

Trial reintroduction of European beaver to Knapdale Forest – Advice and Recommendations to the Scottish Government by Scottish Natural Heritage.

8 May 2008.

DOCUMENT 2

SNH'S APPRAISAL OF THE PROPOSAL IN RELATION TO POSSIBLE EFFECTS ON TAYNISH AND KNAPDALE WOODS SAC AND KNAPDALE LOCHS SPA.

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1. INTRODUCTION

In December 2007 a partnership of the Royal Zoological Society of Scotland (RZSS) and the Scottish Wildlife Trust (SWT) submitted a licence application to Scottish Government (SG) for the release of European beaver *Castor fiber* to Knapdale Forest, mid-Argyll, for the purposes of a trial reintroduction.

Under domestic legislation, it is an offence to release into the wild any animal which is of a kind not ordinarily resident in Great Britain (Section 14 of the Wildlife and Countryside Act 1981 (as amended)). In order for a trial reintroduction to proceed at Knapdale, a licence is therefore required from the Scottish Government.

A proportion of the proposed trial reintroduction area (defined as that part of Knapdale Forest owned by FCS) lies within part of the Taynish and Knapdale Woods SAC. Also, part of Knapdale Lochs SPA (Loch Clachaig) is situated within the proposed trial reintroduction area. Animals will be released at three specific lochs within the SAC but it is possible, during the five year trial, that they may move to other parts of the overall trial area including other parts of the SAC, and Loch Clachaig within the SPA. No other Natura sites occur within the proposed trial area.

This document provides SNH's advice to the Scottish Government in relation to the appraisal of the proposal in relation to the SAC and SPA in line with the requirements of Article 6.3 of Council Directive 92/43/EEC (the 'Habitats Directive'), as transposed by regulation 48 of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended (the 'Habitats Regulations').

This appraisal will be restricted specifically to the proposed trial as described in the licence application submitted by RZSS and SWT.

SNH has a standard approach when dealing with proposals potentially affecting Natura sites, which reflects the legal stages set out in Regulations 48 and 49 of the Habitats Regulations. The three main steps which need to be addressed are:

Step 1: Is the proposal directly connected with or necessary to site management for nature conservation? - If it is judged that the answer is no, then the next step has to be addressed.

Step 2: Is the proposal likely to have a significant effect on the site? - This is a relatively simple decision, but it is an important step. It is like a scoping stage to remove proposals which can be easily dismissed from further consideration. A significant effect may be positive or negative. If it is judged that there is likely significant effect, then the next step has to be addressed.

Step 3: Can it be ascertained that the proposal will not adversely affect the integrity of the site? - An 'appropriate assessment' by the appropriate

competent authority is required at this stage. This involves an assessment of the implications for the site's conservation objectives (identified in section 4 of this document). The answer to this question might be yes, but could require certain conditions to be put in place.

This document addresses all three steps.

Since this appraisal covers the trial project as described in the licence application, this means that once the trial has been completed, a consideration of the effects of any retention of beavers at Knapdale on the qualifying interests of the Taynish and Knapdale Woods SAC and Knapdale Lochs SPA will need to be undertaken. This will need to be considered as part of a wider assessment as to whether beavers should be reintroduced to Scotland.

2. THE PROPOSAL

The licence application proposes that beavers will be captured in Norway in autumn 2008, placed in quarantine for a six month period and then three to four families will be released at Knapdale in spring 2009. The proposed release sites are Loch Coille Bharr, Loch Linne/ Loch Fidhle and Creagmhor Loch/ small unnamed loch immediately to the west. This will be followed by a five year period of monitoring which will run until Spring 2014. An exit strategy is an integral part of a project plan.

The application states that the primary aims of the trial reintroduction are to:

- Study the ecology of the beaver in the Scottish environment;
- Assess the effects of beaver activities on the environment, including a range of land uses;
- Generate information during the proposed trial release that will inform a potential further release of beavers at other sites with different habitat characteristics;
- Explore the environmental education opportunities that may arise from the trial itself and the scope for a wider programme should the trial be successful;
- Determine the extent and impact of any increased tourism generated through the presence of beaver.

The proposed trial location is within the area of Knapdale Forest managed by Forest Enterprise Scotland (FES). Part of this area falls within the northern, Knapdale component of the Taynish and Knapdale Woods SAC. It is not proposed to release beavers within the southern, Taynish component of the SAC which is separated from the Knapdale component by approximately 0.5km of sea. Part of Knapdale Lochs SPA lies within the proposed trial area, although in a separate catchment to the proposed release sites.

3. THE QUALIFYING INTERESTS FOR TAYNISH AND KNAPDALE WOODS SAC AND KNAPDALE LOCHS SPA

The Habitats Directive Annex I habitats for which Taynish and Knapdale Woods SAC has been classified is shown below.

HABITATS DIRECTIVE ANNEX I HABITATS FOR WHICH THE SITE HAS BEEN DESIGNATED AS AN SAC	EU CODE FOR HABITATS DIRECTIVE ANNEX I HABITAT TYPE	ABBREVIATED TERM USED IN THIS DOCUMENT
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	H91A0	OAK WOODLAND
Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littoreletea uniflorae</i> and/or of the <i>Isoëto-Nanjuncetea</i>	H3130	OLIGO-MESOTROPHIC LOCHS

The Habitats Directive Annex II species for which Taynish and Knapdale Woods SAC has been classified are shown below.

HABITATS DIRECTIVE ANNEX II SPECIES FOR WHICH THE SITE HAS BEEN DESIGNATED AS AN SAC	EU CODE FOR HABITATS DIRECTIVE ANNEX II SPECIES	COMMON NAME USED IN THIS DOCUMENT
<i>Lutra lutra</i>	S1355	OTTER
<i>Euphydryas (Eurodryas, Hypodryas) aurinia</i>	S1065	MARSH FRITILLARY BUTTERFLY

The Birds Directive Annex I species for which Knapdale Lochs SPA has been classified is shown below.

BIRDS DIRECTIVE ANNEX I SPECIES FOR WHICH THE SITE HAS BEEN DESIGNATED AS AN SPA	COMMON NAME USED IN THIS DOCUMENT
<i>Gavia arctica</i>	BLACK-THROATED DIVER

4. CONSERVATION OBJECTIVES FOR TAYNISH AND KNAPDALE WOODS SAC AND KNAPDALE LOCHS SPA

Conservation objectives for the SAC and SPA, in relation to Article 6.3 of the Habitats Directive, and regulation 48 of the Habitats Regulations, are given below.

Habitats Directive Annex I habitats

To avoid deterioration of the qualifying habitats (listed below) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favorable conservation status for each of the qualifying features; and

To ensure for the qualifying habitats that the following are maintained in the long term:

- Extent of the habitat on site
- Distribution of the habitat within site
- Structure and function of the habitat
- Processes supporting the habitat
- Distribution of typical species of the habitat
- Viability of typical species as components of the habitat
- No significant disturbance of typical species of the habitat

Qualifying Habitats:

- **Oak woodland**
- **Oligo-mesotrophic lochs**

Habitats Directive Annex II species

To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favorable conservation status for each of the qualifying features; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Qualifying Species:

- **Otter**
- **Marsh fritillary butterfly**

Birds Directive Annex I species

To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Qualifying Species:

- **Black-throated diver**

5. LEGISLATIVE REQUIREMENTS FOR EUROPEAN SITES

The following stages need to be considered as required under Article 6.3 of the Habitats Directive and regulation 48 of the Habitats Regulations, and laid out in Revised Circular 6/95:

- Determine whether the proposal is directly connected with or necessary to site management for conservation; and, if not,
- determine whether the proposal is likely to have a significant effect on the site either individually or in combination with other plans or projects; and, if so, then
- make an appropriate assessment of the implications (of the proposal) for the site in view of that site's conservation objectives.

The proposal is not directly connected with or necessary to site management for nature conservation. Hence, further consideration is required.

It is therefore necessary to consider whether the proposal to reintroduce European beaver is likely to have a significant effect on the Taynish and Knapdale Woods SAC and Knapdale Lochs SPA.

SNH's advice is that the proposal is likely to have a significant effect on the qualifying interests of the SAC and the SPA. SNH's view is that, as a consequence, the Scottish Government is required to undertake an appropriate assessment of the proposal for the SAC and SPA in view of the sites' conservation objectives for their qualifying interests.

SNH's appraisal of whether it can be ascertained that the proposal will not adversely affect the integrity of the site is outlined in the following sections. Five separate appraisals are provided, together with a summary, as follows:

- 6.2 Appraisal: Taynish and Knapdale Woods SAC - Oak woodland
- 6.3 Appraisal: Taynish and Knapdale Woods SAC - Oligo-mesotrophic lochs
- 6.4 Appraisal: Taynish and Knapdale Woods SAC – Otter
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6. APPRAISAL AS TO WHETHER IT CAN BE ASCERTAINED THAT THE PROPOSAL WILL NOT ADVERSELY AFFECT THE INTEGRITY OF THE SITES

6.1 General issues

The trial reintroduction, as described in the licence application, will result in a number of potential issues that SNH considers will contribute to significant effect in the context of Regulation 48 (1). There are other issues not explicitly referred to in the licence application which SNH also considers will be relevant to the appropriate assessment. These issues can be broadly summarised as follows:

Issues relating to beaver activities:

- *Effects of beaver grazing activities, trampling etc. on qualifying interests.*
- *Effects of habitat modification behaviour (e.g. damming, canal construction, lodge construction) of beavers on qualifying interests.*
- *Effects of beaver presence on behaviour and ecology of resident qualifying interest species and qualifying habitat 'typical species'.*

Issues relating to human activities associated with the beaver project:

- *Construction of artificial lodges by project staff to reduce risk of beaver dispersal immediately after release.*
- *Erection of fencing by project staff to reduce risk of beaver dispersal immediately after release, and to exclude beaver from specific areas.*
- *Other potential effects (e.g. disturbance of qualifying interest species and qualifying habitat 'typical species') resulting from fieldwork activities of beaver project staff, associated contractors, researchers, film-makers etc.*
- **Effects of increased visitor pressure, including addition of small-scale interpretative facilities.*

(*Note: The following appraisal assumes relatively low levels of visitors in the early stages of the project, and the simple interpretative facilities such as self-guided, or guided visits. If there are plans for other visitor facilities, a further appraisal will be required).

To provide some context, a GIS analysis has been undertaken by SNH using National Vegetation Classification (NVC) survey data collected in 2003. The analysis included data for the Knapdale component and the Taynish component of the overall SAC – this is because the proposal is to release beavers to the

Knapdale component and exclude them from the Taynish component for the duration of the trial. The analysis also included the use of 'buffers' (bordered zones artificially created by GIS) around freshwater features. Beaver activity is heavily weighted to the riparian zone, particularly the area up to 10m from water edge. However they can also forage, albeit much less frequently, up to 100m from the water edge. Buffers were therefore produced for 10m and 100m from freshwater edge, and separate analyses of NVC data undertaken for the areas within them (note: beaver will forage further afield under unusual circumstances, e.g. to reach aspen stands, but 10m and 100m buffers are deemed to be realistic for the purposes of this analysis).

It is very unlikely that all the areas within the 10m buffer, and especially the 100m buffer, will be affected by beaver during the trial period.

The main results of the analysis can be summarised as follows;

(Note - National Vegetation Classification (NVC) Woodland community codes used below are; 'W' = woodland communities; 'M' = mire communities; 'H12a' = a heathland community; 'S3' = tussock-edge swamp; 'U' = acid grassland):

- The overall area of Taynish and Knapdale Woods SAC is 966ha (587ha in the Knapdale component, plus 379ha in the Taynish component), of which 85ha (8.8%) is within the 10m buffer of the Knapdale component of the SAC, and 231ha (23.9%) within 100m buffer (note that 63ha of the area within both the 10m and 100m buffers is open water).
- The total area of Taynish and Knapdale Woods SAC woodland as defined by NVC 'W' communities, is 447ha. Out of this total of NVC 'W' communities, 8ha (1.9%) lies within the 10m buffer of Knapdale, and 61ha (13.6%) within 100m buffer of Knapdale (therefore 98.1% of all the SAC's NVC 'W' communities lie outwith the 10m Knapdale buffer, and 86.4% outwith the 100m buffer)
- Of the 8 ha of NVC 'W' communities within the 10m buffer of the Knapdale component, 73% is NVC sub-community W17b, 21% is W7b, 3% is W11b (plus smaller areas of other sub-communities)
- Of the 61 ha of NVC 'W' communities within the 100m buffer of the Knapdale component, 72% is NVC sub-community W17b, 9% is W7b, 10% is W11b (plus smaller areas of other sub-communities)
- Within the 10m buffer of Knapdale, the main NVC habitat types are:
 - 'Open water': 63ha (6.5% of overall SAC area)
 - 'W': 8ha (0.9% of overall SAC area)
 - 'M': 6ha (0.6% of overall SAC area)
 - 'Felled': 4ha (0.4% of overall SAC area)
 - plus less than 2ha of conifer plantation, 'H12a', 'S3', U.

- Within the 100m buffer of Knapdale, the major main NVC communities are:
 - 'Open water': 63ha (6.5% of overall SAC area)
 - 'W': 61ha (6.3% of overall SAC area)
 - 'M': 32ha (3.3% of overall SAC area)
 - 'Felled': 43ha (4.4% of overall SAC area)
 - plus less than 17ha of conifer plantation, 'H12a', 'S3', U.

Further details on the habitat types within the 'open water' category are included in Section 6.3.

6.2 APPRAISAL: TAYNISH AND KNAPDALE WOODS SAC - OAK WOODLAND

6.2.1 Introduction

The overall SAC has an area of approximately 966ha. However, the proposal is to undertake the trial in the Knapdale component of the SAC (587ha). The Taynish component of the SAC lies to the south-west of the Knapdale component and, at their closest point the two components are approximately 0.5km from each other across an area of sea.

Beaver activity is very much weighted towards freshwater riparian areas. The majority of their time, and foraging effort, is spent either within water or within 10m of water edge. They may occasionally forage up to a few tens of metres away from water edge.

The GIS analysis set out in section 6.1 indicates that there is about 23ha of terrestrial habitat within 10m of freshwater edge within the Knapdale component of the SAC (2.3% of the overall SAC area) which, potentially, could be affected by beaver grazing activities (ranging up to 23.9% of the SAC area within the 100m buffer). Within this 23ha, 8ha can be defined as NVC woodland communities, which is 0.8% of the overall SAC area and 1.9% of the overall area of NVC woodland communities in the SAC.

However, it should be noted that it is not possible to undertake a direct read-across from the NVC communities to the Annex I qualifying interest. The Annex I interest of oak woodland, CORINE code 41.53 (full name 'old sessile oak woods with *Ilex* and *Blechnum* in the British Isles'), is described in the Interpretation Manual of European Union Habitats (April 2003) as having the corresponding NVC woodland communities W10 (not recorded at Taynish and Knapdale SAC), W11 and W17. Even so, some patches categorised by these NVC communities at Knapdale may not necessarily have oak present, and other tree species may be more dominant. For the purposes of this appraisal the precautionary approach has been taken, and the assumption made that all areas covered by these NVC communities relate to the oak woodland qualifying interest.

However, there may be areas within the SAC covered by other NVC communities which could also be important to the conservation objectives of the oak woodland qualifying interest, for example if they contribute to the functional connectivity of the qualifying interest or to overall site integrity. Beaver may also affect non-woodland NVC communities, for example through foraging in areas of mire, areas of recently felled conifer plantation etc.

Beaver activity within the riparian zones will include grazing, both on the aquatic, semi-aquatic and ground flora (especially in the warmer months) and on woody

species (especially during the cooler months). Woody plants with diameters of 3-8cm are grazed most frequently, although plants outwith these size categories can also be grazed. It is anticipated that the majority of woody species found within the riparian zones will be suitable for beaver.

Beavers usually have the entrances of their dens/lodges underwater. In situations where existing water levels are insufficiently low, they may dam to raise the water levels. There is therefore the possibility that, in some areas under certain circumstances, water will be raised with some areas of riparian habitat affected. This is expected to be most likely to occur along some of the shallow, interconnecting burns within the trial area.

Grazing activity and changes in local hydrology, could affect certain patches of woodland, including 'typical species' of oak woodland, primarily those associated with stands of mature trees such as lichen assemblages.

Impacts caused by human-related activities associated with the project could include increased visitor pressure, and localised effects of small-scale constructions such as the building of artificial lodges.

European beaver is a natural component of woodlands in Europe. This is reflected by the fact that there are 580 SACs within the EU (within nine Member States) where both beaver and Habitats Directive Annex I "temperate forest" habitats are both identified as SAC interests (it is not possible to do this analysis specifically for oak woodland, which is a "temperate forest" habitat, as this Annex I habitat type only occurs in Britain and Ireland).

Therefore there is a likely significant effect from the proposed trial due to beaver grazing activities and altering of water levels, plus the effects of small-scale works by beaver project personnel, and increased visitor numbers.

6.2.2 Conservation Objectives

In order to determine the effects of the proposal on site integrity, the conservation objectives which apply to the oak woodland interest are examined in turn below.

The conservation objectives are to ensure for the qualifying habitat, oak woodland, that the following are maintained in the long term;

Extent of the habitat on site

The analysis above indicates that the terrestrial area that is more likely to be potentially affected by beaver grazing activity is the 23ha within 10m of freshwater (2.3% of the overall SAC area). Eight hectares of this falls within the NVC 'W' woodland community type. Not all of this area will, in practice, be affected by beaver during the trial as beavers will be less active further away from their dens/lodges.

The SAC consists of intricate mosaics with woodland stands, heavily influenced by site topography. In terms of the issue of dam building by beaver, the topography, which is dominated by a series of parallel hills and valleys, is such that the vast majority of the qualifying woodland interest is situated on land above the height that would be affected by any localised flooding. Dam building on the outflows of lochs will not be an issue assuming the recommended mitigation set out for the oligo-mesotrophic lochs habitat qualifying interest is applied (see section 6.3). This mitigation will ensure that loch water levels will be maintained around current levels during the trial.

However, in addition to the lochs there are also interconnecting freshwater burns running throughout the SAC which beavers may dam in some places. Many sections of the interconnecting burns are on higher gradients which beavers are less likely to dam (beavers prefer gradients of less than 2%). The majority of the lengths of burns within the SAC flow through areas bordered by habitat described in NVC surveys as conifer plantation, felled or recently felled conifer plantation, mire and heather dominated. Some of these habitat types (such as conifer plantation) are clearly not such important components of the oak woodland interest and so if they became wetter as a result of dam building this would not be judged to be affecting site integrity. If burns adjacent to woodland areas were dammed, and became flooded, then there will be localised changes to the woodland. This could be beneficial, such as increases in standing dead wood (and the habitat of associated typical species) which is usually limited in native woodlands. However if a dam was created in an area where the extent of the woodland affected was judged to be of concern, then the dam will require to be regulated or removed prior to flooding of the area. This will require the monitoring of dam building during the trial, and SNH to be quickly informed. SNH will make judgements on a case by case basis.

In the longer term any dams that are created would eventually be abandoned and water levels would subsequently decrease to previous levels, and the habitat types within previously inundated patches would change again.

We expect no adverse impact on the extent of qualifying woodland habitat if the recommended mitigation is addressed, rather some change in its structure and species composition in some localised riparian areas.

Distribution of the habitat within site

Beaver activity will tend to be restricted to relatively narrow, riparian zones and the animals will rarely move through, or have any effect on, most of the area of oak woodland distributed throughout the site. In all, 97.7% of the overall SAC area is outwith the 10m buffer of terrestrial habitat fringing freshwater areas in which beavers are most likely to be active (in addition to freshwater habitat itself). There may be localised changes to structure and species composition but the distribution of the overall habitat within the site will not be adversely impacted.

Structure and function of the habitat

The speed of regeneration of natural woodland from previous sitka spruce stands may be slightly checked in places by beaver grazing but such effects are likely to be very localised. A particularly large-scale programme of conifer removal a few years ago has resulted in very dense birch stands in some places. The effect of beaver grazing in areas of dense regeneration is expected to be the opening of patches of birch, thereby allowing other species to move in. Much of the regeneration is on the drier areas of the SAC, which are less likely to be targeted by beavers.

The oak woodland within the SAC is already characterised by a wide range of ground and field layer vegetation. Further diversification, on a small scale, of these woodland layers through beaver activity is considered to be compatible with this conservation objective.

Processes supporting the habitat

Short, medium or long-term changes in the vegetative structure and/or hydrology of localised areas of riparian woodland as a result of beaver activity would not affect the integrity of existing patterns of natural woodland development and, indeed, could increase the overall conservation value of the site (for example, by increasing the amount of standing dead wood and fallen dead wood, thereby increasing habitat for dead wood 'typical species'). Such changes would be compatible with this conservation objective.

It is highly likely that the European beaver was once a natural component of this habitat type. The trial will therefore result in the restoration of what was likely to have once been one of the more significant and influential species of Scottish woodland.

Effects on typical species of the habitat (distribution, viability and disturbance)

Adverse impacts on the distribution of most typical species is not expected. There may be some 'typical species', however, which could be more affected.

A small number of aspen trees *Populus tremulus* are known to occur in the Faery Isles. The species is preferentially selected by beaver as a food source. However, the communities associated with the aspen of the Scottish west coast are not as unique as aspen in eastern Scotland. Although it is likely that they support some species of the characteristic *Lobarion* and *Graphidion* communities – as do most broadleaved tree species in this area – it is not believed that they do so to the extent of being integral to the habitat. There are also no obvious freshwater bodies in the Faery Isles area, and consequently it is not expected that beaver will move into this part of the SAC.

Impact on the bryophyte assemblages is not judged to be a problematic issue. Much of the bryophyte resource of particular conservation interest is associated with rocks and boulders, rather than trees.

There are stands of hazel *Corylus avellana* of high conservation value that are known to be within the distance from freshwater that beaver can forage (e.g. the stand of hazel to the north-east of Loch Barnluasgan). The tree diameters of the hazel are within the sizes most frequently grazed by beaver. These hazel stands are important for their lichen assemblages.

Since beaver could, potentially, affect these hazel stands and their associated 'typical species' of lichens, it will be necessary to arrange for suitable protection for these in localised areas (to exclude beaver, not deer), following discussion with SNH. This would ensure that this component of the site will not be adversely impacted.

The issue of beaver dam creation is addressed under the 'Extent of the habitat' heading above. If beaver dams were built on burns near stands of hazel, then the mitigation described would ensure the site will not be adversely impacted.

Beavers will not significantly disturb typical species of the habitat. However, the presence of people, and dogs etc., can result in disturbance to some animal species under certain scenarios. The issue of visitor management linked to the beaver proposal is therefore relevant to this conservation objective.

There are proposals to develop visitor facilities at the site. This would largely be targeted at the provision of visitor information and interpretation within the existing FCS buildings at Barnluasgan (NR791909) and Barr an Daimh (NR796917), where the majority of visitors would be channelled through the use of signage and existing parking facilities. The aim is to manage visitors at the existing information and interpretation 'honeypots', and to avoid large increase of visitors moving into the more sensitive areas of the SAC.

There are already designated public footpaths, cycling tracks etc within the SAC area. For those visitors who wish to move away from the FCS facilities, provision will need to be put in place to allow self-guided and guided walks which are designed to utilise these existing public footpaths.

On the basis that an overall visitor management plan is agreed and implemented prior to the release of beaver and throughout the project (e.g. signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.), and this plan and the design of associated facilities are discussed with SNH, the site will not be adversely impacted.

Note that this appraisal assumes relatively low levels of visitors in the early stages of the project, and the provision of the interpretative facilities as described

above. If there are plans for other visitor facilities (e.g. there is a future proposal for a hide to be set up near a beaver lodge – but this cannot be assessed until the location of any proposed hide is known, which in turn cannot be identified until the beavers set up a lodge), a further appraisal will be required.

6.2.3 SNH Advice in relation to effects on oak woodland

Background

The proposal consists of a trial reintroduction of European beaver to Knapdale. This lies partly within Special Area of Conservation (SAC) classified for Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (referred to elsewhere in this document as oak woodland).

The site's status as a classified SAC under the EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the "Habitats Directive"), means that the Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations") apply. The requirements are summarised in SE Circular 6/1995 as amended June 2000 and include, at paragraph 12:

"The Regulations (48) require that, where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 site is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the conservation interests for which the area has been designated."

SNH's advice is that this proposal is likely to have a significant effect on the qualifying interest of the site. However SNH would further advise the Scottish Government that on the basis of the appraisal carried out to date, that if the proposal is undertaken strictly in accordance with the following conditions, then the proposal will not adversely affect the integrity of the site.

- a) Beaver dam construction on burns to be carefully monitored and SNH to be informed immediately once new dams are created. An assessment will then be made by SNH on a case by case basis and, if judged necessary, management of the dam will be required.
- b) Stands of hazel, which hold significant communities of 'typical species' of lichens, should be protected where necessary using appropriate methods and following discussion and agreement with SNH.
- c) A visitor management plan must be agreed and implemented prior to the release of beaver and during the lifetime of the project (addressing issues

such as signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.). This plan and the design of associated facilities must be discussed and agreed with SNH.

It should be noted that Scottish Government is required to undertake an appropriate assessment of the implications of the proposal for the site in view of the site's conservation objectives for its qualifying interest(s). This assessment may be based on the above appraisal by SNH but the Scottish Government may wish to carry out further appraisal before completing the appropriate assessment.

6.3 APPRAISAL: TAYNISH AND KNAPDALE WOODS SAC - OLIGO-MESOTROPHIC LOCHS

6.3.1 Introduction

The overall SAC has an area of approximately 966ha. However, the proposal is to undertake the trial in the Knapdale component of the SAC (587ha). The Tainish component of the SAC lies to the south-west of the Knapdale component and, at their closest point the two components are approximately 0.5km from each other across an area of sea.

Beaver activity is very much weighted towards freshwater riparian areas. The majority of their time, and foraging effort, is spent either within water or within 10m of water edge. They may occasionally forage up to a few tens of metres away from water edge.

Within the SAC there are eight freshwater lochs within four different main catchments:

- Lochan Tainish – 11.2ha area, perimeter of 2km. The 1989 Freshwater Loch Survey classified it as a Type 2 loch (Palmer *et al.* 1992). Based on these results it has also been described as a Group C2 type oligotrophic loch (Duigan *et al.* 2006). It was described as in “favourable condition” on the basis of 2004 SCM (Site Condition Monitoring) results.
- Loch Barnluasgan – 5.3ha area, perimeter of 1.2km. The 1989 Freshwater Loch Survey classified it as a Type 3 oligotrophic loch (Palmer *et al.* 1992). Based on these results it has also been described as a Group D type oligotrophic loch (Duigan *et al.* 2006). The invasive species *Elodea canadensis* was recorded. *E. canadensis* was also recorded in the loch during the 2004 SCM survey, at a frequency of 2%. However, it was considered naturalised (unlike in Loch Coille-Bharr, see below). The loch was described as in “favourable condition” on the basis of the 2004 SCM results. It is upstream of Loch Coille-Bharr.
- Loch Coille-Bharr – 33.4ha area, perimeter of 4.4km. The 1989 Freshwater Loch Survey classified it as a Type 5A loch (Palmer *et al.* 1992). Based on these results it has also been described as a Group D type oligotrophic loch (Duigan *et al.* 2006). The invasive species *E. canadensis* was recorded in the loch for the first time during a 2004 SCM survey, at a frequency of 4%. The loch was therefore described as in “favourable condition (at risk)” on the basis of the 2004 SCM results. It is downstream of Loch Barnluasgan.
- Un-named loch (100m east of Loch Fidhle) – 1.2ha area, perimeter of 0.6km This loch was not surveyed as part of the 1989 Freshwater Loch

Survey or the 2004 SCM survey. Murphy *et al.* (2002) surveyed the loch but did not classify the loch type due to a lack of data on submerged areas. It is upstream of Loch Linne/Loch Fidhle.

- Loch Fidhle – 3.6ha area, perimeter of 0.9km. This loch was not surveyed as part of the 1989 Freshwater Loch Survey or the 2004 SCM survey. Murphy *et al.* (2002) surveyed the loch and classified it as a Type 5B loch (Palmer *et al.* 1992). This is a mesotrophic loch habitat type. Loch Fidhle is immediately east of, and connected to, Loch Linne and downstream of the un-named loch described above.
- Loch Linne – 16.5ha area, perimeter of 3.1km. The 1989 Freshwater Loch Survey classified it as a Type 3 loch (Palmer *et al.* 1992). Based on these results it has also been described as a Group C2 type oligotrophic loch (Duigan *et al.* 2006). It was described as in “favourable condition” on the basis of the 2004 SCM results. Loch Fidhle is immediately east of, and connected to, Loch Linne, and downstream of the un-named loch described above.
- Creagmhor Loch – 5.3ha area, perimeter of 1.2km. This loch was not surveyed as part of the 1989 Freshwater Loch Survey or the 2004 SCM survey. Murphy *et al.* (2002) surveyed the loch and classified it as a Type 2 loch (Palmer *et al.* 1992). This falls within the oligotrophic to mesotrophic loch habitat type.
- Dubh Loch - 0.3ha area, perimeter of 0.3km. This small lochan was not surveyed as part of the 1989 Freshwater Loch Survey, the 2004 SCM survey or by Murphy *et al.* (2002). The loch type has not been classified. It is approximately 100m east of Loch Coille-Bharr, although there is no obvious surface connection to it.

Therefore, of the lochs identified above, Lochan Taynish, Loch Barnluasgan, Loch Coille-Bharr, Loch Linne/ Fidhle and Creagmhor Loch are known to fall within the oligotrophic to mesotrophic habitat type. Note that Lochan Taynish is within the Taynish component of the SAC from which beaver will be excluded during the trial.

The proposal states that beaver families would be released at sites on the edge of Loch Coille-Bharr, Loch Linne/Fidhle and Creagmhor Loch. Therefore, since the former two are connected other standing waters situated upstream within the SAC, it is likely that beavers could be active in all the lochs within the Knapdale component of the SAC at some time during the trial period.

Potential beaver effects relevant to this habitat type include grazing activities. Beaver will feed on a wide range of terrestrial, aquatic and semi-aquatic plant

species. Consequently they are expected to graze on submerged species, floating species, emergents, and littoral species.

Beavers usually have the entrances of their dens/lodges to be underwater. In situations where existing water levels are insufficiently low, they may dam to raise the water levels. This is expected to be most likely to occur along some of the shallow, interconnecting burns within the trial area. In the case of the standing waters, the water levels are already sufficiently high for beaver, and they are less likely to dam. However, it is possible they may attempt to dam outflows of the standing waters and raise water levels by a limited amount (i.e. water levels would not have to be raised as much as for a shallow burn). Water levels in the lochs are known to vary. SNH monitored water levels through monthly checking of fixed stage boards at all of the lochs within the Knapdale component of the SAC between 27/6/02 and 12/10/05. The following gives an indication of water level variation recorded for each loch during this period:

- Loch Barnluasgan - 34cm
- Loch Coille-Bharr - 33cm
- Unnamed loch (east of Fidhle) - 12cm
- Lochs Linne/Fidhle - 41cm
- Creagmhor Loch - 22cm
- Dubh Loch - 27cm

The effect of any dam construction at the outflow may be to produce higher levels than at present.

Any damming of burns upstream of the standing waters may result in decreases in the sediment load, although this is expected to be minor. Changes to water chemistry are expected to be limited within the standing waters since they are relatively large, and effects will be buffered.

European beaver is a natural component of freshwater ecosystems in Europe. This is reflected by the fact that there are 98 SACs within the EU (within seven Member States) where both beaver and oligo-mesotrophic lochs, of the type found at Knapdale, are both identified as SAC interests. There are also other SACs where other types of Annex I standing water interests occur with beaver.

In summary, there is a likely significant effect from the proposed trial due to beaver grazing activities and potential altering of water levels. Issues relating to visitors to the beaver project could also have a significant effect, particularly in relation to disturbance of typical species.

6.3.2 Conservation Objectives

In order to determine the effects of the proposal on site integrity, the conservation objectives which apply to the oligo-mesotrophic lochs interest are examined in turn below.

The conservation objectives are to ensure for the qualifying habitat, oligo-mesotrophic lochs, that the following are maintained in the long term;

Extent of the habitat on site

The SAC consists of intricate mosaics of aquatic macrophyte, and other semi-aquatic and emergent plant communities within the standing waters of the site. Based on the European experience, this heterogeneous pattern of vegetation is expected to be maintained.

A study of beaver effects on aquatic macrophytes has been undertaken at a Scottish site where animals are kept in large enclosures (Jones 2006). Beaver-proof enclosures placed in and around a well-developed loch system were used to examine the effect of grazing on macrophyte communities over two years. Aquatic macrophyte species richness was found to be slightly higher outside than inside the enclosures, in both sampling years. When the annual datasets were combined, the results showed the same trend, although the higher species richness outside than inside the enclosures was not significant. Beavers had no discernible impact on *Potamogeton natans* which was the dominant macrophyte at the site. Beavers fed on the basal shoots and rhizomes of a number of emergent species, including *Iris pseudacorus*, *Menyanthes trifoliata*, *Equisetum fluviatile* and *Carex rostrata*. The areas affected were <1% of the total area of vegetation so such impacts were judged to be negligible compared with the sort of impacts that would be associated with storms, natural failures of floating macrophyte rafts etc. More recently it has become evident at the study site that beavers redistribute fragments of these species so there are now floating rafts formed from detached fragments in places where no vegetation had existed previously.

We expect no adverse impact on the extent of qualifying standing water habitat, rather some localised changes to species composition and structure in some specific areas.

Distribution of the habitat within site

The response as set out for the above conservation objective also applies here.

Structure and function of the habitat

In the bays/inlets of the lochs where natural succession might normally affect aquatic plant communities, beaver activities are likely to result in a local reduction of edge scrub invasion and a maintenance of open water areas. This will also apply to small standing water bodies such as the small Dubh Loch (although we cannot confirm that this particular water body is an oligo-mesotrophic loch). Beaver grazing on riparian trees and shrubs is expected to result in localised, patchy reductions in shading in some areas thereby increasing aquatic macrophyte growth on a small scale.

Water levels in the standing waters are already relatively high, in terms of requirements for beavers. Beaver damming of outflows is therefore not as likely as the damming on the shallow interconnecting burns, although still possible. At the moment there is some existing natural variation in water levels on these lochs (e.g. monitoring of water levels at Loch Barnluasgan has shown variations of 34cm over a 28 month period). The presence of a beaver dam on the outflow would reduce the existing water level fluctuation, and possibly increase levels above those at present. In the longer term any dams that are created would eventually be abandoned and water levels would subsequently decrease to previous levels.

We believe that the damming of loch outflows will probably not be detrimental, and may possibly be beneficial. However, we propose that this issue is investigated as part of the trial within those lochs not part of the SAC. While this issue is investigated further, if beaver dams are created on the SAC loch outflows, then they will either be removed, or regulated (e.g. using pipe systems) so that the water levels are within the usual natural range. This would ensure the site will not be adversely affected.

Processes supporting the habitat

The issue relating to the possible damming of outflows, described above, also applies here. The effects of damming outflows on water quality in lochs with low nutrient levels, which are not receiving anthropogenic nutrient inputs, would not be expected to be large.

The construction of beaver dams upstream of standing waters may result in minor, localised alterations to quantities and timing of silt inputs to lochs. This reduction of silt input could be more significant and beneficial to the oligo-mesotrophic lochs during large-scale disturbance of soils, for example during forestry operations to remove conifer.

The presence of beavers may have some effect on the aquatic plants in this habitat type, possibly beneficial. Some localised and small scale modification of species abundance and structure in the lochs would be compatible with the conservation objective.

North American beaver *Castor canadensis* is known to feed extensively on *Elodea* spp. *Elodea canadensis*, an invasive non-native species, which has been recorded in Lochs Barnluasgan and Loch Coille-Bharr (and was identified during SCM as a reason for categorising Loch Coille-Bharr loch as "favourable condition – at risk"). European beaver is expected to feed on *Elodea canadensis* and, by ensuring the invasive plant does not become too dominant, may be able to play a role in reducing any potential detrimental impacts on native species.

It is highly likely that the European beaver was once a natural component of this habitat type in Scotland, as it currently is in mainland Europe. The trial may therefore result in the restoration of what was likely to have once been one of the more significant and influential 'typical species' of oligo-mesotrophic lochs.

Effects on typical species of the habitat (distribution, viability and disturbance)

Beaver will feed on a wide range of terrestrial, aquatic and semi-aquatic plant species. Consequently they are expected to graze on submerged species, floating species, emergents, and littoral species. Beavers will tend to mix their diet, rather than concentrate on individual species. The lochs within the SAC contain intricate mosaics of aquatic macrophytes, and other semi-aquatic and emergent plant communities within the standing waters of the site. It is expected that the overall distribution of the typical species of vegetation in the lochs will be maintained (further details in 'extent of habitat on the site' above). Similarly, the overall distribution of associated invertebrate and vertebrate typical species is expected to be maintained.

Beavers will not significantly disturb typical species of the habitat. However, the presence of people, and dogs etc., can result in disturbance to some animal species under certain scenarios. The issue of visitor management linked to the beaver proposal is therefore relevant to this conservation objective.

There are proposals to develop visitor facilities at the site. This would largely be targeted at the provision of visitor information and interpretation within the existing FCS buildings at Barnluasgan (NR791909) and Barr an Daimh (NR796917), where the majority of visitors would be channelled through the use of signage and existing parking facilities. The aim is to manage visitors at the existing information and interpretation 'honeypots', and to avoid large increase of visitors moving into the more sensitive areas of the SAC.

There are already designated public footpaths, cycling tracks etc within the SAC area. For those visitors who wish to move away from the FCS facilities, provision will need to be put in place to allow self-guided and guided walks which are designed to utilise these existing public footpaths.

On the basis that an overall visitor management plan is agreed and implemented prior to the release of beaver and throughout the project (e.g. signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.), and this plan and the design of associated facilities are discussed with SNH, the site will not be adversely impacted.

Note that this appraisal assumes relatively low levels of visitors in the early stages of the project, and the provision of the interpretative facilities as described above. If there are plans for other visitor facilities (e.g. there is a future proposal for a hide to be set up near a beaver lodge – but this cannot be assessed until

the location of any proposed hide is known, which in turn cannot be identified until the beavers set up a lodge), a further appraisal will be required.

6.3.3 SNH Advice in relation to effects on oligo-mesotrophic lochs

Background

The proposal consists of a trial reintroduction of European beaver to Knapdale. This trial area lies partly within Special Area of Conservation (SAC) classified for oligotrophic to mesotrophic standing waters with vegetation of the *Littoreletea uniflorae* and/or of the *Isoëto-Nanjuncetea* (referred to elsewhere in this document as oligo-mesotrophic lochs).

The site's status as a classified SAC under the EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the "Habitats Directive"), means that the Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations") apply. The requirements are summarised in SE Circular 6/1995 as amended June 2000 and include, at paragraph 12:

"The Regulations (48) require that, where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 site is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the conservation interests for which the area has been designated."

SNH's advice is that this proposal is likely to have a significant effect on the qualifying interest of the site. However SNH would further advise the Scottish Government that on the basis of the appraisal carried out to date, that if the proposal is undertaken strictly in accordance with the following conditions, then the proposal will not adversely affect the integrity of the site.

- a) Beaver dam construction on loch outflows to be carefully monitored and SNH to be informed immediately once new dams are created. If beaver dams are constructed on the outflows of oligo-mesotrophic lochs within the SAC, then the natural water levels of the lochs must be maintained, either through the use of beaver-specific devices which can be incorporated to manage water flow, or through removing the dam. The details to be discussed and agreed with SNH.
- b) A visitor management plan must be agreed and implemented prior to the release of beaver and during the lifetime of the project (addressing issues such as signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.). This plan and the design of associated facilities must be discussed and agreed with SNH.

It should be noted that Scottish Government is required to undertake an appropriate assessment of the implications of the proposal for the site in view of the site's conservation objectives for its qualifying interest(s). This assessment may be based on the above appraisal by SNH but the Scottish Government may wish to carry out further appraisal before completing the appropriate assessment.

References

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6.4 APPRAISAL: TAYNISH AND KNAPDALE WOODS SAC - OTTER

6.4.1 Introduction

A survey for otter was undertaken at Taynish and Knapdale Woods SAC in September 2003 for the purpose of Site Condition Monitoring (SCM). The survey was also a contribution to the Fourth National Otter Survey of Scotland (Strachan 2004). Taynish and Knapdale Woods SAC was assessed to be maintaining favourable status for otter, with no potential threats noted. Five survey sites were visited, all with signs of otters including resting sites and potential breeding dens. In total 49 spraints were found of various ages, confirming regular use of the habitat. Some of the spraints on the coast consisted entirely of crab, suggesting the possible presence of cubs.

The SCM survey found that the rocky shores to Loch Sween and the associated woodland cover provide favourable habitat for otters. However, it was judged unlikely that the freshwater lochs of Knapdale could maintain otters in isolation from prey-rich coastal areas adjacent to Loch Sween, due to their limited fish biomass. The freshwater lochs at Knapdale, therefore, are not thought to provide sufficient prey for all the needs of the local otter population.

Information from Europe indicates that the presence of beaver does not appear to be detrimental to otter, and indeed may be beneficial. For example, the Danish trial reintroduction of beaver to Klosterheden Forest included an assessment of the effect on the resident otter population. No negative effects were observed on the otter population. The number of locations with evidence of otter presence has increased throughout the catchment following beaver reintroduction. After the beavers were released at the site, otter was put forward as a Habitats Directive Annex II interest at the SAC at Klosterheden, and it is the view of the Danish Forest and Nature Agency that the otter interest can be maintained in the presence of beavers.

European beaver is a natural component of freshwater ecosystems in Europe, and beaver and otter are often recorded in the same areas. This is reflected by the fact that there are 396 SACs within the EU (within eight Member States) where both beaver and otter are both identified as Annex II SAC interests.

There is a likely significant effect from the proposed trial due to beaver grazing activities and potential altering of water levels. Issues relating to visitors to the beaver project may also have a significant effect, particularly in relation to disturbance.

6.4.2 Conservation Objectives

In order to determine the effects of the proposal on site integrity, the conservation objectives which apply to the otter interest are examined in turn below.

The conservation objectives are to ensure for the qualifying species, otter *Lutra lutra*, that the following are maintained in the long term;

Population of the species as a viable component of the site

European beaver and otter do not compete directly for resources. Otter is a predatory species, beaver is herbivorous. Otter and beaver territories will overlap. There are occasional records of otter predation on beaver.

Information from Europe indicates that the presence of beaver does not appear to be detrimental to otter, and indeed may be beneficial. This is believed to be linked to the habitats that are created where beaver has been active, such as ponds, localised wetland areas etc., which are also good quality habitat for otter and otter prey.

There will therefore be no adverse impact on the population of the species as a viable component of the site.

Distribution of the species within the site

As described above, European information indicates that the presence of beaver will not affect otter distribution adversely. It is possible that an increase in wetland habitat may result in some localised increases in the overall area where otters are most likely to actively forage.

In terms of the effect of increased human activity associated with the project, the relatively small-scale activity of project workers will generally have no effect as otter can tolerate low levels of disturbance. The construction of artificial lodges, and the erection of fencing does have the potential to affect otter distribution at a local scale. This will mean sites to be affected in this way will need to be surveyed to check for the presence of otter holts/couches, and beaver fences must be designed to avoid otter pathways, or constructed to allow otter to cross them. Artificial lodges could be removed completely at the end of the trial, or left *in situ*, since otter may eventually use abandoned lodges as holts.

The integrity of the site will not be adversely affected, in relation to otter, if the proposed mitigation is addressed.

Distribution and extent of habitats supporting the species

Beaver activities can result in increased wetland habitat suitable for amphibians and some localised changes to fish populations. Amphibians may be important seasonal sources of prey for otter populations. A net benefit to otter, in terms of provision of foraging habitat, is expected as a result of beaver activities.

Coastal otter populations require access to freshwater bathing pools in order to remove salt from their fur, thus maintaining thermal efficiency. Beaver activities could result in increased numbers and area of freshwater pools that could potentially be used by otter as bathing sites. Abandoned beaver lodges and dens may be used by otter as holts.

The issue of artificial lodge construction and fence erection is dealt with above. There will be no adverse impact on the distribution and extent of habitats supporting otter, if the proposed mitigation described in the above section is addressed.

Structure, function and supporting processes of habitats supporting the species

This is dealt with in the section above.

No significant disturbance of the species

Beavers will not significantly disturb otter. However, the presence of people, and dogs etc., can result in disturbance to otter at certain levels and under certain scenarios. The issue of visitor management linked to the beaver proposal is therefore relevant to this conservation objective.

There are proposals to develop visitor facilities at the site. This would largely be targeted at the provision of visitor information and interpretation within the existing FCS buildings at Barnluasgan (NR791909) and Barr an Daimh (NR796917), where the majority of visitors would be channelled through the use of signage and existing parking facilities. The aim is to manage visitors at the existing information and interpretation 'honeypots', and to avoid large increase of visitors moving into the more sensitive areas of the SAC.

There are already designated public footpaths, cycling tracks etc within the SAC area. For those visitors who wish to move away from the FCS facilities, provision will need to be put in place to allow self-guided and guided walks which are designed to utilise these existing public footpaths.

On the basis that an overall visitor management plan is agreed and implemented prior to the release of beaver and throughout the project (e.g. signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.), and this plan and the design of associated facilities are discussed with SNH, the site will not be adversely impacted.

Note that this appraisal assumes relatively low levels of visitors in the early stages of the project, and the provision of the interpretative facilities as described above. If there are plans for other visitor facilities (e.g. there is a future proposal for a hide to be set up near a beaver lodge – but this cannot be assessed until the location of any proposed hide is known, which in turn cannot be identified until the beavers set up a lodge), a further appraisal will be required.

6.4.3 SNH Advice in relation to effects on otter

Background

The proposal consists of a trial reintroduction of European beaver to Knapdale. This lies partly within Special Area of Conservation (SAC) classified for otter *Lutra lutra*.

The site's status as a classified SAC under the EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the "Habitats Directive"), means that the Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations") apply. The requirements are summarised in SE Circular 6/1995 as amended June 2000 and include, at paragraph 12:

"The Regulations (48) require that, where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 site is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the conservation interests for which the area has been designated."

SNH's advice is that this proposal is likely to have a significant effect on the qualifying interest of the site. However SNH would further advise the Scottish Government that on the basis of the appraisal carried out to date, that if the proposal is undertaken strictly in accordance with the following conditions, then the proposal will not adversely affect the integrity of the site.

- a) The methods, and the location, design and construction of structures, required for the 'soft release' of beavers (e.g. artificial lodges and fencing) must take into account local otter activity. The same applies to the erection of fencing for any other purpose during the trial (e.g. the exclusion of beavers from sensitive areas). This must be discussed and agreed with SNH.
- b) A visitor management plan must be agreed and implemented prior to the release of beaver and during the lifetime of the project (addressing issues such as signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.). This plan and the design of associated facilities must be discussed and agreed with SNH.

It should be noted that Scottish Government is required to undertake an appropriate assessment of the implications of the proposal for the site in view of the site's conservation objectives for its qualifying interest(s). This assessment

may be based on the above appraisal by SNH but the Scottish Government may wish to carry out further appraisal before completing the appropriate assessment.

References

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6.5 APPRAISAL: TAYNISH AND KNAPDALE WOODS SAC – MARSH FRITILLARY BUTTERFLY

6.5.1 Introduction

A survey for marsh fritillary butterfly was undertaken at Taynish and Knapdale Woods SAC in August 2004 for the purpose of Site Condition Monitoring (SCM). The SAC was assessed to be maintaining favourable status for the butterfly. A total of 214 larval webs were counted (47 webs per hour of searching). The area of habitat judged suitable within the SAC was estimated to be approximately 10ha, restricted to the coastal grassland area in the southern part of the Taynish component of the SAC.

The proposal is to undertake the trial in the Knapdale component of the SAC only. The Taynish component of the SAC lies to the south-west of the Knapdale component and, at their closest point the two components are approximately 0.5km from each other across an area of sea. However, three larval webs were found near Loch Barnluasgan in autumn 2006, and three adults in summer 2007. These are the first records of the species within the Knapdale component of the SAC since the site was designated. There is also a historical 1972 record of marsh fritillary from NR787908, by the north-west tip of Loch Coille-Bharr.

Management for marsh fritillary butterfly aims to create a mosaic of vegetation, mainly within the an optimal sward height of 5-15cm (sub-optimal heights of 15-25 cm), with some longer, tussocky vegetation which provides shelter for larval webs. Devil's bit scabious *Succisa pratensis* is the larval food plant. Suitable habitat is presently maintained at Taynish by light cattle grazing. However vegetation in ungrazed areas has become too rank and *Succisa pratensis* has been suppressed by *Molinia*. It is uncertain whether suitable habitat can be restored in such areas in the absence of grazing.

Highland cattle and Hebridean sheep have recently been introduced as seasonal grazers at the Loch Barnluasgan site where the butterfly has just been recorded,

Marsh fritillary butterflies tend to live within metapopulations, and demonstrate cyclical, fluctuating population numbers linked to parasite population numbers and the weather. "Core" parts of the metapopulations persist even during the poor years, although surrounding "satellite" colonies may become temporarily extinct. The theory is that such satellite colony areas may be re-colonised from animals dispersing away from core colonies in good years, if the habitat is suitable. A core part of the SAC's metapopulation is within the south Taynish area. It seems likely that the newly recorded Loch Barnluasgan population is a satellite colony, and it remains to be seen whether it can persist within poor years.

European beaver and marsh fritillary butterfly are often recorded in the same areas on the European continent. This is reflected by the fact that there are 57 SACs within the EU (within seven Member States) where both beaver and marsh fritillary butterfly are both identified as Annex II SAC interests.

There is a likely significant effect from the proposed trial due to beaver grazing activities. Issues relating to visitors to the beaver project may also have a significant effect.

6.5.2 Conservation Objectives

In order to determine the effects of the proposal on site integrity, the conservation objectives which apply to the marsh fritillary butterfly interest are examined in turn below.

The conservation objectives are to ensure for the qualifying species, marsh fritillary butterfly *Euphydryas* (*Eurodryas*, *Hypodryas*) *aurinia*, that the following are maintained in the long term;

Population of the species as a viable component of the site

The vast proportion of the SAC's marsh fritillary population is on the Taynish component of the site. However, the trial will only take place within the Knapdale component.

Beaver activity is very much weighted towards freshwater riparian areas. The majority of their time, and foraging effort, is spent either within water or within 10m of water edge. They may occasionally forage up to a few tens of metres away from water edge. Most of the marsh fritillary butterfly population is more than 10m distance from freshwater edge, and therefore away from areas within which beavers would be most frequently active.

Even if beavers were to be active within such areas, their grazing activity would have an overall beneficial effect (or at the very least, neutral), through reducing the encroachment of shrubby and shading species.

There will therefore be no adverse impact on the population of the species as a viable component of the site.

Distribution of the species within the site

As described above, the Taynish component of the population will not be affected. The Knapdale component of the overall SAC population, newly discovered at Loch Barnluasgan, now forms an important part of the overall distribution of the species.

Beaver will not be released at Loch Barnluasgan but, since the proposed release site of Loch Coille-Bharr is downstream, it is expected that they will reach the loch during the trial. The activity of beaver is expected to be beneficial as

described above. There will therefore be no adverse impact on the population of the species as a viable component of the site.

Distribution and extent of habitats supporting the species

The presence of devil's bit scabious *Succisa pratensis* is essential, within a mosaic of vegetation, mainly within the optimal sward height of 5-15cm (sub-optimal heights of 15-25 cm), with some longer, tussocky vegetation which can provide shelter for larval webs. The activity of beaver is expected to be beneficial (or at the very least, neutral), as described above. There will therefore be no adverse impact on the population of the species as a viable component of the site.

Structure, function and supporting processes of habitats supporting the species

This is dealt with in the section above.

No significant disturbance of the species

Beavers will not significantly disturb marsh fritillary butterfly.

In terms of visitors coming to see the beaver project, there are already designated public footpaths, cycling tracks etc within the SAC area. For those visitors who wish to move away from the FCS facilities, provision will need to be put in place to allow self-guided and guided walks which are designed to utilise these existing public footpaths.

There is currently a footpath that is located around Loch Barnluasgan and runs close to the area within which marsh fritillary butterfly has recently been recorded. However, on the basis that an overall visitor management plan is agreed and implemented prior to the release of beaver and throughout the project (e.g. signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.), and this plan and the design of associated facilities are discussed with SNH, the site will not be adversely impacted.

Note that this appraisal assumes relatively low levels of visitors in the early stages of the project, and the provision of the interpretative facilities as described above. If there are plans for other visitor facilities (e.g. there is a future proposal for a hide to be set up near a beaver lodge – but this cannot be assessed until the location of any proposed hide is known, which in turn cannot be identified until the beavers set up a lodge), a further appraisal will be required.

6.5.3 SNH Advice in relation to effects on marsh fritillary butterfly

Background

The proposal consists of a trial reintroduction of European beaver to Knapdale. This lies partly within Special Area of Conservation (SAC) classified for marsh fritillary butterfly *Euphydryas* (*Eurodryas*, *Hypodryas*) *aurinia*.

The site's status as a classified SAC under the EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the "Habitats Directive"), means that the Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations") apply. The requirements are summarised in SE Circular 6/1995 as amended June 2000 and include, at paragraph 12:

"The Regulations (48) require that, where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 site is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the conservation interests for which the area has been designated."

SNH's advice is that this proposal is likely to have a significant effect on the qualifying interest of the site. However SNH would further advise the Scottish Government that on the basis of the appraisal carried out to date, that if the proposal is undertaken strictly in accordance with the following conditions, then the proposal will not adversely affect the integrity of the site.

- a) A visitor management plan must be agreed and implemented prior to the release of beaver and during the lifetime of the project (addressing issues such as signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.). This plan and the design of associated facilities must be discussed and agreed with SNH.

It should be noted that Scottish Government is required to undertake an appropriate assessment of the implications of the proposal for the site in view of the site's conservation objectives for its qualifying interest(s). This assessment may be based on the above appraisal by SNH but the Scottish Government may wish to carry out further appraisal before completing the appropriate assessment.

6.6 APPRAISAL: KNAPDALE LOCHS SPA – BLACK-THROATED DIVER.

6.6.1 Introduction

The SPA is composed of a cluster of breeding lochs of which Loch [REDACTED] is the only one within the proposed trial area. Loch [REDACTED] is not one of the proposed release sites for the beavers, nor is it within the same catchment as the release sites. However it is possible that beavers may move to this loch during the trial period. [REDACTED]

The trial will be for five years plus up to one further year to assess the results, meaning six breeding seasons could be affected. There are key periods during the diver breeding season that could overlap with the activities of the beavers and/or indirectly by disturbance from project staff or others checking for beaver occupancy.

European beaver is a natural component of freshwater ecosystems in Europe in which the diver may also occur. Similarly, the black-throated diver is also recorded living in the same areas as the North American species of beaver.

Impacts of beavers could be to raise the water level of the loch by damming outflow burn(s) that could flood diver nests with eggs. Otherwise, fluctuations in water levels are a normal experience for divers at breeding lochs. [REDACTED]

The key period of the year would be nesting, egg laying and incubation. Divers sometimes lay replacement clutches and so the breeding season can be prolonged in some years.

Therefore there is a likely significant effect from the proposed trial due to beavers altering water levels at times during the breeding season and from disturbance to adults and young during the breeding season.

6.6.2 Conservation Objectives

In order to determine the effects of the proposal on site integrity, the conservation objectives which apply to the black-throated diver interest are examined in turn below.

The conservation objectives are to ensure for the qualifying species, black-throated diver, that the following are maintained in the long term;

Population of the species as a viable component of the site

The site supports four pairs of breeding divers and therefore Loch [REDACTED] is an important component to ensure that the population is maintained. Dam building

in the outflow burns during the breeding season could cause changes in water levels that might flood nests with eggs or prevent adults brooding young. This would only occur if the birds nested on the shore. [REDACTED]

[REDACTED] Beavers could have a direct impact if dam building took place during the nesting period. A dam established before breeding and which maintained a near constant water level would not have an impact. An increase in water level is unlikely to have an adverse impact on divers through indirect impacts to fish prey. Under natural conditions fluctuations occur and outwith the breeding season major fluctuations occur due to the usage [REDACTED]. If damming were prevented during the crucial part of the breeding season then there would be no adverse impact from beavers.

There is also the potential for disturbance from project staff and others checking the area for beaver activity during the breeding season. There is an existing track up to the loch but the level of usage is low. Any project activity during the breeding season should be confined to the outflow burns to check for beaver activity

Distribution of the species within the site

The loch is one of several breeding lochs used by breeding divers. The birds would use the lochs and attempt to nest irrespective of fluctuations in water level and so the distribution of birds in the site would not be affected during the period of the trial. However their breeding distribution in the site would be affected as would the overall breeding success of the site. Therefore, as above, if damming was prevented during the key part of the breeding season and monitoring activity minimised then there would be no direct adverse impact from beavers.

Distribution and extent of habitats supporting the species

The only physical impact the beavers would have on the loch itself is by raising the water level but this would not affect the divers. The loch is an oligotrophic hill loch and contains few macrophytes and it, or its outflow burns, are unlikely to be colonised by beavers during the trial period. Therefore there will be no adverse impact on the distribution and extent of habitats supporting the breeding divers.

Structure, function and supporting processes of habitats supporting the species

The habitats supporting the breeding divers at the loch are the loch itself, water level and the prey fish. Beavers are only likely to have an impact on the water level and that can be dealt with as above.

No significant disturbance of the species

Already dealt with above.

6.6.3 SNH Advice in relation to effects on black-throated diver

Background

The proposal consists of a trial reintroduction of European beaver to Knapdale. This lies partly within Special Protection Area (SPA) classified for its breeding black-throated diver, *Gavia arctica*.

The site's status as a classified SPA under the EC Directive 79/409/EEC on the Conservation of Wild Birds (the "Birds Directive"), means that the Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations") apply. The requirements are summarised in SE Circular 6/1995 as amended June 2000 and include, at paragraph 12:

"The Regulations (48) require that, where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 site is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the conservation interests for which the area has been designated."

SNH's advice is that this proposal is likely to have a significant effect on the qualifying interest of the site. However SNH would further advise the Scottish Government that on the basis of the appraisal carried out to date, that if the proposal is undertaken strictly in accordance with the following conditions, then the proposal will not adversely affect the integrity of the site.

- a) Outflow burns of Loch [REDACTED] to be checked for beaver activity annually in March before the return of divers; if a dam is present consult SNH to determine whether it needs to be removed
- b) No dam building by beavers in outflow burns of Loch [REDACTED] to be permitted during the period April to July inclusive. Any dams being built during that period should be removed without disturbance to the divers.
- c) If divers are breeding on Loch [REDACTED] in any year then checking for beavers must be carried out without any disturbance to the breeding birds. Black-throated diver is listed on Schedule 1 of the Wildlife & Countryside Act 1981, as amended, therefore, prior to any survey work, relevant project staff must apply for a licence from SNH.

It should be noted that Scottish Government is required to undertake an appropriate assessment of the implications of the proposal for the site in view of the site's conservation objectives for its qualifying interest(s). This assessment

may be based on the above appraisal by SNH but the Scottish Government may wish to carry out further appraisal before completing the appropriate assessment.

6.7. SUMMARY OF APPRAISALS AS TO WHETHER IT CAN BE ASCERTAINED THAT THE PROPOSAL WILL NOT ADVERSELY AFFECT THE INTEGRITY OF THE SITES

6.7.1 Introduction

Sections 6.2 – 6.6 provide separate appraisals for each SAC and SPA qualifying interest. In each case, SNH's advice is that this proposal is likely to have a significant effect on the qualifying interest of the site. However SNH further advises the Scottish Government that on the basis of the appraisal carried out to date, that if the proposal is undertaken strictly in accordance with certain conditions, then the proposal will not adversely affect the integrity of the site.

This final section, therefore, provides a collation of all the relevant conditions (section 6.7.3 below). We recommend that the Scottish Government considers including these conditions as part of any licence issued to the applicants.

6.7.2 Conservation Objectives

The conservation objectives are to ensure for the qualifying habitats, oak woodland and oligo-mesotrophic lochs, that the following are maintained in the long term;

- Extent of the habitat on site
- Distribution of the habitat within site
- Structure and function of the habitat
- Processes supporting the habitat
- Distribution of typical species of the habitat
- Viability of typical species as components of the habitat
- No significant disturbance of typical species of the habitat

To ensure for the qualifying species, otter, marsh fritillary butterfly and black-throated diver, that the following are maintained in the long term;

- Population of the species as a viable component of the site
- Distribution of the species within the site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

6.7.3 SNH Advice in relation to effects on the SAC and SPA qualifying interests

Background

The proposal consists of a trial reintroduction of European beaver to Knapdale. This lies partly within Special Area of Conservation (SAC) classified for:

- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (referred to elsewhere in this document as oak woodland).
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littoreletea uniflorae* and/or of the *Isoëto-Nanjuncetea* (referred to elsewhere in this document as oligo-mesotrophic lochs).
- Otter *Lutra lutra*,
- Marsh fritillary butterfly *Euphydryas (Eurodryas, Hypodryas) aurinia*.

It also lies partly within Special Protection Area (SPA) classified for:

- Black-throated diver *Gavia arctica*.

The site's status as a classified SAC under the EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the "Habitats Directive"), and as a classified SPA under the EC Directive 79/409/EEC on the Conservation of Wild Birds (the "Birds Directive"), means that the Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations") apply. The requirements are summarised in SE Circular 6/1995 as amended June 2000 and include, at paragraph 12:

"The Regulations (48) require that, where an authority concludes that a development proposal unconnected with the nature conservation management of a Natura 2000 site is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the conservation interests for which the area has been designated."

SNH's advice is that this proposal is likely to have a significant effect on the qualifying interests of the sites. However SNH would further advise the Scottish Government that on the basis of the appraisal carried out to date, that if the proposal is undertaken strictly in accordance with the following conditions, then the proposal will not adversely affect the integrity of the sites.

- a) Beaver dam construction on burns to be carefully monitored and SNH to be informed immediately once new dams are created. An assessment will then be made by SNH on a case by case basis and, if judged necessary, management of the dam will be required.
- b) Beaver dam construction on loch outflows to be carefully monitored and SNH to be informed immediately once new dams are created. If beaver dams are constructed on the outflows of oligo-mesotrophic lochs within the SAC, then the natural water levels of the lochs must be maintained, either through the use of beaver-specific devices which can be

incorporated to manage water flow, or through removing the dam. The details to be discussed and agreed with SNH.

- c) No dam building by beavers in outflow burns of Loch [REDACTED] to be permitted during the period April to July inclusive. Any dams being built during that period should be removed without disturbance to the divers.
- d) Outflow burns of loch [REDACTED] to be checked for beaver activity annually in March before the return of divers; if a dam is present consult SNH to determine whether it needs to be removed
- e) Stands of hazel, which hold significant communities of 'typical species' of lichens, should be protected where necessary using appropriate methods and following discussion and agreement with SNH.
- f) The methods, and the location, design and construction of structures, required for the 'soft release' of beavers (e.g. artificial lodges and fencing) must take into account local otter activity. The same applies to the erection of fencing for any other purpose during the trial (e.g. the exclusion of beavers from sensitive areas). This must be discussed and agreed with SNH.
- g) If divers are breeding on Loch [REDACTED] in any year then checking for beavers must be carried out without any disturbance to the breeding birds. Black-throated diver is listed on Schedule 1 of the Wildlife & Countryside Act 1981, as amended, therefore, prior to any survey work, relevant project staff must apply for a licence from SNH.
- h) A visitor management plan must be agreed and implemented prior to the release of beaver and during the lifetime of the project (addressing issues such as signage, interpretive information in existing buildings, provision for self-guided and guided walks etc.). This plan and the design of associated facilities must be discussed with and agreed with SNH.

It should be noted that Scottish Government is required to undertake an appropriate assessment of the implications of the proposal for the site in view of the sites' conservation objectives for their qualifying interests. This assessment may be based on the above appraisal by SNH but the Scottish Government may wish to carry out further appraisal before completing the appropriate assessment.