic end uses

[Source: British Geological Society 1998]

Table 3: Sand and gravel classification

Series	Description	Category
Summary assessments	Gravelly deposits	1
Summary assessments	Sandy deposits	2
Assessment maps	Potentially workable sand and gravel in continuous spreads, chiefly of glacial meltwater origin, locally overlain by till	3
Preliminary Studies	Glacial meltwater deposits, locally overlain by till in the Kelvin Valley; also raised marine deposits	4
1:50,000 maps	Glacial meltwater deposits	5
1:50,000 maps	Raised marine and glaciomarine deposits	6
1:50,000 maps	Glaciolacustrine deltaic deposits	7

[Source: British Geological Society 1998]

¹ The ranking in Table 2 is a rough guide to economic viability: 1 high - 5 low

Table 4: Conservation principles associated with mineral extraction activities

Activity	General Comments	Additional comments
Extensions to existing quarries and pits	Quarrying and extensions to mineral workings are generally compatible with effective Earth science conservation, although there are particular circumstances where quarrying may be damaging - broadly, where 'integrity' sites are involved.	<p>Quarrying is damaging in particular circumstances: a) Major excavations in landform sites where a substantial part of the feature of interest (e.g. kame, esker) will be removed. However, where excavations are at the periphery of the main landform and do not threaten its overall integrity, the sections created by excavation may in some circumstances be a useful adjunct to the main interest; and b) Complete or substantial removal of a unique feature such as an important mineral vein or fossiliferous horizon.</p> <p>Extensions into areas where active geomorphological processes are occurring, e.g. rivers, coasts, should be avoided.</p>
Mine dumps - reworking for aggregate or fill	Wholesale extraction of mine dumps is incompatible with effective site conservation; local extraction or reworking may be more compatible. Mine dumps often contain important minerals, representative of the mineralogy of the area.	<p>Extraction of large quantities of material will result in rapid depletion of the scientific resource. Small-scale extraction over a protracted period may have a similar result.</p> <p>Where planning permission for removal of mine dumps already exists or, where permission is not required, a compromise which allows for the purchase of material from another source should be sought.</p>
Inland outcrops and stream sections - mineral workings	Major developments are normally incompatible with effective site conservation unless they are restricted to areas away from outcrops and where they do not impinge on active processes.	<p>It may be possible, where sites of limited extent are involved, to reach a compromise whereby the key outcrops remain undeveloped and access is maintained.</p> <p>It will be beneficial in such circumstances to negotiate a management agreement to ensure that the conservation area is protected in perpetuity.</p>
Landform sites - excavations	Excavations are generally incompatible with effective site conservation although small-scale extraction is unlikely to pose a significant threat, unless the integrity of the landform assemblage is destroyed by the development.	<p>Major excavations in landform sites, such as those resulting from mineral extraction or road construction are generally incompatible with effective site conservation. Even where road cuttings are created in sand and gravel deposits, it is unlikely that useful permanent sections will result. Trenching for pipelines which involves full reinstatement may be acceptable after Environmental Assessment.</p> <p>Minor excavations, such as small borrow pits on agricultural land, are less likely to pose a significant threat unless the landform is so limited in extent that continued small-scale extraction would result in the removal of the whole feature of interest. It should be noted that planning permission for mineral extraction is not required where the material is to be used within the associated landholding.</p>

(Source: Nature Conservancy Council 1990)

Appendix 3. Nature Conservation

Methodology for Annex 1 habitats

The probability of any area having an Annex 1 habitat was assessed using the only comprehensive and standardised dataset that was available for the whole of the Midland Valley i.e. LCS 88.

However there are several problems with this method as follows;

- the dataset is almost 30 years old
- it is based on aerial photographic interpretation of 1:24000 maps
- habitats covering less than 2 ha are not recorded
- the classification used does not readily cross-reference to that used for the Annex 1 habitats

It is therefore important to accept that the original dataset is of limited accuracy. However it is hoped that adopting it at the strategic rather than the site level will compensate for this.

A pragmatic approach was taken whereby each of the single features of the LCS 88 survey was assigned a score as to whether SNH expert opinion felt it was likely that the LCS 88 habitat would correspond to an Annex 1 habitat. For some it is possible to be confident that the match is good e.g. 'blanket bog/peat veg; erosion no trees' (LCS 88 category) is very likely to have an Annex 1 habitat and therefore scores 3. Conversely built up areas are very unlikely to have an Annex 1 habitat and therefore score 0.

Although no specific figures can be given for the probability of the presence of Annex 1 habitats the following were agreed as the best guide;

High probability	say > 80%	3
Medium probability	say 20-79%	2
Low probability	say < 20%	1
No probability	0%	0

The High, Medium and Low probabilities are assumed to correspond with High, Medium and Low sensitivity respectively. However if the presence of an Annex 1 habitat is confirmed then the site would be of High sensitivity. The sensitivities of confirmed habitats are defined as follows;

- High - site of high (international/national) nature conservation interest and therefore sensitive to mineral development. Unlikely/difficult to mitigate against damage to interest. ('High risk of conflict with nature conservation')
- Medium- site of regional/local nature conservation interest where mitigation measures will be required if a development is to take place. ('Medium risk of conflict with nature conservation'.)
- Low - site of no known nature conservation interest but requiring normal restoration procedures that take account of existing nature conservation features with potential to enhance or create new nature conservation feature(s). ('Low risk of conflict with nature conservation'.)

These definitions correspond well with those of Figure 6 of D8 in the SNH 'Handbook of Environmental Assessment' for landscape sensitivities.

Species datasets

In June 1999 Species Group of Advisory Services completed a large scale assessment of species data as input to the Natural Heritage Zones (NHZ) project. The relevant data for the Midland Valley has been used and therefore the datasets can be regarded as being up to date.

Vascular plants - data on vascular plants consists largely of data from the Threatened Plants in Scotland (TPIS) project. All locations have therefore been checked in the last few years. Where species not included in this project were assessed data was obtained from the Biological Records Centre and only post 1970 records used.

Lower plant data - obtained from the relevant national experts as part of the NHZ work

Invertebrates - data is from the Invertebrate Site Register and the currency of the records was assessed as part of the NHZ work

Squirrels - data is from the current SNH/BRC database

Bats - information is from the SNH database which contains data from 1985 to 1999.

Great Crested Newt - data is from the SNH dataset which is based on the SWT survey with additional updates

Nature conservation interests

There are a range of nature conservation interests that could occur in the Midland Valley, and they are listed below:

- Special Protection Areas (SPA) & Special Areas of Conservation (SAC) - these relate to the EC Birds and Habitats Directives respectfully
- Ramsar - international wetland designation for birds and/or plants
- Sites of Special Scientific Interest (SSSI) with Directive habitats and/or species
- SSSIs without Directive habitats and species
- Directive habitats and species in the wider countryside i.e. non-designated sites
- Species listed for protection in schedules of the Wildlife and Countryside Act
- Red Data Book species
- Biodiversity Action Plan (BAP) priority habitats and species
- Sites which meet SSSI criteria but which are not designated
- Voluntary Organisations' reserves e.g. Royal Society for the Protection of Birds, Scottish Wildlife Trust
- Local Wildlife Sites
- Rare Species present in 15 or fewer 10 km squares in Britain
- Scarce vascular plant species - present in 16-100 10 km squares in Britain
- Species group assemblages of regional/local importance
- Local BAP habitats and species
- Habitats of local importance

The majority of these interests will be covered by the habitat and species maps. Items of more local importance (i.e. possible medium or low sensitivity to development) should be taken into account as part of the EA process via a specific Environmental Statement.

NPPG 14 provides some guidance on what significance should be placed on BAP habitats and species in the wider countryside or by Planning Authorities. All the species listed in the BAP short and middle lists have been included in the species evaluation for this guidance. However not all of the BAP habitats overlap with the Annex 1 Habitats derived from the LCS 88 data.

There are problems in weighting BAP interests from the nature conservation perspective. They are of national significance but when non priority BAP or LBAP interests are the only nature conservation concern they would only constitute a Medium category of sensitivity.

Appendix 4. Further References

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Working with Scotland's people to care for our natural heritage.

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Scotland's natural heritage is a local, national and global asset. We promote its care and improvement, its responsible enjoyment, its greater understanding and appreciation and its sustainable use now and for future generations.

Our operating principles:

We work in partnership, by co-operation, negotiation and consensus, where possible, with all relevant interests in Scotland: public, private and voluntary organisations, and individuals.

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