Beavers in Scotland

Strategic Environmental Assessment

Environmental Report

Annex 2 – Habitats Regulations Appraisal

Advice by Scottish Natural Heritage (SNH) to inform an appropriate assessment (AA) of The Scottish Government decision to allow Eurasian beavers to remain in Scotland.

17 May 2017

Summary

Scottish Ministers are minded to allow beavers to remain in Scotland and have agreed that:

- Beaver populations in Argyll and Tayside can remain
- The species will receive legal protection in accordance with the EU Habitats Directive
- Beavers will be allowed to expand their range naturally
- Beavers should be actively managed to minimise adverse impacts on farmers and other land owners
- It will remain an offence for beavers to be released without a licence, punishable by up to 2 years imprisonment and an unlimited fine

The area of Argyll and Tayside in which beavers are likely to occur and into which they may expand within the short term as a result of this decision is referred to as the 'Beaver Policy Area'; this equates to the Zone of Detailed Appraisal which has been defined for the purposes of the Appropriate Assessment carried out in this document (Section 9).

This appraisal concludes that adverse effects will be avoided on the integrity of 34 European sites within the Beaver Policy Area taking into account the current range of mitigation techniques which are available. Regarding 47 of the 67 quallifying interests affected it was concluded that mitigation measures would be required to avoid effects on site integrity (Annex G). There were no Natura sites where it was concluded there would be an adverse effect on their integrity.

Process

HRA is a three stage process (see Figure 1):

Stage 1 considered whether the Ministerial announcement on beavers is directly connected with or necessary to the nature conservation management of a Natura site. This test is a strict one and our advice is that it does not met this test.

Stage 2 examined all designated Natura qualifiers in Scotland for likely significant effects from beavers.

142 sites were identified with a potential LSE through identifying connectivity between qualifying interests and beavers (Annex F and Table 13).

Stage 3 only examined the designated features on Natura sites that were both in the Zone of Detailed Appraisal, and for which a likely significant effect was concluded in Stage 2. This stage allows a full appraisal of whether there would be an adverse effect on site integrity by beavers on those sites where beavers are already present, or could possibly occur in within the next 15 years.

There is the potential for beavers to spread naturally from the Tay/Earn catchments and Knapdale into other parts of Scotland, but that this is likely to take place in a slow unpredictable fashion over an extended period, possibly decades.

Thirty-four Natura sites required detailed appraisal of the potential impacts of beaver upon their qualifying interests.

As set out in law an HRA focusses on potential adverse effects on qualifying interests of Natura sites, and on Natura site integrity in view of their conservation objectives. The beneficial effects of beavers have been set out in 'Beavers in Scotland' and are referred to in Stage 2 for individual qualifiers.

The appraisal took into account consideration that there is a wide range of the techniques to mitigate the impacts of beavers have evolved in continental Europe and North America. Many of these are well developed and understood and new ones continue to be developed or existing ones refined. Because beavers are still relatively new to Scotland some of these techniques have yet to be needed or to be tried. If the re-introduction of beavers receives final approval then there is likely to be an extended period when mitigation techniques will be trialled in particular circumstances.

Beavers are known to have been present in a number of SACs and SPAs[1] for up to 10 years. Specific monitoring in the Trial area, and under SNH's Common Standards Monitoring protocols in the Scottish Beaver Trial area and in Tayside, and as well as more general site surveillance have not indicated that beavers are having an adverse effect on designated features, and the water level mitigation implemented (ie. in the Scottish Beaver Trial) has been sufficient to avoid adverse effects on these Natura qualifiers. The appraisal concluded that beaver mitigation plans should ensure no adverse effect on site integrity.

Should Scottish Ministers confirm their decision to allow beavers to remain permanently in Scotland: a review of the HRA should be carried out in 10 to 12 years, or at the point any new release site or other reinforcement is considered, to ensure that there remains no adverse effects on site integrity after this initial period.

[1] Including the River Tay SAC, Dunkeld – Blairgowrie Lochs SAC, Shingle Islands SAC, Loch of Kinnordy SPA, Loch of Lintrathen SPA, Knapdale Lochs SPA and the Taynish and Knapdale Woods SAC

1. Commission from Scottish Government

1.1. This document has been requested by Scottish Government, and is the advice of Scottish Natural Heritage (SNH) to Scottish Government to help inform a check for likely significant effects and an appropriate assessment as part of a 'Habitats Regulations Appraisal' (HRA) of any decision to be minded to retain Eurasian beavers *Castor fiber* in Scotland. This advice is mainly strategic in nature, and is designed to advise on the long-term situation that may develop from any of the scenarios involving the reintroduction, natural expansion and/or further release of animals. The SNH 'Beavers in Scotland' report refers to four possible future scenarios for beavers in Scotland, three of which involve retaining the current Tayside and Knapdale populations and allowing natural expansion from them. Two of these three scenarios would also involve further approved releases.

1.2. Scottish Ministers are now minded to allow beavers to remain in Scotland and have agreed *inter alia* that:

- Beaver populations in Argyll and Tayside can remain
- The species will receive legal protection in accordance with the EU Habitats Directive
- Beavers will be allowed to expand their range naturally

1.3. The area of Argyll and Tayside in which beavers are likely to occur and expand into within the short term is referred to in this document as the Beaver Policy Area; this equates to the Zone of Detailed Appraisal which has been defined for the purposes of this document (see Annex D)

2. Background

2.1. Eurasian beavers inhabit riparian broadleaf woodland or scrub bordering fresh standing, or slow-moving water courses. They are well-known as ecosystem engineers and can have a variety of notable impacts on habitats and species through physical changes they make to their environments, especially in those freshwater and riparian zones where most of their activity takes place. Trying to understand what changes might happen, and where and how the changes might occur are key aspects of any decision-making related to a reintroduction.

2.2. A key driver for the consideration of any beaver reintroduction is the EU 'Habitats Directive'[2] which requires that Member States study the desirability of reintroducing

[2] Council Directive 92/43/EEC.

certain native species that are listed in Annex IV of the Directive. The Eurasian beaver was previously native to the UK with evidence pointing to the likelihood that it existed in Scotland until the sixteenth century.

2.3. Due to this driver, work has been ongoing by SNH for over twenty years concerning the issues surrounding reintroducing beavers to Scotland including SNH-commissioned projects, the Scottish Beaver Trial in Knapdale, and the Beaver-Salmonid Working Group. There have also been many other studies abroad including mainland Europe where several reintroductions have taken place. A major outcome was the publication in 2015 of 'Beavers in Scotland', a report to Scottish Government by SNH that focussed on assessments of the interactions beavers may have on the natural and human environments; examined legal and beaver management issues; and presented a series of potential future scenarios for beavers in Scotland.

2.4. One aspect of any potential reintroduction plan is a legal requirement for a focussed assessment of the impacts of beaver on Natura sites in Scotland through a legally-binding procedure known as Habitats Regulations Appraisal.

3. Habitats Regulations Appraisal

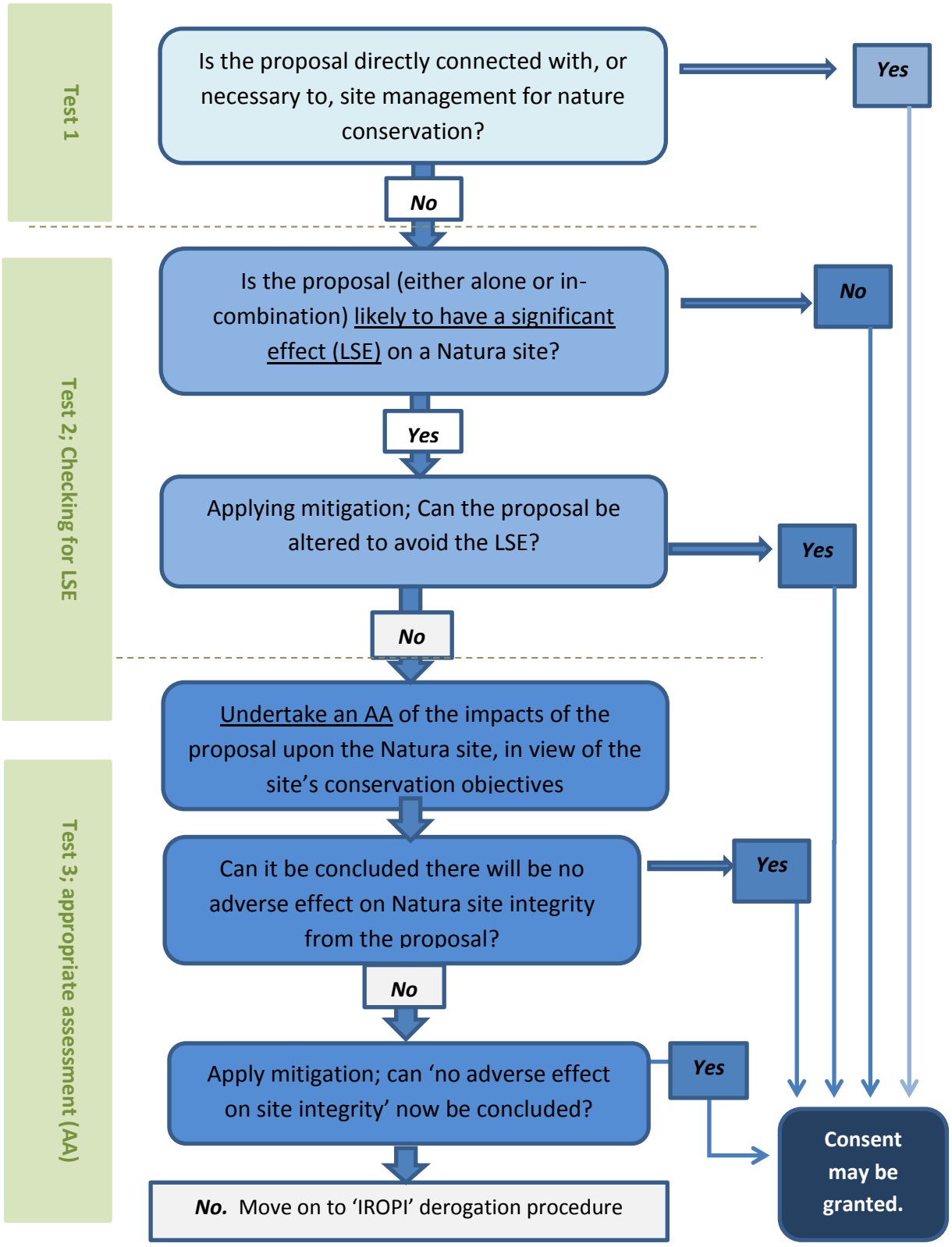
3.1. Habitats Regulations Appraisal (HRA) is the term used to describe the procedure required by regulation 48 of The Conservation (Natural Habitats, &c.) Regulations 1994, (as amended) (The 'Habitats Regulations'). These regulations transpose the Habitats Directive into Scottish law. Article 6(3) of the Directive (and regulation 48 of the Regulations) requires that any plan or project which is not directly connected with or necessary to the management of a Natura site, but which would be likely to have a significant effect on such a site, either individually or in combination with other plans and projects, shall be the subject of an appropriate assessment of its impacts, in view of the site's conservation objectives. This equates in practice to three tests (Figure 1). HRA is a rigorous, precautionary procedure that examines the potential negative effects on Natura sites resulting from a plan or project, and is designed – with the precautionary principle at its core - to ensure the protection of Natura sites against plans and projects that may harm their integrity.

3.2. Therefore any plan or project to reintroduce beavers should be subject to a HRA, and the competent authority (in this case Scottish Government) may only agree to

the plan or project after having concluded that it will not adversely affect the integrity of any Natura sites[3].

[3] Unless the exceptional derogation circumstances as set out in Article 6(4) of the Directive and regulation 49 of the Habitats Regulations are met.

Figure 1: The HRA process, up to and including appropriate assessment (AA).



3.3. The first HRA test to determine if a plan or project is directly connected with or necessary to the nature conservation management of a Natura site is a strict one. The consideration at this stage must extend to all qualifying interests of all potentially affected Natura sites. SNH advises that a plan to reintroduce beavers to Scotland could not be considered to meet the strict interpretation of this test, although for certain individual sites this might be the case. This means the next test must be applied: which is deciding if the plan or project is likely to have a significant effect on a Natura site or not.

4. Checking for likely significant effects (LSE)

4.1. Checking for any likely significant effects is the second test. Decisions at this stage are taken by the competent authority. It is not a legal requirement to consult SNH, though they encourage competent authorities to do so. It acts as a screening stage although it is not formalised as such. The legal interpretation of this test[4] regarding what can constitute a 'likely significant effect' means that it is far more precautionary than it sounds, and effectively means that unless the impacts of a plan or project which might undermine one or more of the site's conservation objectives can be excluded on the basis of objective information, then a competent authority should conclude there is a LSE and proceed to a more thorough analysis[5], i.e. an appropriate assessment.

4.2. The full test at this point in the HRA procedure is "alone or in combination with other plans and projects". So identified impacts of the plan or project which may not cause a threshold of significance or likeliness to be crossed on their own should be checked with the impacts of other plans and projects that are completed, underway, or proposed, to see if the thresholds are crossed when they are combined.

4.3. Mitigation that is simple and eliminates, cancels, or minimises the effects of a plan or project can be taken into account at this stage of a HRA; however, given the light touch nature of the check for LSE and the precautionary approach embedded in the HRA procedure, there should be no doubt as to the effectiveness of the mitigation measures. If surety of success is not possible then such circumstances indicate that the risk to Natura sites may be too high and the consideration of the plan or project should proceed to an appropriate assessment to allow the issues to be explored fully and properly.

---

[4] Primarily set out in the CJEU 'Waddenzee' case C-127/02, and reinforced by further cases such as the 'Sweetman' case C-258/11

[5] In the 'Sweetman' case C-258/11 in the Opinion of the Advocate General paragraph 46 says, "*although the words 'likely to have an effect' used in the English-language version of the text may immediately bring to mind the need to establish a degree of probability… the expression used in the other language versions is weaker. ..the question is simply whether the plan or project concerned is capable of having an effect. It is in that sense that the English 'likely to' should be understood*".

5. Methodology for LSE check

5.1. This stage of the HRA procedure is conducted as a relatively simple, but precautionary appraisal of available information on the plan or project. EU guidance[6] says, "*it is worth recalling that the initial screening undertaken here is not the same as a full-scale appropriate assessment – it only requires sufficient information to be able to decide if there is likely to be a significant effect or not*".

5.2. Given the national scale of this check for LSEs a methodology was devised to allow a check for LSE across all relevant Scottish Natura sites. Although a series of exercises were needed to help gather the information required, the analysis of the information was relatively simple. An initial GIS map-based exercise was conducted to help provide a clearer focus for the relevant SNH species/habitat specialist advisers, as set out below.

5.3. A pre-existing 'Beaver core habitat' GIS map, developed during 2015 and described in Commissioned Report 875[7] and the 'Beavers in Scotland' report was used. It shows the locations of suitable riparian woodland[8] buffered to suitable freshwater habitat[9] that are expected are able to support viable beaver territories (core habitat). There is also a GIS map identifying 'Beaver habitat' (i.e. non-core) which is similar, but includes habitat fragments of any size, including very small ones likely to be unable to support beaver territories – but which might be used on occasion by, for example, dispersing individuals etc. Combined, these maps show the entire potential habitat existing now which one may expect beavers to inhabit at some future point, in some cases possibly quite far into the future (these combined GIS layers can be seen in Annex A). Of course in reality, even in the long term, beavers would not inhabit all this habitat at the same time, and habitats could change over time.

5.4. The following mapping exercises were done for mainland Scotland and for a number of Scottish islands where beavers might be able to reach at some point in the future based on recorded beaver dispersal abilities through coastal waters[10].

---

[6] Paragraph 5.3.1. European Union (2011). EU guidance on wind energy developments in accordance with the EU nature legislation. Publications Office of the European Union, Luxembourg.

[7] SNH Commissioned Report 875: A geospatial analysis of potential Eurasian beaver (Castor fiber) colonisation following reintroduction to Scotland.

[8] 'Suitable' woodland means the presence of broadleaf woodland and shrub within approximately 50m of a freshwater edge. See Beavers in Scotland report. Section 3.2

[9] 'Suitable' freshwater habitat means within 50m of broadleaf woodland and shrub, with streams of less than 15% gradient, and in sections not affected by tides. See 'Beavers in Scotland' report. Section 3.2

[10] Beavers in Scotland report. Section 3.2, and Figure 3.12.

- Overlay the ‘beaver core habitat’ map with all Natura sites in Scotland – for the mainland, and the relevant islands

- Overlay the ‘beaver habitat’ (i.e. not just core habitat) map with all Natura sites in Scotland – for the mainland, and the relevant islands

5.5. This work provided a list of all the Natura sites where there is at least some overlap with the relevant beaver GIS maps. These showed the sites where there are varying degrees of potential for future beaver presence and/or influence (Annex B), and therefore where judgements should be made as to whether there is likely to be a significant effect or not. The list also included the total area of each site; the area of potential beaver core habitat, and beaver habitat that overlays with the Natura site; and the proportion.

5.6. This work resulted in the production of a list of all the qualifying interests (habitats and species) and their associated Natura sites, where there is an overlap with predicted beaver habitat (Annex C).

5.7. Using the results of the GIS exercises SNH Policy and Advice advisers provided their judgements regarding LSE, at a generally broad scale, on Natura qualifying habitat types where there was an identified link from the GIS exercise between Natura sites and beavers.

6. Advice concerning the likelihood of significant effects on qualifying habitats and species

6.1. This advice on the likelihood of significant effects on Natura sites in Scotland is a series of relatively simple, scientific, precautionary judgements in line with the approach indicated by existing CJEU case law (see paragraphs 4.1 to 4.3). The judgements have been based in part on the results of the overlaying of the 'beaver core habitat' and 'beaver habitat' GIS maps with individual Natura sites in Scotland. The results have been provided in a range: sometimes in a broad strategic manner or using subset of sites – where impacts are regarded to be very similar to the different sites due to the qualifying interests present and the similarity of impacts; and sometimes individually, where a site could be singled out for a specific impact.

6.2. Some types of qualifiers were discounted as not having any LSE due to their lack of ecological connectivity with beavers. These included those qualifiers which are classified under SNH's Report Feature Categories of 'upland', 'coastal' and 'marine'. These qualifiers are listed in Table 1 below. However, there were a few exceptions to this rule which were checked for LSE despite belonging to one of these categories. These were the Annex I qualifiers; 'Blanket bog' and 'Depressions on peat substrates', and they have been included in Table 6.

Table 1; Habitats and species initially identified as having some overlap with GIS beaver habitat maps, but which are advised to have no LSE due to a lack of connectivity with beavers

Acidic scree	Dry heaths	Humid dune slacks	Plants in crevices on base-rich rocks	Vegetated sea cliffs
Alpine and subalpine calcareous grasslands	Dune grassland	Intertidal mudflats and sandflats	Reefs	Wet heathland with cross-leaved heath
Alpine and subalpine heaths	Dunes with creeping willow	Juniper on heaths or calcareous grasslands	Shallow inlets and bays	
Atlantic salt meadows	Dunes with juniper thickets	Lime-deficient dune	Shifting dunes	

		heathland with crowberry		
Base-rich scree	Estuaries	Limestone pavements	Shifting dunes with marram	
Coastal dune heathland	Glasswort and other annuals colonising mud and sand	Montane acid grasslands	Species-rich grassland with mat-grass in upland areas	
Coastal shingle vegetation outside the reach of waves	Grasslands on soils rich in heavy metals	Mountain willow scrub	Subtidal sandbanks	
Dry grasslands and scrublands on chalk or limestone	Harbour seal (*Phoca vitulina*)	Plants in crevices on acid rocks	Tall herb communities	

6.3. The advice in the following section should not be considered a detailed or comprehensive analysis of the potential effects of any reintroduction in Scotland as such work is more in keeping with an appropriate assessment. All the subsections are set out with a list of the qualifying interests covered by each subsection; any LSEs identified and a brief rationale for the advice given; a note of some of the positive impacts on the qualifying interests[11]; and any potential mitigation for the LSEs.

Table 2: Measures employed in Europe and North America to mitigate beaver impacts. Adapted from Table 5.1 in Beavers in Scotland report

Impact	Mitigation measure	Summary
	Dam notching	Removal of a small section of beaver dam, usually by hand, to increase water flow over that section

[11] These do not constitute any part of the HRA procedure.

Dam building	**Flow devices / flow control devices**	Placing a pipe through a dam to manage the water level behind it on a permanent basis
	Dam removal	Removal of a dam, either by hand or using mechanical devices
	Discouraging dam-building	Use of dissuasive techniques to prevent dam building either where known 'pinch points' occur or where a dam has been removed and is likely to be reconstructed
	Grilles	Use of metal grilles to prevent access to certain types of likely damming points, such as culverts
Burrowing activity	**Prevention of burowing**	Use of sheet metal piling, rock armour or mesh to prevent burrowing, or further burrowing, into vulnerable flood defences or adjacent land
	Realignement of flood banks	Expanding the riparian zone used by beavers by moving existing flood defences a minimum of 20 m from the edge of a watercourse
Foraging activity	**Exclusion fencing**	Fencing, either permanent or temporary, to prevent beavers accessing areas of water, crops or trees where damage is deemed intolerable
	Individual tree protection	Protection of individual or small numbers of amenity or other valuable trees by use of individual fences, mesh wrapping or deterrent paints

6.4. Management techniques to mitigate (i.e. eliminate, cancel or reduce) beaver impacts are referred to throughout the LSE and AA sections (sections 7 – 20). These measures and what they mean in practice have been summarised in Table 2 (above). Further information on both beaver management and beaver impact management can be found on pages 153 – 164 of the Beavers in Scotland report.

7. Qualifying habitat / species types:

Table 3; Woodlands

Habitat	Likely Significant Effect (LSE)	Rationale	Positive impacts
Bog Woodland	LSE	Beaver browsing of trees and other woodland vegetation. Loss of trees due to felling for dam building - though this is probably of a less intense nature than the more deciduous woodland due to the predominance of pine trees. Creation of beaver ponds inundating woodland areas with impacts on woodland structure	There are potential positive impacts on all the listed Natura woodland types. Due to their activities beavers can have a variety of positive effects on woodland structure, leading to a greater diversity of age classes, particularly in even-aged stands improving the variety of species present in woodlands and potentially creating biodiverse hot spots through the creation of increased levels of standing dead wood. The increased heterogeneity produced by felling and browsing can be beneficial to a range of taxonomic groups that are typically part of woodland qualifying habitats, e.g. vascular plants, dragonflies and butterflies. Inundation and drowning of trees can also create new patterns of habitat and promotes the growth certain species of trees.
Caledonian Forest	LSE	Beaver browsing of trees and other woodland vegetation – though this is probably of a less intense nature than the deciduous woodland due to the predominance of pine trees. Loss of trees due to felling for dam building. Creation of beaver ponds inundating woodland areas with impacts on woodland structure	
Alder woodland on floodplains	LSE	Beaver browsing of trees and other woodland vegetation. Loss of trees due to felling for dam building. Creation of beaver ponds inundating woodland areas with impacts on woodland structure	
Western Acidic oak woodland	LSE	Beaver browsing of trees and other woodland vegetation. Loss of trees due to felling for dam building. Creation of beaver ponds inundating woodland areas with impacts on woodland structure	
Mixed woodland on base-rich soils associated with rocky slopes	LSE	Beaver browsing of trees and other woodland vegetation. Loss of trees due to felling for dam building. Creation of beaver ponds inundating woodland areas with impacts on woodland structure	

Mitigation

A potential long-term mitigation measure would be to provide increased areas of woodland close to freshwater areas where beaver may move in to. This would not avoid an effect on a woodland SAC but could be sufficient to minimise the effect such that it is not significant. Fencing certain areas within a buffer zone close to freshwater against beavers is another possible mitigation measure that could be implemented to avoid a LSE on woodland SACs where necessary.

Table 4; Freshwater – standing waters

Habitat	Likely Significant Effect (LSE)	Rationale	Positive impacts
Acid peat-stained lakes and ponds	No LSE	The six SACs with acid peat-stained lakes and ponds have very little core beaver habitat which overlaps with them.	Beavers have a variety of beneficial impacts on standing freshwater SACs mostly connected with their dam building and foraging habits and the physical, hydrological and chemical changes these can effect. For instance; increasing macrophyte diversity as a result of persistent preferential feeding, the building of lodges, dams, food caches and the increased levels of woody debris also contribute to considerable increases in biodiversity.
Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	LSE	There is connectivity between the beaver core habitat and some of these SACs, although the degree of overlap varies between sites. E.g. the 'Beavers in Scotland' Report identifies Loch Ruthven SAC, Loch Ussie SAC and Muir of Dinnet SAC as each having abundant beaver core habitat. Loch nan Cat in Ben Lawers SAC, due to its altitude and lack of tree cover, has no LSE.	
Calcium-rich nutrient-poor lakes, lochs and pools	LSE	Two of the SACs with this qualifier have very low levels of core beaver habitat and it is advised that there is no LSE; the other (Durness SAC) has more potential habitat leading to advice of LSE for Durness SAC.	
Naturally nutrient-rich lakes or lochs which are often dominated by pondweed	LSE	Loch Achnacloich SAC near the Cromarty Firth is the only SAC with the naturally nutrient-rich lakes or lochs which are often dominated by pondweed qualifier that also has any core beaver woodland habitat. LSE advised here although only for the single SAC.	

Mitigation

Mitigation that could eliminate or avoid any LSE could consist of preventing beaver access to particular freshwater SAC locations or removing them if they appear to be creating a territory and before they could have a LSE. Both of these options would require permanent management and commitments from Scottish Government, SNH and other stakeholders involved in any reintroduction. Flow devices are a measure that can (and have been) used to prevent excessive hydrological changes resulting from dam building.

Table 5; Freshwater – running waters

Habitat	Likely Significant Effect (LSE)	Rationale	Positive impacts
Rivers with floating vegetation often dominated by water-crowfoot	LSE	There is a high chance that beavers will have some impacts upon this habitat based upon levels of predicted overlap. The 'Beavers in Scotland' report[12] identifies that much of the qualifying habitat occurs in sections that will not be dammed by beavers, nevertheless a LSE is advised at this stage of any HRA because the potential for an effect cannot be ruled-out with the degree of certainty required at this stage.	Any impacts are likely to be varied spatially and temporally, and could include helping the spread of water-crowfoot possibly by distributing seeds or by creating more suitable habitat for it to move into. The 'Beavers in Scotland' report states that levels of interaction are likely to be small to medium in their scale.

Mitigation

[12] Section 3.4.3

Mitigation that could eliminate or avoid any LSE could consist of preventing beaver access to particular freshwater SAC locations or removing them if they appear to be creating a territory and before they could have a LSE. Both of these options would require permanent management and commitments from Scottish Government, SNH and other stakeholders involved in any reintroduction.

Table 6; Wetlands

Habitat	Likely Significant Effect (LSE)	Rationale	Positive impacts
Very wet mires often identified by an unstable 'quaking' surface	LSE	Very wet mires (Quaking Bogs) would generally not be disadvantaged by the presence of beavers as the habitat tends to float and fall in response to the water level. However, in the short term 'tethered' quaking mire at the edges of the fen would not be able to move freely, and in the short term could be lost. Beavers are also selective feeders and may graze on some of the vegetation that helps contributes to the qualifying habitat. So there is a LSE in this instance due to potential impacts on the tethered portions of quaking bogs and from the possible effects of grazing.	Beaver dams could lead to the expansion of the extent of base-rich fens if there is a shallow surrounding topography. The increased water volume in the fen may also dilute the effect of any pollutants. Felling/coppicing of trees by the beavers, and the death of trees and other flora due to anoxia of the roots or partial anoxia leading to secondary infection by fungal diseases can be beneficial to the fen flora and fauna in similar ways to those
Alpine pioneer formations of the *Caricion bicoloris-atrofuscae*	No LSE	Alpine pioneer formations of the *Caricion bicoloris-atrofuscae* are dependent on flushing by calcareous water and changes in water chemistry brought about by beaver damming could possibly lead to a change in the characteristic species of the habitat. Importantly, this habitat mostly occurs on slopes on the sides of hills, and above potentially suitable beaver habitat, but also occurs occasionally on flatter ground. However, even the occurrences on flatter ground are in locations (i.e. above the zone that beaver might be able to affect through dam-building) most unlikely to be affected by beaver activity.	
Petrifying springs with tufa formation	No LSE	Petrifying springs with tufa formation are usually found on steeper slopes and at higher altitudes, and therefore less likely to be impacted by beavers. Tufa forms in areas where highly calcareous ground water percolates to the surface and the main tufa-forming mosses *Cratoneuron commutatum* and *C. filicinum* are present. Tufa is found in soligenous fens	

		and wet flushes on sloping ground which are set above areas with the potential to be flooded (flooding would wash away the tufa/mosses). Typically they form transitions to other open habitats such as heathland, grassland, limestone pavement and cliffs/screes. Given the locations of the habitat they are very unlikely to be affected by beaver activity either through dam building or tree felling.	described earlier for woodland habitats. Very Wet Mires (Quaking Bog); a greater extent of open and/or shallow water resulting from beaver activities may provide greater opportunities for the expansion of this habitat.
Active raised bog	No LSE	Lowland raised bogs (Active and Degraded) and Upland Bogs are unlikely to be significantly affected by beavers in a negative way as they are domed in structure and become isolated from the influence of surrounding groundwater sources. Because they are entirely rainwater-fed, and typically higher than surrounding land they are therefore not impacted by beaver activity. Some raised bogs also have scrub and willow growing on them, and although beavers would be likely to feed on some if they spent much time in their vicinity, neither the scale nor nature of the impacts would result in a LSE.	
Degraded raised bog	No LSE		
Alkaline fens	LSE	Alkaline fen extent is dependent on a shallow topography. Basin fens often have little scope for significant expansion as they are in confined basins. Blockages of outflows could create deep water, which in the short term could result in the loss of the fen habitat. Higher water tables could also submerge the base-rich springs and flushes which enter the fens. In some cases like Whitlaw Mosses SAC, higher water levels could mean these features would disappear. Beavers are also selective feeders and may graze on some of the vegetation that helps contributes to the qualifying habitat leading to a conclusion of LSE.	
Blanket bog	No LSE	Blanket bogs are unlikely to be significantly affected by beavers although beavers have been known to temporarily visit such habitats on occasion. The characteristic vegetation of Blanket bog is supported by waterlogged peat soils. Blanket bogs are found on gently sloping locations, in upland areas which are largely treeless (any trees near to blanket bog are mainly	

		coniferous – which are usually not felled by beavers). They will not build dams in such areas. They are at best marginal habitats for beavers who may feed on some of the vegetation present. However, such a type of effect and the very small scale of it potential scale of it means we advise no LSE.	
Depressions on peat substrates	No LSE	This qualifying habitat can be found on blanket bog, and as such the upland nature of the locations where this qualifier is found, the lack of trees, and the relatively poor quality of the blanket bog habitat for beavers means we advise no LSE.	

Mitigation

Similarly to the previous sections on both standing and running freshwater, mitigation that could eliminate or avoid any LSE would consist of preventing beaver access to particular wetland SAC locations, or removing them if they appear to be creating a territory and before they could have a LSE. Both of these options would require permanent management and commitments from Scottish Government, SNH and other stakeholders involved in any reintroduction. Flow regulation devices set up so that there would be no LSE are measures that could (and have been) used to prevent excessive hydrological changes resulting from dam-building. This mitigation measure might also be used to help avoid an adverse effect on site integrity at the AA stage of any HRA.

Table 7; Bryophytes

Species	Likely Significant Effect (LSE)	Rationale	Positive impacts
Green shield-moss (*Buxbaumia viridis*)	No LSE	Known locations for this species in both the Cairngorms SAC and Moniack Gorge SAC do not overlap with potential beaver habitat. However, it is noted that there is potential for this qualifier to move into areas not presently colonised that would overlap with potential beaver habitat, so there may be a LSE in the future.	
Slender green feather-moss (*Drepanocladus (Hamatocaulis) vernicosus*)	No LSE	The Branxholm and Wester Lochs SAC is a composite site consisting of a number of sub-sites, many of which have a good degree of overlap with potential beaver habitat; however, the only sub-site hosting this qualifier does not overlap with potential beaver habitat. Provided this remains the case we advise there is no LSE on this qualifying species. It is noted that there is potential for this qualifier to move into areas not presently colonised that would overlap with potential beaver habitat, so there may be a LSE in the future.	This qualifier could benefit from the control of willow scrub by beavers.

Mitigation

None required at present. No LSE. Any possible future LSE from beavers on these SACs could be mitigated sufficiently by excluding beavers from areas where they could negatively impact on the qualifying species. An alternative in some situations could be to make use of flow regulation devices to prevent any unwanted hydrological changes resulting from dam building and pond creation.

Table 8; Terrestrial and freshwater - aquatic vascular plants

Species	Likely Significant Effect (LSE)	Rationale	Positive impacts
Marsh saxifrage (*Saxifraga hirculus*)	No LSE	There is currently no overlap between predicted beaver habitats and known populations of marsh saxifrage within SACs designated for marsh saxifrage, and therefore only an insignificant level of possible interaction. Consequently there is no LSE advised for this species.	
Slender naiad (*Najas flexilis*)	LSE	The main identified threats to slender naiad are eutrophication and acidification[13]; however, there is a high chance of SACs designated for slender naiad being impacted by beavers[14] as there is a clear overlap between the distribution of slender naiad in SACs and potential beaver habitat. Impacts on the species are uncertain, and may range from positive to negative depending on site-specific circumstances.	Beavers may, depending on site-specifics, benefit slender naiad through attenuating sedimentation and consequently nutrient fluxes. They may also feed on Canadian pondweed and invasive non-native macrophyte which can compete with Slender naiad.

Mitigation

Flow regulation devices can be used to limit or prevent any unwanted hydrological changes resulting from dam building and pond creation. Permanently excluding beavers from areas where they could negatively impact on the qualifying species is an alternative.

[13] Wingfield, R.A., Murphy, K.J., Hollingsworth, P. and Gaywood, M.J. (2004).
The Ecology of Najas flexilis. Scottish Natural Heritage Commissioned Report No. 017
(ROAME No. F98PA02).

[14] There already exists one SAC designated for Slender naiad with beavers also present; Dunkeld and Blairgowrie lochs SAC

Table 9; Invertebrates

Species	Likely Significant Effect (LSE)	Rationale	Positive impacts
Freshwater pearl mussel (*Margaritifera margaritifera*)	LSE	There is sufficient overlap between the distribution of this species and potential beaver habitat to advise LSE. FWPM are only likely to be significantly affected by the impacts of dam building from beavers, and the 'Beavers in Scotland' report[15] states that 92% of FWPM locations are in places not likely to be dammed, e.g. the main stems of rivers; however risks remain in some SACs, particularly in some smaller watercourses and LSE is advised on freshwater river SACs at this stage. The LSEs relate to: the potential loss of riparian woodland leading to increased water temperatures in places where FWPM are located, and potential impacts on salmonids through dam-building. Salmonids act as a host species and are needed by FWPM to complete their life-cycle. Dam-building prevents their free movement up- and down-stream. There may also be localised sediment increases in the water immediately upstream of a beaver dam which if located near to a FWPM bed could harm the FWPM, especially juveniles.	Beaver dams and ponds can reduce in-stream sediment loads improving conditions for FWPM downstream of them. Increased woody debris volumes can also be helpful to FWPM increasing habitat diversity and this is already being planned as a management measure for some known FWPM populations. There may also be a range of positive impacts on salmonid host species.
Round-mouthed whorl snail (*Vertigo genesii*)	No LSE	Both species of snail are found in areas where calcareous ground water percolates to the surface. There is some overlap in the GIS layers between the distribution of this species and potential beaver	

[15] Section 3.4.6

Geyer's whorl snail (*Vertigo geyeri*)	No LSE	habitat. Despite this overlap the known locations on the specific sites (Beinn a'Ghlo SAC, Tulach Hill and Glen Fender Meadows SAC and Morrone Birkwoods SAC) are in soligenous fens or wet flushes which are on sloping ground set above any likely flood waters. These wetlands are in transitions to other open habitats such as heathland, grassland, limestone pavement and cliffs/screes. Given their locations they are very unlikely to be significantly affected by beaver activity either through dam building or tree felling.	
Marsh fritillary butterfly (Euphydryas (*Eurodryas, Hypodryas) aurinia*)	No LSE	In Scotland this species has a restricted range and tends to inhabit short coastal grasslands. There is little chance of any significant interaction between this butterfly and beavers due to the lack of any overlap in their distribution and potentially suitable beaver habitat respectively.	

Mitigation

LSE on FWPM could potentially be either partially eliminated or minimised, where appropriate, through maintaining free fish passage through beaver dams to allow FWPM to complete their life-cycle. Mitigation to protect riparian woodland may also be appropriate in certain areas. Physical exclusion or on-going removal of beavers from certain sub-catchments of FWPM concern is possible but would need to be permanently retained if required.

Table 10; Fish

Species	Likely Significant Effect (LSE)	Rationale	Positive impacts
Atlantic salmon (*Salmo salar*)	LSE	Atlantic salmon, river, and sea lamprey migrate down rivers to the sea as juveniles before returning to spawn as adults. LSEs therefore result from possible impacts on salmon, river and sea lamprey in relation to completing their life cycles.	Enhanced habitat availability/complexity. Enhanced over-wintering habitat. Enhanced rearing habitat. Provision of cover. Enhanced diversity/species richness. Sediment trapping. Enhanced invertebrate productivity. Enhanced growth rates. Enhanced fish condition. Enhanced abundance/productivity. Provision of habitat under low flows. Provision of high flow refuge. Provision of temperature refuge. Enhanced water quality.
River lamprey (*Lampetra fluviatilis*)	LSE	The degree of impact depends on a wide range of ecological factors. Regarding salmon, mapping work carried out for the Beaver-Salmonid Working Group indicates that for six catchments the percentage overlap between potential beaver woodland habitat and the wetted area of Atlantic salmon habitat ranged from 47% to 73%. This overlap was greater in rivers wider than 10m than for rivers less than 10m wide. A more recent SNH assessment[16] predicted that, within the Atlantic salmon SAC suite, the lengths of the rivers predicted to be 'less likely' to be dammed ranged from 84.5% for the River Spey SAC up to 100% for the Little Gruinard River SAC and River Thurso SAC. Any actual impacts would be very site-specific, depending on the particulars of each river SAC with these fish as qualifiers.	
Sea lamprey (*Petromyzon marinus*)	LSE		
Brook lamprey (*Lampetra planeri*)	LSE	Brook lamprey are also capable of being affected significantly via changes to their habitats from beaver activity, though this is likely to be to a lesser degree than for the three anadromous species.	

[16] Beavers in Scotland report. http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=2273

Mitigation

Mitigation measures are possible, such as notching of beaver dams or installing flow devices in beaver dams which allow natural upstream and downstream movement of fish to take place. Any mitigation should also allow for the maintenance of adequate areas of good quality spawning substrate, and ensure that water quality requirements for each of the SAC fish species are not compromised. Ongoing management and mitigation could, potentially, eliminate at least some of the LSEs identified. Exclusion of beavers from some catchments would ensure no LSE. The removal of their dams (which are usually temporary structures) may need to be carried out to remove LSE or reduce it sufficiently, particularly around peak migration times, or in areas important for reproduction.

Table 11; Amphibians

Species	Likely Significant Effect (LSE)	Rationale	Positive impacts
Great crested newt (*Triturus cristatus*)	No LSE	Despite the fact that Great crested newts are amphibious animals, there are only two SACs designated for them overlapping with potential beaver habitat. Burrow Head SAC has a very small amount of beaver habitat in the SAC and none of it 'core'. It is an agricultural landscape, with improved grassland and gorse scrub. The ponds at Burrow Head SAC are all rain-fed or spring-fed and there is no running water for beavers to manipulate. Colonisation by beavers would be very unlikely. The Great crested newts at Luce Bay and Sands SAC are surrounded by dune grassland and heath, and the ponds at Luce Sands SAC where the GCN are breeding are essentially dune slacks. So although there is a reasonable extent of woodland and core beaver habitat in the SAC, there is no overlap with the distribution of Great crested newts and no likely significant interactions.	Beaver activity, particularly the creation of ponds, wetlands, and larger areas of slow-moving water all generally benefit Great crested newts. Such activity might well be beneficial to Great crested newts outside the Natura network of sites.

Mitigation

None necessary. No LSE.`

Table 12; Birds

Species	Likely Significant Effect (LSE)	Rationale	Positive impacts
Bar-tailed godwit (*Limosa lapponica*), non-breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	Increases in wetland areas are the main mechanism by which beavers positively influence bird species. The ephemeral and indistinct edges of beaver ponds may be a key driver of high bird biodiversity as they provide a structurally complex habitat that may improve nest concealment, reduce predation, increase food production and provide a diverse range of ecological niches for species. Beaver impoundments tend to contain an abundant aquatic assemblage including a diverse range of macro-invertebrates which are an excellent food source for water birds such as ducks. Beaver meadows support diverse grassland
Black-throated diver (*Gavia arctica*), breeding	LSE	LSE is advised re. Black-throated diver in their SPAs due to the potential for beaver dams to impede migratory fish and reduce prey base for adults and older chicks.	
Capercaillie (*Tetrao urogallus*), breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Chough (*Pyrrhocorax pyrrhocorax*), breeding	No LSE		
Chough (*Pyrrhocorax pyrrhocorax*), non-breeding	No LSE		
Common scoter (*Melanitta nigra*), breeding	No LSE		
Common scoter (*Melanitta nigra*), non-breeding	No LSE		
Common tern (*Sterna hirundo*), breeding	No LSE		

Cormorant (*Phalacrocorax carbo*), non-breeding	No LSE		vegetation, which promotes bird biodiversity and may be an essential source of habitat for grassland birds on a landscape scale
Corncrake (*Crex crex*), breeding	No LSE		
Curlew (*Numenius arquata*), non-breeding	No LSE		
Dotterel (*Charadrius morinellus*), breeding	No LSE		
Dunlin (*Calidris alpina alpina*), non-breeding	No LSE		
Dunlin (*Calidris alpina schinzii*), breeding	No LSE		
Eider (*Somateria mollissima*), non-breeding	No LSE		
Gadwall (*Anas strepera*), non-breeding	No LSE		
Golden eagle (*Aquila chrysaetos*), breeding	No LSE		
Golden plover (*Pluvialis apricaria*), breeding	No LSE		
Golden plover (*Pluvialis apricaria*), non-breeding	No LSE		
Goldeneye (*Bucephala clangula*), non-breeding	No LSE		
Goosander (*Mergus merganser*), non-breeding	No LSE		

Great crested grebe (*Podiceps cristatus*), non-breeding	No LSE		
Greenland Barnacle goose (*Branta leucopsis*), non-breeding	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Greenland white-fronted goose (*Anser albifrons flavirostris*), non-breeding	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Greenshank (*Tringa nebularia*), breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Grey plover (*Pluvialis squatarola*), non-breeding	No LSE		
Greylag goose (*Anser anser*), non-breeding	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Guillemot (*Uria aalge*), breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether	

Hen harrier (*Circus cyaneus*), breeding	No LSE	in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Hen harrier (*Circus cyaneus*), non-breeding	No LSE		
Herring gull (*Larus argentatus*), breeding	No LSE		
Icelandic Black-tailed godwit (*Limosa limosa islandica*), non-breeding	No LSE		
Kittiwake (*Rissa tridactyla*), breeding	No LSE		
Knot (*Calidris canutus*), non-breeding	No LSE		
Lapwing (*Vanellus vanellus*), non-breeding	No LSE		
Light-bellied Brent goose (*Branta bernicla hrota*), passage	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Little tern (*Sternula albifrons*), breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Long-tailed duck (*Clangula hyemalis*), non-breeding	No LSE		

Mallard (*Anas platyrhynchos*), non-breeding	No LSE		
Marsh harrier (*Circus aeruginosus*), breeding	No LSE		
Merlin (*Falco columbarius*), breeding	No LSE		
Osprey (*Pandion haliaetus*), breeding	No LSE		
Oystercatcher (*Haematopus ostralegus*), non-breeding	No LSE		
Peregrine (*Falco peregrinus*), breeding	No LSE		
Pink-footed goose (*Anser brachyrhynchus*), non-breeding	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Pintail (*Anas acuta*), non-breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Pochard (*Aythya ferina*), non-breeding	No LSE		
Razorbill (*Alca torda*), breeding	No LSE		
Red-breasted merganser (*Mergus serrator*), non-breeding	No LSE		

Redshank (*Tringa totanus*), non-breeding	No LSE		
Red-throated diver (*Gavia stellata*), breeding	No LSE		
Red-throated diver (*Gavia stellata*), non-breeding	No LSE		
Ringed plover (*Charadrius hiaticula*), non-breeding	No LSE		
Ringed plover (*Charadrius hiaticula*), passage	No LSE		
Sanderling (*Calidris alba*), non-breeding	No LSE		
Sandwich tern (*Sterna sandvicensis*), passage	No LSE		
Scaup (*Aythya marila*), non-breeding	No LSE		
Scottish crossbill (*Loxia scotica*), breeding	LSE	LSE is advised re. Scottish crossbill due to the potential for small scale losses of cone-bearing trees in their SPAs resulting from beaver dam building / pond creation activity.	
Seabird assemblage, breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Shag (*Phalacrocorax aristotelis*), breeding	No LSE		
Shelduck (*Tadorna tadorna*), non-breeding	No LSE		

Short-eared owl (*Asio flammeus*), breeding	No LSE		
Shoveler (*Anas clypeata*), non-breeding	No LSE		
Slavonian grebe (*Podiceps auritus*), breeding	No LSE		
Slavonian grebe (*Podiceps auritus*), non-breeding	No LSE		
Slavonian grebe (*Podiceps auritus*), passage	No LSE		
Spotted crake (*Porzana porzana*), breeding	No LSE		
Svalbard Barnacle goose (*Branta leucopsis*), non-breeding	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Taiga bean goose (*Anser fabalis fabalis*), non-breeding	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Teal (*Anas crecca*), non-breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether	

Tufted duck (*Aythya fuligula*), non-breeding	No LSE	in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Turnstone (*Arenaria interpres*), non-breeding	No LSE		
Velvet scoter (*Melanitta fusca*), non-breeding	No LSE		
Waterfowl assemblage, non-breeding	No LSE		
Whooper swan (*Cygnus cygnus*), non-breeding	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Whooper swan (*Cygnus cygnus*), passage	LSE	LSE is advised for the goose and swan qualifiers as they typically feed on agricultural land (from the autumn to spring) which can often be in proximity to streams, ditches and burns. There could be minor (and usually temporary) losses of this land at these times of year from flooding due to beaver dams, leading to a reduction in the availability of supporting habitat; i.e. feeding areas outside the SPAs.	
Wigeon (*Anas penelope*), breeding	No LSE	There is very limited, or no, potential overlap / connectivity with the bird qualifying species due to their feeding and / or nesting habits, whether in the breeding or wintering seasons as applicable. Or any effects on some of the species will be positive	
Wigeon (*Anas penelope*), non-breeding	No LSE		
Wood sandpiper (*Tringa glareola*), breeding	No LSE		

Mitigation

Scottish crossbill:

The area affected likely to be minimal and a very small proportion of available habitat for crossbills. The mitigation most likely to be successful in avoiding this small effect is to exclude beavers and/or their dams from areas where their activities might lead to this impact. Positive management of pine woodland and/or Scottish crossbill SPAs to increase the area of suitable foraging habitat away from the beaver-influenced areas could also be effective mitigation in certain cases.

Black-throated diver:

The mitigation most likely to be successful in avoiding this effect is to exclude beavers and/or their dams from areas where their activities might lead to this impact. Alternative mitigation includes 'notching' or other management of dams, and/or installation of flow devices.

Geese qualifying species and Whooper swan:

The area of supporting habitat that might be lost as a proportion of total supporting habitat for any SPA will only ever be extremely small. The mitigation that might avoid the LSE would be similar to that for other species which could be affected by water level increases resulting from beaver damming (i.e. dam management and beaver management to avoid the loss of supporting habitat).

Table 13; Mammals

Species	Likely Significant Effect (LSE)	Rationale	Positive impacts
Otter (*Lutra lutra*)	LSE	There is a clear potential for interaction between beaver and otter. This is probably more significant or likely or both in SACs designated for otter which are not coastal in nature and instead have a freshwater and woodland component. The LSE is advised because dam building has the potential to restrict migratory fish movement which, in turn, could influence prey availability for otters in the upper reaches of river catchments, particularly in the autumn when spawning salmon would otherwise be present as a seasonally important resource. Dam-building could also restrict upstream salmon movement at this time, and otters might learn to capitalise on this seasonal distribution, focussing their efforts on pools below dams where the salmon are concentrated.	For coastal sites there is a much reduced capacity for either positive or negative effects on otter, though this will depend upon site-specifics. At the freshwater otter SACs beavers are expected to have a largely positive influence. The creation of dams, new ponds and new riparian wetland is expected to boost prey abundance (primarily fish and amphibians) for otters. The creation of lodges and burrows (when not occupied by beavers) and large felled trees will provide additional secure holts and resting places for otters. There may also be improvements in downstream water quality with associated potential improvements in fish stocks.

Mitigation

The only possible practical mitigation that could be effective at avoiding or eliminating the LSE advised here would be the use of measures that ensure water flows through beaver dams allowing fish to pass through unimpeded. Although in theory beavers could be excluded from particular catchments, this is not likely to be practical on the scale that might be needed given the wide distribution of SAC otters in Scotland.

Summary

7.1. Identification of LSEs on Natura sites from the potential impacts of plans and projects is an initial check to see if the proposal "is capable" of having an effect[17] on a Natura site, and if so how. It is not a full-scale appraisal of the entire range of potential effects; that is the role of an 'appropriate assessment' (AA) which is carried out by competent authorities who must consult SNH and have regard to their advice.

7.2. This check for LSE advises that there are a variety of likely significant effects on a list of habitats and species for which SACs and SPAs have been designated (Table 14).

7.3. The check for LSE is a relatively simple, light-touch stage which is also required to be very precautionary; and because of this there should be no doubt as to the effectiveness of the mitigation measures introduced at this stage. Where mitigation cannot be certain to remove or minimise the LSE, the 'Habitats Regulations' dictate that the analysis of the plan or project must move on to the next stage of the HRA process, and an AA must be carried out by the competent authority to determine if there will be no adverse effect on site integrity from the plan or project. It is entirely possible that despite the identification of LSEs, it may be concluded at the AA stage that there is no adverse effect on site integrity, either without any mitigation, or with the addition of further mitigation measures.

Table 14; Summary of qualifying habitats and species identified as likely to be significantly affected by a plan or project to allow beaver to remain in Scotland

Qualifying habitats	Qualifying species
Caledonian forest	Slender naiad (*Najas flexilis*)
Bog woodland	Freshwater pearl mussel (*Margaritifera margaritifera*)
Alder woodland on floodplains	Atlantic salmon (*Salmo salar*)
Western Acidic oak woodland	River lamprey (*Lampetra fluviatilis*)
Mixed woodland on base-rich soils associated with rocky slopes	Sea lamprey (*Petromyzon marinus*)

[17] CJEU Sweetman' case C-258/11. Opinion of the Advocate General, paragraph 46.

Qualifying habitats	Qualifying species
Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Brook lamprey (*Lampetra planeri*)
Calcium-rich nutrient-poor lakes, lochs and pools	Otter (*Lutra lutra*)
Naturally nutrient-rich lakes or lochs which are often dominated by pondweed	Black-throated diver (*Gavia arctica*), breeding
Rivers with floating vegetation often dominated by water-crowfoot	Scottish crossbill (*Loxia scotica*), breeding
Very wet mires often identified by an unstable 'quaking' surface (‘quaking bogs’)	Greenland Barnacle goose (*Branta leucopsis),* non-breeding
Alkaline (base-rich) fens	Greenland white-fronted goose (*Anser albifrons flavirostris*), non-breeding
	Greylag goose (*Anser anser*), non-breeding
	Light-bellied Brent goose (*Branta bernicla hrota*), passage
	Pink-footed goose (*Anser brachyrhynchus*), non-breeding
	Svalbard Barnacle goose (*Branta leucopsis*), non-breeding
	Taiga bean goose (*Anser fabalis fabalis*), non-breeding
	Whooper swan (*Cygnus cygnus*), non-breeding
	Whooper swan (*Cygnus cygnus*), passage

7.4. At this strategic stage only broad details have been provided on the types of mitigation that might be used to eliminate, avoid, or minimise impacts on Natura sites, and therefore remove any LSE. The nature of the mitigation is perforce

relatively limited given the requirements and interpretation of the LSE stage of HRA. Particular focus is given to dam management; for example dam prevention, removal or modification to maintain hydrological patterns and the ability of fish to move. Reference is also made to removing or excluding beavers from particular locations such as sub-catchments, although such mitigation would likely involve long term (effectively permanent) management and continuing costs. A broader examination of beaver management / mitigation techniques is discussed in the 'Beavers in Scotland' report.

7.5. Due to the identified LSEs, an AA is required to fully assess the implications for Natura sites that host the impacted qualifiers. The scientific appraisal of the impacts may conclude that (despite the existence of LSEs) there is no adverse effect on site integrity from such impacts. This concept of, "no adverse effect on site integrity" forms the crucial test that, if passed, allows a competent authority to consent to a plan or project. If this cannot be concluded, then it is important to realise there is also an opportunity during the AA to identify mitigation measures that would *then* ensure there is no adverse effect on Natura site integrity (see Figure 1).

8. Appropriate Assessment (AA)

8.1. Article 6.3 of the Habitats Directive requires that any plan or project which is not directly connected with, or necessary to, the nature conservation management of a Natura site and which is likely to have a significant effect on such a site, either individually or in combination, shall be subject to an **appropriate assessment** of its implications for a Natura site in view of the site's conservation objectives by a competent authority (in this case The Scottish Government). The full procedure is known as 'Habitats Regulations Appraisal', of which the appropriate assessment (AA) is a part (see Figure 1). An AA can be broken down into two distinct phases:

- An assessment of the potential impacts of the proposal on the qualifying interests of the Natura sites. This is informed by the prior check for 'likely significant effects', as set out in the legislation.
- The decision-making process based on this assessment. Where the competent authority must formally ascertain whether the proposal in question will not adversely affect Natura site integrity.

8.2. HRA is therefore a rigorous, precautionary procedure that examines the potential negative effects on Natura sites of a plan or project; and which, by the end of the procedure must allow the competent authority to come to a firm conclusion as to whether there are no adverse effects on the integrity of Natura sites. The way in which this question is framed reflects the degree to which the precautionary principle is written into the Habitats Directive, and consequently the Habitats Regulations and means that proof of the negative is required before consent can be given[18].

8.3. Regulation 48 allows for modifications to the proposal, including conditions, to be considered in the AA by the competent authority in coming to a final conclusion. For consent to be given this mitigation must ensure adverse effects are avoided, eliminated, or are reduced to an acceptable level so that there is no adverse effect on site integrity (AESI).

9. Appropriate assessment methodology

9.1. Given the potentially national scale of this proposal a methodology has been devised to allow a precautionary but proportionate appraisal of all relevant Scottish Natura sites to determine whether there was no adverse effect on Natura site integrity.

[18] The CJEU Waddenzee Judgement (C-127/02) states in paragraph 61, "*The competent national authorities, taking account of the appropriate assessment of the implications... for the site concerned in the light of the site's conservation objectives, are to authorise such an activity only if they have made certain that will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects*".

9.2. The focus of the methodology is the area in which Scottish Ministers have said that they would be prepared to consider making beavers legally a native species – the 'Beaver Policy Area'.

9.3. A detailed appraisal of the impacts of beavers on Natura sites in Scotland will be carried out on Natura sites which have been identified to have a LSE and which are at least partially in a 'zone of detailed appraisal' (the ZDA). The ZDA consists of the Beaver Policy Area together with a further 'buffer' strip of land, a minimum of 10km, into which beavers might be expected to appear in the next 10 to 12 years.

9.4. The ZDA is therefore defined as the area including the existing beaver locations in Knapdale and Tayside; the Tayside river catchments; and a further 'buffer' strip of land, a minimum of 10km, encircling the boundaries of the Knapdale Scottish Beaver Trial area and the Tay, Earn, Lunan, Perth Coastal, and South Esk catchments[19]. Maps of the ZDA are given in Annex D. The ZDA is considered to equate to the Beaver Policy Area.

9.5. The ZDA has been defined using the work carried out by Newcastle University in their Commissioned Report 814 on beaver population modelling. This showed a non-reinforced population in Knapdale being slow to expand outwards: reaching just 5.4 km from their release point over 30 years from where they are presently found (and a reinforced population expanding not much further). Over a similar time-scale the model of the Tayside population shows that beavers are most likely to infill gaps in the Tayside rivers, where there is a large amount of suitable habitat rather than spreading much further upstream/downstream or into other catchments.

9.6. Beavers have appeared in very small numbers in the Forth and Teith catchments[20] since c.2012, but they appear to be unpaired, isolated individuals (see Annex E); which is consistent with the assumptions in the Commissioned Report (814) on population modelling.

9.7. '*The model does not account for the occasional long-distance dispersal events seen in wild beaver populations (Nolet & Baveco, 1996; Saveljev* ***et al****., 2002). However, the impact of these movements on population growth in an introduced beaver population were likely to be minimal. Since the habitat into which these beavers are moving does not contain beavers, the chance of these long-distance movements resulting in the establishment of a family was small. This was due to the requirement of a second beaver of the opposite sex making a similar dispersal movement in the same direction and time that brings it close enough to the first beaver for them to sense*

[19] As identified in the SEPA Main River & Coastal Catchments (SDE view). This is a polygon coverage of the main river catchments > 100km2 and coastal catchments (1 per hydrometric area).
[20] The River Teith is designated as a SAC.

each other's presence. As far as the model was concerned, these were rare events that have little or no impact on population growth in the modelled study area, and were thus ignored.'

9.8. The 'buffer' strip element of the ZDA has also been partly defined by taking a time-limited approach to the appraisal to cover a minimum period of 15 years. It is thought that given the volume of potential ecological (legislative, and other) variables involved, and the uncertainty that this creates, a meaningful appraisal of all Natura sites in Scotland with a LSE is not possible at this time. Instead the approach chosen will allow an appraisal of all those Natura sites where there is both a LSE and where, on a conservative and precautionary basis using the population modelling, beavers might conceivably reach within the next 15 years, if they spread more quickly than anticipated[21].

9.9. In any HRA there must still be certainty that a plan or project will have no adverse effect on site integrity. Where elements of strategic plans and projects may not be realised for many years, this can be achieved by doing sufficient work to be able to conclude that no matter what happened as a result of the plan the necessary mitigation is known, and understood to be capable of ensuring no AESI, and this mitigation is clearly stated (and should be written into the plan, with a commitment to implement it should it become necessary to avoid an adverse effect). This can be achieved by using mitigation in the form of conditions, restrictions, caveats, or management/mitigation plans etc. that are legally enforceable and are written in such a way to ensure there will be no adverse effects on the integrity of Natura sites. This is the approach undertaken here to Natura sites outside the ZDA. This seems both correct and proportionate in that it meets the obligations of The Scottish Government to avoid adverse effects on site integrity, but doesn't require at this point a highly detailed appraisal of every site with LSE in Scotland when the various details of any potential impacts are so uncertain[22], and therefore it would not informative to conduct.

9.10. A quote from ECJ case C-6/04 (vs the UK) by the Advocate General helps set out the basis for this approach. It said that "*adverse effects on areas of conservation must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan*".

9.11. Scottish Ministers' decision to be minded to allow beavers to remain in Scotland is the subject of this advice to inform an AA, and involves the appraisal of the impacts of one species upon other habitats and species. The types, scope, degree, durations, nature, and locations of these interactions are very complex. Any

[21] assuming a scenario where populations might spread more quickly than the model states
[22] This is over both space, and time.

appraisal of the interactions becomes less certain as it appraises those interactions which are temporally and spatially more distant from the existing beaver locations in Scotland. Therefore this advice has been provided, in accordance with ECJ case C-6/04, '*to the extent possible on the basis of the precision of the plan'*.

9.12. In order to ensure that there remain no adverse effects on site integrity there should be a review period after ten to twelve years, or at the point any new release site or other reinforcement is considered (whichever comes first) the HRA must be updated to take into account relevant data acquired since the date of this HRA. This precautionary, early review is a crucial element of this HRA - to ensure it also continues to meet the requirements of the Habitats Regulations into the future.

10. Advice to inform an appropriate assessment

10.1. The earlier broad check for likely significant effects identified 142 sites with potential LSE, through identifying connectivity between qualifying interests and beavers (Annex C). When the ZDA is applied to this list, 34 Natura sites require detailed appraisal of the potential impacts of beaver upon their qualifying interests (Table 15).

10.2. An appraisal against their conservation objectives has been carried out by SNH for The Scottish Government, and is provided below. These are grouped initially by habitat or species types, and where there may be differences between the potential impacts on different Natura sites these are noted accordingly. Some Natura sites have multiple qualifiers which are therefore appraised in different sections of this document.

Table 15; Geographical location of SACs and SPAs requiring a detailed appraisal of the potential impacts of the decision regarding beavers, in view of their conservation objectives.

Tayside	SAC / SPA	**Knapdale**	SAC / SPA
Ballochbuie	SAC	Moine Mhor	SAC
Beinn a' Ghlo	SAC	Tarbert Woods	SAC
Ben Heasgarnich	SAC	Taynish and Knapdale Woods	SAC
Black Wood of Rannoch	SAC	Tayvallich Juniper and Coast	SAC
Cairngorms	SAC	Knapdale Lochs	SPA

Craighall Gorge	SAC		
Dunkeld - Blairgowrie Lochs	SAC		
Glen Coe	SAC		
Keltneyburn	SAC		
Kippenrait Glen	SAC		
Loch Lomond Woods	SAC		
Morrone Birkwood	SAC		
Rannoch Moor	SAC		
River Dee	SAC		
River South Esk	SAC		
River Spey	SAC		
River Tay	SAC		
River Teith	SAC		
Shingle Islands	SAC		
Tulach Hill and Glen Fender Meadows	SAC		
Upper Strathearn Oakwoods	SAC		
Ballochbuie	SPA		
Cairngorms	SPA		
Firth of Tay and Eden Estuary	SPA		
Loch Leven	SPA		
Loch of Lintrathen	SPA		
Loch of Kinnordy	SPA		
Rannoch Lochs	SPA		
South Tayside Goose Roosts	SPA		

11. Woodlands

11.1. Beavers are already present at some woodland SACs in the Knapdale and Tayside areas and we presume, will continue to naturally colonise some of these sites.

11.2. The main factor causing unfavourable condition in Scottish woodlands is grazing / browsing pressure from herbivores (largely deer and sheep). At present, saplings can be considered 'safe' from further browsing once they get to a certain size (the specific size varies with the species). However, since beavers are able to fell quite large trees, this will no longer be the case in areas colonised by beavers for a reasonable length of time. In the absence of natural regeneration from seed continuation of woodland will depend on coppice regrowth from the felled stumps or suckering from roots. Whilst all native Scottish broadleaves are able to coppice or sucker to some extent; if the regrowth is subsequently eaten by deer, sheep, or other large herbivores, there could be a simplification in the structure of the woodland, and possibly loss or deterioration of the woodland habitat.

11.3. So long as grazing/ browsing do not increase within these SACs, changes in structure are more likely than a deterioration of structure. It is not possible to be absolutely precise about what this will involve because it depends upon many factors and will vary from site to site; but it is likely to include an increase in young tree growth from coppicing, and changes in deadwood volume - either an increase if beavers leave it lying around, or a decrease if they remove it for food or dam construction.

11.4. The following Annex I woodland types are present on the woodland SACs to be appraised:

- Alder woodland on floodplains
- Bog woodland
- Caledonian forest
- Mixed woodland on base-rich soils associated with rocky slopes
- Western acidic oak woodland

11.5. In order to determine the relevant effects of the proposal on site integrity, the conservation objectives which apply to woodland qualifying interests are examined in turn below, with comments specific to individual SACs.

Qualifying interest - Alder woodland on floodplains

Shingle Islands SAC

Conservation Objectives

11.6. To avoid deterioration of the qualifying habitat thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

11.7. **Extent of the habitat on site**

Beaver activity in combination with browsing pressure from other herbivores could lead to a loss of habitat, if regeneration is prevented. The Site Condition Monitoring cycle 2 management notes reported that grazing / browsing was generally low at this site; provided this continues change in structure is more likely than a change in extent.

11.8. **Distribution of the habitat within site**

This qualifying interest is, by its nature, wholly within the core beaver habitat. There is no reason to suppose that impact will vary across the site and, provided regeneration is able to continue, there should be no change in the distribution of the habitat.

11.9. **Structure and function of the habitat**

Change in structure is likely, but difficult to predict. Possible impacts include changes in the volume of deadwood, increases in dense young growth or in open space. Provided regeneration is able to continue, these changes are most likely to be beneficial, contributing to the dynamism which is an important feature of this habitat.

11.10. **Processes supporting the habitat**

Short, medium or long-term changes in the vegetative structure, and/or hydrology of localised areas of alder woodland, as a result of beaver activity, are likely to increase the dynamism of woodland processes. Provided regeneration is able to continue, this is likely to increase the overall conservation value of the site (for example, by increasing the amount of standing dead wood resulting from flooding, thereby increasing habitat for dead wood ‘typical species’). Such changes would be compatible with this conservation objective and do not undermine it. The Eurasian beaver is a natural component of this habitat type across Europe.

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

These depend on the precise nature of any potential changes, but they are likely to be positive provided regeneration is able to continue as it is at present.

11.12. We advise that it cannot be ascertained that there is no adverse effect on site integrity as a result of the potential combined grazing and browsing impacts of beaver and other herbivores on the alder woodland on floodplains qualifier without mitigation.

11.13. Therefore any potential adverse impacts on the integrity of the SAC should be mitigated through increased herbivore management measures (upon deer, goats, sheep, or beavers as appropriate) before they occur. Signs of over-grazing can be detected before any adverse impacts result. As beavers continue to naturally colonise some of these sites, impacts should be monitored using the Woodland Grazing Toolbox methodology. If the necessary mitigation measures, including monitoring are carried out then SNH advise the Scottish Government that it can be ascertained that there is no adverse effect on site integrity[23].

Qualifying interest - Bog woodland

Ballochbuie SAC, and Cairngorms SAC

Conservation Objectives

11.14. To avoid deterioration of the qualifying habitat thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

[23] The Site Condition Monitoring cycle 2 management note for the single site assessed in this appraisal reported that grazing/ browsing was generally low. Provided this continues, positive changes in structure are likely to occur.

- No significant disturbance of typical species of the habitat

11.15. Beavers generally avoid felling pine trees, and other tree species form only a tiny component of bog woodland. Therefore there is an extremely limited ability for beavers to impact on the bog woodland qualifier for these two SACs in any way that might undermine the conservation objectives.

11.16. SNH advise The Scottish Government that it can be ascertained that there is no adverse effect on site integrity through impacts to bog woodland at Ballochbuie SAC and Cairngorms SAC.

Qualifying interest - Caledonian forest

Ballochbuie SAC, Black Wood of Rannoch SAC, Cairngorms SAC

Conservation Objectives

11.17. To avoid deterioration of the qualifying habitat thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

11.18. **Extent of the habitat on site**

No impact expected. Beaver generally avoid pine and, although broadleaved species are an important component of Caledonian forest, they do not comprise a large enough proportion for impacts to affect the area.

11.19. **Distribution of the habitat within site**

No impact expected. Beaver generally avoid pine and, although broadleaved species are an important component of Caledonian forest, they do not comprise a large enough proportion for impacts to affect the area.

11.20. **Structure and function of the habitat**

Changes in structure of the broadleaved component in the immediate vicinity of rivers is possible due to beaver foraging and dam building, although any potential impacts would only be considered adverse if their regeneration is impeded or restricted, e.g. due to excessive pressure from other herbivores.

11.21. **Ballochbuie SAC**: much of the site is steep, so any impact is likely to be limited to the area adjacent to the Dee. Over-grazing by deer has been the main issue causing unfavourable condition on this site, although it is now considered Unfavourable recovering due to management. Attention to deer management will be an important element of mitigating AESI if beaver reach this area.

11.22. **Black Wood of Rannoch SAC**: much of the site is steep, so any impact is likely to be limited to the area adjacent to Loch Rannoch and possibly the Dall Burn. The site is in favourable condition and deer management is meeting objectives at present, so change in structure (possibly leading to increased diversity) is more likely than an adverse impact.

11.23. **Cairngorms SAC**: as for the previous sites, any impact is likely to be limited to the immediate vicinity of rivers. Herbivore impact varies across the site; meeting objectives in some areas and not in others. Attention to deer management across the site will likely be an important element of avoiding AESI if beaver create territories in this area.

11.24. It should be noted that aspen is an important component of the Strathspey pinewoods and mature / veteran trees are valuable for biodiversity, including a number of species which are dependent on this tree. This is also a strongly preferred species for beavers, and a large proportion of the resource would be accessible to them, being concentrated on lower ground along the Spey and its tributaries. Beaver could therefore have an adverse impact on the population structure of aspen (e.g. removal of a large proportion of mature and over-mature trees) and its associated species. If they reach these areas[24], it will be necessary to protect important stands of aspen in order to mitigate this impact. However, it should also be noted that the large majority of aspen trees are found in the northern parts of Cairngorms SAC along Strathspey and are therefore distant from the the present location of beavers which are to the south in Tayside. Mitigation methods, if they become necessary to prevent negative effects on aspen, can include fencing aspen blocks from beavers.

[24] Survey work and databases exist that can help identify potentially vulnerable blocks.

11.25. **Processes supporting the habitat**

Short, medium or long-term changes in the vegetative structure, and/or hydrology of areas in the immediate vicinity of rivers, is likely to increase the dynamism of woodland processes. Provided regeneration is able to continue, this is likely to increase the overall conservation value of the site (for example, by increasing the amount of standing dead wood resulting from flooding, thereby increasing habitat for dead wood 'typical species'). Such changes would be compatible with this conservation objective and do not undermine it.

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

Depends on the precise nature of changes, but generally likely to be positive provided regeneration of affected trees and shrubs is able to continue. An exception may be for species dependent on aspen, which could be adversely affected if beavers change the population structure of aspen.

11.27. **We advise that it cannot be ascertained that there is no adverse effect on site integrity of Ballochbuie SAC and Black Wood of Rannoch SAC from impacts to Caledonian forest without mitigation. Impacts could result from the cumulative effects of beavers and other herbivores on the broadleaved component of these sites: where beavers might fell some trees and / or shrubs, and other herbivores then prevent the natural regeneration of those trees through browsing. Adverse impacts on these SACs can be mitigated through any necessary herbivore management measures (on either deer or beavers or both). Monitoring for signs of over-grazing should be carried out using the Woodland Grazing Toolbox methodology to ensure any impacts can be avoided before they have an adverse effect on site integrity.**

11.28. We advise that it cannot be ascertained that there is no adverse effect on the integrity of Cairngorms SAC. In this SAC beavers could reduce the amount of aspen due to their preference for it as food, including mature and over-mature specimens which are especially important for maintaining biodiversity. However, these impacts on the SAC can be mitigated by protecting important areas of aspen, to prevent access by beavers. As beavers colonise such sites, monitoring for signs of over-grazing should be carried out using the Woodland Grazing Toolbox methodology to ensure any impacts can be avoided before they have an adverse effect on site integrity.

Qualifying interest - Mixed woodland on base-rich soils associated with rocky slopes

Craighall Gorge SAC, Keltneyburn SAC, Kippenrait Glen SAC[25]

Conservation Objectives

11.29. To avoid deterioration of the qualifying habitats (listed above) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

11.30. **Extent of the habitat on site**

Beaver activity in combination with pressure from other herbivores could lead to a loss of qualifying habitat, but this is only possible on flatter ground at these SACs. The steeper slopes which are typical of this habitat are largely avoided by herbivores therefore the exact extent of possible impacts would be limited by the topography of the SACs (if the beavers decide to remain in the area). The Site Condition Monitoring cycle 2 notes for these three sites show low impacts of grazing/ browsing throughout. So a change in woodland structure is more likely than a change in extent.

11.31. **Distribution of the habitat within site**

Only a small proportion of this qualifying habitat is accessible to beavers, and change in the structure is the probable outcome of any impacts; however, loss of qualifying habitat cannot be absolutely ruled-out with certainty.

11.32. **Structure and function of the habitat**

Only a small proportion of this qualifying habitat is accessible to beavers. Change in structure of accessible areas is possible if beavers stay in the area for a length of time, but it is difficult to predict accurately. Possible impacts include changes in the volume of deadwood, increases in dense young growth or in open space. Provided regeneration of trees and shrubs is able to continue, these changes are most likely to be beneficial, contributing to the dynamism which is an important feature of this habitat.

[25] This SAC is just outside the ZDA, but due to the presence of qualifying woodland and adjacent freshwater was nevertheless included in the detailed appraisal.

11.33. **Processes supporting the habitat**

Short, medium or long-term changes in the vegetative structure, and / or hydrology of localised areas of accessible qualifying woodland, as a result of beaver activity, is likely to increase the dynamism of woodland processes. Provided regeneration is able to continue, this is likely to increase the overall conservation value of the site (for example, by increasing the amount of standing dead wood resulting from flooding, thereby increasing habitat for dead wood 'typical species'). Such changes would be compatible with this conservation objective.

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

These depend on the precise nature of any possible changes, but they are likely to be positive provided regeneration is able to continue.

11.35. SNH advise that it cannot be ascertained that there is no adverse effect on site integrity, without mitigation. This is as a result of the potential combined grazing and browsing impacts of beaver and other herbivores on this qualifying interest. Therefore any potential adverse impacts on the integrity of the SAC should be mitigated through increased herbivore management measures (upon either deer or beavers or both) before they occur. Signs of over-grazing can be detected before any adverse impacts result. As beavers naturally colonise these sites, impacts should be monitored using the Woodland Grazing Toolbox methodology.

11.36. If the necessary mitigation measures, including monitoring are carried out then SNH advise the Scottish Government that it can be ascertained that there is no adverse effect on site integrity.

Qualifying interest - Western acidic oak woodland

Loch Lomond Woods SAC, Moine Mhor SAC, Tarbert Woods SAC, Taynish and Knapdale Woods SAC, Upper Strathearn Oakwoods SAC

Conservation Objectives

11.37. To avoid deterioration of the qualifying habitats (listed above) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

11.38. **Extent of the habitat on site**

Beaver foraging activity in combination with grazing and browsing pressure from other herbivores could lead to a loss of qualifying habitat. Grazing / browsing by herbivores is one of the pressures currently causing unfavourable condition on several of these sites, and the added impacts of beavers could potentially exacerbate this, leading to the deterioration and / or loss of qualifying habitat.

11.39. **Distribution of the habitat within site**

The Knapdale Beaver Trial monitoring suggested that beavers rarely moved more than 30m from waterbodies, so any loss of habitat is likely to be confined to a small proportion of the site. Therefore some loss or deterioration of qualifying woodland near waterbodies is possible due to the combined impacts of beaver and other herbivores, leading to a change in the distribution of the habitat.

11.40. **Structure and function of the habitat**

Only a small proportion of this habitat, close to waterbodies, is likely to be used by beavers. Change in the structure of accessible woodland areas is likely, but difficult to predict with accuracy at this point in time. Possible impacts include changes in the volume of deadwood, increases in dense young growth or in open space. Provided regeneration of felled trees and shrubs is able to continue, these changes are most likely to be beneficial, contributing to the dynamism which is an important feature of this habitat.

11.41. **Processes supporting the habitat**

Short, medium or long-term changes in the vegetative structure, and / or hydrology of localised areas of accessible woodland, as a result of beaver activity, is likely to increase the dynamism of woodland processes. Provided regeneration of felled trees and shrubs is able to continue, this is likely to increase the overall conservation value of the site (for example, by increasing the amount of standing dead wood resulting from flooding, thereby increasing habitat for dead wood 'typical species'). Such changes would be compatible with this conservation objective.

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

Depends on the precise nature of changes, but likely to be positive provided regeneration is able to continue.

11.43. We advise that it is not possible to ascertain no adverse effect on site integrity without mitigation. Impacts are possible in areas of qualifying habitat likely to be used by beavers (i.e. within c.30m of water-bodies), as a result of the cumulative impacts of beavers and other herbivores[26]. As beavers begin, or continue, to naturally colonise these sites, impacts should be monitored using the Woodland Grazing Toolbox methodology. Signs of over-grazing can be detected before any adverse impacts result. These impacts should then be mitigated by using all necessary herbivore management measures (of either deer or beavers, or both).

12. Freshwater – Standing waters;

Cairngorms SAC

***Qualifying interest* - Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels**

12.1. The Cairngorms contain the highest oligotrophic waterbodies in the UK. This complex of lochs has a range of high-altitude conditions. The very highest waters (corrie and plateau lochs at >900 m) have rocky substrates and very low nutrient status, and suffer the harshest climate. In combination, these factors lead to low species diversity and the absence of aquatic macrophytes. This is an extreme variation of the habitat type.

12.2. Loch Einich, the principle waterbody referred to is 72ha and lies at 490m. Mean depth is 6.8m. It is a large slightly acidic upland loch supporting a diversity of plant species. The CEH Land Cover Map 2000 found less than 0.4% woodland in the catchment.

12.3. The SAC description also refers to lochs in the Cairngorm valley floors which enjoy more sheltered conditions. The occurrence of finer sediments allows limited establishment of higher plants, although these are still extremely oligotrophic systems. Although not specifically identified Loch Garten also falls within the SAC. It is 40ha and lies at the lower altitude of 200m. The CEH Land Cover Map 2000 shows that the catchment is 63% woodland, although most of this is conifer. This and other valley floor lochs are more likely to be colonised by beaver than the higher altitude lochs with almost no woodland in their catchments.

[26] Grazing / browsing is one of the pressures currently causing unfavourable condition on several of these sites, and this pressure will probably be greater if beaver colonise these areas for any length of time.

Conservation Objectives

12.4. To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

12.5. Beavers will not adversely affect the actual extent of freshwater. Beavers do not generally dam in water bodies more than 0.85m deep and 6m wide. Any dam-building is therefore likely to be restricted to outflow and inflow streams. The presence of a beaver dam on the outflow would also reduce the existing water level fluctuation.

12.6. Raising the water levels could potentially affect the submerged and floating macrophytes through raising the depth to which light penetrates above the substrate. This makes it more difficult for plants to reach the surface to form leaves and for the flowering of air-pollinated plants. However, it is not thought that there will be any damming at the inflows or outflows of these lochs, and any water-level changes caused by beaver felling non-coniferous trees and damming outflows would not happen quickly enough on lochs of these sizes to cause either of these effects on these types of vegetation. Changes to water level can also affect the fringing vegetation. Land can be dried out or inundated as the levels fall or rise. The shallower the depth profile and the flatter the surrounding land the more pronounced the effects because of the gradient. Fringing vegetation is adapted to deal with seasonal and event related changes to water levels. Damming will not be able to create changes in the loch level which are beyond the vegetation's ability to adapt. It may create more extensive areas of wetland surrounding the loch which can help increase levels of biodiversity.

12.7. The overall impact of damming is generally considered to be beneficial; returning catchments to a more natural and diverse condition which would have been in place prior to the loss of beavers. It should be noted there is little possibility of damming occurring at the lochs in this SAC, either because there are only very small amounts of wood nearby (e.g. Loch Einich), or in the case of low lying lochs which do have trees close to the water, the trees are mostly coniferous (e.g. Loch Garten). Conifers are generally avoided by beavers, and not felled; however we do

not have sufficient certainty to rule out impacts from water level changes via beaver dams yet.

12.8. Damming of inflows, if it occurred, may result in reduction of silt and finer sediments flowing into the lochs. This would reduce the nutrient inputs and would be considered positive. The overall phosphorus loading will not be increased by the trapping of silt. Silt from failed or abandoned dams is likely to be remobilised by storm and flooding events when flushing rates will be relatively high. In some circumstances the wetting-up of drier areas and the trapping of organic material may result in more anaerobic conditions resulting in the release of phosphorus. Damming may also affect the timing of the release of sediment. The precise effects on water chemistry and nutrients will vary for each site and may be complex. The effects of these changes on the qualifying interests may also be complex; however, the scale and speed of the impacts means that where they were thought to possibly lead to an adverse effect on site integrity, they would need to be mitigated through appropriate management measures which are able to identify impacts to site integrity before they occur and modify or remove dams as necessary.

12.9. Beavers will feed on a wide range of plant species including submerged and emergent macrophytes. The Knapdale study found that there were no apparent adverse effects on the submerged plant assemblages that form part of the basis for designation of the Taynish and Knapdale Woods SAC. The greatest effects from the Knapdale study were on plant cover with species richness being little affected. The preferred species at Knapdale were all rhizomatous. A study by Jones 2006[27] using enclosures to study the effect of herbivory found no discernable impact on *P. natans,* the dominant macrophyte

12.10. Loch Garten has a number of emergents such as *Sparganium angustifolium,* a characteristic species. It also has *Schoenoplectus lacustris* and *Menyanthes trifoliata* which were heavily grazed in places at Knapdale. The Knapdale study also found some limited impacts upon the isoetid plant population[28] of the lochs although these were considered collateral impacts of grazing on the tall emergents.

[27] Jones K. 2006. Ecological effects of the feeding and construction activities of the Eurasian beaver (Castor fiber) in Scotland: implications for reintroduction. PhD thesis; University of Stirling.

[28] Uprooting of of isoetid plant species. Isoetids are short emergent plants in shallow water and the draw down zone around water bodies.

12.11. Changes are likely to be to the sward structure and local distribution of some species if beaver colonise these Cairngorm lochs. The greatest impacts at Knapdale were found where multiple animals were in occupancy for more than one season. However in order to completely avoid risk of adverse impact the scheme should include provision for beaver control measures.

12.12. **We advise that it cannot be ascertained that there is no adverse effect on site integrity Cairngorms SAC without mitigation.**

12.13. **Colonisation of the catchment of Loch Einich, and the plateau and corrie lochs over 900m is improbable given the harsher climate and low extent of tree cover. However, beavers are more likely to colonise the areas around the lower lying lochs which are generally found further north in the SAC. This could happen if the area is sufficiently attractive to beavers despite the relative paucity of deciduous woodland near the lochs. If beavers settle in the vicinity of the valley lochs any potential adverse impacts from water level changes could be prevented by having a mitigation plan in place to identify those impacts before they had an AESI. Mitigation is likely to include the use of flow control devices to manage dams, the removal of dams, or if necessary beavers. Any adverse impacts on the vegetation community would also be avoided by having a mitigation / management plan in place for beavers.**

Dunkeld - Blairgowrie Lochs SAC;

***Qualifying interest* - Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels**

12.14. This site, comprising five lochs along the Lunan Burn on the northern edge of the central Scottish lowlands, provides a natural example of gradually-increasing eutrophy. The three upper lochs (Craiglush, Lowes and Butterstone) lie north of the Highland Boundary Fault with catchments which are predominantly upland and acidic; the lower lochs (Clunie and Marlee) lie south of the Fault with predominantly agricultural and more enriched catchments. The series provides examples of relatively unpolluted oligotrophic to mesotrophic loch types, which are rare and decreasing habitats in Britain, especially in the lowlands. The catchments of the lochs range in woodland cover from approximately 66% – 25%.

12.15. The Dunkeld- Blairgowrie Lochs SAC is currently assessed as unfavourable no change. The main causes are diffuse pollution and colonisation by *Elodea Canadensis*. Beavers have been recorded and are almost certainly in the area around all five lochs.

Conservation Objectives

12.16. To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

12.17. A network of dams on the feeder streams may increase the extent of freshwater habitat. Beavers do not generally dam in water bodies more than 0.85m deep and 6m wide. Any dam-building on the lochs is therefore likely to be restricted to outflow and inflow streams. This has already occurred. The presence of a beaver dam on the outflow would probably reduce the existing water level fluctuation.

12.18. Raising the water levels could potentially affect the submerged and floating macrophytes through raising the depth to which light penetrates above the substrate. This makes it more difficult for plants to reach the surface to form leaves and for the flowering of air-pollinated plants. However, it is not thought that the water-level changes caused by beaver damming on outflows would be of sufficient scale or speed to cause either of these effects on the lochs.

12.19. Changes to water level can also affect the fringing vegetation. Land can be dried out or inundated as the levels fall or rise. The shallower the depth profile and the more flat the surrounding land, the more pronounced the effects because of the gradient. Fringing vegetation is adapted to deal with seasonal and event-related changes to water levels. However, damming would not be able to create changes in the loch level which are beyond the vegetation's ability to adapt. It may create more extensive areas of wetland surrounding the loch.

12.20. The impact of damming is generally considered to be beneficial returning catchments to a more natural and diverse condition which would have been in place prior to the removal of beavers. Damming of inflows may result in reduction of silt and finer sediments flowing into the lochs. This would reduce the nutrient inputs and would be considered positive. The overall phosphorus loading will not be increased by the trapping of silt. Silt from failing or abandoned dams is likely to be remobilised by storm or flooding events when flushing rates will be relatively high. In some circumstances the wetting up of drier areas and the trapping of organic material may

result in more anaerobic conditions resulting in the release of phosphorus. Damming may also affect the timing of the release of sediment. The effects on water chemistry and nutrients will vary for each site and may be complex. The effects of these changes on the qualifying interests may also be complex.

12.21. The lochs are rich in submerged and floating macrophyte species. Beavers will feed on a wide range of plant species including submerged and emergent macrophytes. The Knapdale study found that there were no apparent adverse effects on the submerged plant assemblages that form part of the basis for designation of the Taynish and Knapdale Woods Special Area of Conservation. The greatest effects from the Knapdale study were on plant cover with species richness being little affected. The preferred species at Knapdale were all rhizomatous.

12.22. The lochs have a number of emergents such as *Sparganium angustifolium* a characteristic species. They also have *Schoenoplectus lacustris* and *Menyanthes trifoliata* which were heavily grazed in places at Knapdale. The Knapdale study also found impacts upon the populations of aquatic plants growing in shallow water near the edge (known as isoetids, such as *Lobelia dortmanna*) although this may be described as collateral impacts of grazing on the tall emergents. Any potential changes at this SAC are likely to be to the sward structure and local distribution of some species. *Schoenoplectus* has been slow to regrow at Knapdale; however it remains a viable part of the plant communities. The greatest impacts at Knapdale were found where multiple animals were in occupancy for more than one season.

12.23. High cover of *Elodea canadensis* an invasive non–native species has been found in all of the lochs. This can have an adverse effect upon the native flora by creating competition for space and light. Beavers have been known to graze on *Elodea*. It is possible that they would reduce the cover, break up the sward and allow greater species richness which would be beneficial.

12.24. We advise that it can be ascertained that there is no adverse effect on site integrity of Dunkeld – Blairgowrie Lochs SAC through impacts to the loch qualifying interest, provided any potential adverse impacts on integrity from damming are prevented by having a management plan in place to monitor beaver activity and install control devices or remove dams as necessary.

12.25. Potential adverse impacts on the vegetation community of the SAC lochs should also be avoided by having a management plan in place to monitor and control beavers where their activities might result in an AESI.

Glen Coe SAC;

Qualifying interest - Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

Conservation Objectives

12.26. To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

12.27. Glen Coe includes Loch Achtriochtan, representing oligotrophic lochs in the mountainous western Highlands of Scotland. This loch lies on the valley floor where the River Coe spreads. The catchment is mainly upland habitat. The loch contains high-quality oligotrophic habitat with vegetation typical of nutrient-poor conditions on a substrate dominated by stones. The surrounding semi-natural land use has protected the site from disturbance or eutrophication.

12.28. It is advised that beavers will not adversely affect the site via dam-building. This is due to the lack of woody material in the area of the loch which means any potential for dam building is very improbable. Any dam-building would be restricted to the outflow stream of the loch rather than in the vicinity of the loch, as this is the location with reasonable woodland cover.

12.29. Characteristic species for this loch are mainly isoetids, with *Potamogeton natans* and *P.polygonifolius*. Beavers will feed on a wide range of plant species, including submerged and emergent macrophytes. The Knapdale study found that there were no apparent adverse effects on the submerged plant assemblages that form part of the basis for designation of the Taynish and Knapdale Woods Special Area of Conservation. The greatest effects from the Knapdale study were on plant cover with species richness being little affected. The

preferred species at Knapdale were all rhizomatous. A study by Jones 2006[29] using enclosures to study the effect of herbivory found no discernable impact *on P. natans* which was the dominant macrophyte on both the study site and this loch.

12.30. The loch has relatively little in the way of rhizomatous fringing vegetation with the exception of *Menyanthes trifoliata* which was grazed at Knapdale and may be affected. The Knapdale study also found impacts upon the isoetid population although this may be ascribed to secondary impacts of grazing on the tall emergents. Any potential future changes are likely to be to the sward structure and local distribution of some species. Browsing at Knapdale did remove a relatively high biomass of the beaver's preferred species. However the species affected were all generally fairly widespread and might be expected to recolonize from seed or vegetative structures. *Schoenoplectus* has been slow to regrow at Knapdale; however, it remains a viable part of the plant communities. The greatest impacts at Knapdale were found where multiple animals were in occupancy for more than one season.

12.31. We advise that it can be ascertained that there is no adverse effect on site integrity Glen Coe SAC provided suitable mitigation is identified, and will be implemented if it proves necessary.

12.32. Dam-building is unlikely, though possible, given the low level of tree cover near the loch. If the area was colonised, grazing by beavers might have an effect on most macrophyte species though it is likely to be limited to effects upon the structure and abundance of rhizomatous edge-vegetation. In such a situation any potential adverse impacts on the vegetation community should be avoided by having a suitable management plan with mitigation, in place to manage beavers.

Rannoch Moor SAC;

***Qualifying interest* - Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels**

Conservation Objectives

[29] Jones K. 2006. Ecological effects of the feeding and construction activities of the Eurasian beaver (Castor fiber) in Scotland: implications for reintroduction. PhD thesis, University of Stirling.

12.33. To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying interests; 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

12.34. Rannoch Moor contains the most extensive complex of western blanket and soligenous / valley mire in Britain and supports a range of nutrient-poor freshwater habitats from dystrophic to oligotrophic waterbodies. The waterbodies vary in size from small lochans to relatively large lochs such as Loch Bà (294 m altitude) and Loch Laidon (208m altitude). Many of the small lochans have a predominantly peaty substrate resulting in a very low nutrient status, and consequently low species diversity. However the larger lochs support vegetation typical of oligotrophic to mesotrophic standing waters.

12.35. We advise that it can be ascertained that there is no adverse effect on site integrity.

12.36. The SAC is sufficiently unattractive to beavers due to: the low percentage of woodland cover in the catchment of the Rannoch Moor lochs (c. 2%)[30], the harsh climate, and exposed nature of Rannoch Moor, meaning they are not expected to colonise the area. Therefore there will be no adverse effect on site integrity.

River Tay SAC;

***Qualifying interest* - Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels**

Conservation Objectives

12.37. To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

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

[30] which is mostly made up of conifers.

- 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

12.38. Loch Rannoch is 1,888ha; it lies at 200m, with a maximum depth 134m. The catchment is about 15% afforested about 2.5% broadleaved or mixed. It supports a diversity of plant species, and the condition is currently 'favourable maintained'. The following Lochs also form part of the Tay SAC and have suitable beaver woodland nearby. Loch Tay is 2,629ha it lies at 100m, with a high diversity of plants including *Littorella uniflora, Myriophyllum alterniflorum, Callitriche hamulata, Fontinalis antipyretica* and *Glyceria fluitans*. Loch Dochart is 19.5ha and lies at 150m, and Loch Lubhair is 61ha and lies at 152m.

12.39. Loch Rannoch is both deep and steep-sided. The catchment of Loch Rannoch is relatively small and steep, and the loch level is controlled for hydro power. The loch is also relatively deep with a large volume. Any effect on the loch is likely to come from potential damming upstream, this will probably have a positive rather than negative effect by reducing silt inflow and therefore reducing nutrients.

12.40. Beavers do not generally dam in water bodies more than 0.85m deep and 6m wide. Any dam-building on the larger lochs is therefore likely to be restricted to outflow and inflow streams. Any dam building on the smaller lochs and lochans is likely to increase the amount of freshwater habitat available.

12.41. Raising the water levels could potentially affect the submerged and floating macrophytes through raising the depth to which light penetrates above the substrate. This makes it more difficult for plants to reach the surface to form leaves, and for the flowering of air-pollinated plants. However, the water-level changes caused by beaver damming on outflows attached to the large lochs in this SAC would not be sufficient to cause either of these effects at this site.

12.42. The overall phosphorus loading will not be increased by the trapping of silt. Silt from failing or abandoned dams is likely to be remobilised by storm and / or flooding events when flushing rates will be relatively high. In some circumstances the wetting up of drier areas and the trapping of organic material may result in more anaerobic conditions resulting in the release of phosphorus. Damming may also affect the timing of the release of sediment. The effects on water chemistry and nutrients will

vary for each site and may be complex. The effects of these changes on the listed features may also be complex.

12.43. Beavers will feed on a wide range of plant species including submerged and emergent macrophytes. The Knapdale study found that there were no apparent adverse effects on the submerged plant assemblages that form part of the basis for designation of the Taynish and Knapdale Woods Special Area of Conservation. The greatest effects from the Knapdale study were on plant cover with species richness being little affected. The preferred species at Knapdale were all rhizomatous. A study by Jones (2006)[31] using enclosures to study the effect of grazing found no discernable impact on *Potamogeton natans* the dominant macrophyte on the study site. Changes are likely to be to the sward structure and local distribution of some species. Browsing at Knapdale did remove a relatively high biomass of the beaver's preferred species. However the species affected were all generally fairly widespread and might be expected to recolonize from seed or vegetative structures. *Schoenoplectus* has been slow to regrow at Knapdale but it remains a viable part of the plant communities. The greatest impacts at Knapdale were found where multiple animals were in occupancy for more than one season. However, in order to completely avoid risk of adverse impact any management plan should include provision for beaver control measures.

12.44. The natural expansion of beaver will not adversely affect the integrity of the standing water feature of River Tay SAC. Should beavers settle near the smaller lochs any potential adverse impacts from water level changes could be prevented by having a scheme in place to install flow control devices or remove dams.

12.45. Overall grazing by beavers is likely to be limited to effects upon the structure and abundance of rhizomatous edge vegetation. However any potential adverse impacts on the vegetation community could be avoided by having a scheme in place to control beavers.

12.46. We advise that it can be ascertained that there is no adverse effect on site integrity of the River Tay SAC, provided suitable mitigation is identified and can be implemented if it proves necessary.

12.47. Colonisation of the catchments of the lochs is possible given the level of tree cover and the existing areas of the Tay catchment already colonised. Should beavers settle near the smaller lochs and build dams at their outflows,

[31] [31] Jones K. 2006. Ecological effects of the feeding and construction activities of the Eurasian beaver (Castor fiber) in Scotland: implications for reintroduction. PhD thesis, University of Stirling.

any potential adverse impacts on these smaller lochs from water level changes should be prevented by having suitable mitigation in place that can identify potential adverse effects and install control devices, or remove dams or beavers where necessary.

12.48. Grazing by beavers might have an effect on macrophyte species though it is likely to be limited to effects upon the structure and abundance of rhizomatous edge-vegetation. Where it is identified that this might happen any potential adverse impacts on the vegetation community should be avoided by having a suitable management plan with mitigation in place to manage the impacts of beavers.

Taynish and Knapdale Woods SAC;

***Qualifying interest* - Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels**

Conservation Objectives

12.49. To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

12.50. The following lochs in the SAC are known to fall within the oligotrophic to mesotrophic habitat type;

- Lochan Taynish 11.2ha
- Loch Barnaluasgan 5.3ha
- Loch Coille-Bharr 33.4ha
- Un-named loch 100m east of Loch Fidhle 1.2ha
- Loch Fidhle 3.6ha
- Loch Linne 16.5ha
- Creagmhor Loch 5.3ha

12.51. All of these, with the exception of Lochan Taynish which was excluded, fell within the area where the beaver trial took place and it is proposed that the beavers remain. An appraisal was carried out prior to the trial, and reports on the effect of the beavers on the vegetation[32] were published based on data acquired during the trial.

12.52. The main findings included the following statements:

"There were no apparent adverse effects on the submerged plant assemblages that form part of the basis for designation of the Taynish and Knapdale Woods Special Area of Conservation". and;

"Four species, common club-rush ***Schoenoplectus lacustris****, great fen-sedge* ***Cladium mariscus****, white water-lily* ***Nymphaea alba*** *and water horsetail* ***Equisetum fluviatile****, were affected by direct herbivory. Impacts on* ***N. alba*** *and* ***E. fluviatile*** *were small and rather variable between territories or between years and these effects are probably transient. Selective grazing of* ***S. lacustris*** *and* ***C. mariscus*** *by beavers caused significant reductions in the standing stock of these species in beaver-occupied lochs, averaging 39% and 81% respectively. Given the low productivity of the Knapdale lochs, recovery of populations of these species in the absence of beaver may prove to be slow".*

12.53. The vegetation report overall found that there was no evidence of adverse effects of beavers specifically on the ***Littorelletea uniflorae*** and/or of the ***Isoeto-Nanojuncetea*** plant associations that form part of the basis of the Taynish and Knapdale Woods SAC designation. Thus beavers are not considered to have had a detrimental impact on the specific aquatic vegetation features for which the SAC has been designated up to this point in time.

12.54. All the species on which the beavers have been feeding at Knapdale are common and grow throughout Scotland, with the exception of saw sedge which is not rare but is uncommon in Britain. It seems likely that the beavers' preference for these species indicates a more general preference for

[32] The Scottish Beaver Trial: Monitoring of aquatic vegetation and associated features of the Knapdale lochs 2008-2013, final report. SNH Commissioned Report No. 688.

rhizomatous edge vegetation, and that where other suitable species such as *Typha* is present this may also be browsed. It is useful to note that none of the more heavily-affected species are characteristic of oligotrophic or mesotrophic lake types. Overall the greatest effects of beaver were on plant cover, with plant richness being little affected. These effects are most evident on lochs with lodges that have been occupied for several successive growing seasons by multiple animals. Intermittent occupancy by one or two individuals produced weak effects.

12.55. At the outset of the Scottish Beaver Trail (SBT) management of dams was required, as a condition of the release licence to prevent significant water-level change and potential adverse effects on the qualifying habitat of the lochs within the SAC. Thus, sustained and pronounced water level rise due to dam building occurred at only a single site (Dubh Loch) which did not contain the SAC qualifying aquatic vegetation. Where dam building took place the water-level change resulted in major alteration in the abundance and distribution of aquatic and terrestrial vegetation. However, it is worth noting that at Dubh Loch aquatic vegetation lost to both herbivory and submersion was replaced by rapid colonisation of the flooded areas between 2011 and 2013, and the number and diversity of plant species increased along with invertebrate diversity and numbers. Where water level changes were smaller than at Dubh Loch or were temporary, vegetation did not show a directional change, though this might be down to the timescale of the study.

12.56. We advise that it can be ascertained that there is no adverse effect on the site integrity of Taynish and Knapdale Woods SAC provided the ability to implement mitigation is maintained.

12.57. Work already published concludes that there is no AESI on the submerged vegetation community of the standing water qualifier from the beavers resident in the SAC area. However, dam management was a condition of the SBT and although dam-building did not have an AESI during the SBT, there may be adverse effects in the future should circumstances change (such as additional water-level increases, higher densities of beavers etc.). Any potential adverse impacts on the site from water level changes must be mitigated. Monitoring of dams is required, and water flows that will not have an AESI must be maintained. Mitigation could include a management plan involving measures such as the installation of dam-regulators or the removal of dams.

12.58. Grazing by beavers may affect most macrophyte species though it may be limited to effects upon the structure and abundance of rhizomatous edge vegetation. However any negative impacts on the vegetation community that might constitute an AESI should be avoided. Monitoring of beaver grazing activity is required and such mitigation could form part of a management plan to control the potentially damaging effects of beavers on the SAC.

13. Terrestrial and freshwater - aquatic vascular plants;

Qualifying interest - slender naiad *Najas flexilis*

Dunkeld - Blairgowrie Lochs SAC

13.1. This site contains the most easterly occurrence of slender naiad *(Najas flexilis)* on the Scottish mainland and is the second-largest known population. The site consists of a cluster of five lochs lying along a river valley – the Lochs of Butterstone, Craiglush and Lowes are about 5 km upstream of Lochs Clunie and Marlee. They are all mesotrophic waterbodies with a diverse macrophyte flora. Slender naiad has been recorded since the 19th century in the lochs.

Conservation Objectives

13.2. To avoid deterioration of the habitats of the qualifying species 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 favourable 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

13.3. Slender naiad has previously been found in all five lochs in 1994; however a 2004 survey found it had been lost from Craiglush. The 2007 survey found no plants in Craiglush, Butterstone or Clunie only two plants in Marlee but an increased population in Lowes. The slender naiad feature is currently classed as 'unfavourable recovering'. The main pressures on the qualifying species are considered to be nutrient enrichment of the lochs' waters, and competition from the non-native species *Elodea canadensis*.

13.4. The ranges of beaver and *N.flexilis* overlap. Slender naiad has been found in abundance in recently abandoned beaver ponds in North America. The Knapdale study found that there were no apparent adverse effects on the submerged plant assemblages. Instead, in Knapdale the beavers preferred to eat rhizomatous edge / emergent or floating-leaved plant species. Slender naiad is a submerged, annual species that spreads by seed and has no rhizome which suggests that it will not be preferentially eaten.

13.5. The formation of beaver dams on burns and watercourses in the catchment may result in a reduction of silt inflow, with benefits for the nutrient status of the lochs. Elsewhere beavers have been known to consume *Elodea* and it may be that this would reduce the effects of competition on the qualifying species. *N.flexilis* has also been known to germinate better in disturbed conditions.

13.6. Theoretically, should damming raise the water level sufficiently in one of the lochs, or should new habitat at appropriate depth be unsuitable for colonising it is possible that there could be negative effects on the qualifier. This could also happen if water quality was adversely affected, e.g. by increased water opacity, or additional nutrients were released as an effect of inundation of nutrient rich areas. However, dam building by Eurasian beavers isnot considered to be of sufficient scale to deepen the lochs to such an extent that slender naiad might be negatively affected. Neither will their feeding on other water plants have a negative effect on the quallifer.

13.7. **We advise that it can be ascertained that there is no adverse effect on site integrity of the Dunkeld – Blairgowrie Lochs SAC through impacts to Slender naiad.**

14. <u>Wetlands</u>

Qualifying interest - Alkaline fen

Beinn a' Ghlo SAC, Ben Heasgarnich SAC, Glen Coe SAC, Morrone Birkwoods SAC, Tulach Hill and Glen Fender Meadows SAC

Conservation objectives

14.1. To avoid deterioration of the qualifying habitats thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

Beinn a' Ghlo SAC

14.2. The alkaline fens and base-rich springs of Beinn a' Ghlo SAC are associated with the limestone outcrops, pavements and sugar limestone of the massif. The base-rich rocks outcrop at low to moderate altitudes and the lower slopes are striped with base-rich flushes and springs. On Beinn a' Ghlo the alkaline fens are represented by the M9 *Carex rostrata-Calliergonella cuspidata/Calliergon giganteum* mire and the M10 *Carex dioica-Pinguicula vulgaris* mire NVC communities. The majority of the fens are of the NVC type M10 and these are commonest in the limestone areas of the site and where there is some base-rich flushing of the schists. The alkaline fen feature is currently assessed as favourable recovered with previous pressures identified as overgrazing and trampling.

Ben Heasgarnich SAC

14.3. Ben Heasgarnich is one of a series of arctic-alpine sites on calcareous schist in the Breadalbane range; such sites are a rare type in Britain. The site is particularly notable for its extensive cliff face, rocky outcrop and rich flush vegetation which contains many nationally-rare species. Small-herb ledge communities are infrequent on wet rock and include banks characterised by yellow mountain saxifrage *Saxifraga aizoides* and smooth lady's mantle *Alchemilla glabra*, another nationally-rare community. Calcareous rock crevice communities are widespread at higher levels on the site. On Ben Heasgarnich SAC the wetland features are very much confined to the higher steeper slopes

Glen Coe SAC

14.4. Glen Coe SAC is a large upland site located within the Lochaber area of the North West Highlands. The altitude range in Glen Coe is wide, ranging from 20m to 1141m above sea level. The geology of the Glen Coe SAC is complicated and varied, ranging from Dalradian limestone at the western end of the site to granite at the eastern end with a wide range of types of exposures and intrusions in between.

14.5. On Glen Coe SAC the alkaline fen vegetation is mainly represented by the M10 *Carex dioica – Pinguicula vulgaris* mire, with smaller amounts of the M9 *Carex rostrate–Calliergon cuspidatum* mire also present. The condition of the alkaline fens was assessed as being unfavourable recovering. In previous assessments trampling had been recorded as an issue in the alkaline fens and flushes but browsing pressure has been reduced in recent years leading to an improvement in the condition of the feature.

Morrone Birkwoods SAC

14.6. Morrone Birkwood SAC is located on a foothill of the Cairngorms (340 - 859m), overlooking Braemar, on south Deeside. The hill itself is dominated by acid granulites/schists but a band of calcareous schist/limestone on the mid slopes gives rise to small crags and a series of calcareous springs and flushes.

14.7. During the most recent monitoring visit the grazing levels were assessed to be broadly appropriate but trampling was noted as a pressure both in the alkaline fen feature, and in the high altitude plant communities associated with areas of water seepage. As a result both features were assessed as being in favourable declining condition.

14.8. At Morrone Birkwood SAC the majority of the alkaline fen feature belongs to the M10 *Carex dioica – Pinguicula vulgaris* mire community, with some M9 also present. The alkaline fens occur across the site in mosaics with a range of other habitats.

Tulach Hill and Glen Fender meadows SAC

14.9. Tulach Hill and Glen Fender Meadows SAC is a large site notified for a suite of upland habitats including extensive dry heath and various calcareous habitats. The underlying Dalradian limestone gives rise to a range of important plant communities including alkaline or calcareous fens, subalpine calcareous grassland, dry and wet heath and birch/oak woodland, as well as limestone pavement.

14.10. On Tulach Hill and Glen Fender Meadows the majority of the alkaline fen feature belongs to the M10 *Carex dioica – Pinguicula vulgaris* mire with several sub-communities widespread across the site and locally these are species-rich. Other mire communities are also present, including occasional stands of the M11 *Carex demissa – Saxifraga aizoides* mire. The alkaline fens are assessed as being in favourable condition, with appropriate grazing levels on the site and no current site pressures noted.

Extent of habitat on site

14.11. Beinn a' Ghlo SAC; the alkaline fens are widespread and common and are typically small in size and linear in shape, occurring in wet flushes amongst grasslands and heaths. Although widespread, due to their small size the fens and flushes make up a small percentage of the vegetation as a whole (< 0.5% made up of 27.5ha of M10 and 2.6ha of M9).

14.12. Ben Heasgarnich SAC; The SAC data form lists 13.64ha of alkaline fens, and this site is one of the few upland sites where the altitudinal range of semi-natural habitats has remained intact and the montane fauna is consequently diverse and

representative. The alkaline fens themselves are all located at higher altitudes and on steeper topography

14.13. Glen Coe SAC; The alkaline fens are represented by M10 mires, and are common on the hill slopes at this site where base-rich water seeps out of the ground. They are the most widespread type of small basic mire in the British uplands. The Glen Coe SAC covers 2967 ha and the alkaline fen covers less than 0.9ha of this. It is estimated that bogs, fens and marshes together make up 1% of the cover of the SAC.

14.14. Morrone Birkwood SAC; the main alkaline fen NVC type present is M10 *Carex dioica – Pinguicula vulgaris* mire. The alkaline fens are widespread and are the most extensive type of mire on the site but the individual fens and flushes are still relatively small in size. Overall they comprise 6.7% of the SAC (the total area of the SAC is approximately 320 ha). The site boundary includes a few small lochans and burns which could support beaver activity.

14.15. Tulach Hill and Glen Fender Meadow SAC; this site has extensive spring-fed alkaline fens across the whole of the SAC where calcareous seepages occur. The SAC extends to 1535 ha and the alkaline fen covers approximately 10% of this. It is the most extensive and species-rich alkaline fen system in Scotland. The main alkaline fen NVC type present is M10 *Carex dioica – Pinguicula vulgaris* mire, with five different sub-communities represented. Stony flushes can support a local abundance of the nationally rare *Schoenus ferrugineus* and these are associated with the variant M10aiii.

14.16. The dam building and foraging activities of beavers can have an effect on the extent of wetland habitats and species, succession processes and the species composition and diversity of wetland communities. The construction of beaver dams can affect the hydrology, water chemistry, sediment transport patterns and nutrient levels in a number of different ways depending on local circumstances. Reduced flow velocity behind dams can lead to increased sediment deposition. Alternatively, the flooding of adjacent land can lead to an increase in the sediment load. The build-up of woody debris can lead to the formation of braided channels, pools and islands.

14.17. Dam building and feeding activities can also lead to changes in nutrient levels in the water and depending on local conditions, beaver ponds can either act as a source of raised nitrogen and phosphorus levels or as nutrient sinks.

14.18. Where the topography is shallow, beaver dams constructed close to base-rich fen communities could lead to an expansion of the habitat by increasing the area with suitably high water levels to support wetland habitats. However, if raised water

levels are maintained in alkaline fens over long periods this could lead to a transition from fen to swamp, reed-bed or open water.

14.19. If damming activity led to a change in the water quality or water chemistry within the fens, e.g. by flooding the fens with surface waters and effectively reducing the influence of the base-rich, low fertility flushes, this could lead to a change in the vegetation communities present and a reduction of the extent of the feature on the site.

Distribution of the habitat within site

14.20. Beinn a' Ghlo SAC; the alkaline fens are widely distributed across the site, wherever the hydro-ecological conditions are suitable. At Beinn a' Ghlo the base-rich rocks outcrop at low to moderate altitudes and the distribution of the alkaline fens and flushes reflects this, including the areas of lower ground in the south east of the site and on slopes on either side of the River Tilt.

14.21. The main alkaline fen NVC type present is M10 and these flushes are widespread across both sections of the SAC. The most frequent sub-community is M10a *Carex demissa - Juncus bulbosus/kochii* .This community occurs frequently throughout the site, from the lowest altitude up to about 1000 m, although it diminishes in extent with increasing altitude above about 750 - 850 m. It occurs mostly on gently sloping ground, in depressions elongated downslope, on terraces along hillsides or near the base of corries or glens, as well as on almost level ground at bealachs. Its distribution reflects zones of base-rich irrigation from spring lines which occur below schist outcrops.

14.22. Ben Heasgarnich SAC; The NVC communities that constitute this feature are M9, M10 and M13. M9 and M13 were not recorded on the site in the NVC. The feature is mainly represented by M10 (possibly with a small amount of M37 flushes and brown moss springs). This Annex 1 habitat is found throughout the site and is particularly frequent in the south west of the site on Stob nan Clach, along the steep regular slopes of Coire Chirdle and Beinn Heasgarnich, where there is flushing among rocky outcrops. It is associated with steeper slopes where there are exposed rocks or strewn boulders. It is also found near some areas of blanket bogs where there is water movement over underlying base-rich rocks.

14.23. Glen Coe SAC; The main alkaline fen NVC type present is M10 and these flushes are frequent on the slopes of Meall Mhor, and the west-facing slopes of Fionn Ghleann, which support the most extensive areas of base-rich habitats within the SAC. They occur frequently and widely throughout the site but as they are small the flushes form only a small fraction of the vegetation present on the site. The fens are found in a mosaic with other communities and occur between an altitudinal range of 30 – 1150m. The alkaline fens are mainly of the M10a sub-community and

they are frequently transitional to M11 *Carex dioica-Pinguicula vulgaris* mire vegetation.

14.24. The M11 mires are stony flushes, generally more open and sparsely-vegetated than the M10 mires described above. However, on Glen Coe the alkaline fen vegetation is frequently transitional between these communities. The alkaline fens are dependent on the presence of suitable water supply sources and these are associated with base-rich rocks. Therefore the activities of beavers on site are not likely to lead to an increase in the distribution of the alkaline fen habitat across the site, although they may lead to an increase in the amount of wetland habitat present.

14.25. Morrone Birkwood SAC; The alkaline fens are widely distributed across the site, wherever the hydro-ecological conditions are suitable. They are found in a mosaic with other communities. They range in altitude from 350m to 550m. The alkaline fens are characterised by the M10 small-sedge brown moss mires. They are found in the calcareous flushes below the main block of birch-juniper scrub and locally within it and in the Coire nan Muc birch-juniper scrub area, grading to wet-heath and grassland (M15 and U5) and mixed with runnels of M11 mire. The M11 calcareous flush and spring communities of moderately high altitudes are well developed on the Morrone Birkwood SAC, and consist of springs dominated by the moss *Palustriella commutata*, stony flushes characterised by yellow mountain saxifrage *Saxifraga aizoides*, and more closed swards of small-sedges in mixture with brown mosses.

14.26. The alkaline fens are dependent on the presence of suitable water supply sources and these are associated with base-rich rocks. Therefore the activities of beavers on site are not likely to lead to an increase in the distribution of the alkaline fen habitat across the site, although they may lead to an increase in the amount of wetland habitat present.

14.27. Tulach Hill and Glen Fender Meadows SAC; The alkaline fens are widely distributed across the site, wherever the hydro-ecological conditions are suitable. They are found in a mosaic with other communities. The main alkaline fen NVC type present is M10 and these flushes are widespread across both sections of the SAC. The alkaline fens are present across Tulach Hill wherever there are calcareous seepages and here they form a mosaic with other plant communities including other mires, wet heaths and dry heath. On Glen Fender Meadow there are very extensive areas of alkaline fen on the more level ground on the south side of the Fender burn. Small patches of M9 *Carex rostrata – Calliergon cuspidatum*/*giganteum* mire have developed as basin mire in hollows to the south and southwest of the Tulach hill summit. The predominant *Carex – Pinguicula* mires occur in mosaics with local open flushes of M11 *Carex demissa – Saxifraga aizoides* mire.

14.28. The alkaline fens are dependent on the presence of suitable water supply sources and these are associated with base-rich rocks. Therefore the activities of beavers on site are not likely to lead to an increase in the distribution of the alkaline fen habitat across the site, although they may lead to an increase in the amount of wetland habitat present.

14.29. The dam building and foraging activities of beavers can have an effect on the extent of wetland habitats and species, succession processes and the species composition and diversity of wetland communities. The construction of beaver dams can affect the hydrology, water chemistry, sediment transport patterns and nutrient levels in a number of different ways depending on local circumstances. Reduced flow velocity behind dams can lead to increased sediment deposition. The flooding of adjacent land can lead to an increase in the sediment load. The build-up of woody debris can lead to the formation of braided channels, pools and islands.

14.30. Dam building and feeding activities can also lead to changes in nutrient levels in the water and depending on local conditions, beaver ponds can either act as a source of raised nitrogen and phosphorus levels or as nutrient sinks.

14.31. Where the topography is shallow, beaver dams constructed close to base-rich fen communities could lead to an expansion of the habitat by increasing the area with suitably high water levels to support wetland habitats. However, if raised water levels are maintained in alkaline fens over long periods this could lead to a transition from fen to swamp, reed-bed or open water.

14.32. If damming activity led to a change in the water quality or water chemistry within the fens, e.g. by flooding the fens with surface waters and effectively reducing the influence of the base-rich, low fertility flushes, this could lead to a change in the vegetation communities present and a change in the distribution of the qualifying habitat within the site.

Structure and function of the habitat

14.33. Beinn a' Ghlo SAC; the alkaline fens are mainly represented by the M10 NVC community. This is a low growing community dominated by small sedges and bryophytes and it mainly occurs in small, localised springs and on flushed slopes. The M9 flushes are dependent on the maintenance of a more or less consistently high water table, with typically base-rich waters and a pH usually above 6. Where M9 occurs in flood plains, it can develop as a floating mat of vegetation. A change in the water chemistry could lead to a loss of the characteristic small sedge and bryophyte communities and a transition to other wetland vegetation types.

14.34. Ben Heasgarnich SAC; At Ben Heasgarnich the alkaline fens are mainly represented by the M10 NVC community. This is a low growing community

dominated by small sedges and bryophytes and it mainly occurs in small, localised springs and on flushed slopes. A change in the water chemistry could lead to a loss of the characteristic small sedge and bryophyte communities and a transition to other wetland vegetation types. However, given the location of the feature on the site - namely high up, on the steep slopes in the mountainous core of the site, dam building activity in close proximity to the feature should not occur..

14.35. Glen Coe SAC; the alkaline fens are mainly represented by the M10 NVC community. This is a low growing community dominated by small sedges and bryophytes and it mainly occurs in small, localised springs and on flushed slopes with pH levels typically in the range 5.5 – 8. The M11 flushes are also dependent on the maintenance of a more or less consistently high water table, and base-rich waters. A change in the water chemistry could lead to a loss of the characteristic small sedge and bryophyte communities and a transition to other wetland vegetation types.

14.36. On some wetland habitats, the activities of beavers in felling trees and scrub could help to keep the fen vegetation open and maintain the condition of the wetland but at Glen Coe monitoring has not recorded any significant scrub encroachment on the fens.

14.37. Morrone Birkwood SAC; the alkaline fens are mainly represented by the M10 NVC community. This is a low growing community dominated by small sedges and bryophytes and it mainly occurs in small, localised springs and on flushed slopes with pH levels typically in the range 5.5 – 8. The M9 flushes are also dependent on the maintenance of a more or less consistently high water table, with typically base-rich waters and a pH usually above 6. A change in the water chemistry could lead to a loss of the characteristic small sedge and bryophyte communities and a transition to other wetland vegetation types.

14.38. On some wetland habitats, the activities of beavers in felling trees and scrub could help to keep the fen vegetation open and maintain the condition of the wetland. At Morrone Birkwood SAC there were a few birch seedlings present in some of the alkaline fens (though they were not frequent enough to cause the feature to fail the condition assessment).

14.39. Tulach Hill and Glen Fender Meadows SAC; the alkaline fens are mainly represented by the M10 NVC community. This is a low growing community dominated by small sedges and bryophytes and it mainly occurs in small, localised springs and on flushed slopes with pH levels typically in the range 5.5 – 8. The M9 flushes are also dependent on the maintenance of a more or less consistently high water table, with typically base-rich waters and a pH usually above 6. A change in

the water chemistry could lead to a loss of the characteristic small sedge and bryophyte communities and a transition to other wetland vegetation types.

14.40. On some wetland habitats, the activities of beavers in felling trees and scrub could help to keep the fen vegetation open and maintain the condition of the wetland but at all these sites monitoring has not recorded any significant scrub encroachment on the fens.

14.41. The habitats are usually unenclosed and the vegetation is kept short and open by grazing by deer, sheep and cattle. It is considered that foraging activities of beavers would not have an adverse effect on the site integrity of these SACs.

14.42. The dam building and foraging activities of beavers can have an effect on the extent of wetland habitats and species, succession processes and the species composition and diversity of wetland communities. The construction of beaver dams can affect the hydrology, water chemistry, sediment transport patterns and nutrient levels in a number of different ways depending on local circumstances. Reduced flow velocity behind dams can lead to increased sediment deposition. The flooding of adjacent land can lead to an increase in the sediment load. The build-up of woody debris can lead to the formation of braided channels, pools and islands.

14.43. Dam building and feeding activities can also lead to changes in nutrient levels in the water and depending on local conditions, beaver ponds can either act as a source of raised nitrogen and phosphorus levels or as nutrient sinks.

14.44. Where the topography is shallow, beaver dams constructed close to base-rich fen communities could lead to an expansion of the habitat by increasing the area with suitably high water levels to support wetland habitats. However, if raised water levels are maintained in alkaline fens over long periods this could lead to a transition from fen to swamp, reed-bed or open water.

14.45. If damming activity led to a change in the water quality or water chemistry within the fens, e.g. by flooding the fens with surface waters and effectively reducing the influence of the base-rich, low fertility flushes, this could lead to a change in the vegetation communities present and a change in the structure and function of the qualifying habitat within the site.

Processes supporting the habitat; and effects on typical species of the habitat ('distribution', 'viability' and 'significant disturbance')

14.46. For all the SACs the alkaline fens are dependent on the maintenance of a more or less consistently high water table through continued flushing by a base-rich water source, with pH levels typically in the range 5.5 – 8 and low fertility. They occur on a

variety of soil types but M10, the main alkaline fen community on these sites, is usually found on mineral soil.

14.47. Alkaline fens consist of a complex assemblage of vegetation types, characteristic of sites where there is tufa and/or peat formation with a high water table and a calcareous base-rich water supply. The characteristic vegetation is short sedge mire (with a range of sedge species) and a rich bryophyte flora. At most sites there are transitions to a range of other fen vegetation types including other types of mire, tall-herb fens, swamp or wet grassland in the lowlands or wet heath and blanket bogs in the uplands.

14.48. The activities of beavers are not likely to have an effect on the functioning of the base-rich water sources themselves at these sites, but they could affect a key process supporting the habitat: i.e. the balance of water sources supplying the fens (and hence the water chemistry). If beaver dams cause surface waters to back up across any of the fens, this could lead to a loss of the characteristic species and communities of the alkaline fen, and lead to a transition to other wetland vegetation types.

14.49. Beavers will feed on a variety of species but the majority of their foraging effort is spent within water or within 30m of water edge habitat. Given the widespread location of the numerous small alkaline fens and flushes it is concluded that any beaver feeding activity, by direct impacts on the distribution, viability or disturbance of the characteristic species, will not have an adverse effect on the site integrity.

14.50. We advise that it can be ascertained that there is no adverse effect on the site integrity of Ben Heasgarnich SAC due to the altitudes and topography of the site where the alkaline fens are found.

14.51. We further advise that it can be ascertained that there is no adverse effect on the site integrity of the other SACs provided there is monitoring of the location of beaver dams within and upstream of the SACs, in order to manage water flows, and managing or removing any beaver dams which could cause alkaline fens to be flooded with impounded water.

Qualifying interest – Transition mires and Quaking bog

Cairngorms SAC, Rannoch Moor SAC, Dunkeld - Blairgowrie Lochs SAC

14.52. As the name indicates, transition mires are found in mosaics and transitions with other habitat types. They are generally small in size and are usually mapped as part of a mosaic with other communities.

14.53. Both the mires and bogs are typically dominated by sedges and rushes over a ground layer of semi-aquatic bog-moss *Sphagnum* species or feather-mosses such as *Calliergon* species. The term 'transition mire' refers to the fact that the vegetation and ecological/hydrochemical characteristics are transitional between acidic bog and alkaline fen conditions. This transitional state can arise either by being in an intermediate position between bog and fen or by being a successional stage in which, after accumulating in fen or over open water, rainwater-fed (ombrogenous) peat, which is wholly or partly isolated from groundwater influence, accumulates.

14.54. Many of these systems are very unstable underfoot and are also described as 'quaking bogs'. Small quaking bogs can occur in a wide variety of landscape situations, including small basins in post-glacial landscapes, the margins of lochs and lochans in blanket bog, and the edges of coastal machair lochs. Larger examples are found in floodplain mires. They are usually found within other larger wetlands such as valley mires, basin mires, blanket bogs and the lagg areas of raised bogs.

Conservation objectives

14.55. To avoid deterioration of the qualifying habitat thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable 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

Rannoch Moor SAC

14.56. Rannoch Moor lies in the central Highlands. It is a large site, extending to approximately 10,114 ha and made up of different vegetation types, including blanket bog, mires and wet and dry heath. The transition mires feature covers 2% of the SAC - or approximately 202ha.

14.57. It is a high-level basin at about 300m altitude and encompasses one of the most extensive and undisturbed blanket bog and fen complexes in Britain. Blanket bog

occupies hollows, level ground and gentle slopes, with the species composition reflecting the overall wetness and water movement. It is nationally and internationally important for its blanket bog habitat and extensive complex of water bodies, (all of which are low in nutrient levels) and associated plant communities. These range in size from small lochans to relatively large lochs such as Loch Bà and Loch Laidon. On Rannoch Moor SAC the transitions mires and quaking bogs (together with the depressions in peat substrates and the blanket bog) were both found to be in favourable condition when last monitored in 2007.

14.58. Rannoch Moor is an unusual ecological variant of transition mire, developing amongst areas of blanket bog, and supporting the Rannoch-rush *Scheuchzeria palustris* at its only known location in the UK. Other types of transition mire occur widely, including ladder fens. On Rannoch Moor SAC the transition mire and quaking bog feature is mainly represented by the M4 *Carex rostrata-Sphagnum recurvum (S. fallax*) mire community. This community is generally found alongside M18 raised or blanket bog and M16 wet heath, marking the wettest parts of ground subject to soligenous influence (groundwater fed from these adjacent mire types on higher ground). It is slightly less ombrotrophic and less acidic than the adjacent rain-fed bog and wet heath.

14.59. There are significant areas of transition mire and quaking bog at Rannoch Moor, though they are not well mapped. The SAC contains numerous rivers, burns, lochs and lochans and is potentially an area where beavers could become established if there is also sufficient suitable woodland habitat. If beavers established themselves here individual stands of transition mire and quaking bog could be affected by flooding resulting from dam building activity.

14.60. We advise that it can be ascertained that there is no adverse effect on site integrity. SNH earlier advised that there was a LSE on the SACs with this qualifier.

14.61. Upon further appraisal it is advised that the SAC is sufficiently unattractive to beavers due to: the low percentage of woodland cover in the catchment of the Rannoch Moor lochs (c. 2%)[33], the harsh climate, and exposed nature of Rannoch Moor, meaning they are not expected to colonise the area. Therefore there will be no adverse effect on site integrity.

Cairngorms SAC

14.62. The Cairngorms SAC is a large upland site made up of a mosaic of a large range of different vegetation types with many qualifying habitats. The SAC extends to approximately 57692 ha. The transition mires cover approximately 23 hectares,

[33] which is mostly made up of conifers.

which represents 0.04% of the SAC. In 2004 and 2007 the Cairngorms SAC site condition monitoring for this qualifying interest was assessed as being in favourable condition. No negative pressures on the feature were identified.

14.63. The majority of confirmed locations for this qualifying habitat are located in the lower north-western parts of the Cairngorms SAC within Abernethy and Rothiemurchus pine forests, usually in wet hollows or associated with valley mires. These are areas that could possibly sustain some beaver activity although beavers do not prefer coniferous trees to feed upon or fell.

Dunkeld – Blairgowrie Lochs SAC

14.64. The Dunkeld-Blairgowrie Loch SAC covers approximately 428 ha. There is approximately 5.4ha of transition mire and quaking bog and this is located between Craiglush loch and Lowes Loch.

14.65. The Lochs of Butterstone, Craiglush and Lowes form a chain, linked by the Lunan Burn, between Dunkeld and Blairgowrie and are about 5 km upstream of Lochs Clunie and Marlee. They are mesotrophic water bodies with a diverse macrophyte flora. On Dunkeld –Blairgowrie Lochs SAC the transitions mires and quaking bogs are found in the area between the Craiglush and Lowes lochs. They are generally small in size and are usually mapped as part of a mosaic with other communities. Here they are transitional with basin fen, and open water transition swamp communities.

Extent of the habitat on site, and distribution of the habitat within site

14.66. Cairngorms SAC; the transition mires are mainly found in the lower north-western parts of the Cairngorms SAC within Abernethy and Rothiemurchus pine forests, usually in wet hollows or associated with valley mires. On this site the majority of the quaking mire vegetation belongs to the M4 *Carex rostrata – Sphagnum recurvum* mire, with occasional patches of more species-rich vegetation with a bryophyte carpet with abundant *Calliergonella cuspidata* and *Calliergon cordifolium*. Small pockets of more species-rich vegetation are frequent in the fens and transition mires of Strathspey. The majority of the confirmed locations for transition mire in the SAC points are either in the eastern Abernethy (Tulloch Moor-Loch Garten) area or Moormore (Rothiemurchus) where individual stands of transition mire or quaking bog could possibly be affected by flooding resulting from dam building activity if the less-preferred coniferous, or the few non-coniferous trees are felled for dam building.

14.67. Dunkeld Blairgowrie Lochs SAC; the primary communities that make up the transition mire and quaking bog feature are the M9 *Carex rostrata-Calliergon cuspidatum/giganteum* mire, with smaller amounts of M5 *Carex rostrata-Sphagnum squarrosum* mire and S27 *Carex rostrata-Potentilla palustris* fen also present. The areas of transition mire and quaking bog are found in a large stand between the

Loch of Craiglush and the Loch of Lowes. There are already confirmed reports of beaver activity in the area. The area of transition mire and quaking bog could be affected by flooding resulting from dam building activity.

14.68. Loch of Craiglush lies to the north-west of the Loch of the Lowes and is linked to its south-west shore by an artificial canal. The area of poor fen which would have been the original link between these two lochs prior to the construction of the canal, is liable to flood in high water. The transition mire and quaking bog qualifier is found in the area between the Loch of Craiglush and the Loch of Lowes.

14.69. The dam building and foraging activities of beavers at these two SACs could have an effect on the extent of wetland habitats and species, succession processes and the species composition and diversity of wetland communities. The construction of beaver dams can affect the hydrology, water chemistry, sediment transport patterns and nutrient levels in a number of different ways depending on local circumstances. Reduced flow velocity behind dams can lead to increased sediment deposition. Alternatively, the flooding of adjacent land can lead to an increase in the sediment load. The build-up of woody debris can lead to the formation of braided channels, pools and islands. An increase in water levels could lead to a change in wetland habitats with a corresponding transition to different wetland plant communities e.g. from fen to swamp.

14.70. Dam building and feeding activities can also lead to changes in nutrient levels in the water and, depending on local conditions, beaver ponds can either act as a source of raised nitrogen and phosphorus levels or as a nutrient sink. Beaver dams constructed close to transition mires and quaking bogs could lead to an increase in water levels. However, quaking mires form a mat of floating vegetation which rises and falls with the water levels, so the condition of the feature is not likely to be affected as a result of moderate increases in water levels.

14.71. Although the habitat represents a transition between bog and fen conditions, the water tends to be fairly acidic and only slightly enriched. An increase in nutrient levels could lead to a transition to fen vegetation, although in some cases floating rafts of ombrotrophic vegetation can persist above more nutrient rich water. A prolonged, significant rise in water levels, combined with an increase in nutrient levels could lead to a transition to swamp vegetation.

Structure and function of the habitat, and processes supporting the habitat

14.72. Quaking bogs can form through the infilling of a water body or when large pools in blanket bog (dubh lochans) infill with an encroaching vegetation mat. The latter is a very common mechanism of quaking bog formation in Scotland.

14.73. The surface of transitional mires and quaking bogs is typically highly acidic and low in nutrients, reflecting the predominant role of precipitation in the water balance,

with only a weaker minerotrophic influence. The mean pH of quaking bogs is around 4. However, their transitional character between bogs and impoverished forms of fen means that the pH may be higher than that found in bogs. The same trend applies to mineral content. In some situations floating rafts may overlie water with a significantly higher pH and nutrient content, where the floating nature of the raft reduces or removes the influence of the underlying base-rich water.

14.74. Quaking bog vegetation rafts are sensitive to the duration of low water levels, which could result in the buoyant raft becoming anchored to the underlying substrate if water levels are reduced sufficiently for too long. The activities of beavers are not likely to result in a reduction in water levels in transition mires and quaking bogs.

14.75. Increased mineral and nutrient levels arising from changes to water quantities or quality could result in a shift in the species composition towards more typical fen communities, although where there is a floating raft of vegetation this can effectively become isolated from the underlying water. Precise changes cannot yet be predicted, and will depend upon the nature, scale, duration, and location of beavers and their activities.

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

14.76. A variety of changes in the floral, and subsequently the faunal, composition of the qualifying habitat are possible through the dam-building activities of beavers (especially through changes in water chemistry and water levels).

14.77. Beaver will feed on a variety of plant species but the majority of their foraging effort is spent within water or within 30m of water edge habitat.

14.78. We advise that it cannot be ascertained that there is no adverse effect on site integrity of Cairngorms SAC, and Dunkeld – Blairgowrie Lochs SAC without monitoring, and management of beaver dams.

14.79. Mitigation in the form of monitoring and management of beaver dams is required to avoid the adverse effect where dams might cause individual stands of transition mires or quaking bogs to be flooded.

15. Invertebrates

***Qualifying interest* - Freshwater pearl mussel (*Margaritifera margaritifera*)[34]**
River South Esk SAC, River Spey SAC, and River Dee SAC

Conservation Objectives;

15.1. To avoid deterioration of the habitats of the qualifying species 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, including range of genetic types for salmon, 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
- Distribution and viability of freshwater pearl mussel host species
- Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species

15.2. The principle means by which beavers could affect pearl mussels in any SAC, is through the construction of dams. This could have a detrimental effect if pearl mussels are immediately upstream, potentially causing disturbance of the species and changing the habitat that can support pearl mussels. However, it is worth noting that in all SACs more than 99.9% of pearl mussels are in the main stems of the rivers which are too large for beavers to dam.

15.3. In the River South Esk the main stem supports all of the known pearl mussel population and cannot be affected by dam building. In the Rivers Spey and Dee there are small populations in tributaries. In the Spey there is a very small population that was reintroduced into a burn tributary (<50 animals) and other small populations have recently been found in a burn near the A9 and in another major burn further south in the catchment. Otherwise the population, including all juveniles, is in the mainstem of the Spey (estimated population c.5 million). In the Dee there are small populations in two tributaries which are both too wide for beavers to dam; the rest of the known population is in the mainstem. This lack of an ecological connection means there will be no adverse effect on site integrity of the River Dee SAC from dam building. In the River Spey there is only a tiny percentage

[34] The locations of some of the Freshwater pearl mussel populations have been withheld due to the sensitive nature of this information.

of the overall population in tributaries that are potentially damnable by beavers and careful monitoring and management of any beaver potentially damaging activity on the tributaries would ensure there is no adverse effect on site integrity.

15.4. Another potential impact is the felling of trees by beavers into the river mainstems, where trees could change local erosion and deposition patterns in an area that is particularly important for pearl mussel (thereby potentially disturbing the species and changing the local distribution of the supporting habitat). However, any foreseeable changes will be so small in scale, localised, and mimic current natural events where trees already fall into the river, that the SAC populations as a whole will be able to adapt to such disturbance (largely in the way they do now to floods etc by occupying other, newly created habitat). So this particular issue would not have an adverse effect on site integrity.

15.5. The other relevant potential impact (mentioned in the Beavers in Scotland report) is the effects on the salmonid host(s). This could affect the distribution and viability of freshwater pearl mussel host species and the structure, function and supporting processes of habitats supporting freshwater pearl mussel host species. Dam building in the tributaries of the SACs could impede the migration of local Atlantic salmon and trout populations upon which the mussels depend to complete their life cycle, although nearly all of the mussels in all three SACs live further downstream in the mainstems of the SAC rivers where damming will not affect the pearl mussels. The appraisal for the Atlantic salmon qualifying interest of each of the three riverine SACs in the 'fish' section is below (16). Sections 16.25 to 16.27 conclude that an adverse effect on Atlantic salmon cannot be ruled out without mitigation. **Given that freshwater pearl mussels (within limited exceptions on the River Spey) are located far downstream of locations where beavers may be able to build dams, then an indirect impact on pearl mussels is improbable. However, an adverse effect cannot be ruled out with certainty for the three SACs without the implementation of the mitigation required for Atlantic salmon (see Section 16).**

16. Fish

Qualifying Interest – Atlantic salmon (*Salmo salar)*

River Dee SAC, River South Esk SAC, River Spey SAC, River Teith SAC, and River Tay SAC

Conservation objectives

16.1. 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 favourable 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, including range of genetic types for salmon, 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

Context

16.2. The potential (positive and negative) impact of Eurasian beaver on freshwater fish, and the fisheries that they support, is extensively reviewed within the Beavers in Scotland report to the Scottish Government. Additional material, for Atlantic salmon only, is provided also within the Final Report of the Beaver Salmonid Working Group [35]

16.3. Atlantic salmon are widely distributed across Scotland and within the network of Atlantic salmon SACs. However, when considering the viability of individual populations it is important to consider the complex nature of Atlantic salmon populations within UK rivers. Stock structure can, for example, incorporate a variety of discrete populations each of which are adapted to complete their life history within certain geographical areas of a catchment. The time taken to smolt, the timing and duration of the smolt migration, time spent at sea and timing of return may all have a genetic basis. In terms of location, it is widely accepted that early running multi-sea-winter fish (known as the Spring stock component) tend to spawn in the upper catchments of rivers, and that late-running fish (Autumn spring stock component) may ultimately spawn in the lower reaches of river systems. Whilst this may be a simplistic view, it demonstrates that Atlantic salmon can, and often do, utilise the entire catchment during spawning time and for the production of juvenile fish.

16.4. Based on the proportions of river lengths of Atlantic salmon and lamprey SACs which are estimated are unlikely to be dammed by Eurasian beaver (based on river widths >6m) and the absence/restricted distribution of core beaver woodland (see Table 16), it seems that those SACs which already host Eurasian beaver (the River Tay and River Teith, or whose catchments are adjacent to these SACs, have catchment characteristics which favour the highest likelihood of being dammed.

[35] Final Report of the Beaver Salmonid Working Group (Beaver Salmonid Working Group, 2015).

Table 16: SAC rivers and beaver damming

Proportion of River SACs designated for Atlantic salmon which are unlikely to be dammed. These estimates are based on river width (greater than 6 m) and the absence of potential core beaver woodland. Sites shaded blue in the table are those where Eurasian beavers are already present; i.e. the River Tay SAC, and those SACs which are adjacent. (copied from Table 4.5.of the Beavers in Scotland: A report to the Scottish Government (SNH, 2015)).

SAC	River length (km)	River length (%) predicted to be unlikely to be dammed: because wider than 6m, or no core beaver woodland
Little Gruinard River	57	100.0
River Thurso	114	100.0
Langavat	107	99.6
North Harris	311	99.6
Berriedale and Langwell Waters	46	99.3
River Oykel	242	98.1
River Naver	141	97.2
River Borgie	17	95.9
River Teith	188	94.8
River Bladnoch	154	93.7
River Tweed	1,089	93.4
River Tay	1,029	93.4
River Moriston	43	93.0
Endrick Water	47	92.5
River South Esk	188	87.9
River Dee	686	85.0
River Spey	1,042	84.5

16.5. These data mean that it cannot be concluded that Eurasian beaver will not have an impact on Atlantic salmon, or individual stock components. The Spring stock component typically spawns in the upper reaches of rivers, and damming activity in areas downstream of such areas may have a negative impact on this portion of the Atlantic salmon stock. This life history type, which is included as a reason for selection in many Atlantic salmon SACs, has undergone a long-term national decline and remains a key issue for those involved in the maintenance of Atlantic salmon fisheries, as well as SNH. The resilience of migratory Atlantic salmon populations to new pressures is an issue that must be considered in respect of how beaver–salmon interactions are managed.

16.6. Attention must focus on those areas where interactions are likely to occur. This means that the potential impact of Eurasian beaver activity on all life-history stages must be fully considered. Whilst most attention has focussed on upstream migrating adult fish, all Atlantic salmon may spend significant time in areas affected by beavers prior to migrating to sea. Given the nature of fish distribution within each of these SAC river catchments, mitigation to reduce the scale of any impact on the structure and function of the habitats which support these fish and which could undermine the conservation objectives must be addressed at an individual SAC level.

16.7. Although Eurasian beaver appear to be present only within the River Tay SAC, and recently as one or two unpaired individuals in the River Teith SAC, it is possible that they may access the catchments of adjoining SACs (the River Dee, the River Spey SAC, and the River South Esk SAC within the lifetime of this HRA, which is why the ZDA have been considered as the basis for this assessment. The spring stock component, possibly the most vulnerable stock component, was considered to be in unfavourable condition within the River South Esk and Spey SACs when they were last assessed through Site Condition Monitoring by SNH during 2010. More recent assessments of the Atlantic salmon stock have been provided by Marine Scotland Science through their work on The Conservation of Salmon (Scotland) Regulations 2016. These identify Atlantic salmon in all of these SAC rivers to be at Grade 1, meaning that MSS calculate, using the data available, that there is at least an 80% probability that the Conservation Limits for the SAC will be met. It also means that MSS consider current levels of exploitation by anglers to be sustainable, and that no additional management action is currently required.

Appraisal of impacts on Atlantic salmon in view of their Conservation Objectives

16.8. This appraisal applies to all five of the river SACs with LSE that require greater appraisal. The nature and scale of the potential impacts of beavers are very similar for the salmon qualifying interest of each SAC and they have therefore been considered together.

Population of the species, including range of genetic types for salmon as a viable component of the site

16.9. Eurasian beaver have the potential to impact Atlantic salmon populations within all of the affected, or potentially affected, SACs. Beaver activity may be restricted to certain areas of the catchment (with river width < 6 m and presence of potential core beaver woodland) but the locations of impacts may be coincident with vulnerable life history types of Atlantic salmon (the 'Spring' stock component). An adverse effect on site integrity cannot be ruled-out due to the potential undermining of this conservation objective.

Distribution of the species within site

16.10. The building of dams in areas where river widths are < 6m may have a particularly significant impact on the Spring stock component or other fish which spawn in river tributaries which are narrow (i.e. <6m). Even if a dam does not form a complete barrier to upstream Atlantic salmon movement, delays caused by such an obstruction can increase the probability of predation, result in a loss of fish condition, and delay movement to a point where low water temperature becomes a physiological constraint. Juvenile Atlantic salmon occupy all areas of suitable habitat and barriers may slow or prevent their movement, or impact specifically on the downstream movement of smolts.

16.11. To maintain the distribution of Atlantic salmon in such areas it is important to ensure that the passage of fish past any barrier is assured. This may be achieved through the easement or removal of barriers at certain times of year (e.g. during spawning time) or through the installation of measures such as flow management devices. However; it is unclear whether such a device could be used to assist the upstream migration of large Atlantic salmon (which is typical of 'Spring' fish) as it has not yet been scientifically tested in Scotland in this regard.

Distribution and extent of habitats supporting the species

16.12. Barriers and other in-stream/riparian beaver activities may impact sediment transport within rivers and streams, either directly or by influencing the hydrology of affected watercourses. This can negatively impact the replenishment of Atlantic salmon spawning areas.

Structure, function and supporting processes of habitats supporting the species

16.13. As above, by impacting issues such as sediment transport and hydrology, Eurasian beaver may affect the structure, function and supporting processes of habitats in which Atlantic salmon live.

No significant disturbance of the species

16.14. There is potential for dam building and feeding-related activities of Eurasian beaver to impact on the life history of Atlantic salmon. The location, nature and degree of these impacts could be considered to be a significant disturbance to the salmon. This impact on their life history can also occur in man-made structures where facilities such as fish passes can be partially or wholly blocked by in-stream structures created by Eurasian beaver.

Qualifying Interest* – Sea lamprey (*Petromyzon marinus)

***Qualifying Interest* – River lamprey (*Lampetra fluviatilis*)**

Qualifying Interest* – Brook lamprey (*Lampetra planeri)

River Teith SAC and River Tay SAC, (all three lamprey species); River Spey SAC (Sea lamprey only)

Conservation objectives

16.15. To avoid deterioration of the habitats of the qualifying species (listed above) 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 favourable 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

16.16. The latest SCM data for the qualifying interests in the 3 SACs show that all are in Favourable (maintained) condition except the Sea lamprey feature of the River Teith SAC.

16.17. Little is known about how the biology of the 3 lamprey species. Anadromous forms are not considered to ‘home’ to their natal streams in the same way as Atlantic salmon do. The distribution of lamprey within catchments does differ according to species: Brook lamprey are more widely distributed within catchments, while Sea lamprey are typically found in the lower reaches of rivers; River and Brook lamprey are more closely associated with the middle and upper catchment. Whilst most attention has focussed on upstream migrating adult fish, both Sea and River lamprey may spend significant time in areas affected by beavers prior to migrating to sea.

Appraisal of impacts on lamprey species in view of their Conservation Objectives

16.18. This appraisal applies to all three of the river SACs with LSE that require greater appraisal. The nature and scale of potential impacts of beavers are very similar for the lamprey qualifying interest(s) of each SAC and they have therefore been brigaded together to avoid repetition.

Population of the species as a viable component of the site, and Distribution of the species within site

16.19. Eurasian beaver have the potential to impact lamprey populations within all of the potentially affected SACs through dam building restricting their movements. However, given the distribution of anadromous lamprey (particularly Sea lamprey) within river catchments where they are often restricted to the lower reaches of rivers and mainstems, the potential for impact by Eurasian beaver is not as high as it may be for Atlantic salmon. For instance Sea lamprey surveys have only ever found this species in rivers wider than 6m which means they are largely found outwith areas of beaver dam building activity.

16.20. The potential overlap with Brook lamprey, and to a lesser extent River lamprey, requires more consideration. Brook lamprey is not anadromous and remains in freshwater for its entire life cycle. Little is known about its movement within river systems, although it is clear that the species is mobile enough to utilise all available habitats within a river system. In the River Tay SAC Brook lamprey have a wider distribution than the other two species. Research in Denmark suggests that whilst dams are a complete barrier to Brook lamprey, they did not have an overall negative effect on this species and therefore may not undermine the conservation objectives. (See Table 3.13 in the Beavers in Scotland report, page 84). The distribution of River lamprey within the SACs is less certain

16.21. The building of dams in areas where river widths are <6m, may impact river (and to a lesser extent brook lamprey) which require to utilise in-stream habitats in tributaries of this size. Whilst barriers may have the potential to negatively impact the upstream movements of adult lamprey, this may not also be the case for downstream migrants. To maintain the distribution of lamprey into such areas however, it is important to ensure that passage past any barrier is assured. This may be achieved through the easement or removal of barriers at certain times of year (during spawning time) or through the installation of flow control devices.

Distribution and extent of habitats supporting the species

16.22. Barriers and other in-stream/riparian beaver activities may impact sediment transport within rivers and streams, either directly or by influencing the hydrology of affected watercourses. This can negatively impact the replenishment of lamprey

spawning areas, which like those required for Atlantic salmon are clean well-oxygenated gravels.

Structure, function and supporting processes of habitats supporting the species

16.23. As above, by impacting issues such as sediment transport and hydrology, Eurasian beaver may affect the structure, function and supporting processes of habitats in which all species of lamprey live.

No significant disturbance of the species

16.24. Where the two species co-occur, there is potential for the activities of one (Eurasian beaver) to impact on the life history of the others (Brook, River and Sea lamprey). For migrating adults, the scale of this impact may be significant if it results in the loss of passage to key spawning areas. For juvenile lamprey, the scale of impact may be less, if additional habitats are created through the in-stream and riparian activities of Eurasian beaver.

16.25. We advise that it cannot be ascertained that there is no adverse effect on the site integrity of SACs designated for Atlantic salmon and lampreys through dam-building activities and other related activities. Mitigation to avoid these impacts is necessary[36]. It is important to ensure that the passage of fish past any barrier is assured such as by the use of flow devices; this precautionary approach is currently needed due to the existing lack of understanding of the full details of any potential impacts on the SACs.

16.26. Mitigation to ensure passage may be achieved through the easement or removal of barriers at certain times of year important for salmon (i.e during spawning and smolt emigration) or through the installation of flow control devices[37]. However; it is unclear at this time whether such devices could be used to assist the upstream migration of large Atlantic salmon (which is typical of 'Spring' fish).

16.27. If a beaver dam might cause an adverse effect on the integrity of the SAC and a fish pass might not allow passage upstream, then alternative mitigation measures which will allow passage must be put in place. These mitigation measures should be included in a Beaver Management Plan for the individual SACs, which should also set out in what circumstances there could be an adverse effect on site integrity, and a framework through which to implement any mitigation measures should they become necessary.

[36] The degree to which mitigation is necessary depends upon which species is being impacted. Atlantic salmon are the species at a greater risk of negative impacts on their conservation objectives than lampreys: and amongst lamprey species river and brook lamprey are at a greater risk then sea lamprey.

[37] Such as 'Beaver Deceivers'.

17. Birds

Conservation Objectives;

- The conservation objectives for all Scottish SPAs are the same.
- 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 interest* - Black-throated diver (*Gavia arctica*)**

Rannoch Lochs SPA, Knapdale Lochs SPA

Rannoch Lochs SPA

17.1. The SPA is composed of a cluster of eight breeding lochs most of which are in open upland habitat.

17.2. Eurasian beaver is a natural component of freshwater ecosystems in Europe in which the diver may also occur. Similarly, the Pacific diver (a congener of Black-throated diver) is recorded living in the same areas as the North American species of beaver. Impacts of beavers at this SPA could be to raise the water level of the lochs by damming outflow burn(s) that could flood diver nests containing eggs. Fluctuations in water levels are a normal experience for divers at breeding lochs.

17.3. In order to determine the effects of the proposal on site integrity, the conservation objectives are examined below.

Population of the species as a viable component of the site:

17.4. The site supports seven pairs of breeding divers. 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 occur if the birds nested on the shore. However breeding attempts also occur on artificial rafts which are able to move up and down with changing water levels. Beavers could have a negative 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 would not have an adverse impact on divers through indirect impacts to their fish prey. If damming that had the potential to have an adverse effect were prevented during the crucial part of the breeding season there would then be no adverse impact from beavers.

17.5. For three of the lochs (Ossian, Laidon and Ba) the size of the loch and their major out flows are so large that beaver dams couldn't affect the water levels within the loch. None of the remaining 5 smaller lochs have areas of potential core beaver woodland on their shores or along their outflow burns. Colonisation of these lochs within the next 10 years is extremely improbable despite their inclusion in this appraisal due to both their distance from existing beaver locations and the nature of their habitat i.e. that of oligotrophic lochs with little available foraging resource for beavers.

Distribution of the species within the site:

17.6. If any of the individual lochs were affected by beaver activity and the divers failed to breed the distribution within the site could be affected. However, as stated above, the possibility of beavers affecting any of the lochs within the next 10 years is minimal, and if potentially damaging damming was prevented during the breeding season this conservation objective would be met.

Distribution and extent of habitats supporting the species:

17.7. The only physical impact the beavers would have on the lochs would be by raising the water level but this would not affect the divers if it remained stable. The lochs are mostly oligotrophic hill lochs and contain few macrophytes and are unlikely to be colonised by beavers during the next 10 years. 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:

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

No significant disturbance of the species:

17.9. Any disturbance that is significant, such as impacts on pairs during the breeding season has been dealt with under earlier conservation objectives.

17.10. We advise that it can be ascertained that there is no adverse effect on site integrity of the Rannoch Lochs SPA as at present, and in the foreseeable future, because of the very low percentage of woodland cover in the catchment of the Rannoch Moor lochs (c. 2%), the harsh climate, and exposed

nature of Rannoch Moor, meaning beavers are not expected to colonise the area. Therefore there will be no adverse effect on site integrity. In addition what woodland is present is adjacent to Loch Ossian and Loch Laidon: both of which are sufficiently large that beavers will not be able to raise the water level during a single diver breeding season.

Knapdale Lochs SPA

17.11. Knapdale Lochs Special Protection Area (SPA) comprises a group of four small oligotrophic and mesotrophic lochs in the Knapdale area of Argyll & Bute in southwest Scotland. These are the southernmost regular black-throated diver territories in Britain, and the most south-westerly in Europe. At the time of classification the site had an average of 4 breeding pairs of black-throated divers. The combination of a large population size, high productivity and a location at the edge of the European range make this an extremely valuable site.

Possible interaction with beavers

17.12. Eurasian beaver is a natural component of freshwater ecosystems in Europe in which the diver may also occur. Similarly, a closely related species the Pacific diver, is recorded living in the same areas as the North American species of beaver.

17.13. 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. 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 expansion of beavers out from the initial trial location. This effect is the result of beavers altering water levels at times during the breeding season.

17.14. Although all the lochs in the SPA are in catchments that contain potential beaver woodland only one has any of this type of woodland within 1km. Loch Fuar-Bheinne has potential beaver woodland approximately 900m downstream of its outflow. The likelihood of beavers colonising the SPA lochs would appear to be low but this assessment is based on the assumption that it is possible.

Conservation Objectives

17.15. 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.

Population of the Species as a viable component of the site

17.16. The site supports four pairs of breeding divers. Dam building in the outflow burns from the nesting lochs 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. 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 both during, and outwith the breeding season. One loch in the SPA is used as a water supply for the Crinan Canal by Scottish Canals and to avoid impacts on the SPA water is only taken from this loch outwith the diver breeding season. If damming was prevented during the crucial part of the breeding season then there would be no adverse impact from beavers on the SPA lochs.

Distribution of the species within the Site

17.17. The birds will use the lochs in the SPA, and attempt to nest, irrespective of fluctuations in water level. The damming of an outflow burn on any particular loch will not affect the distribution of birds in the site. 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 would be no direct adverse impact from beavers.

Distribution and extent of habitats supporting the species

17.18. The only physical impact the beavers would have on the lochs is by raising the water level but this would not affect the divers. The lochs are oligotrophic hill lochs and contain few macrophytes and they, and their outflow burns, are unlikely to be colonised by beavers within the next 10 years. 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

17.19. 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

17.20. The presence of beavers in a diver loch would not cause significant disturbance unless it became a well-known site for viewing beavers and attracted increased numbers of visitors. All four lochs appear to be distant from public roads and/or tracks and would seem unlikely to attract significant numbers of beaver watchers. Significant disturbance is therefore unlikely

17.21. **We advise that it can be ascertained that there is no adverse effect on site integrity if the proposal is undertaken strictly in accordance with the following conditions.**

17.22. No dam building by beavers in outflow burns of the SPA will be permitted during the period April to July inclusive. Any dams being built during that period should be removed without disturbance to the divers.

17.23. If divers are breeding on the lochs within the SPA in any year then checking for beaver dams 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.

Qualifying interest - Scottish crossbill *(Loxia scotica)*

Ballochbuie SPA, Cairngorms SPA

17.24. Both of these SPAs are large areas of Caledonian forest dominated by Scots pine. Crossbills are cone feeding specialists and feed and nest in the pine trees. However, due to the annual variation of pine cone crops Scottish crossbills are known to be nomadic, and in years where there is a poor cone crop in a particular SPA the population may not reach the qualifying levels.

17.25. Eurasian beaver is a natural component of wet woodland ecosystems in Europe in which other crossbill species may also occur. Impacts of beavers could be to raise the water level of the lochs and rivers within the SPAs by damming smaller watercourses (< 6m width). The increased wet zones resulting from water level rises could result in a conversion from pine dominated to willow and alder dominated woodland in certain limited locations.

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

Population of the species as a viable component of the site

17.27. A sufficient reduction of suitable habitat within the SPAs could reduce the Scottish crossbill populations of the SPAs, however, given the limited amount of potential beaver woodland habitat within both of these SPAs, and the topography of the sites, any area affected by beaver activity will be very small (see paras 11.13, 11.16 and 11.17 for a further explanation of the potential beaver woodland found in Bog Woodland and Caledonian Forest SACs). As stated above, Scottish crossbills are known to be nomadic and move between SPAs, and also make use of habitats

outwith the SPAs. Losses of small areas of habitat within specific SPAs will not affect the population using a particular SPA when there are adequate cone crops in the wider region.

Distribution of the species within the site

17.28. Changes in woodland type within the SPAs may change the distribution of Scottish crossbills within the SPAs. However, as the areas that could be affected are small and are distributed along water courses that are spread across the SPAs, the distribution of Scottish crossbills within the SPAs will not be altered.

Distribution and extent of habitats supporting the species

17.29. Beaver activity may result in small areas of suitable habitat being lost within the SPAs. However, pine trees are known to grow in some wet habitats, e.g. bog woodland, within the Caledonian forest. Alteration of the woodlands to wetter types should not therefore result in complete loss of habitat for Scottish crossbill as the Scots pines are a key tree species in bog woodland. As noted in paragraphs 11.13 and 11.16 beaver also generally avoid felling pine trees, and other tree species form only a tiny component of bog woodland, therefore the extent of any loss of crossbill habitat will be very small.

Structure, function and supporting processes of habitats supporting the species:

17.30. There may be a small loss of potential habitat for pine regeneration due to increased wetness but, as stated above, pine trees will germinate and colonise some wetter habitats and produce cones that can be eaten by crossbills.

No significant disturbance of the species:

17.31. Any disturbance that might be considered significant is dealt with under the preceding conservation objectives. It is advised that there will be no significant disturbance to Scottish crossbill.

17.32. We advise that, due to the ecological characteristics of the qualifier and the scale, nature and degree of potential impacts by beavers, there will be no adverse effect on the integrity of the Ballochbuie and Cairngorms SPAs.

***Qualifying Interest* – Greylag goose (*Anser anser*) non-breeding**

***Qualifying Interest* – Pink footed goose (*Anser brachyrhynchus*) non-breeding**

***Qualifying Interest* – Whooper swan (*Cygnus cygnus*) non-breeding**

Firth of Tay & Eden Estuary SPA, Loch Leven SPA, Loch of Lintrathen SPA, Loch of Kinnordy SPA, and South Tayside Goose Roosts SPA

Qualifying interests initially advised with LSE (see Table 10);

- Greenland Barnacle goose (*Branta leucopsis*), non-breeding
- Greenland white-fronted goose (*Anser albifrons flavirostris*), non-breeding
- Greylag goose (*Anser anser*), non-breeding
- Light-bellied Brent goose (*Branta bernicla hrota*), passage
- Pink-footed goose (*Anser brachyrhynchus*), non-breeding
- Svalbard Barnacle goose (*Branta leucopsis*), non-breeding
- Taiga bean goose (*Anser fabalis fabalis*), non-breeding
- Whooper swan (*Cygnus cygnus*), non-breeding

17.33. In keeping with the simple, precautionary approach required in the check for LSE, all the above species were initially concluded to be likely to be significantly affected due to potential losses to their supporting habitats from flooding by beaver dams. However the list of qualifiers requiring detailed appraisal was reduced when the ZDA was used to help determine which SPAs required further appraisal. This is because some of the SPAs are far removed, temporally and spatially from any possible locations where beaver might build dams in the next fifteen years.

17.34. The SPAs that are within the ZDA, and the qualifying interests that may be affected in those SPAs are:

- **Firth of Tay & Eden Estuary –** Greylag goose and Pink footed goose
- **Loch Leven -** Pink footed goose & Whooper swan (non-breeding)
- **Loch of Lintrathen –** Greylag goose
- **Loch of Kinnordy –** Greylag goose and Pink footed Goose
- **South Tayside Goose Roosts –** Greylag goose, Pink footed goose

17.35. The Greylag geese which are qualifiers of SPAs tend to be in unfavourable condition because most of the Icelandic Greylags now winter to the north west of a line roughly from Bute to Aberdeen – mostly in Orkney & Caithness. The Pink-footed goose SPAs are in favourable condition because of the large increases in the Greenland / Iceland populations of these geese. Whooper swan populations in the UK are also increasing according to the International Surveys in 2010 and 2015.

17.36. Most of the Greylag, Pink-footed geese, and Whooper swans roosting on the inland SPAs are feeding on agricultural land, and importantly the availability of

feeding areas is not considered to be a limiting factor on their populations. A recent paper in 'Ambio'[38] states:

"*Continental scale spatial and temporal shifts among geese undergoing spring fattening confirm their flexibility to respond rapidly to broad scale changes in agriculture. These dramatic changes support the hypothesis that use of agricultural landscapes has contributed to elevated reproductive success and that European and North American farmland currently provides unrestricted winter carrying capacity for goose populations formerly limited by wetlands habitats prior to the agrarian revolution of the last century".*

17.37. **We advise that it can be ascertained that there is no adverse effect on site integrity of the SPAs listed in paragraph 17.34. This is due to the evidence that the availability of feeding areas is not a limiting factor in the populations of the qualifying geese, as well as the evidence for increasing Whooper swan populations in the UK. This evidence provides the basis for the advice that any minor, temporary reductions in extent of supporting habitat in the areas surrounding the five SPAs that may occur from flooding due to beavers will not have an AESI on them.**

18. Mammals

Qualifying interest – Otter (*Iutra Iutra)*

Conservation Objectives

18.1. To avoid deterioration of the habitats of the qualifying species 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 favourable 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

[38] Fox, A.D. & Abraham, K.F. Ambio (2017) 46 (Suppl 2): 188.

18.2. Within the ZDA there are 11 SACs with otter as a qualifying interest. Table 17 lists these and includes their summary condition as assessed in 2011/12.

Table 17: Otter SACs within the ZDA, and their summary condition

SAC name	Summary condition of otter in 2011/12
Ballochbuie	Favourable
Cairngorms	Unfavourable
Dunkeld-Blairgowrie Lochs	Favourable
Loch Lomond Woods	Favourable
Moine Mhor	Favourable
Rannoch Moor	Favourable
River Dee	Favourable
River Spey	Favourable
River Tay	Favourable
Taynish & Knapdale Woods	Favourable
Tayvallich Juniper and Coast	Favourable

18.3. Although one SAC was assessed as being in unfavourable declining condition, it is important to recognise that during the 2011/12 survey conditions were often poor and there were two associated harsh winters which could have resulted in localised short-term declines. Thus, there were uncertainties about how to interpret the lack of signs in some areas. This survey also introduced a more rigorous assessment of the sites when compared with the previous assessment of 2003/4.

18.4. Of these SACs, Tayvallich Juniper and Coast SAC has a substantial coastal component comprising high quality otter habitat where the vast majority of otter activity is focussed. The absence of a significant freshwater component at this site means that beavers will not be present, and any possible otter interactions with beaver will be rare. **This site is not considered due to this lack of interaction no AESI from beaver is advised. further in this assessment**.

18.5. Due to the low percentage of woodland cover in the catchment of the Rannoch Moor lochs (c. 2%), the harsh climate, and exposed nature of the moor, beavers are not expected to colonise the area. **Because the location is so unattractive to**

beavers there will be no interactions between them and otter: and this SAC is not considered further in this appraisal, as there will be no adverse effect on site integrity.

18.6. With respect to the remaining 10 sites, a likely significant effect due to beaver grazing activities and potential altering of water levels has been advised. However, 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 State Forest[39] 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 area 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.

18.7. Eurasian 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.

Population of the species as a viable component of the site(s)

18.8. Eurasian beavers and otters do not compete directly for resources. The otter is a predatory species, and the beaver is herbivorous. Otter and beaver territories will overlap. There are occasional records of otter predation on beaver.

18.9. Information from Europe indicates that the presence of beavers does not appear to be detrimental to otters, and indeed may be beneficial. This is supported by the findings of the monitoring undertaken during the Scottish Beaver Trial[40]. This is believed to be linked to the habitats that are created where beavers have been active, such as ponds, localised wetland areas etc., which are also good quality habitat for otters and otter prey.

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

[39] Klosterheden State Forest includes an SAC

[40] Harrington, L.A., Feber, R., Raynor, R. and Macdonald, D.W. 2015. The Scottish Beaver Trial: Ecological monitoring of the Eurasian beaver Castor fiber and other riparian mammals 2009-2014, final report. Scottish Natural Heritage Commissioned Report No. 685.

Distribution of the species within the site(s)

18.11. As described above, European information and the results of the Scottish Beaver Trial monitoring programme conclude that the presence of beavers 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. However, beaver dams may sometimes have adverse impacts on migratory fish species which are one of the many prey species for otter. There is potential, therefore, for consequent localised impacts on otters. An AESI cannot yet be ruled out.

Distribution and extent of habitats supporting the species, and Structure, function and supporting processes of habitats supporting the species

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

No significant disturbance of the species

18.13. Beavers will not significantly disturb otters, although there is anecdotal evidence from the Scottish Beaver Trial of an encounter between a beaver and an otter during which the latter was observed to retreat. However, the presence of people, and dogs etc., can result in disturbance to otters at certain levels and under certain scenarios. At Knapdale, the issue of visitor management has been closely linked to the Scottish Beaver Trial and is therefore relevant to this conservation objective at this site. Elsewhere, the dispersed nature of the beaver population in areas where there has been no proactive publicity concerning beavers shows that this is not considered to be an issue.

18.14. At Knapdale, visitor facilities have been developed at the site. These have been largely targeted at the provision of visitor information and interpretation within the existing FCS buildings at Barnluasgan and Barr an Daimh, where the majority of visitors are channelled through the use of signage and existing parking facilities. The aim has been to manage visitors at the existing information and interpretation 'honeypots' and utilising existing designated public footpaths, cycling tracks etc. within the SAC area, thereby avoiding large numbers of visitors moving into the more sensitive areas of the SAC.

18.15. The existing visitor management provisions combined with the experience of the beaver trial and the continued favourable conservation status of the Taynish & Knapdale SAC are considered sufficient to conclude that the site has not been adversely impacted and will not in the future under the existing scenario. If new visitor management facilities are proposed, a further assessment may be required.

18.16. **We advise that it can be ascertained that there is no adverse effect on site integrity if the proposal is undertaken in accordance with the following mitigation condition.**

18.17. Where beaver dams are constructed that impede the movement of migratory fish to such a degree that there might be an adverse effect on site integrity via impacts to otter, all appropriate mitigation measures to facilitate fish passage are put in place to avoid this.

19. Natura sites with LSE but outside the ZDA

19.1. Those sites originally identified as likely to be significantly affected by beavers, but are outside the ZDA have not been appraised in detail for the reasons set out in Section 9. However, they must be appropriately assessed by Scottish Government if the need to do so increases to a position where it is necessary to do so yet still precautionary – for example if it can be predicted that beavers will be present on a Natura site in the short to medium term.

19.2. Any changes to Natura sites outside the ZDA that occur as a result of beaver impacts would not be so great that they could not be managed through known and appropriate mitigation measures. At this point the mitigation measures that might be required to avoid an AESI for all Natura sites are known, understood and able to be implemented.

These include (see also Table 2):

- dam management measures
- use of flow control devices
- restricting beaver access to particularly sensitive areas (that might lead to an adverse effect on Natura site integrity), or
- trapping and removal of beavers from sub-catchments

19.3. **We advise that provided that Scottish Government is able to assure that such measures are implemented in such a way that they meet the requirements of the Habitats Regulations, no AESI can be concluded for those Natura sites with LSE but outside the ZDA.**

20. Advice of SNH to The Scottish Government as to whether it can be ascertained there is no adverse effect on Natura site integrity

20.1. The decision to be minded to allow beavers to remain in Scotland is the subject of this advice to inform an AA, and involves the appraisal of the impacts of Eurasian beaver upon other habitats and species. The types, scope, degree, durations, nature, and locations of these interactions are very complex: and any appraisal generally becomes less certain and meaningful as it examines those interactions which are temporally and spatially more distant from the existing beaver locations in Scotland.

20.2. In any HRA there must be certainty for the competent authority that a plan or project will have no adverse effect on the site integrity of any Natura site. This appraisal of the potential impacts has been carried out to differing levels of detail depending on the degree of spatial and temporal separation of the Natura sites from the existing beaver locations. This approach was adopted in part due to the decreasing value of conducting a detailed appraisal of Natura sites so far removed from the impacts of beavers for at least the next decade or more.

20.3. Firstly a detailed appraisal of the impacts of beavers on Natura sites in Scotland has been carried out on Natura sites that have been identified to have a LSE and which are at least partially within a ZDA surrounding the existing beaver locations in Knapdale and the Tayside river catchments. This zone extends a minimum of 10km beyond the boundaries of the Knapdale Beaver Trial area, and around the Tay, Earn, Lunan, Perth Coastal, and South Esk catchments as appropriate.

20.4. The ZDA is considered sufficiently precautionary given the work carried out by Newcastle University in their Commissioned Report 814 on beaver population modelling which shows a non-reinforced population in Knapdale being slow to expand, reaching just 5.4 km from their release point over 30 years from where they are presently found (and a reinforced population expanding not much further). Similarly, the Tayside population is thought by the report to most likely infill existing gaps in the Tayside rivers and not spread much further upstream/downstream, or into other catchments.

20.5. The ZDA includes all the Natura sites which according to the scientific data are likely to be significantly affected by beavers in the next thirty years. However, to increase the degree of precaution this appraisal should only be regarded as being appropriate for the next 15 years[41]. **There should be a commitment to conduct an updated HRA after ten to twelve years, or at the point any new release site or other reinforcement is considered (whichever comes first)**. This should

[41] This should ensure that if beavers spread more rapidly than the existing data shows, there will still be no AESI.

result in a new iteration of the HRA to take into account all relevant data acquired since the date of this HRA.

20.6. For those sites which are advised to be likely to be significantly affected, but which are beyond the ZDA, sufficient work was carried out at the LSE stage to ensure that the types of qualifying habitats and species which are likely to be significantly affected[42] along with their sensitivities, are known.

20.7. The potential impacts on qualifying habitats and species within the ZDA have been appraised in this document, and because the impacts from beavers will be of the same broad types, the mitigation identified to ensure no AESI on the more distant sites is the same, in general terms, as the mitigation identified for the sites within the ZDA. **A list of Natura sites and qualifying interests, and whether mitigation is required to avoid an AESI is provided in Annex G**. More detailed appraisal work regarding the more distant sites, at this point in time, is of very limited use. The competent authority should ensure that any necessary mitigation measures can and would be implemented, if it became necessary, for these more distant sites outside the ZDA.

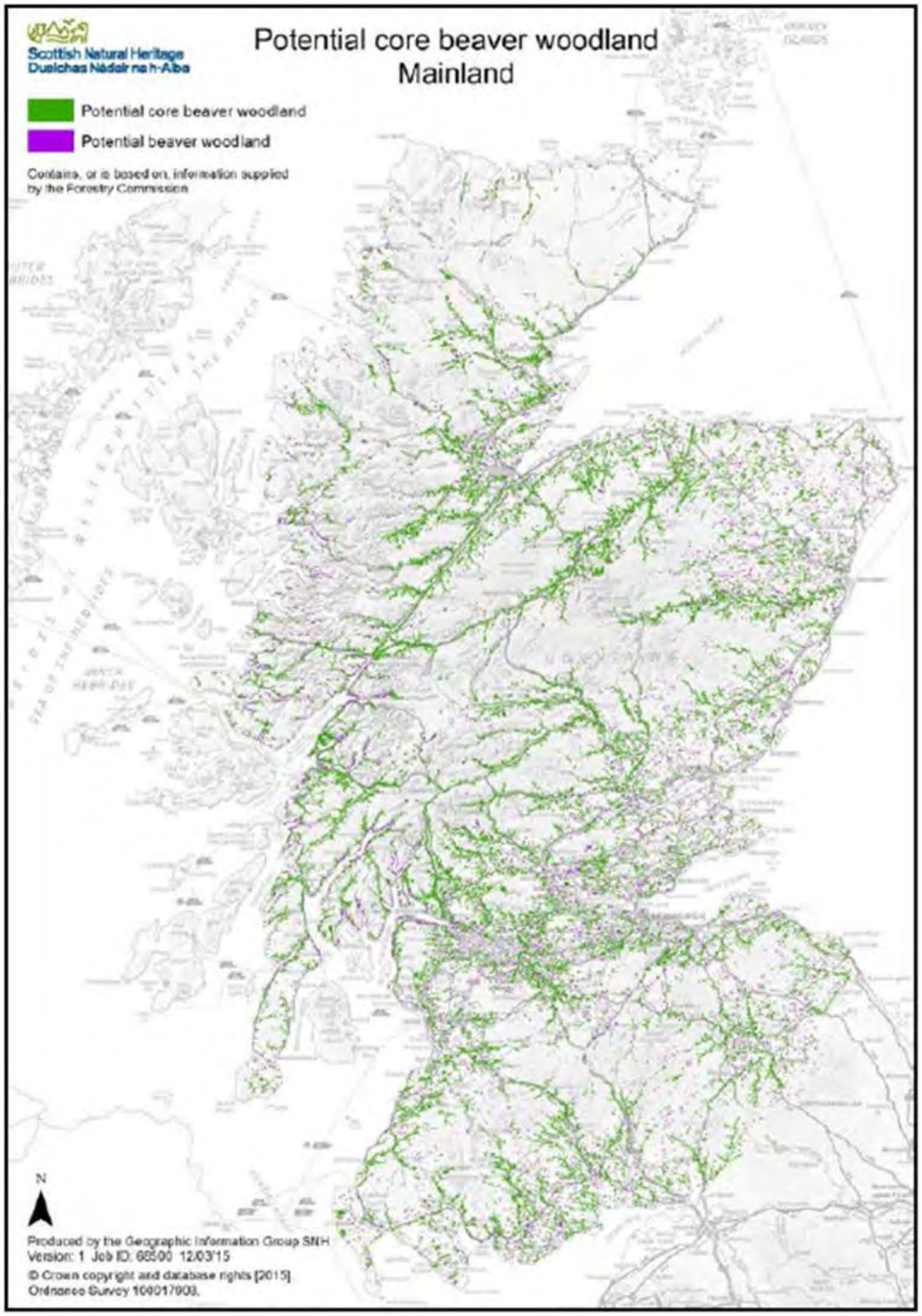
20.8. This high degree of concurrence between impacts and impacted qualifiers means we can advise that any and all necessary mitigation measures to avoid an AESI for all Natura sites are known: and are capable of ensuring no AESI. All necessary mitigation should be written into beaver management plans / strategies along with a commitment to implement it should it become necessary to avoid any adverse effect. This can be achieved by using a variety of conditions, restrictions, caveats, or management / mitigation plans etc. that are legally enforceable and are written in such a way to ensure there will be no adverse effects on the integrity of Natura sites.

20.9. There may be site-related issues that need further examination in the long term, but any later appraisal will be far better-informed once more is understood about Scottish beavers. In the meantime, if impacts to those sites were to occur then the types of mitigation measures that will be needed to avoid an AESI are understood and capable of being implemented should they be needed.

20.10. SNH provide this advice to the extent possible, based on the precision of the plan. SNH advise The Scottish Government that it can conclude there are no adverse effects on Natura site integrity provided mitigation measures as have been described above are implemented.

[42] sometime after approximately fifteen or more years,

Annex A; Potential beaver core woodland habitat, and potential beaver woodland habitat in mainland Scotland, (from Beavers in Scotland report, page 26).



Annex B: All Scottish Natura sites that overlap with the GIS beaver maps, showing 'core' and 'all' beaver habitat.

SITE TYPE:
SAC or SPA - currently designated sites only.

LOCATION:
This distinguishes between mainland or island site.

BEAVER WOODLAND HABITAT TYPE:
ALL = all woodland that is of potential use to beaver. As well as 'CORE' habitat this also includes small habitat fragments likely to be unable to support beaver territories, but which might be used on occasion by, for example, dispersing individuals etc.
CORE = woodland areas that are of sufficient size and / or quality that they could form part of a beaver territory.

WOODLAND AREA (HA):
The total wooded area of the Natura site ('CORE' or 'ALL' as applicable) that is considered potential habitat for beaver.

ISLAND WITHIN 6KM:
This column highlights those sites which are on isalnds that are 6km or less from the mainland (Y in this column), and those that were a further 6km from the first set of islands (N in the column).

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Abhainn Clais an Eas and Allt a' Mhuilinn	1.21	SAC	MAINLAND	ALL	0.13	
Altnaharra	69.25	SAC	MAINLAND	CORE	0.81	
Altnaharra	69.25	SAC	MAINLAND	ALL	0.81	
Amat Woods	234.89	SAC	MAINLAND	CORE	41.78	
Amat Woods	234.89	SAC	MAINLAND	ALL	41.78	
Ardgour Pinewoods	1645.96	SAC	MAINLAND	CORE	131.86	
Ardgour Pinewoods	1645.96	SAC	MAINLAND	ALL	131.89	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Ardnamurchan Burns	26.3	SAC	MAINLAND	CORE	0.76	
Ardnamurchan Burns	26.3	SAC	MAINLAND	ALL	0.76	
Ardvar and Loch a' Mhuilinn Woodlands	808.1	SAC	MAINLAND	CORE	51.45	
Ardvar and Loch a' Mhuilinn Woodlands	808.1	SAC	MAINLAND	ALL	64.61	
Ballochbuie	1882.72	SAC	MAINLAND	CORE	142.74	
Ballochbuie	1882.72	SAC	MAINLAND	ALL	143.71	
Barry Links	770.88	SAC	MAINLAND	CORE	29.79	
Barry Links	770.88	SAC	MAINLAND	ALL	31.23	
Beinn a' Ghlo	8080.39	SAC	MAINLAND	CORE	20.26	
Beinn a' Ghlo	8080.39	SAC	MAINLAND	ALL	24.13	
Beinn Dearg	13854.09	SAC	MAINLAND	CORE	1.98	
Beinn Dearg	13854.09	SAC	MAINLAND	ALL	2.77	
Ben Alder and Aonach Beag	6653.48	SAC	MAINLAND	CORE	1.33	
Ben Alder and Aonach Beag	6653.48	SAC	MAINLAND	ALL	3.53	
Ben Lawers	5032.66	SAC	MAINLAND	ALL	4.29	
Ben Nevis	9316.12	SAC	MAINLAND	CORE	60.94	
Ben Nevis	9316.12	SAC	MAINLAND	ALL	61.59	
Ben Wyvis	5386.77	SAC	MAINLAND	CORE	5.31	
Ben Wyvis	5386.77	SAC	MAINLAND	ALL	5.31	
Berriedale and Langwell Waters	58.75	SAC	MAINLAND	CORE	1.94	
Berriedale and Langwell Waters	58.75	SAC	MAINLAND	ALL	1.94	
Black Wood of Rannoch	1101.14	SAC	MAINLAND	CORE	90.39	
Black Wood of Rannoch	1101.14	SAC	MAINLAND	ALL	93.20	
Borders Woods	54.12	SAC	MAINLAND	CORE	26.70	
Borders Woods	54.12	SAC	MAINLAND	ALL	27.14	
Braehead Moss	122.8	SAC	MAINLAND	CORE	1.67	
Braehead Moss	122.8	SAC	MAINLAND	ALL	1.82	
Burrow Head	244.1	SAC	MAINLAND	ALL	1.20	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Cairngorms	57714.44	SAC	MAINLAND	CORE	1181.58	
Cairngorms	57714.44	SAC	MAINLAND	ALL	1255.04	
Caithness and Sutherland Peatlands	143568.71	SAC	MAINLAND	CORE	27.17	
Caithness and Sutherland Peatlands	143568.71	SAC	MAINLAND	ALL	34.48	
Carn nan Tri-tighearnan	4150.04	SAC	MAINLAND	CORE	13.46	
Carn nan Tri-tighearnan	4150.04	SAC	MAINLAND	ALL	13.46	
Carsegowan Moss	49.32	SAC	MAINLAND	CORE	8.78	
Carsegowan Moss	49.32	SAC	MAINLAND	ALL	8.78	
Cawdor Wood	161.68	SAC	MAINLAND	CORE	38.50	
Cawdor Wood	161.68	SAC	MAINLAND	ALL	40.73	
Claish Moss and Kentra Moss	1018.82	SAC	MAINLAND	CORE	0.07	
Claish Moss and Kentra Moss	1018.82	SAC	MAINLAND	ALL	0.07	
Clyde Valley Woods	432.89	SAC	MAINLAND	CORE	280.15	
Clyde Valley Woods	432.89	SAC	MAINLAND	ALL	280.50	
Coalburn Moss	224.51	SAC	MAINLAND	ALL	0.18	
Cockinhead Moss	47.6	SAC	MAINLAND	ALL	1.06	
Coille Mhor	310.84	SAC	MAINLAND	CORE	42.35	
Coille Mhor	310.84	SAC	MAINLAND	ALL	42.56	
Conon Islands	120.64	SAC	MAINLAND	CORE	48.10	
Conon Islands	120.64	SAC	MAINLAND	ALL	49.96	
Conon Islands	120.64	SAC	ISLAND	ALL	3.77	Y
Craighall Gorge	53.66	SAC	MAINLAND	CORE	30.15	
Craighall Gorge	53.66	SAC	MAINLAND	ALL	30.16	
Cranley Moss	101.55	SAC	MAINLAND	ALL	0.79	
Creag Meagaidh	6143.52	SAC	MAINLAND	CORE	16.41	
Creag Meagaidh	6143.52	SAC	MAINLAND	ALL	16.85	
Creag nan Gamhainn	15.66	SAC	MAINLAND	CORE	3.67	
Creag nan Gamhainn	15.66	SAC	MAINLAND	ALL	3.67	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Dam Wood	19.56	SAC	MAINLAND	CORE	2.29	
Dam Wood	19.56	SAC	MAINLAND	ALL	2.29	
Dinnet Oakwood	19.78	SAC	MAINLAND	CORE	0.05	
Dinnet Oakwood	19.78	SAC	MAINLAND	ALL	0.21	
Dornoch Firth and Morrich More	8706.8	SAC	MAINLAND	CORE	1.20	
Dornoch Firth and Morrich More	8706.8	SAC	MAINLAND	ALL	6.49	
Drumochter Hills	9443.6	SAC	MAINLAND	CORE	9.06	
Drumochter Hills	9443.6	SAC	MAINLAND	ALL	11.59	
Dunkeld - Blairgowrie Lochs	427.88	SAC	MAINLAND	CORE	77.23	
Dunkeld - Blairgowrie Lochs	427.88	SAC	MAINLAND	ALL	77.23	
Dykeneuk Moss	61.92	SAC	MAINLAND	CORE	2.87	
Dykeneuk Moss	61.92	SAC	MAINLAND	ALL	2.87	
Eilean na Muice Duibhe	568.86	SAC	ISLAND	CORE	7.81	N
Eilean na Muice Duibhe	568.86	SAC	ISLAND	ALL	7.81	N
Endrick Water	235.65	SAC	MAINLAND	CORE	50.06	
Endrick Water	235.65	SAC	MAINLAND	ALL	50.07	
Firth of Lorn	20999.35	SAC	ISLAND	CORE	0.00	Y
Firth of Lorn	20999.35	SAC	MAINLAND	ALL	0.00	
Firth of Lorn	20999.35	SAC	ISLAND	ALL	0.00	Y
Firth of Tay and Eden Estuary	15441.67	SAC	MAINLAND	CORE	1.08	
Firth of Tay and Eden Estuary	15441.67	SAC	MAINLAND	ALL	2.48	
Flanders Mosses	1073.33	SAC	MAINLAND	CORE	54.55	
Flanders Mosses	1073.33	SAC	MAINLAND	ALL	64.49	
Foinaven	14853.66	SAC	MAINLAND	CORE	12.61	
Foinaven	14853.66	SAC	MAINLAND	ALL	12.69	
Galloway Oakwoods	353.7	SAC	MAINLAND	CORE	121.37	
Galloway Oakwoods	353.7	SAC	MAINLAND	ALL	123.99	
Glen Beasdale	505.56	SAC	MAINLAND	CORE	47.86	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Glen Beasdale	505.56	SAC	MAINLAND	ALL	55.36	
Glen Coe	2967.37	SAC	MAINLAND	CORE	7.68	
Glen Coe	2967.37	SAC	MAINLAND	ALL	7.69	
Glen Creran Woods	705.91	SAC	MAINLAND	CORE	32.54	
Glen Creran Woods	705.91	SAC	MAINLAND	ALL	37.73	
Glen Tanar	4180.88	SAC	MAINLAND	CORE	230.86	
Glen Tanar	4180.88	SAC	MAINLAND	ALL	230.87	
Glenartney Juniper Wood	101.79	SAC	MAINLAND	CORE	6.68	
Glenartney Juniper Wood	101.79	SAC	MAINLAND	ALL	6.68	
Green Hill of Strathdon	640.91	SAC	MAINLAND	CORE	0.25	
Green Hill of Strathdon	640.91	SAC	MAINLAND	ALL	0.77	
Hill of Towanreef	1889.66	SAC	MAINLAND	ALL	0.17	
Inchnadamph	1283.21	SAC	MAINLAND	ALL	2.27	
Insh Marshes	1157.26	SAC	MAINLAND	CORE	92.48	
Insh Marshes	1157.26	SAC	MAINLAND	ALL	96.48	
Inverasdale Peatlands	1264.4	SAC	MAINLAND	CORE	0.35	
Inverasdale Peatlands	1264.4	SAC	MAINLAND	ALL	2.36	
Invernaver	288.14	SAC	MAINLAND	ALL	0.53	
Inverpolly	11881.94	SAC	MAINLAND	CORE	97.61	
Inverpolly	11881.94	SAC	MAINLAND	ALL	118.19	
Keltneyburn	32.04	SAC	MAINLAND	CORE	28.41	
Keltneyburn	32.04	SAC	MAINLAND	ALL	28.41	
Kinloch and Kyleakin Hills	5275.63	SAC	ISLAND	CORE	37.62	Y
Kinloch and Kyleakin Hills	5275.63	SAC	ISLAND	ALL	57.39	Y
Kinveachy Forest	2849.86	SAC	MAINLAND	CORE	155.11	
Kinveachy Forest	2849.86	SAC	MAINLAND	ALL	161.53	
Kippenrait Glen	62.42	SAC	MAINLAND	CORE	38.04	
Kippenrait Glen	62.42	SAC	MAINLAND	ALL	38.04	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Ladder Hills	4353.9	SAC	MAINLAND	ALL	1.49	
Ledmore Wood	93.37	SAC	MAINLAND	ALL	1.62	
Lendalfoot Hills Complex	1308.02	SAC	MAINLAND	CORE	0.81	
Lendalfoot Hills Complex	1308.02	SAC	MAINLAND	ALL	1.21	
Lismore Lochs	108.72	SAC	ISLAND	CORE	2.34	Y
Lismore Lochs	108.72	SAC	ISLAND	ALL	2.44	Y
Little Gruinard River	1174.23	SAC	MAINLAND	ALL	0.75	
Loch Achnacloich	20.64	SAC	MAINLAND	CORE	7.66	
Loch Achnacloich	20.64	SAC	MAINLAND	ALL	7.66	
Loch Etive Woods	2642.6	SAC	MAINLAND	CORE	331.63	
Loch Etive Woods	2642.6	SAC	MAINLAND	ALL	358.89	
Loch Lomond Woods	1450.01	SAC	MAINLAND	CORE	308.40	
Loch Lomond Woods	1450.01	SAC	MAINLAND	ALL	309.57	
Loch Maree Complex	15753.98	SAC	MAINLAND	CORE	340.45	
Loch Maree Complex	15753.98	SAC	MAINLAND	ALL	346.56	
Loch Moidart and Loch Shiel Woods	1761.64	SAC	MAINLAND	CORE	106.74	
Loch Moidart and Loch Shiel Woods	1761.64	SAC	MAINLAND	ALL	121.96	
Loch Ruthven	200.84	SAC	MAINLAND	CORE	15.64	
Loch Ruthven	200.84	SAC	MAINLAND	ALL	15.64	
Loch Ussie	102.76	SAC	MAINLAND	CORE	13.92	
Loch Ussie	102.76	SAC	MAINLAND	ALL	13.92	
Loch Watten	428.33	SAC	MAINLAND	ALL	1.96	
Lochs Duich, Long and Alsh Reefs	2375.29	SAC	MAINLAND	ALL	0.15	
Lochs Duich, Long and Alsh Reefs	2375.29	SAC	ISLAND	ALL	0.03	Y
Lower Findhorn Woods	177.14	SAC	MAINLAND	CORE	73.05	
Lower Findhorn Woods	177.14	SAC	MAINLAND	ALL	73.05	
Lower River Spey - Spey Bay	654.31	SAC	MAINLAND	CORE	96.47	
Lower River Spey - Spey Bay	654.31	SAC	ISLAND	CORE	0.15	Y

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Lower River Spey - Spey Bay	654.31	SAC	MAINLAND	ALL	100.24	
Lower River Spey - Spey Bay	654.31	SAC	ISLAND	ALL	0.15	Y
Merrick Kells	8730.25	SAC	MAINLAND	CORE	0.00	
Merrick Kells	8730.25	SAC	MAINLAND	ALL	0.00	
Methven Moss	83.85	SAC	MAINLAND	CORE	14.18	
Methven Moss	83.85	SAC	MAINLAND	ALL	14.18	
Mingarry Burn	4.22	SAC	ISLAND	ALL	0.05	Y
Mochrum Lochs	179.16	SAC	MAINLAND	CORE	1.09	
Mochrum Lochs	179.16	SAC	MAINLAND	ALL	1.09	
Moffat Hills	2881.72	SAC	MAINLAND	CORE	14.25	
Moffat Hills	2881.72	SAC	MAINLAND	ALL	14.26	
Moidach More	930.19	SAC	MAINLAND	CORE	0.09	
Moidach More	930.19	SAC	MAINLAND	ALL	2.55	
Moine Mhor	1149.02	SAC	MAINLAND	CORE	23.22	
Moine Mhor	1149.02	SAC	MAINLAND	ALL	28.43	
Monadh Mor	252.42	SAC	MAINLAND	CORE	12.08	
Monadh Mor	252.42	SAC	MAINLAND	ALL	14.74	
Monadhliath	10672.8	SAC	MAINLAND	CORE	0.51	
Monadhliath	10672.8	SAC	MAINLAND	ALL	0.51	
Moniack Gorge	32.66	SAC	MAINLAND	CORE	4.35	
Moniack Gorge	32.66	SAC	MAINLAND	ALL	4.35	
Moorfoot Hills	8558.14	SAC	MAINLAND	CORE	6.57	
Moorfoot Hills	8558.14	SAC	MAINLAND	ALL	7.23	
Morrone Birkwood	320.53	SAC	MAINLAND	CORE	10.05	
Morrone Birkwood	320.53	SAC	MAINLAND	ALL	10.09	
Morven and Mullachdubh	916.69	SAC	MAINLAND	CORE	14.53	
Morven and Mullachdubh	916.69	SAC	MAINLAND	ALL	15.00	
Morvern Woods	1924.86	SAC	MAINLAND	CORE	108.74	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Morvern Woods	1924.86	SAC	MAINLAND	ALL	133.50	
Mound Alderwoods	299.52	SAC	MAINLAND	CORE	131.06	
Mound Alderwoods	299.52	SAC	MAINLAND	ALL	131.07	
Muir of Dinnet	417.84	SAC	MAINLAND	CORE	43.84	
Muir of Dinnet	417.84	SAC	MAINLAND	ALL	48.08	
Mull Oakwoods	1405.46	SAC	ISLAND	CORE	82.93	Y
Mull Oakwoods	1405.46	SAC	ISLAND	ALL	91.36	Y
Ness Woods	841.38	SAC	MAINLAND	CORE	175.68	
Ness Woods	841.38	SAC	MAINLAND	ALL	175.69	
North Shotts Moss	53.79	SAC	MAINLAND	ALL	0.02	
Pitmaduthy Moss	121.4	SAC	MAINLAND	CORE	11.26	
Pitmaduthy Moss	121.4	SAC	MAINLAND	ALL	17.48	
Rannoch Moor	10113.96	SAC	MAINLAND	CORE	6.54	
Rannoch Moor	10113.96	SAC	MAINLAND	ALL	10.48	
Rassal	1018.89	SAC	MAINLAND	CORE	20.70	
Rassal	1018.89	SAC	MAINLAND	ALL	21.28	
Reidside Moss	87.15	SAC	MAINLAND	CORE	10.26	
Reidside Moss	87.15	SAC	MAINLAND	ALL	10.27	
Rhidorroch Woods	740.26	SAC	MAINLAND	CORE	40.18	
Rhidorroch Woods	740.26	SAC	MAINLAND	ALL	40.37	
Rigg - Bile	499.64	SAC	ISLAND	ALL	0.98	Y
River Bladnoch	290.51	SAC	MAINLAND	CORE	37.38	
River Bladnoch	290.51	SAC	ISLAND	CORE	0.00	Y
River Bladnoch	290.51	SAC	MAINLAND	ALL	40.22	
River Bladnoch	290.51	SAC	ISLAND	ALL	0.00	Y
River Borgie	33.98	SAC	MAINLAND	CORE	7.22	
River Borgie	33.98	SAC	MAINLAND	ALL	7.22	
River Dee	2430.1	SAC	MAINLAND	CORE	453.33	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
River Dee	2430.1	SAC	MAINLAND	ALL	454.84	
River Evelix	23.6	SAC	MAINLAND	CORE	12.54	
River Evelix	23.6	SAC	MAINLAND	ALL	12.54	
River Kerry	10.91	SAC	MAINLAND	CORE	4.01	
River Kerry	10.91	SAC	MAINLAND	ALL	4.01	
River Moidart	16.19	SAC	MAINLAND	CORE	8.29	
River Moidart	16.19	SAC	MAINLAND	ALL	8.29	
River Moriston	194.38	SAC	MAINLAND	CORE	35.55	
River Moriston	194.38	SAC	MAINLAND	ALL	35.55	
River Naver	1069.27	SAC	MAINLAND	CORE	8.41	
River Naver	1069.27	SAC	MAINLAND	ALL	9.11	
River Oykel	954.23	SAC	MAINLAND	CORE	13.22	
River Oykel	954.23	SAC	ISLAND	CORE	0.01	Y
River Oykel	954.23	SAC	MAINLAND	ALL	13.71	
River Oykel	954.23	SAC	ISLAND	ALL	0.17	Y
River South Esk	471.83	SAC	MAINLAND	CORE	120.08	
River South Esk	471.83	SAC	MAINLAND	ALL	120.44	
River Spey	5766.99	SAC	MAINLAND	CORE	984.64	
River Spey	5766.99	SAC	ISLAND	CORE	0.15	Y
River Spey	5766.99	SAC	MAINLAND	ALL	995.37	
River Spey	5766.99	SAC	ISLAND	ALL	0.15	Y
River Tay	9478.66	SAC	MAINLAND	CORE	596.85	
River Tay	9478.66	SAC	MAINLAND	ALL	608.33	
River Tay	9478.66	SAC	ISLAND	ALL	2.28	Y
River Teith	1311.95	SAC	MAINLAND	CORE	87.66	
River Teith	1311.95	SAC	MAINLAND	ALL	87.96	
River Teith	1311.95	SAC	ISLAND	ALL	0.18	Y
River Thurso	351.65	SAC	MAINLAND	ALL	0.10	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
River Tweed	3379.59	SAC	MAINLAND	CORE	466.53	
River Tweed	3379.59	SAC	MAINLAND	ALL	491.99	
Shingle Islands	77.89	SAC	MAINLAND	CORE	29.76	
Shingle Islands	77.89	SAC	MAINLAND	ALL	30.46	
Solway Firth	43652.9	SAC	MAINLAND	CORE	8.92	
Solway Firth	43652.9	SAC	MAINLAND	ALL	10.92	
Solway Mosses North	650.32	SAC	MAINLAND	CORE	39.86	
Solway Mosses North	650.32	SAC	MAINLAND	ALL	42.58	
Strath	1388.34	SAC	ISLAND	CORE	22.94	Y
Strath	1388.34	SAC	ISLAND	ALL	28.40	Y
Strathglass Complex	23591.92	SAC	MAINLAND	CORE	525.28	
Strathglass Complex	23591.92	SAC	MAINLAND	ALL	538.33	
Sunart	10246.65	SAC	MAINLAND	CORE	174.74	
Sunart	10246.65	SAC	MAINLAND	ALL	236.37	
Sunart	10246.65	SAC	ISLAND	ALL	0.65	Y
Tarbert Woods	1576.3	SAC	MAINLAND	CORE	77.56	
Tarbert Woods	1576.3	SAC	MAINLAND	ALL	98.04	
Taynish and Knapdale Woods	1017.96	SAC	MAINLAND	CORE	102.31	
Taynish and Knapdale Woods	1017.96	SAC	MAINLAND	ALL	108.79	
Tayvallich Juniper and Coast	1213.16	SAC	MAINLAND	CORE	4.85	
Tayvallich Juniper and Coast	1213.16	SAC	MAINLAND	ALL	16.24	
Threepwood Moss	53.18	SAC	MAINLAND	CORE	12.52	
Threepwood Moss	53.18	SAC	MAINLAND	ALL	12.52	
Trossachs Woods	377.5	SAC	MAINLAND	CORE	69.04	
Trossachs Woods	377.5	SAC	MAINLAND	ALL	69.05	
Tulach Hill and Glen Fender Meadows	1584.68	SAC	MAINLAND	CORE	28.29	
Tulach Hill and Glen Fender Meadows	1584.68	SAC	MAINLAND	ALL	28.30	
Turclossie Moss	62.17	SAC	MAINLAND	CORE	10.26	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Turclossie Moss	62.17	SAC	MAINLAND	ALL	10.27	
Tynron Juniper Wood	6.6	SAC	MAINLAND	ALL	0.00	
Upper Nithsdale Woods	99.62	SAC	MAINLAND	CORE	42.82	
Upper Nithsdale Woods	99.62	SAC	MAINLAND	ALL	42.82	
Urquhart Bay Wood	46.39	SAC	MAINLAND	CORE	31.80	
Urquhart Bay Wood	46.39	SAC	MAINLAND	ALL	31.80	
Waukenwae Moss	154.58	SAC	MAINLAND	CORE	2.11	
Waukenwae Moss	154.58	SAC	MAINLAND	ALL	2.11	
Whitlaw and Branxholme	41.3	SAC	MAINLAND	CORE	13.51	
Whitlaw and Branxholme	41.3	SAC	MAINLAND	ALL	15.66	
Abernethy Forest	5792.56	SPA	MAINLAND	CORE	454.09	
Abernethy Forest	5792.56	SPA	MAINLAND	ALL	493.27	
Assynt Lochs	1158.19	SPA	MAINLAND	CORE	9.15	
Assynt Lochs	1158.19	SPA	MAINLAND	ALL	10.60	
Ballochbuie	1882.42	SPA	MAINLAND	CORE	142.73	
Ballochbuie	1882.42	SPA	MAINLAND	ALL	143.70	
Bridgend Flats, Islay	332.08	SPA	ISLAND	CORE	0.09	N
Bridgend Flats, Islay	332.08	SPA	ISLAND	ALL	0.09	N
Cairngorms	50915.54	SPA	MAINLAND	CORE	720.37	
Cairngorms	50915.54	SPA	MAINLAND	ALL	754.42	
Caithness and Sutherland Peatlands	145313.31	SPA	MAINLAND	CORE	38.47	
Caithness and Sutherland Peatlands	145313.31	SPA	MAINLAND	ALL	47.30	
Caithness Lochs	1381.66	SPA	MAINLAND	CORE	4.20	
Caithness Lochs	1381.66	SPA	MAINLAND	ALL	6.99	
Cameron Reservoir	68.71	SPA	MAINLAND	ALL	3.13	
Castle Loch, Lochmaben	107.04	SPA	MAINLAND	CORE	14.08	
Castle Loch, Lochmaben	107.04	SPA	MAINLAND	ALL	14.08	
Craigmore Wood	654.94	SPA	MAINLAND	CORE	52.11	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Craigmore Wood	654.94	SPA	MAINLAND	ALL	52.12	
Cromarty Firth	3247.96	SPA	MAINLAND	CORE	1.00	
Cromarty Firth	3247.96	SPA	MAINLAND	ALL	1.30	
Cromarty Firth	3247.96	SPA	ISLAND	ALL	0.37	Y
Din Moss - Hoselaw Loch	50.58	SPA	MAINLAND	CORE	15.41	
Din Moss - Hoselaw Loch	50.58	SPA	MAINLAND	ALL	15.41	
Dornoch Firth and Loch Fleet	7856.54	SPA	MAINLAND	CORE	142.67	
Dornoch Firth and Loch Fleet	7856.54	SPA	MAINLAND	ALL	150.65	
Drumochter Hills	9431.89	SPA	MAINLAND	CORE	9.06	
Drumochter Hills	9431.89	SPA	MAINLAND	ALL	11.49	
Eilean na Muice Duibhe (Duich Moss), Islay	577.27	SPA	ISLAND	CORE	8.11	N
Eilean na Muice Duibhe (Duich Moss), Islay	577.27	SPA	ISLAND	ALL	8.11	N
Firth of Forth	6317.93	SPA	MAINLAND	CORE	0.07	
Firth of Forth	6317.93	SPA	MAINLAND	ALL	1.06	
Firth of Tay and Eden Estuary	6947.62	SPA	MAINLAND	CORE	1.08	
Firth of Tay and Eden Estuary	6947.62	SPA	MAINLAND	ALL	5.95	
Forest of Clunie	19347.7	SPA	MAINLAND	CORE	17.65	
Forest of Clunie	19347.7	SPA	MAINLAND	ALL	21.32	
Gladhouse Reservoir	186.58	SPA	MAINLAND	CORE	4.85	
Gladhouse Reservoir	186.58	SPA	MAINLAND	ALL	5.90	
Glen Tanar	4180.88	SPA	MAINLAND	CORE	230.86	
Glen Tanar	4180.88	SPA	MAINLAND	ALL	230.87	
Gruinart Flats, Islay	3262.13	SPA	ISLAND	CORE	4.73	N
Gruinart Flats, Islay	3262.13	SPA	ISLAND	ALL	12.00	N
Inner Clyde	1825.29	SPA	MAINLAND	CORE	0.13	
Inner Clyde	1825.29	SPA	MAINLAND	ALL	2.24	
Inner Moray Firth	2290.25	SPA	MAINLAND	CORE	3.05	
Inner Moray Firth	2290.25	SPA	MAINLAND	ALL	7.89	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Inner Moray Firth	2290.25	SPA	ISLAND	ALL	1.89	Y
Inverpolly, Loch Urigill and nearby Lochs	1937.05	SPA	MAINLAND	CORE	10.10	
Inverpolly, Loch Urigill and nearby Lochs	1937.05	SPA	MAINLAND	ALL	12.70	
Kinveachy Forest	2849.7	SPA	MAINLAND	CORE	155.14	
Kinveachy Forest	2849.7	SPA	MAINLAND	ALL	161.56	
Knapdale Lochs	112.39	SPA	MAINLAND	CORE	0.00	
Laggan, Islay	1229.62	SPA	ISLAND	ALL	0.00	N
Lairg and Strath Brora Lochs	286.56	SPA	MAINLAND	CORE	1.60	
Lairg and Strath Brora Lochs	286.56	SPA	MAINLAND	ALL	1.60	
Langholm - Newcastleton Hills	7543.81	SPA	MAINLAND	CORE	34.03	
Langholm - Newcastleton Hills	7543.81	SPA	MAINLAND	ALL	36.90	
Loch Ashie	162.55	SPA	MAINLAND	CORE	2.29	
Loch Ashie	162.55	SPA	MAINLAND	ALL	4.49	
Loch Eye	205.61	SPA	MAINLAND	CORE	18.94	
Loch Eye	205.61	SPA	MAINLAND	ALL	18.95	
Loch Ken and River Dee Marshes	767.97	SPA	MAINLAND	CORE	80.35	
Loch Ken and River Dee Marshes	767.97	SPA	MAINLAND	ALL	80.35	
Loch Knockie and nearby Lochs	396.4	SPA	MAINLAND	CORE	22.44	
Loch Knockie and nearby Lochs	396.4	SPA	MAINLAND	ALL	22.44	
Loch Leven	1611.29	SPA	MAINLAND	CORE	70.73	
Loch Leven	1611.29	SPA	MAINLAND	ALL	70.94	
Loch Lomond	509.65	SPA	MAINLAND	CORE	71.18	
Loch Lomond	509.65	SPA	MAINLAND	ALL	72.27	
Loch Maree	3182.01	SPA	MAINLAND	CORE	115.23	
Loch Maree	3182.01	SPA	MAINLAND	ALL	115.97	
Loch of Inch and Torrs Warren	2110.5	SPA	MAINLAND	CORE	50.70	
Loch of Inch and Torrs Warren	2110.5	SPA	MAINLAND	ALL	54.25	
Loch of Kinnordy	85.14	SPA	MAINLAND	CORE	20.75	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Loch of Kinnordy	85.14	SPA	MAINLAND	ALL	20.75	
Loch of Lintrathen	186.27	SPA	MAINLAND	CORE	3.46	
Loch of Lintrathen	186.27	SPA	MAINLAND	ALL	3.46	
Loch of Skene	121.76	SPA	MAINLAND	CORE	6.30	
Loch of Skene	121.76	SPA	MAINLAND	ALL	6.30	
Loch of Strathbeg	616.26	SPA	MAINLAND	CORE	12.72	
Loch of Strathbeg	616.26	SPA	MAINLAND	ALL	12.72	
Loch Ruthven	200.84	SPA	MAINLAND	CORE	15.64	
Loch Ruthven	200.84	SPA	MAINLAND	ALL	15.64	
Loch Shiel	2292.98	SPA	MAINLAND	CORE	71.73	
Loch Shiel	2292.98	SPA	MAINLAND	ALL	72.34	
Loch Spynie	90.05	SPA	MAINLAND	CORE	26.46	
Loch Spynie	90.05	SPA	MAINLAND	ALL	26.46	
Loch Vaa	44.83	SPA	MAINLAND	CORE	11.94	
Loch Vaa	44.83	SPA	MAINLAND	ALL	15.27	
Montrose Basin	981.19	SPA	MAINLAND	CORE	11.73	
Montrose Basin	981.19	SPA	MAINLAND	ALL	14.19	
Morangie Forest	3510.85	SPA	MAINLAND	CORE	91.06	
Morangie Forest	3510.85	SPA	MAINLAND	ALL	106.03	
Moray and Nairn Coast	2325.67	SPA	MAINLAND	CORE	85.78	
Moray and Nairn Coast	2325.67	SPA	ISLAND	CORE	0.39	Y
Moray and Nairn Coast	2325.67	SPA	MAINLAND	ALL	85.79	
Moray and Nairn Coast	2325.67	SPA	ISLAND	ALL	0.39	Y
Muir of Dinnet	157.73	SPA	MAINLAND	CORE	24.89	
Muir of Dinnet	157.73	SPA	MAINLAND	ALL	24.89	
North Inverness Lochs	123.18	SPA	MAINLAND	CORE	0.70	
North Inverness Lochs	123.18	SPA	MAINLAND	ALL	1.60	
Rannoch Lochs	1175.79	SPA	MAINLAND	CORE	3.20	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Rannoch Lochs	1175.79	SPA	MAINLAND	ALL	4.53	
Rinns of Islay	9434.15	SPA	ISLAND	CORE	4.75	N
Rinns of Islay	9434.15	SPA	ISLAND	ALL	16.84	N
River Spey - Insh Marshes	1157.26	SPA	MAINLAND	CORE	92.48	
River Spey - Insh Marshes	1157.26	SPA	MAINLAND	ALL	96.48	
South Tayside Goose Roosts	332.17	SPA	MAINLAND	CORE	25.48	
South Tayside Goose Roosts	332.17	SPA	MAINLAND	ALL	25.76	
St Abb's Head to Fast Castle	1736.75	SPA	MAINLAND	CORE	1.17	
St Abb's Head to Fast Castle	1736.75	SPA	MAINLAND	ALL	4.49	
Upper Solway Flats and Marshes	43654.09	SPA	MAINLAND	CORE	8.92	
Upper Solway Flats and Marshes	43654.09	SPA	MAINLAND	ALL	10.92	
Wester Ross Lochs	1989.82	SPA	MAINLAND	CORE	0.75	
Wester Ross Lochs	1989.82	SPA	MAINLAND	ALL	2.05	
Ythan Estuary, Sands of Forvie and Meikle Loch	1014.62	SPA	MAINLAND	CORE	0.00	
Ythan Estuary, Sands of Forvie and Meikle Loch	1014.62	SPA	MAINLAND	ALL	0.00	
Raeburn Flow	64.2	SAC	MAINLAND	ALL	1.22	
Red Moss of Netherley	93.17	SAC	MAINLAND	CORE	9.05	
Red Moss of Netherley	93.17	SAC	MAINLAND	ALL	10.54	
Cuillins	29503.25	SPA	ISLAND	CORE	38.56	Y
Cuillins	29503.25	SPA	ISLAND	ALL	5.03	N
Cuillins	29503.25	SPA	ISLAND	ALL	51.08	Y
Cnuic agus Cladach Mhuile	29258.54	SPA	ISLAND	CORE	109.82	Y
Cnuic agus Cladach Mhuile	29258.54	SPA	ISLAND	ALL	161.60	Y
Arran Moors	10801.78	SPA	ISLAND	CORE	94.22	Y
Arran Moors	10801.78	SPA	ISLAND	ALL	99.60	Y
Glen App and Galloway Moors	8948.65	SPA	MAINLAND	CORE	1.88	
Glen App and Galloway Moors	8948.65	SPA	MAINLAND	ALL	5.56	
Muirkirk and North Lowther Uplands	26345.76	SPA	MAINLAND	CORE	17.25	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Muirkirk and North Lowther Uplands	26345.76	SPA	MAINLAND	ALL	20.30	
Fannich Hills	9639.4	SAC	MAINLAND	CORE	0.00	
Fannich Hills	9639.4	SAC	MAINLAND	ALL	1.15	
Onich to North Ballachulish Woods	620.2	SAC	MAINLAND	CORE	10.42	
Onich to North Ballachulish Woods	620.2	SAC	MAINLAND	ALL	16.98	
Glen Shira	65.4	SAC	MAINLAND	CORE	6.63	
Glen Shira	65.4	SAC	MAINLAND	ALL	6.63	
Luce Bay and Sands	48753.15	SAC	MAINLAND	CORE	49.08	
Luce Bay and Sands	48753.15	SAC	MAINLAND	ALL	52.32	
Novar	1055.36	SPA	MAINLAND	CORE	43.59	
Novar	1055.36	SPA	MAINLAND	ALL	50.78	
Renfrewshire Heights	8947.55	SPA	MAINLAND	CORE	2.65	
Renfrewshire Heights	8947.55	SPA	MAINLAND	ALL	2.65	
Darnaway and Lethen Forest	1830.42	SPA	MAINLAND	CORE	63.24	
Darnaway and Lethen Forest	1830.42	SPA	MAINLAND	ALL	64.16	
Anagach Woods	393.06	SPA	MAINLAND	CORE	43.16	
Anagach Woods	393.06	SPA	MAINLAND	ALL	50.96	
Slamannan Plateau	592.99	SPA	MAINLAND	CORE	0.03	
Slamannan Plateau	592.99	SPA	MAINLAND	ALL	0.04	
West Inverness-shire Lochs	2967.52	SPA	MAINLAND	CORE	18.20	
West Inverness-shire Lochs	2967.52	SPA	MAINLAND	ALL	18.57	
Strath Carnaig and Strath Fleet Moors	14701.44	SPA	MAINLAND	CORE	118.17	
Strath Carnaig and Strath Fleet Moors	14701.44	SPA	MAINLAND	ALL	133.84	
The Oa	1931.04	SPA	ISLAND	ALL	2.02	N
Foinaven	21082.64	SPA	MAINLAND	CORE	29.87	
Foinaven	21082.64	SPA	MAINLAND	ALL	32.13	
Glen Etive and Glen Fyne	81372.9	SPA	MAINLAND	CORE	262.98	
Glen Etive and Glen Fyne	81372.9	SPA	MAINLAND	ALL	309.33	

NAME	SITE AREA (HA)	SITE TYPE	LOCATION	BEAVER WOODLAND HABITAT TYPE	WOODLAND AREA (HA)	ISLAND WITHIN 6KM
Jura, Scarba and the Garvellachs	34585.96	SPA	ISLAND	CORE	11.44	Y
Jura, Scarba and the Garvellachs	34585.96	SPA	ISLAND	ALL	0.61	N
Jura, Scarba and the Garvellachs	34585.96	SPA	ISLAND	ALL	33.75	Y
Moidart and Ardgour	41428.29	SPA	MAINLAND	CORE	298.84	
Moidart and Ardgour	41428.29	SPA	MAINLAND	ALL	329.74	
Upper Strathearn Oakwoods	154.82	SAC	MAINLAND	CORE	36.52	
Upper Strathearn Oakwoods	154.82	SAC	MAINLAND	ALL	37.01	
Glen Affric to Strathconon	50419.34	SPA	MAINLAND	CORE	580.21	
Glen Affric to Strathconon	50419.34	SPA	MAINLAND	ALL	602.10	
Cairngorms Massif	187500.95	SPA	MAINLAND	CORE	667.29	
Cairngorms Massif	187500.95	SPA	MAINLAND	ALL	712.42	

Annex C: All qualifying interests for Scottish Natura sites that overlap with the GIS layers showing predicted beaver habitat in Scotland.

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Abhainn Clais an Eas and Allt a' Mhuilinn	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Altnaharra	SAC	Very wet mires often identified by an unstable 'quaking' surface
Amat Woods	SAC	Caledonian forest
Ardgour Pinewoods	SAC	Alder woodland on floodplains
Ardgour Pinewoods	SAC	Caledonian forest
Ardnamurchan Burns	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Ardvar and Loch a' Mhuilinn Woodlands	SAC	Western acidic oak woodland
Ardvar and Loch a' Mhuilinn Woodlands	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Ardvar and Loch a' Mhuilinn Woodlands	SAC	Otter (Lutra lutra)
Ballochbuie	SAC	Bog woodland
Ballochbuie	SAC	Caledonian forest
Ballochbuie	SAC	Dry heaths
Ballochbuie	SAC	Wet heathland with cross-leaved heath
Ballochbuie	SAC	Plants in crevices on base-rich rocks
Ballochbuie	SAC	Plants in crevices on acid rocks
Ballochbuie	SAC	Blanket bog
Ballochbuie	SAC	Otter (Lutra lutra)
Barry Links	SAC	Coastal dune heathland
Barry Links	SAC	Shifting dunes
Barry Links	SAC	Dune grassland
Barry Links	SAC	Humid dune slacks
Barry Links	SAC	Shifting dunes with marram
Beinn a' Ghlo	SAC	Dry grasslands and scrublands on chalk or limestone
Beinn a' Ghlo	SAC	Species-rich grassland with mat-grass in upland areas

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Beinn a' Ghlo	SAC	Dry heaths
Beinn a' Ghlo	SAC	Plants in crevices on base-rich rocks
Beinn a' Ghlo	SAC	Plants in crevices on acid rocks
Beinn a' Ghlo	SAC	Acidic scree
Beinn a' Ghlo	SAC	Alpine and subalpine heaths
Beinn a' Ghlo	SAC	Montane acid grasslands
Beinn a' Ghlo	SAC	Base-rich fens
Beinn a' Ghlo	SAC	High-altitude plant communities associated with areas of water seepage
Beinn a' Ghlo	SAC	Hard-water springs depositing lime
Beinn a' Ghlo	SAC	Blanket bog
Beinn a' Ghlo	SAC	Round-mouthed whorl snail (Vertigo genesii)
Beinn a' Ghlo	SAC	Geyer's whorl snail (Vertigo geyeri)
Beinn Dearg	SAC	Caledonian forest
Beinn Dearg	SAC	Species-rich grassland with mat-grass in upland areas
Beinn Dearg	SAC	Dry heaths
Beinn Dearg	SAC	Wet heathland with cross-leaved heath
Beinn Dearg	SAC	Plants in crevices on base-rich rocks
Beinn Dearg	SAC	Tall herb communities
Beinn Dearg	SAC	Plants in crevices on acid rocks
Beinn Dearg	SAC	Acidic scree
Beinn Dearg	SAC	Alpine and subalpine heaths
Beinn Dearg	SAC	Alpine and subalpine calcareous grasslands
Beinn Dearg	SAC	Montane acid grasslands
Beinn Dearg	SAC	Mountain willow scrub
Beinn Dearg	SAC	High-altitude plant communities associated with areas of water seepage
Beinn Dearg	SAC	Blanket bog
Beinn Dearg	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Ben Alder and Aonach Beag	SAC	Dry heaths
Ben Alder and Aonach Beag	SAC	Wet heathland with cross-leaved heath
Ben Alder and Aonach Beag	SAC	Plants in crevices on base-rich rocks

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Ben Alder and Aonach Beag	SAC	Tall herb communities
Ben Alder and Aonach Beag	SAC	Plants in crevices on acid rocks
Ben Alder and Aonach Beag	SAC	Acidic scree
Ben Alder and Aonach Beag	SAC	Alpine and subalpine heaths
Ben Alder and Aonach Beag	SAC	Alpine and subalpine calcareous grasslands
Ben Alder and Aonach Beag	SAC	Montane acid grasslands
Ben Alder and Aonach Beag	SAC	Mountain willow scrub
Ben Alder and Aonach Beag	SAC	High-altitude plant communities associated with areas of water seepage
Ben Alder and Aonach Beag	SAC	Blanket bog
Ben Lawers	SAC	Species-rich grassland with mat-grass in upland areas
Ben Lawers	SAC	Dry heaths
Ben Lawers	SAC	Plants in crevices on base-rich rocks
Ben Lawers	SAC	Tall herb communities
Ben Lawers	SAC	Plants in crevices on acid rocks
Ben Lawers	SAC	Alpine and subalpine heaths
Ben Lawers	SAC	Alpine and subalpine calcareous grasslands
Ben Lawers	SAC	Montane acid grasslands
Ben Lawers	SAC	Mountain willow scrub
Ben Lawers	SAC	Base-rich fens
Ben Lawers	SAC	High-altitude plant communities associated with areas of water seepage
Ben Lawers	SAC	Blanket bog
Ben Lawers	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Ben Nevis	SAC	Western acidic oak woodland
Ben Nevis	SAC	Caledonian forest
Ben Nevis	SAC	Species-rich grassland with mat-grass in upland areas
Ben Nevis	SAC	Dry heaths
Ben Nevis	SAC	Wet heathland with cross-leaved heath
Ben Nevis	SAC	Base-rich scree
Ben Nevis	SAC	Plants in crevices on base-rich rocks
Ben Nevis	SAC	Tall herb communities

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Ben Nevis	SAC	Plants in crevices on acid rocks
Ben Nevis	SAC	Acidic scree
Ben Nevis	SAC	Alpine and subalpine heaths
Ben Nevis	SAC	Alpine and subalpine calcareous grasslands
Ben Nevis	SAC	Montane acid grasslands
Ben Nevis	SAC	Mountain willow scrub
Ben Nevis	SAC	High-altitude plant communities associated with areas of water seepage
Ben Nevis	SAC	Blanket bog
Ben Nevis	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Ben Wyvis	SAC	Dry heaths
Ben Wyvis	SAC	Tall herb communities
Ben Wyvis	SAC	Plants in crevices on acid rocks
Ben Wyvis	SAC	Acidic scree
Ben Wyvis	SAC	Alpine and subalpine heaths
Ben Wyvis	SAC	Montane acid grasslands
Ben Wyvis	SAC	Blanket bog
Ben Wyvis	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Berriedale and Langwell Waters	SAC	Atlantic salmon (Salmo salar)
Black Wood of Rannoch	SAC	Caledonian forest
Borders Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Braehead Moss	SAC	Active raised bog
Braehead Moss	SAC	Degraded raised bog
Burrow Head	SAC	Great crested newt (Triturus cristatus)
Cairngorms	SAC	Juniper on heaths or calcareous grasslands
Cairngorms	SAC	Bog woodland
Cairngorms	SAC	Caledonian forest
Cairngorms	SAC	Dry grasslands and scrublands on chalk or limestone
Cairngorms	SAC	Species-rich grassland with mat-grass in upland areas
Cairngorms	SAC	Dry heaths

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Cairngorms	SAC	Wet heathland with cross-leaved heath
Cairngorms	SAC	Plants in crevices on base-rich rocks
Cairngorms	SAC	Tall herb communities
Cairngorms	SAC	Plants in crevices on acid rocks
Cairngorms	SAC	Acidic scree
Cairngorms	SAC	Alpine and subalpine heaths
Cairngorms	SAC	Montane acid grasslands
Cairngorms	SAC	Mountain willow scrub
Cairngorms	SAC	High-altitude plant communities associated with areas of water seepage
Cairngorms	SAC	Hard-water springs depositing lime
Cairngorms	SAC	Very wet mires often identified by an unstable 'quaking' surface
Cairngorms	SAC	Blanket bog
Cairngorms	SAC	Acid peat-stained lakes and ponds
Cairngorms	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Cairngorms	SAC	Otter (Lutra lutra)
Cairngorms	SAC	Green shield-moss (Buxbaumia viridis)
Caithness and Sutherland Peatlands	SAC	Wet heathland with cross-leaved heath
Caithness and Sutherland Peatlands	SAC	Very wet mires often identified by an unstable 'quaking' surface
Caithness and Sutherland Peatlands	SAC	Blanket bog
Caithness and Sutherland Peatlands	SAC	Depressions on peat substrates
Caithness and Sutherland Peatlands	SAC	Acid peat-stained lakes and ponds
Caithness and Sutherland Peatlands	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Caithness and Sutherland Peatlands	SAC	Otter (Lutra lutra)
Caithness and Sutherland Peatlands	SAC	Marsh saxifrage (Saxifraga hirculus)
Carn nan Tri-tighearnan	SAC	Blanket bog
Carsegowan Moss	SAC	Active raised bog
Carsegowan Moss	SAC	Degraded raised bog
Cawdor Wood	SAC	Western acidic oak woodland
Claish Moss and Kentra Moss	SAC	Blanket bog

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Claish Moss and Kentra Moss	SAC	Depressions on peat substrates
Clyde Valley Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Coalburn Moss	SAC	Active raised bog
Coalburn Moss	SAC	Degraded raised bog
Cockinhead Moss	SAC	Active raised bog
Cockinhead Moss	SAC	Degraded raised bog
Coille Mhor	SAC	Western acidic oak woodland
Conon Islands	SAC	Alder woodland on floodplains
Craighall Gorge	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Cranley Moss	SAC	Active raised bog
Cranley Moss	SAC	Degraded raised bog
Creag Meagaidh	SAC	Dry heaths
Creag Meagaidh	SAC	Wet heathland with cross-leaved heath
Creag Meagaidh	SAC	Plants in crevices on base-rich rocks
Creag Meagaidh	SAC	Tall herb communities
Creag Meagaidh	SAC	Plants in crevices on acid rocks
Creag Meagaidh	SAC	Acidic scree
Creag Meagaidh	SAC	Alpine and subalpine heaths
Creag Meagaidh	SAC	Montane acid grasslands
Creag Meagaidh	SAC	Mountain willow scrub
Creag Meagaidh	SAC	Blanket bog
Creag Meagaidh	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Creag nan Gamhainn	SAC	Hard-water springs depositing lime
Dam Wood	SAC	Juniper on heaths or calcareous grasslands
Dam Wood	SAC	Base-rich fens
Dinnet Oakwood	SAC	Western acidic oak woodland
Dornoch Firth and Morrich More	SAC	Coastal dune heathland
Dornoch Firth and Morrich More	SAC	Dunes with juniper thickets
Dornoch Firth and Morrich More	SAC	Lime-deficient dune heathland with crowberry
Dornoch Firth and Morrich More	SAC	Shifting dunes

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Dornoch Firth and Morrich More	SAC	Dune grassland
Dornoch Firth and Morrich More	SAC	Humid dune slacks
Dornoch Firth and Morrich More	SAC	Shifting dunes with marram
Dornoch Firth and Morrich More	SAC	Glasswort and other annuals colonising mud and sand
Dornoch Firth and Morrich More	SAC	Atlantic salt meadows
Dornoch Firth and Morrich More	SAC	Estuaries
Dornoch Firth and Morrich More	SAC	Intertidal mudflats and sandflats
Dornoch Firth and Morrich More	SAC	Reefs
Dornoch Firth and Morrich More	SAC	Subtidal sandbanks
Dornoch Firth and Morrich More	SAC	Harbour seal (Phoca vitulina)
Dornoch Firth and Morrich More	SAC	Otter (Lutra lutra)
Drumochter Hills	SAC	Species-rich grassland with mat-grass in upland areas
Drumochter Hills	SAC	Dry heaths
Drumochter Hills	SAC	Wet heathland with cross-leaved heath
Drumochter Hills	SAC	Tall herb communities
Drumochter Hills	SAC	Plants in crevices on acid rocks
Drumochter Hills	SAC	Acidic scree
Drumochter Hills	SAC	Alpine and subalpine heaths
Drumochter Hills	SAC	Montane acid grasslands
Drumochter Hills	SAC	Mountain willow scrub
Drumochter Hills	SAC	Blanket bog
Dunkeld - Blairgowrie Lochs	SAC	Very wet mires often identified by an unstable 'quaking' surface
Dunkeld - Blairgowrie Lochs	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Dunkeld - Blairgowrie Lochs	SAC	Slender naiad (Najas flexilis)
Dunkeld - Blairgowrie Lochs	SAC	Otter (Lutra lutra)
Dykeneuk Moss	SAC	Active raised bog
Dykeneuk Moss	SAC	Degraded raised bog
Eilean na Muice Duibhe	SAC	Blanket bog
Eilean na Muice Duibhe	SAC	Depressions on peat substrates
Endrick Water	SAC	River lamprey (Lampetra fluviatilis)

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Endrick Water	SAC	Brook lamprey (Lampetra planeri)
Endrick Water	SAC	Atlantic salmon (Salmo salar)
Fannich Hills	SAC	Montane acid grasslands
Fannich Hills	SAC	Wet heathland with cross-leaved heath
Fannich Hills	SAC	Dry heaths
Fannich Hills	SAC	Alpine and subalpine heaths
Fannich Hills	SAC	Blanket bog
Fannich Hills	SAC	Acidic scree
Fannich Hills	SAC	Plants in crevices on acid rocks
Fannich Hills	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Firth of Lorn	SAC	Reefs
Firth of Tay and Eden Estuary	SAC	Estuaries
Firth of Tay and Eden Estuary	SAC	Intertidal mudflats and sandflats
Firth of Tay and Eden Estuary	SAC	Subtidal sandbanks
Firth of Tay and Eden Estuary	SAC	Harbour seal (Phoca vitulina)
Flanders Mosses	SAC	Active raised bog
Flanders Mosses	SAC	Degraded raised bog
Foinaven	SAC	Species-rich grassland with mat-grass in upland areas
Foinaven	SAC	Dry heaths
Foinaven	SAC	Wet heathland with cross-leaved heath
Foinaven	SAC	Plants in crevices on base-rich rocks
Foinaven	SAC	Tall herb communities
Foinaven	SAC	Plants in crevices on acid rocks
Foinaven	SAC	Acidic scree
Foinaven	SAC	Alpine and subalpine heaths
Foinaven	SAC	Montane acid grasslands
Foinaven	SAC	Blanket bog
Foinaven	SAC	Depressions on peat substrates
Foinaven	SAC	Acid peat-stained lakes and ponds
Foinaven	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate

Natura site	Designation (SAC / SPA)	Natura qualifying interest
		nutrient levels
Foinaven	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Foinaven	SAC	Otter (Lutra lutra)
Galloway Oakwoods	SAC	Western acidic oak woodland
Glen Beasdale	SAC	Western acidic oak woodland
Glen Beasdale	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Glen Beasdale	SAC	Otter (Lutra lutra)
Glen Coe	SAC	Species-rich grassland with mat-grass in upland areas
Glen Coe	SAC	Dry heaths
Glen Coe	SAC	Plants in crevices on base-rich rocks
Glen Coe	SAC	Tall herb communities
Glen Coe	SAC	Plants in crevices on acid rocks
Glen Coe	SAC	Acidic scree
Glen Coe	SAC	Alpine and subalpine heaths
Glen Coe	SAC	Alpine and subalpine calcareous grasslands
Glen Coe	SAC	Montane acid grasslands
Glen Coe	SAC	Mountain willow scrub
Glen Coe	SAC	Base-rich fens
Glen Coe	SAC	High-altitude plant communities associated with areas of water seepage
Glen Coe	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Glen Creran Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Glen Creran Woods	SAC	Western acidic oak woodland
Glen Shira	SAC	Western acidic oak woodland
Glen Creran Woods	SAC	Otter (Lutra lutra)
Glen Tanar	SAC	Caledonian forest
Glen Tanar	SAC	Dry heaths
Glen Tanar	SAC	Wet heathland with cross-leaved heath
Glen Tanar	SAC	Blanket bog
Glen Tanar	SAC	Otter (Lutra lutra)
Glenartney Juniper Wood	SAC	Juniper on heaths or calcareous grasslands

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Green Hill of Strathdon	SAC	Juniper on heaths or calcareous grasslands
Green Hill of Strathdon	SAC	Dry heaths
Green Hill of Strathdon	SAC	Grasslands on soils rich in heavy metals
Hill of Towanreef	SAC	Juniper on heaths or calcareous grasslands
Hill of Towanreef	SAC	Dry heaths
Hill of Towanreef	SAC	Grasslands on soils rich in heavy metals
Hill of Towanreef	SAC	Alpine and subalpine heaths
Hill of Towanreef	SAC	Blanket bog
Hill of Towanreef	SAC	Marsh saxifrage (Saxifraga hirculus)
Inchnadamph	SAC	Dry heaths
Inchnadamph	SAC	Base-rich scree
Inchnadamph	SAC	Plants in crevices on base-rich rocks
Inchnadamph	SAC	Limestone pavements
Inchnadamph	SAC	Alpine and subalpine calcareous grasslands
Inchnadamph	SAC	Mountain willow scrub
Inchnadamph	SAC	Base-rich fens
Inchnadamph	SAC	Hard-water springs depositing lime
Insh Marshes	SAC	Alder woodland on floodplains
Insh Marshes	SAC	Very wet mires often identified by an unstable 'quaking' surface
Insh Marshes	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Insh Marshes	SAC	Otter (Lutra lutra)
Inverasdale Peatlands	SAC	Blanket bog
Invernaver	SAC	Alpine and subalpine heaths
Invernaver	SAC	Alpine and subalpine calcareous grasslands
Invernaver	SAC	Base-rich fens
Invernaver	SAC	Coastal dune heathland
Invernaver	SAC	Dunes with juniper thickets
Invernaver	SAC	Dunes with creeping willow
Invernaver	SAC	Dune grassland
Invernaver	SAC	Shifting dunes with marram

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Inverpolly	SAC	Western acidic oak woodland
Inverpolly	SAC	Dry heaths
Inverpolly	SAC	Wet heathland with cross-leaved heath
Inverpolly	SAC	Plants in crevices on acid rocks
Inverpolly	SAC	Acidic scree
Inverpolly	SAC	Alpine and subalpine heaths
Inverpolly	SAC	Montane acid grasslands
Inverpolly	SAC	Very wet mires often identified by an unstable 'quaking' surface
Inverpolly	SAC	Blanket bog
Inverpolly	SAC	Depressions on peat substrates
Inverpolly	SAC	Acid peat-stained lakes and ponds
Inverpolly	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Inverpolly	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Inverpolly	SAC	Otter (Lutra lutra)
Keltneyburn	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Kinloch and Kyleakin Hills	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Kinloch and Kyleakin Hills	SAC	Western acidic oak woodland
Kinloch and Kyleakin Hills	SAC	Dry heaths
Kinloch and Kyleakin Hills	SAC	Wet heathland with cross-leaved heath
Kinloch and Kyleakin Hills	SAC	Alpine and subalpine heaths
Kinloch and Kyleakin Hills	SAC	Blanket bog
Kinloch and Kyleakin Hills	SAC	Otter (Lutra lutra)
Kinveachy Forest	SAC	Bog woodland
Kinveachy Forest	SAC	Caledonian forest
Kippenrait Glen	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Ladder Hills	SAC	Dry heaths
Ladder Hills	SAC	Alpine and subalpine heaths
Ladder Hills	SAC	Blanket bog
Ledmore Wood	SAC	Western acidic oak woodland
Lendalfoot Hills Complex	SAC	Species-rich grassland with mat-grass in upland areas

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Lendalfoot Hills Complex	SAC	Dry heaths
Lendalfoot Hills Complex	SAC	Wet heathland with cross-leaved heath
Lendalfoot Hills Complex	SAC	Grasslands on soils rich in heavy metals
Lendalfoot Hills Complex	SAC	Base-rich fens
Lendalfoot Hills Complex	SAC	Very wet mires often identified by an unstable 'quaking' surface
Lismore Lochs	SAC	Calcium-rich nutrient-poor lakes, lochs and pools
Little Gruinard River	SAC	Atlantic salmon (Salmo salar)
Loch Achnacloich	SAC	Naturally nutrient-rich lakes or lochs which are often dominated by pondweed
Loch Etive Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Loch Etive Woods	SAC	Alder woodland on floodplains
Loch Etive Woods	SAC	Western acidic oak woodland
Loch Etive Woods	SAC	Otter (Lutra lutra)
Loch Lomond Woods	SAC	Western acidic oak woodland
Loch Lomond Woods	SAC	Otter (Lutra lutra)
Loch Maree Complex	SAC	Alder woodland on floodplains
Loch Maree Complex	SAC	Western acidic oak woodland
Loch Maree Complex	SAC	Bog woodland
Loch Maree Complex	SAC	Caledonian forest
Loch Maree Complex	SAC	Dry heaths
Loch Maree Complex	SAC	Wet heathland with cross-leaved heath
Loch Maree Complex	SAC	Plants in crevices on base-rich rocks
Loch Maree Complex	SAC	Tall herb communities
Loch Maree Complex	SAC	Plants in crevices on acid rocks
Loch Maree Complex	SAC	Acidic scree
Loch Maree Complex	SAC	Alpine and subalpine heaths
Loch Maree Complex	SAC	Montane acid grasslands
Loch Maree Complex	SAC	Blanket bog
Loch Maree Complex	SAC	Depressions on peat substrates
Loch Maree Complex	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Loch Maree Complex	SAC	Otter (Lutra lutra)
Loch Moidart and Loch Shiel Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Loch Moidart and Loch Shiel Woods	SAC	Alder woodland on floodplains
Loch Moidart and Loch Shiel Woods	SAC	Western acidic oak woodland
Loch Moidart and Loch Shiel Woods	SAC	Intertidal mudflats and sandflats
Loch Moidart and Loch Shiel Woods	SAC	Otter (Lutra lutra)
Loch Ruthven	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Loch Ruthven	SAC	Otter (Lutra lutra)
Loch Ussie	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Loch Watten	SAC	Naturally nutrient-rich lakes or lochs which are often dominated by pondweed
Lochs Duich, Long and Alsh Reefs	SAC	Reefs
Lower Findhorn Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Lower River Spey - Spey Bay	SAC	Alder woodland on floodplains
Lower River Spey - Spey Bay	SAC	Coastal shingle vegetation outside the reach of waves
Luce Bay and Sands	SAC	Shifting dunes
Luce Bay and Sands	SAC	Shifting dunes with marram
Luce Bay and Sands	SAC	Dune grassland
Luce Bay and Sands	SAC	Coastal dune heathland
Luce Bay and Sands	SAC	Shallow inlets and bays
Luce Bay and Sands	SAC	Reefs
Luce Bay and Sands	SAC	Intertidal mudflats and sandflats
Luce Bay and Sands	SAC	Subtidal sandbanks
Luce Bay and Sands	SAC	Great crested newt (Triturus cristatus)
Merrick Kells	SAC	Dry heaths
Merrick Kells	SAC	Wet heathland with cross-leaved heath
Merrick Kells	SAC	Plants in crevices on acid rocks
Merrick Kells	SAC	Acidic scree
Merrick Kells	SAC	Montane acid grasslands

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Merrick Kells	SAC	Blanket bog
Merrick Kells	SAC	Depressions on peat substrates
Merrick Kells	SAC	Acid peat-stained lakes and ponds
Merrick Kells	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Merrick Kells	SAC	Otter (Lutra lutra)
Methven Moss	SAC	Active raised bog
Methven Moss	SAC	Degraded raised bog
Mingarry Burn	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Mochrum Lochs	SAC	Blanket bog
Mochrum Lochs	SAC	Depressions on peat substrates
Moffat Hills	SAC	Dry heaths
Moffat Hills	SAC	Plants in crevices on base-rich rocks
Moffat Hills	SAC	Tall herb communities
Moffat Hills	SAC	Plants in crevices on acid rocks
Moffat Hills	SAC	Acidic scree
Moffat Hills	SAC	Alpine and subalpine heaths
Moffat Hills	SAC	Montane acid grasslands
Moffat Hills	SAC	Blanket bog
Moidach More	SAC	Blanket bog
Moine Mhor	SAC	Western acidic oak woodland
Moine Mhor	SAC	Active raised bog
Moine Mhor	SAC	Degraded raised bog
Moine Mhor	SAC	Atlantic salt meadows
Moine Mhor	SAC	Intertidal mudflats and sandflats
Moine Mhor	SAC	Marsh fritillary butterfly (Euphydryas (Eurodryas, Hypodryas) aurinia)
Moine Mhor	SAC	Otter (Lutra lutra)
Monadh Mor	SAC	Bog woodland
Monadh Mor	SAC	Very wet mires often identified by an unstable 'quaking' surface
Monadhliath	SAC	Blanket bog
Moniack Gorge	SAC	Green shield-moss (Buxbaumia viridis)

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Moorfoot Hills	SAC	Dry heaths
Moorfoot Hills	SAC	Blanket bog
Morrone Birkwood	SAC	Juniper on heaths or calcareous grasslands
Morrone Birkwood	SAC	Dry grasslands and scrublands on chalk or limestone
Morrone Birkwood	SAC	Alpine and subalpine heaths
Morrone Birkwood	SAC	Base-rich fens
Morrone Birkwood	SAC	High-altitude plant communities associated with areas of water seepage
Morrone Birkwood	SAC	Hard-water springs depositing lime
Morrone Birkwood	SAC	Geyer's whorl snail (Vertigo geyeri)
Morven and Mullachdubh	SAC	Juniper on heaths or calcareous grasslands
Morvern Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Morvern Woods	SAC	Western acidic oak woodland
Morvern Woods	SAC	Otter (Lutra lutra)
Mound Alderwoods	SAC	Alder woodland on floodplains
Muir of Dinnet	SAC	Dry heaths
Muir of Dinnet	SAC	Very wet mires often identified by an unstable 'quaking' surface
Muir of Dinnet	SAC	Degraded raised bog
Muir of Dinnet	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Muir of Dinnet	SAC	Otter (Lutra lutra)
Mull Oakwoods	SAC	Western acidic oak woodland
Mull Oakwoods	SAC	Otter (Lutra lutra)
Ness Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Ness Woods	SAC	Western acidic oak woodland
Ness Woods	SAC	Otter (Lutra lutra)
North Shotts Moss	SAC	Active raised bog
Onich to North Ballachulish Woods	SAC	Western acidic oak woodland
Onich to North Ballachulish Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Onich to North Ballachulish Woods	SAC	Base-rich fens
North Shotts Moss	SAC	Degraded raised bog
Pitmaduthy Moss	SAC	Bog woodland

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Raeburn Flow	SAC	Active raised bog
Raeburn Flow	SAC	Degraded raised bog
Rannoch Moor	SAC	Dry heaths
Rannoch Moor	SAC	Wet heathland with cross-leaved heath
Rannoch Moor	SAC	Very wet mires often identified by an unstable 'quaking' surface
Rannoch Moor	SAC	Blanket bog
Rannoch Moor	SAC	Depressions on peat substrates
Rannoch Moor	SAC	Acid peat-stained lakes and ponds
Rannoch Moor	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Rannoch Moor	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
Rannoch Moor	SAC	Otter (Lutra lutra)
Rassal	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Rassal	SAC	Plants in crevices on base-rich rocks
Rassal	SAC	Limestone pavements
Rassal	SAC	Alpine and subalpine calcareous grasslands
Rassal	SAC	Mountain willow scrub
Rassal	SAC	Base-rich fens
Rassal	SAC	Hard-water springs depositing lime
Red Moss of Netherley	SAC	Active raised bog
Red Moss of Netherley	SAC	Degraded raised bog
Reidside Moss	SAC	Active raised bog
Reidside Moss	SAC	Degraded raised bog
Rhidorroch Woods	SAC	Caledonian forest
Rhidorroch Woods	SAC	Wet heathland with cross-leaved heath
Rigg - Bile	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Rigg - Bile	SAC	Vegetated sea cliffs
River Bladnoch	SAC	Atlantic salmon (Salmo salar)
River Borgie	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Borgie	SAC	Atlantic salmon (Salmo salar)
River Borgie	SAC	Otter (Lutra lutra)

Natura site	Designation (SAC / SPA)	Natura qualifying interest
River Dee	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Dee	SAC	Atlantic salmon (Salmo salar)
River Dee	SAC	Otter (Lutra lutra)
River Evelix	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Kerry	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Moidart	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Moriston	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Moriston	SAC	Atlantic salmon (Salmo salar)
River Naver	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Naver	SAC	Atlantic salmon (Salmo salar)
River Oykel	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Oykel	SAC	Atlantic salmon (Salmo salar)
River South Esk	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River South Esk	SAC	Atlantic salmon (Salmo salar)
River Spey	SAC	Freshwater pearl mussel (Margaritifera margaritifera)
River Spey	SAC	Sea lamprey (Petromyzon marinus)
River Spey	SAC	Atlantic salmon (Salmo salar)
River Spey	SAC	Otter (Lutra lutra)
River Tay	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
River Tay	SAC	River lamprey (Lampetra fluviatilis)
River Tay	SAC	Brook lamprey (Lampetra planeri)
River Tay	SAC	Sea lamprey (Petromyzon marinus)
River Tay	SAC	Atlantic salmon (Salmo salar)
River Tay	SAC	Otter (Lutra lutra)
River Teith	SAC	River lamprey (Lampetra fluviatilis)
River Teith	SAC	Brook lamprey (Lampetra planeri)
River Teith	SAC	Sea lamprey (Petromyzon marinus)
River Teith	SAC	Atlantic salmon (Salmo salar)
River Thurso	SAC	Atlantic salmon (Salmo salar)
River Tweed	SAC	Rivers with floating vegetation often dominated by water-crowfoot

Natura site	Designation (SAC / SPA)	Natura qualifying interest
River Tweed	SAC	River lamprey (Lampetra fluviatilis)
River Tweed	SAC	Brook lamprey (Lampetra planeri)
River Tweed	SAC	Sea lamprey (Petromyzon marinus)
River Tweed	SAC	Atlantic salmon (Salmo salar)
River Tweed	SAC	Otter (Lutra lutra)
Shingle Islands	SAC	Alder woodland on floodplains
Solway Firth	SAC	Dune grassland
Solway Firth	SAC	Coastal shingle vegetation outside the reach of waves
Solway Firth	SAC	Glasswort and other annuals colonising mud and sand
Solway Firth	SAC	Atlantic salt meadows
Solway Firth	SAC	Estuaries
Solway Firth	SAC	Intertidal mudflats and sandflats
Solway Firth	SAC	Reefs
Solway Firth	SAC	Subtidal sandbanks
Solway Firth	SAC	River lamprey (Lampetra fluviatilis)
Solway Firth	SAC	Sea lamprey (Petromyzon marinus)
Solway Mosses North	SAC	Active raised bog
Solway Mosses North	SAC	Degraded raised bog
Strath	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Strath	SAC	Wet heathland with cross-leaved heath
Strath	SAC	Plants in crevices on base-rich rocks
Strath	SAC	Limestone pavements
Strath	SAC	Alpine and subalpine calcareous grasslands
Strath	SAC	Base-rich fens
Strath	SAC	Hard-water springs depositing lime
Strath	SAC	Calcium-rich nutrient-poor lakes, lochs and pools
Strathglass Complex	SAC	Bog woodland
Strathglass Complex	SAC	Caledonian forest
Strathglass Complex	SAC	Dry heaths
Strathglass Complex	SAC	Wet heathland with cross-leaved heath
Strathglass Complex	SAC	Plants in crevices on base-rich rocks

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Strathglass Complex	SAC	Tall herb communities
Strathglass Complex	SAC	Plants in crevices on acid rocks
Strathglass Complex	SAC	Acidic scree
Strathglass Complex	SAC	Alpine and subalpine heaths
Strathglass Complex	SAC	Montane acid grasslands
Strathglass Complex	SAC	Mountain willow scrub
Strathglass Complex	SAC	Blanket bog
Strathglass Complex	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Strathglass Complex	SAC	Otter (Lutra lutra)
Sunart	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Sunart	SAC	Western acidic oak woodland
Sunart	SAC	Dry heaths
Sunart	SAC	Wet heathland with cross-leaved heath
Sunart	SAC	Reefs
Sunart	SAC	Otter (Lutra lutra)
Tarbert Woods	SAC	Western acidic oak woodland
Taynish and Knapdale Woods	SAC	Western acidic oak woodland
Taynish and Knapdale Woods	SAC	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Taynish and Knapdale Woods	SAC	Marsh fritillary butterfly (Euphydryas (Eurodryas, Hypodryas) aurinia)
Taynish and Knapdale Woods	SAC	Otter (Lutra lutra)
Tayvallich Juniper and Coast	SAC	Juniper on heaths or calcareous grasslands
Tayvallich Juniper and Coast	SAC	Marsh fritillary butterfly (Euphydryas (Eurodryas, Hypodryas) aurinia)
Tayvallich Juniper and Coast	SAC	Otter (Lutra lutra)
Threepwood Moss	SAC	Active raised bog
Threepwood Moss	SAC	Degraded raised bog
Trossachs Woods	SAC	Western acidic oak woodland
Tulach Hill and Glen Fender Meadows	SAC	Dry grasslands and scrublands on chalk or limestone
Tulach Hill and Glen Fender Meadows	SAC	Dry heaths
Tulach Hill and Glen Fender Meadows	SAC	Limestone pavements

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Tulach Hill and Glen Fender Meadows	SAC	Base-rich fens
Tulach Hill and Glen Fender Meadows	SAC	Round-mouthed whorl snail (Vertigo genesii)
Tulach Hill and Glen Fender Meadows	SAC	Geyer's whorl snail (Vertigo geyeri)
Turclossie Moss	SAC	Active raised bog
Turclossie Moss	SAC	Degraded raised bog
Tynron Juniper Wood	SAC	Juniper on heaths or calcareous grasslands
Upper Nithsdale Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes
Upper Strathearn Oakwoods	SAC	Western acidic oak woodland
Urquhart Bay Wood	SAC	Alder woodland on floodplains
Waukenwae Moss	SAC	Active raised bog
Waukenwae Moss	SAC	Degraded raised bog
Whitlaw and Branxholme	SAC	Base-rich fens
Whitlaw and Branxholme	SAC	Very wet mires often identified by an unstable 'quaking' surface
Whitlaw and Branxholme	SAC	Slender green feather-moss (Drepanocladus (Hamatocaulis) vernicosus)
Abernethy Forest	SPA	Capercaillie (Tetrao urogallus), breeding
Abernethy Forest	SPA	Osprey (Pandion haliaetus), breeding
Abernethy Forest	SPA	Scottish crossbill (Loxia scotica), breeding
Anagach Woods	SPA	Capercaillie (Tetrao urogallus), breeding
Arran Moors	SPA	Hen harrier (Circus cyaneus), breeding
Assynt Lochs	SPA	Black-throated diver (Gavia arctica), breeding
Ballochbuie	SPA	Capercaillie (Tetrao urogallus), breeding
Ballochbuie	SPA	Scottish crossbill (Loxia scotica), breeding
Bridgend Flats, Islay	SPA	Greenland Barnacle goose (Branta leucopsis), non-breeding
Cairngorms	SPA	Capercaillie (Tetrao urogallus), breeding
Cairngorms	SPA	Dotterel (Charadrius morinellus), breeding
Cairngorms	SPA	Golden eagle (Aquila chrysaetos), breeding
Cairngorms	SPA	Merlin (Falco columbarius), breeding
Cairngorms	SPA	Osprey (Pandion haliaetus), breeding
Cairngorms	SPA	Peregrine (Falco peregrinus), breeding
Cairngorms	SPA	Scottish crossbill (Loxia scotica), breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Cairngorms Massif	SPA	Golden eagle (Aquila chrysaetos), breeding
Caithness and Sutherland Peatlands	SPA	Black-throated diver (Gavia arctica), breeding
Caithness and Sutherland Peatlands	SPA	Common scoter (Melanitta nigra), breeding
Caithness and Sutherland Peatlands	SPA	Dunlin (Calidris alpina schinzii), breeding
Caithness and Sutherland Peatlands	SPA	Golden eagle (Aquila chrysaetos), breeding
Caithness and Sutherland Peatlands	SPA	Golden plover (Pluvialis apricaria), breeding
Caithness and Sutherland Peatlands	SPA	Greenshank (Tringa nebularia), breeding
Caithness and Sutherland Peatlands	SPA	Hen harrier (Circus cyaneus), breeding
Caithness and Sutherland Peatlands	SPA	Merlin (Falco columbarius), breeding
Caithness and Sutherland Peatlands	SPA	Red-throated diver (Gavia stellata), breeding
Caithness and Sutherland Peatlands	SPA	Short-eared owl (Asio flammeus), breeding
Caithness and Sutherland Peatlands	SPA	Wigeon (Anas penelope), breeding
Caithness and Sutherland Peatlands	SPA	Wood sandpiper (Tringa glareola), breeding
Caithness Lochs	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Caithness Lochs	SPA	Greylag goose (Anser anser), non-breeding
Caithness Lochs	SPA	Whooper swan (Cygnus cygnus), non-breeding
Cameron Reservoir	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Castle Loch, Lochmaben	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Cnuic agus Cladach Mhuile	SPA	Golden eagle (Aquila chrysaetos), breeding
Craigmore Wood	SPA	Capercaillie (Tetrao urogallus), breeding
Cromarty Firth	SPA	Waterfowl assemblage, non-breeding
Cromarty Firth	SPA	Common tern (Sterna hirundo), breeding
Cromarty Firth	SPA	Osprey (Pandion haliaetus), breeding
Cromarty Firth	SPA	Bar-tailed godwit (Limosa lapponica), non-breeding
Cromarty Firth	SPA	Curlew (Numenius arquata), non-breeding
Cromarty Firth	SPA	Dunlin (Calidris alpina alpina), non-breeding
Cromarty Firth	SPA	Greylag goose (Anser anser), non-breeding
Cromarty Firth	SPA	Knot (Calidris canutus), non-breeding
Cromarty Firth	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Cromarty Firth	SPA	Pintail (Anas acuta), non-breeding
Cromarty Firth	SPA	Red-breasted merganser (Mergus serrator), non-breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Cromarty Firth	SPA	Redshank (Tringa totanus), non-breeding
Cromarty Firth	SPA	Scaup (Aythya marila), non-breeding
Cromarty Firth	SPA	Whooper swan (Cygnus cygnus), non-breeding
Cromarty Firth	SPA	Wigeon (Anas penelope), non-breeding
Cuillins	SPA	Golden eagle (Aquila chrysaetos), breeding
Darnaway and Lethen Forest	SPA	Capercaillie (Tetrao urogallus), breeding
Din Moss - Hoselaw Loch	SPA	Greylag goose (Anser anser), non-breeding
Din Moss - Hoselaw Loch	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Dornoch Firth and Loch Fleet	SPA	Waterfowl assemblage, non-breeding
Dornoch Firth and Loch Fleet	SPA	Osprey (Pandion haliaetus), breeding
Dornoch Firth and Loch Fleet	SPA	Bar-tailed godwit (Limosa lapponica), non-breeding
Dornoch Firth and Loch Fleet	SPA	Curlew (Numenius arquata), non-breeding
Dornoch Firth and Loch Fleet	SPA	Dunlin (Calidris alpina alpina), non-breeding
Dornoch Firth and Loch Fleet	SPA	Greylag goose (Anser anser), non-breeding
Dornoch Firth and Loch Fleet	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Dornoch Firth and Loch Fleet	SPA	Teal (Anas crecca), non-breeding
Dornoch Firth and Loch Fleet	SPA	Wigeon (Anas penelope), non-breeding
Drumochter Hills	SPA	Dotterel (Charadrius morinellus), breeding
Drumochter Hills	SPA	Merlin (Falco columbarius), breeding
Eilean na Muice Duibhe (Duich Moss), Islay	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Firth of Forth	SPA	Waterfowl assemblage, non-breeding
Firth of Forth	SPA	Bar-tailed godwit (Limosa lapponica), non-breeding
Firth of Forth	SPA	Common scoter (Melanitta nigra), non-breeding
Firth of Forth	SPA	Cormorant (Phalacrocorax carbo), non-breeding
Firth of Forth	SPA	Curlew (Numenius arquata), non-breeding
Firth of Forth	SPA	Dunlin (Calidris alpina alpina), non-breeding
Firth of Forth	SPA	Eider (Somateria mollissima), non-breeding
Firth of Forth	SPA	Golden plover (Pluvialis apricaria), non-breeding
Firth of Forth	SPA	Goldeneye (Bucephala clangula), non-breeding
Firth of Forth	SPA	Great crested grebe (Podiceps cristatus), non-breeding
Firth of Forth	SPA	Grey plover (Pluvialis squatarola), non-breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Firth of Forth	SPA	Knot (Calidris canutus), non-breeding
Firth of Forth	SPA	Lapwing (Vanellus vanellus), non-breeding
Firth of Forth	SPA	Long-tailed duck (Clangula hyemalis), non-breeding
Firth of Forth	SPA	Mallard (Anas platyrhynchos), non-breeding
Firth of Forth	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Firth of Forth	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Firth of Forth	SPA	Red-breasted merganser (Mergus serrator), non-breeding
Firth of Forth	SPA	Redshank (Tringa totanus), non-breeding
Firth of Forth	SPA	Red-throated diver (Gavia stellata), non-breeding
Firth of Forth	SPA	Ringed plover (Charadrius hiaticula), non-breeding
Firth of Forth	SPA	Sandwich tern (Sterna sandvicensis), passage
Firth of Forth	SPA	Scaup (Aythya marila), non-breeding
Firth of Forth	SPA	Shelduck (Tadorna tadorna), non-breeding
Firth of Forth	SPA	Slavonian grebe (Podiceps auritus), non-breeding
Firth of Forth	SPA	Turnstone (Arenaria interpres), non-breeding
Firth of Forth	SPA	Velvet scoter (Melanitta fusca), non-breeding
Firth of Forth	SPA	Wigeon (Anas penelope), non-breeding
Firth of Tay and Eden Estuary	SPA	Waterfowl assemblage, non-breeding
Firth of Tay and Eden Estuary	SPA	Little tern (Sternula albifrons), breeding
Firth of Tay and Eden Estuary	SPA	Marsh harrier (Circus aeruginosus), breeding
Firth of Tay and Eden Estuary	SPA	Bar-tailed godwit (Limosa lapponica), non-breeding
Firth of Tay and Eden Estuary	SPA	Common scoter (Melanitta nigra), non-breeding
Firth of Tay and Eden Estuary	SPA	Cormorant (Phalacrocorax carbo), non-breeding
Firth of Tay and Eden Estuary	SPA	Dunlin (Calidris alpina alpina), non-breeding
Firth of Tay and Eden Estuary	SPA	Eider (Somateria mollissima), non-breeding
Firth of Tay and Eden Estuary	SPA	Goldeneye (Bucephala clangula), non-breeding
Firth of Tay and Eden Estuary	SPA	Goosander (Mergus merganser), non-breeding
Firth of Tay and Eden Estuary	SPA	Grey plover (Pluvialis squatarola), non-breeding
Firth of Tay and Eden Estuary	SPA	Greylag goose (Anser anser), non-breeding
Firth of Tay and Eden Estuary	SPA	Icelandic Black-tailed godwit (Limosa limosa islandica), non-breeding
Firth of Tay and Eden Estuary	SPA	Long-tailed duck (Clangula hyemalis), non-breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Firth of Tay and Eden Estuary	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Firth of Tay and Eden Estuary	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Firth of Tay and Eden Estuary	SPA	Red-breasted merganser (Mergus serrator), non-breeding
Firth of Tay and Eden Estuary	SPA	Redshank (Tringa totanus), non-breeding
Firth of Tay and Eden Estuary	SPA	Sanderling (Calidris alba), non-breeding
Firth of Tay and Eden Estuary	SPA	Shelduck (Tadorna tadorna), non-breeding
Firth of Tay and Eden Estuary	SPA	Velvet scoter (Melanitta fusca), non-breeding
Foinaven	SPA	Golden eagle (Aquila chrysaetos), breeding
Forest of Clunie	SPA	Hen harrier (Circus cyaneus), breeding
Forest of Clunie	SPA	Merlin (Falco columbarius), breeding
Forest of Clunie	SPA	Osprey (Pandion haliaetus), breeding
Forest of Clunie	SPA	Short-eared owl (Asio flammeus), breeding
Gladhouse Reservoir	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Glen Affric to Strathconon	SPA	Golden eagle (Aquila chrysaetos), breeding
Glen App and Galloway Moors	SPA	Hen harrier (Circus cyaneus), breeding
Glen Etive and Glen Fyne	SPA	Golden eagle (Aquila chrysaetos), breeding
Glen Tanar	SPA	Capercaillie (Tetrao urogallus), breeding
Glen Tanar	SPA	Hen harrier (Circus cyaneus), breeding
Glen Tanar	SPA	Osprey (Pandion haliaetus), breeding
Glen Tanar	SPA	Scottish crossbill (Loxia scotica), breeding
Gruinart Flats, Islay	SPA	Greenland Barnacle goose (Branta leucopsis), non-breeding
Gruinart Flats, Islay	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Gruinart Flats, Islay	SPA	Chough (Pyrrhocorax pyrrhocorax), breeding
Gruinart Flats, Islay	SPA	Chough (Pyrrhocorax pyrrhocorax), non-breeding
Gruinart Flats, Islay	SPA	Light-bellied Brent goose (Branta bernicla hrota), passage
Inner Clyde	SPA	Redshank (Tringa totanus), non-breeding
Inner Moray Firth	SPA	Waterfowl assemblage, non-breeding
Inner Moray Firth	SPA	Common tern (Sterna hirundo), breeding
Inner Moray Firth	SPA	Osprey (Pandion haliaetus), breeding
Inner Moray Firth	SPA	Bar-tailed godwit (Limosa lapponica), non-breeding
Inner Moray Firth	SPA	Cormorant (Phalacrocorax carbo), non-breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Inner Moray Firth	SPA	Curlew (Numenius arquata), non-breeding
Inner Moray Firth	SPA	Goldeneye (Bucephala clangula), non-breeding
Inner Moray Firth	SPA	Goosander (Mergus merganser), non-breeding
Inner Moray Firth	SPA	Greylag goose (Anser anser), non-breeding
Inner Moray Firth	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Inner Moray Firth	SPA	Red-breasted merganser (Mergus serrator), non-breeding
Inner Moray Firth	SPA	Redshank (Tringa totanus), non-breeding
Inner Moray Firth	SPA	Scaup (Aythya marila), non-breeding
Inner Moray Firth	SPA	Teal (Anas crecca), non-breeding
Inner Moray Firth	SPA	Wigeon (Anas penelope), non-breeding
Inverpolly, Loch Urigill and nearby Lochs	SPA	Black-throated diver (Gavia arctica), breeding
Jura, Scarba and the Garvellachs	SPA	Golden eagle (Aquila chrysaetos), breeding
Kinveachy Forest	SPA	Capercaillie (Tetrao urogallus), breeding
Kinveachy Forest	SPA	Scottish crossbill (Loxia scotica), breeding
Knapdale Lochs	SPA	Black-throated diver (gavia arctica)
Laggan, Islay	SPA	Greenland Barnacle goose (Branta leucopsis), non-breeding
Laggan, Islay	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Lairg and Strath Brora Lochs	SPA	Black-throated diver (Gavia arctica), breeding
Langholm - Newcastleton Hills	SPA	Hen harrier (Circus cyaneus), breeding
Loch Ashie	SPA	Slavonian grebe (Podiceps auritus), breeding
Loch Ashie	SPA	Slavonian grebe (Podiceps auritus), passage
Loch Eye	SPA	Greylag goose (Anser anser), non-breeding
Loch Eye	SPA	Whooper swan (Cygnus cygnus), non-breeding
Loch Ken and River Dee Marshes	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Loch Ken and River Dee Marshes	SPA	Greylag goose (Anser anser), non-breeding
Loch Knockie and nearby Lochs	SPA	Slavonian grebe (Podiceps auritus), breeding
Loch Leven	SPA	Waterfowl assemblage, non-breeding
Loch Leven	SPA	Cormorant (Phalacrocorax carbo), non-breeding
Loch Leven	SPA	Gadwall (Anas strepera), non-breeding
Loch Leven	SPA	Goldeneye (Bucephala clangula), non-breeding
Loch Leven	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Loch Leven	SPA	Pochard (Aythya ferina), non-breeding
Loch Leven	SPA	Shoveler (Anas clypeata), non-breeding
Loch Leven	SPA	Teal (Anas crecca), non-breeding
Loch Leven	SPA	Tufted duck (Aythya fuligula), non-breeding
Loch Leven	SPA	Whooper swan (Cygnus cygnus), non-breeding
Loch Lomond	SPA	Capercaillie (Tetrao urogallus), breeding
Loch Lomond	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Loch Maree	SPA	Black-throated diver (Gavia arctica), breeding
Loch of Inch and Torrs Warren	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Loch of Inch and Torrs Warren	SPA	Hen harrier (Circus cyaneus), non-breeding
Loch of Kinnordy	SPA	Greylag goose (Anser anser), non-breeding
Loch of Kinnordy	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Loch of Lintrathen	SPA	Greylag goose (Anser anser), non-breeding
Loch of Skene	SPA	Greylag goose (Anser anser), non-breeding
Loch of Strathbeg	SPA	Waterfowl assemblage, non-breeding
Loch of Strathbeg	SPA	Sandwich tern (Sterna sandvicensis), breeding
Loch of Strathbeg	SPA	Svalbard Barnacle goose (Branta leucopsis), non-breeding
Loch of Strathbeg	SPA	Greylag goose (Anser anser), non-breeding
Loch of Strathbeg	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Loch of Strathbeg	SPA	Teal (Anas crecca), non-breeding
Loch of Strathbeg	SPA	Whooper swan (Cygnus cygnus), non-breeding
Loch Ruthven	SPA	Slavonian grebe (Podiceps auritus), breeding
Loch Shiel	SPA	Black-throated diver (Gavia arctica), breeding
Loch Spynie	SPA	Greylag goose (Anser anser), non-breeding
Loch Vaa	SPA	Slavonian grebe (Podiceps auritus), breeding
Moidart and Ardgour	SPA	Golden eagle (Aquila chrysaetos), breeding
Montrose Basin	SPA	Waterfowl assemblage, non-breeding
Montrose Basin	SPA	Dunlin (Calidris alpina alpina), non-breeding
Montrose Basin	SPA	Eider (Somateria mollissima), non-breeding
Montrose Basin	SPA	Greylag goose (Anser anser), non-breeding
Montrose Basin	SPA	Knot (Calidris canutus), non-breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Montrose Basin	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Montrose Basin	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Montrose Basin	SPA	Redshank (Tringa totanus), non-breeding
Montrose Basin	SPA	Shelduck (Tadorna tadorna), non-breeding
Montrose Basin	SPA	Wigeon (Anas penelope), non-breeding
Morangie Forest	SPA	Capercaillie (Tetrao urogallus), breeding
Moray and Nairn Coast	SPA	Waterfowl assemblage, non-breeding
Moray and Nairn Coast	SPA	Osprey (Pandion haliaetus), breeding
Moray and Nairn Coast	SPA	Bar-tailed godwit (Limosa lapponica), non-breeding
Moray and Nairn Coast	SPA	Common scoter (Melanitta nigra), non-breeding
Moray and Nairn Coast	SPA	Dunlin (Calidris alpina alpina), non-breeding
Moray and Nairn Coast	SPA	Greylag goose (Anser anser), non-breeding
Moray and Nairn Coast	SPA	Long-tailed duck (Clangula hyemalis), non-breeding
Moray and Nairn Coast	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Moray and Nairn Coast	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Moray and Nairn Coast	SPA	Red-breasted merganser (Mergus serrator), non-breeding
Moray and Nairn Coast	SPA	Redshank (Tringa totanus), non-breeding
Moray and Nairn Coast	SPA	Velvet scoter (Melanitta fusca), non-breeding
Moray and Nairn Coast	SPA	Wigeon (Anas penelope), non-breeding
Muirkirk and North Lowther Uplands	SPA	Hen harrier (Circus cyaneus), breeding
Muirkirk and North Lowther Uplands	SPA	Short-eared owl (Asio flammeus), breeding
Muirkirk and North Lowther Uplands	SPA	Merlin (Falco columbarius), breeding
Muirkirk and North Lowther Uplands	SPA	Peregrine (Falco peregrinus), breeding
Muirkirk and North Lowther Uplands	SPA	Golden plover (Pluvialis apricaria), breeding
Muirkirk and North Lowther Uplands	SPA	Hen harrier (Circus cyaneus), non-breeding
Muir of Dinnet	SPA	Waterfowl assemblage, non-breeding
Muir of Dinnet	SPA	Greylag goose (Anser anser), non-breeding
North Inverness Lochs	SPA	Slavonian grebe (Podiceps auritus), breeding
Novar	SPA	Capercaillie (Tetrao urogallus), breeding
Rannoch Lochs	SPA	Black-throated diver (Gavia arctica), breeding
Renfrewshire Heights	SPA	Hen harrier (Circus cyaneus), breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Rinns of Islay	SPA	Chough (Pyrrhocorax pyrrhocorax), breeding
Rinns of Islay	SPA	Common scoter (Melanitta nigra), breeding
Rinns of Islay	SPA	Corncrake (Crex crex), breeding
Rinns of Islay	SPA	Hen harrier (Circus cyaneus), breeding
Rinns of Islay	SPA	Chough (Pyrrhocorax pyrrhocorax), non-breeding
Rinns of Islay	SPA	Greenland white-fronted goose (Anser albifrons flavirostris), non-breeding
Rinns of Islay	SPA	Whooper swan (Cygnus cygnus), passage
River Spey - Insh Marshes	SPA	Osprey (Pandion haliaetus), breeding
River Spey - Insh Marshes	SPA	Spotted crake (Porzana porzana), breeding
River Spey - Insh Marshes	SPA	Wigeon (Anas penelope), breeding
River Spey - Insh Marshes	SPA	Wood sandpiper (Tringa glareola), breeding
River Spey - Insh Marshes	SPA	Hen harrier (Circus cyaneus), non-breeding
River Spey - Insh Marshes	SPA	Whooper swan (Cygnus cygnus), non-breeding
Slamannan Plateau	SPA	Taiga bean goose (Anser fabalis fabalis), non-breeding
South Tayside Goose Roosts	SPA	Waterfowl assemblage, non-breeding
South Tayside Goose Roosts	SPA	Greylag goose (Anser anser), non-breeding
South Tayside Goose Roosts	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
St Abb's Head to Fast Castle	SPA	Seabird assemblage, breeding
St Abb's Head to Fast Castle	SPA	Guillemot (Uria aalge), breeding
St Abb's Head to Fast Castle	SPA	Herring gull (Larus argentatus), breeding
St Abb's Head to Fast Castle	SPA	Kittiwake (Rissa tridactyla), breeding
St Abb's Head to Fast Castle	SPA	Razorbill (Alca torda), breeding
St Abb's Head to Fast Castle	SPA	Shag (Phalacrocorax aristotelis), breeding
The Oa	SPA	Chough (Pyrrhocorax pyrrhocorax), breeding
Strath Carnaig and Strath Fleet Moors	SPA	Hen harrier (Circus cyaneus), breeding
Upper Solway Flats and Marshes	SPA	Waterfowl assemblage, non-breeding
Upper Solway Flats and Marshes	SPA	Svalbard Barnacle goose (Branta leucopsis), non-breeding
Upper Solway Flats and Marshes	SPA	Bar-tailed godwit (Limosa lapponica), non-breeding
Upper Solway Flats and Marshes	SPA	Cormorant (Phalacrocorax carbo), non-breeding
Upper Solway Flats and Marshes	SPA	Curlew (Numenius arquata), non-breeding
Upper Solway Flats and Marshes	SPA	Dunlin (Calidris alpina alpina), non-breeding

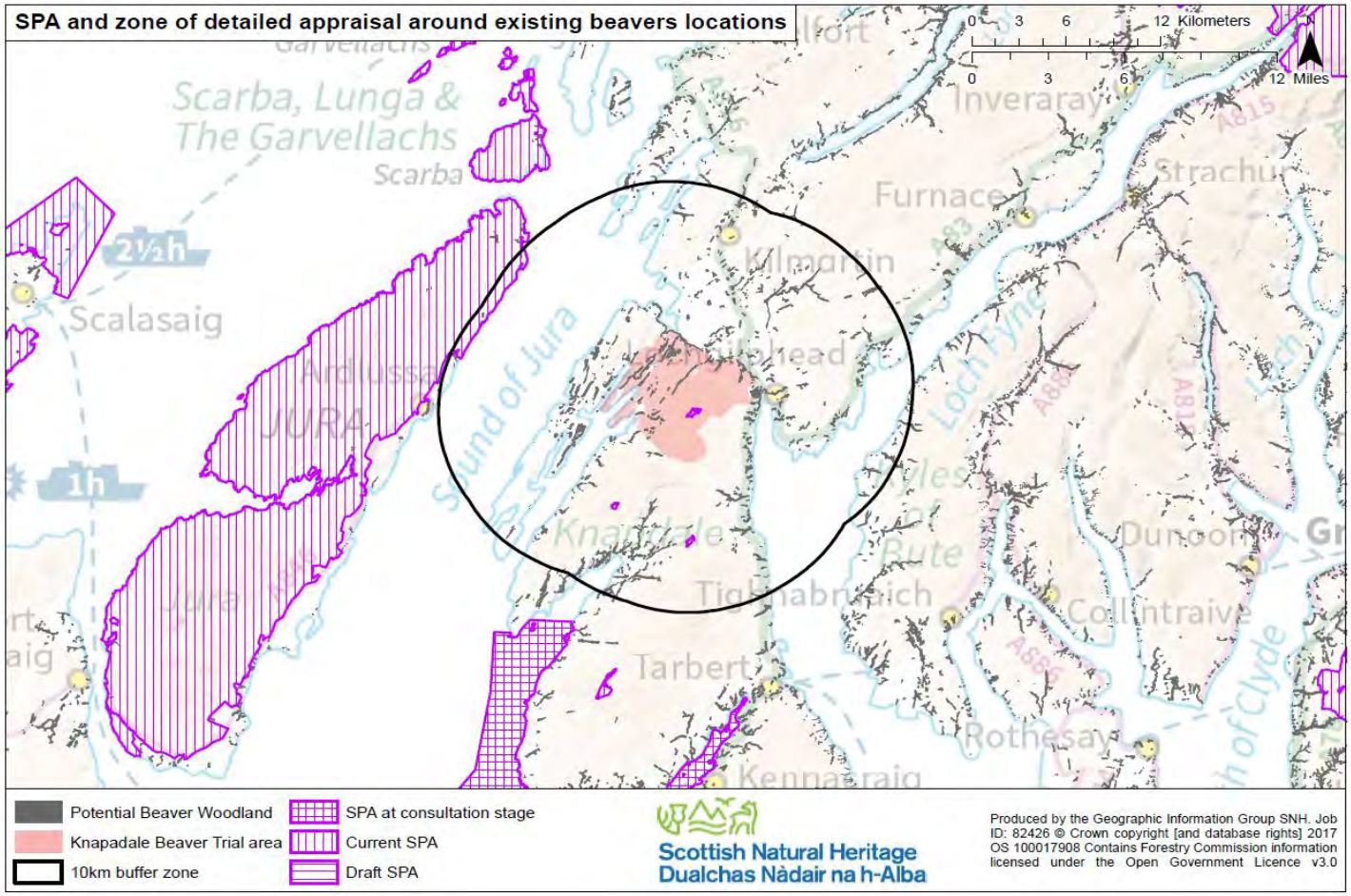
Natura site	Designation (SAC / SPA)	Natura qualifying interest
Upper Solway Flats and Marshes	SPA	Golden plover (Pluvialis apricaria), non-breeding
Upper Solway Flats and Marshes	SPA	Goldeneye (Bucephala clangula), non-breeding
Upper Solway Flats and Marshes	SPA	Great crested grebe (Podiceps cristatus), non-breeding
Upper Solway Flats and Marshes	SPA	Grey plover (Pluvialis squatarola), non-breeding
Upper Solway Flats and Marshes	SPA	Knot (Calidris canutus), non-breeding
Upper Solway Flats and Marshes	SPA	Lapwing (Vanellus vanellus), non-breeding
Upper Solway Flats and Marshes	SPA	Mallard (Anas platyrhynchos), non-breeding
Upper Solway Flats and Marshes	SPA	Oystercatcher (Haematopus ostralegus), non-breeding
Upper Solway Flats and Marshes	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding
Upper Solway Flats and Marshes	SPA	Pintail (Anas acuta), non-breeding
Upper Solway Flats and Marshes	SPA	Redshank (Tringa totanus), non-breeding
Upper Solway Flats and Marshes	SPA	Ringed plover (Charadrius hiaticula), non-breeding
Upper Solway Flats and Marshes	SPA	Scaup (Aythya marila), non-breeding
Upper Solway Flats and Marshes	SPA	Shelduck (Tadorna tadorna), non-breeding
Upper Solway Flats and Marshes	SPA	Whooper swan (Cygnus cygnus), non-breeding
Upper Solway Flats and Marshes	SPA	Ringed plover (Charadrius hiaticula), passage
Wester Ross Lochs	SPA	Black-throated diver (Gavia arctica), breeding
West Inverness-shire Lochs	SPA	Black-throated diver (Gavia arctica), breeding
West Inverness-shire Lochs	SPA	Common scoter (Melanitta nigra), breeding
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	Waterfowl assemblage, non-breeding
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	Common tern (Sterna hirundo), breeding
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	Little tern (Sternula albifrons), breeding
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	Sandwich tern (Sterna sandvicensis), breeding
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	Eider (Somateria mollissima), non-breeding
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	Lapwing (Vanellus vanellus), non-breeding
Ythan Estuary, Sands of Forvie and Meikle	SPA	Pink-footed goose (Anser brachyrhynchus), non-breeding

Natura site	Designation (SAC / SPA)	Natura qualifying interest
Loch		
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	Redshank (Tringa totanus), non-breeding

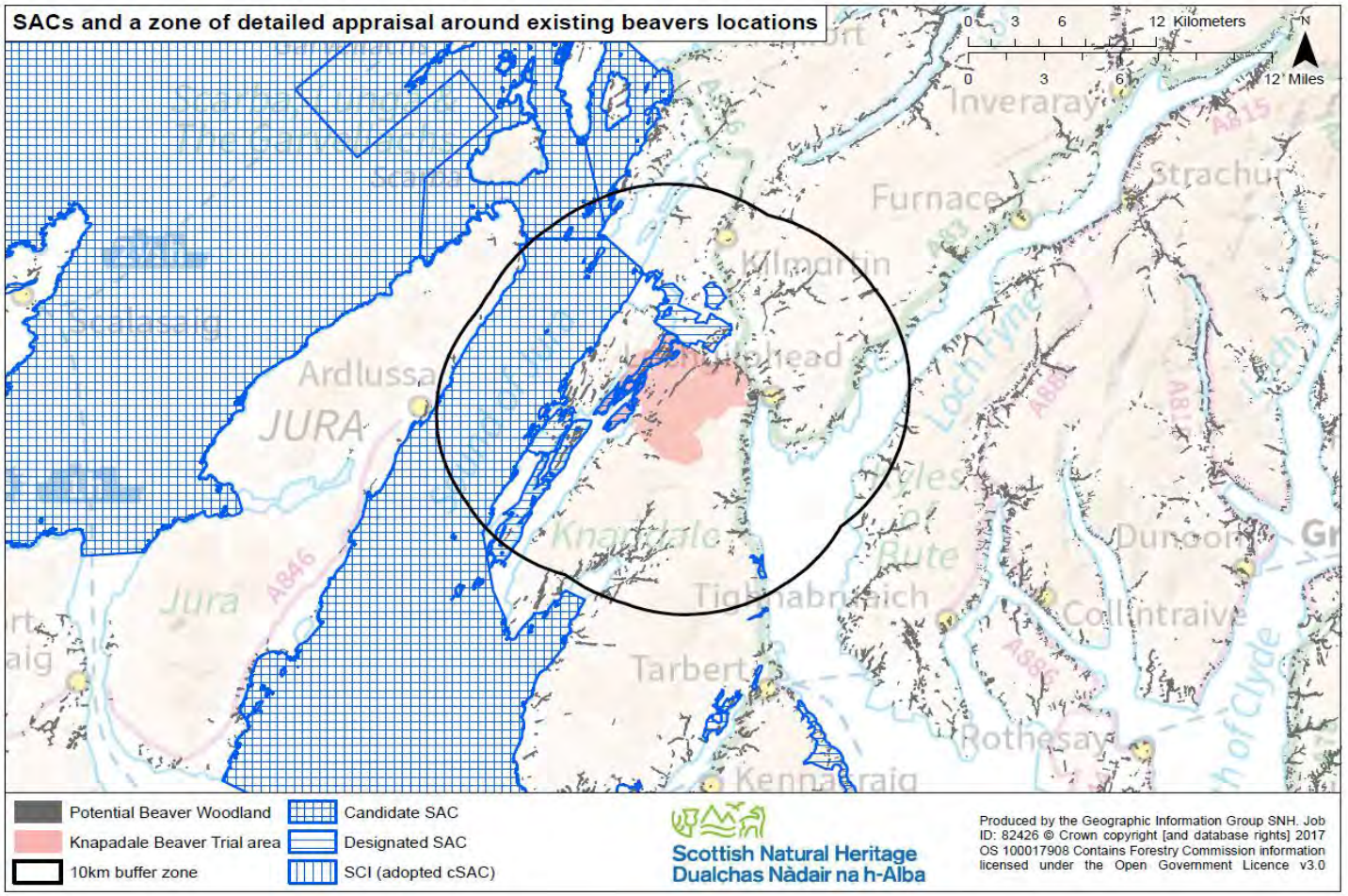
Annex D: Maps showing the zones of detailed appraisal (ZDA).

In the keys to these maps 'Potential Beaver Woodland' is an amalgam of the GIS layers: 'Beaver Core Habitat' and 'Beaver Habitat'. This new layer has combined several habitat sub-divisions for ease of viewing at these scales

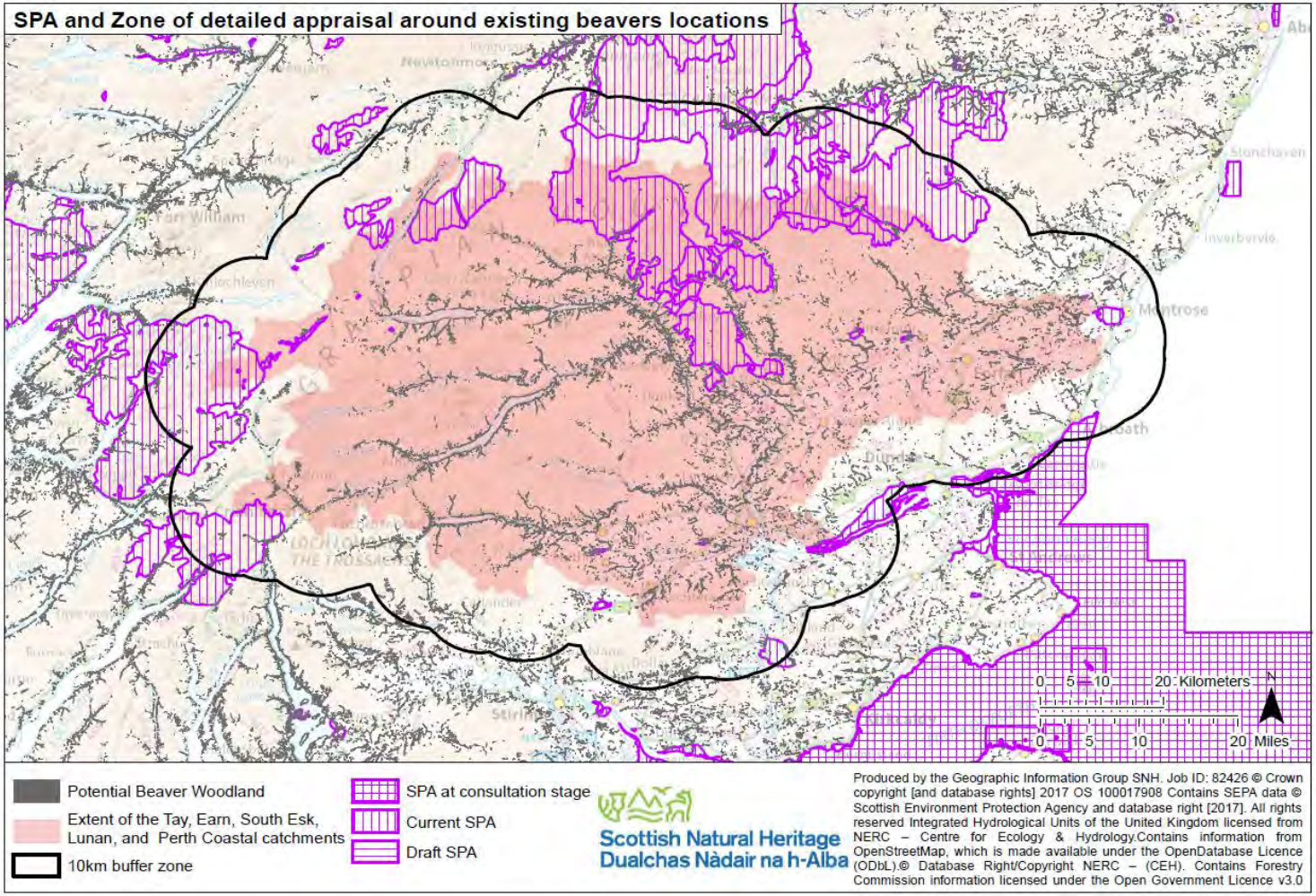
Map 1; Knapdale Beaver Trial Area and surrounding SPAs



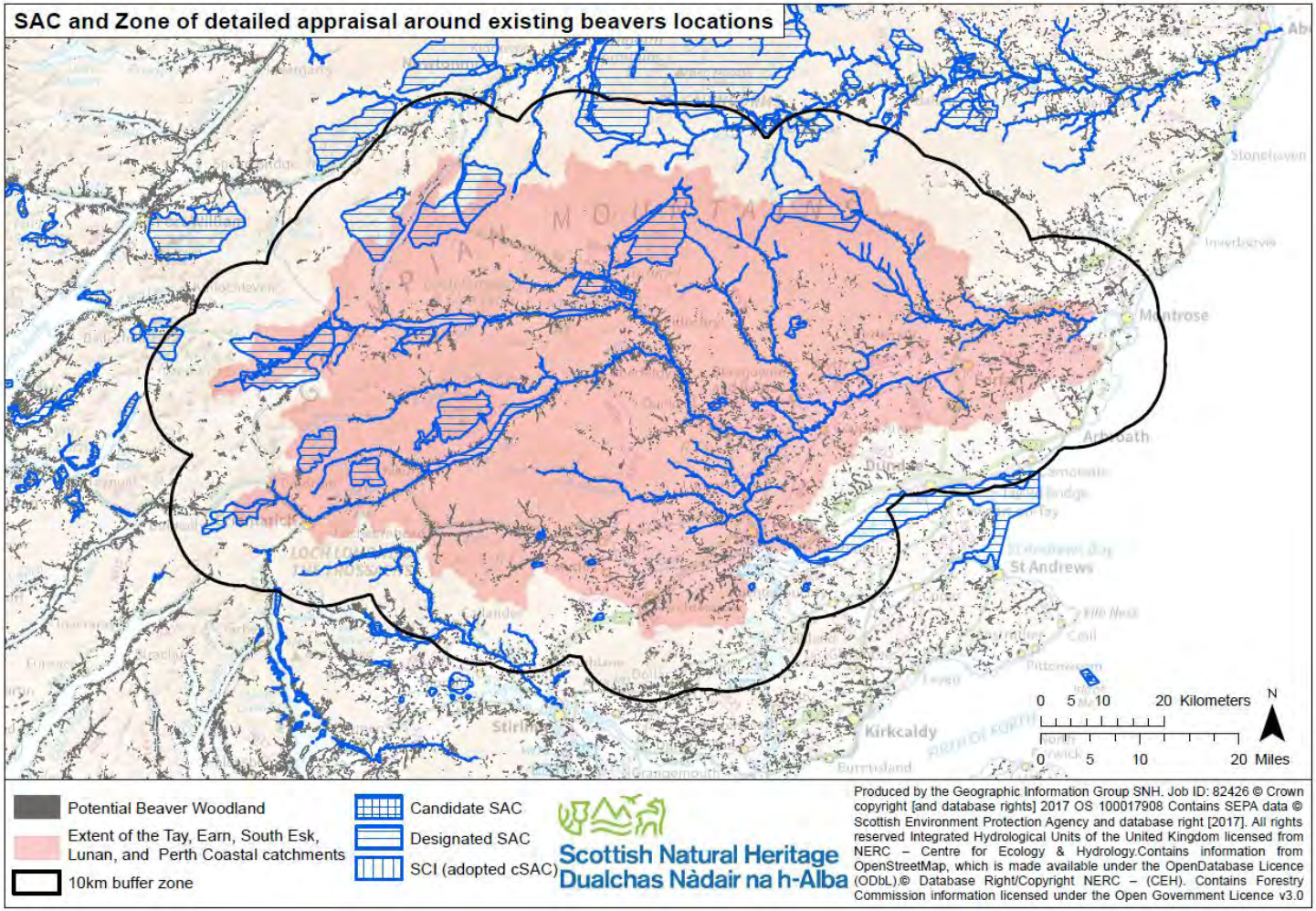
Map 2; Knapdale Beaver Trial Area and surrounding SACs



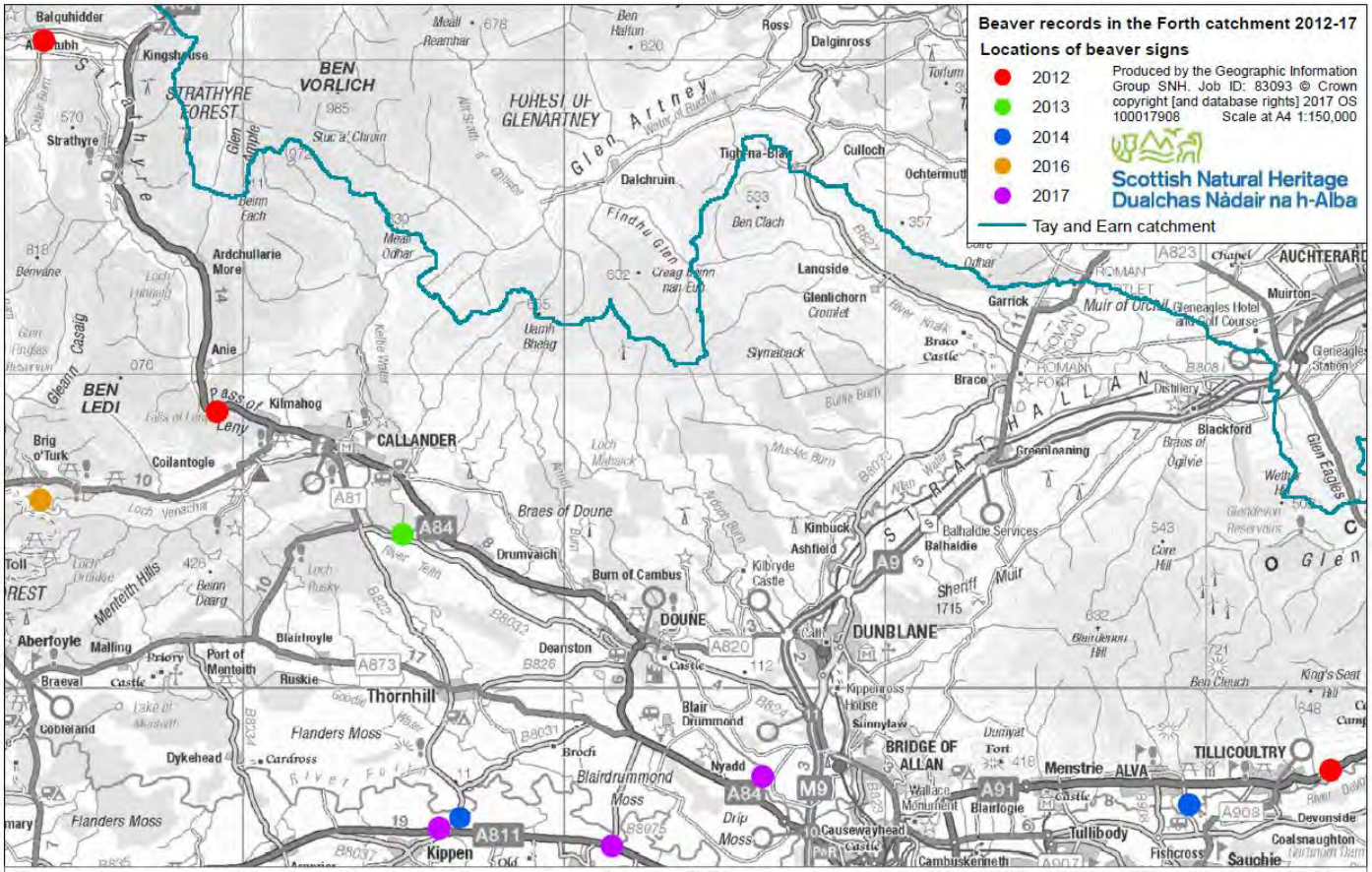
Map 3; Tayside area and surrounding SPAs



Map 4; Tayside and surrounding SACs



Annex E: Records of beaver in the Forth river catchment between 2012 and 2017



The map shows locations where signs of beavers have been noted over the years. 2017 locations show recent activity. Sightings/signs at Kippen/Gargunnock/Stirling may be of the same dispersing singleton. The River Devon (Alloa) is thought to be a resident animal(s) and was reported still active in January 2017. The site at Brig o' Turk site is thought to be a resident site too. The easternmost 2012 location (Dollar) was a road casualty.

Annex F: List of all Natura sites in Scotland advised as likely to be significantly affected.

1.	Abhainn Clais an Eas and Allt a' Mhuilinn	SAC
2.	Altnaharra	SAC
3.	Amat Woods	SAC
4.	Ardgour Pinewoods	SAC
5.	Ardnamurchan Burns	SAC
6.	Ardvar and Loch a' Mhuilinn Woodlands	SAC
7.	Ballochbuie	SAC
8.	Beinn a' Ghlo	SAC
9.	Beinn Dearg	SAC
10.	Ben Nevis	SAC
11.	Berriedale and Langwell Waters	SAC
12.	Black Wood of Rannoch	SAC
13.	Borders Woods	SAC
14.	Cairngorms	SAC
15.	Caithness and Sutherland Peatlands	SAC
16.	Cawdor Wood	SAC
17.	Clyde Valley Woods	SAC
18.	Coille Mhor	SAC
19.	Conon Islands	SAC
20.	Craighall Gorge	SAC
21.	Creag Meagaidh	SAC
22.	Dinnet Oakwood	SAC
23.	Dornoch Firth and Morrich More	SAC
24.	Dunkeld - Blairgowrie Lochs	SAC
25.	Fannich Hills	SAC

26.	Foinaven	SAC
27.	Galloway Oakwoods	SAC
28.	Glen Beasdale	SAC
29.	Glen Coe	SAC
30.	Glen Shira	SAC
31.	Glen Tanar	SAC
32.	Insh Marshes	SAC
33.	Inverpolly	SAC
34.	Keltneyburn	SAC
35.	Kinloch and Kyleakin Hills	SAC
36.	Kinveachy Forest	SAC
37.	Kippenrait Glen	SAC
38.	Ledmore Wood	SAC
39.	Lismore Lochs	SAC
40.	Little Gruinard River	SAC
41.	Loch Achnacloich	SAC
42.	Loch Etive Woods	SAC
43.	Loch Lomond Woods	SAC
44.	Loch Maree Complex	SAC
45.	Loch Moidart and Loch Shiel Woods	SAC
46.	Loch Ruthven	SAC
47.	Loch Ussie	SAC
48.	Loch Watten	SAC
49.	Lower Findhorn Woods	SAC
50.	Lower River Spey - Spey Bay	SAC

51.	Lower River Spey - Spey Bay	SAC
52.	Merrick Kells	SAC
53.	Mingarry Burn	SAC
54.	Moine Mhor	SAC
55.	Monadh Mor	SAC
56.	Morrone Birkwood	SAC
57.	Morvern Woods	SAC
58.	Mound Alderwoods	SAC
59.	Muir of Dinnet	SAC
60.	Mull Oakwoods	SAC
61.	Onich to North Ballachulish Woods	SAC
62.	Pitmaduthy Moss	SAC
63.	Rannoch Moor	SAC
64.	Rassal	SAC
65.	Rhidorroch Woods	SAC
66.	Rigg - Bile	SAC
67.	River Bladnoch	SAC
68.	River Borgie	SAC
69.	River Dee	SAC
70.	River Evelix	SAC
71.	River Kerry	SAC
72.	River Moidart	SAC
73.	River Moriston	SAC
74.	River Naver	SAC
75.	River Oykel	SAC
76.	River South Esk	SAC
77.	River Spey	SAC
78.	River Tay	SAC
79.	River Teith	SAC
80.	River Thurso	SAC

81.	River Tweed	SAC
82.	Shingle Islands	SAC
83.	Solway Firth	SAC
84.	Strath	SAC
85.	Strathglass Complex	SAC
86.	Sunart	SAC
87.	Tarbert Woods	SAC
88.	Taynish and Knapdale Woods	SAC
89.	Tayvallich Juniper and Coast	SAC
90.	Trossachs Woods	SAC
91.	Tulach Hill and Glen Fender Meadows	SAC
92.	Upper Nithsdale Woods	SAC
93.	Upper Strathearn Oakwoods	SAC
94.	Whitlaw and Branxholme	SAC
95.	Abernethy Forest	SPA
96.	Assynt Lochs	SPA
97.	Ballochbuie	SPA
98.	Bridgend Flats, Islay	SPA
99.	Cairngorms	SPA
100.	Caithness and Sutherland Peatlands	SPA
101.	Caithness Lochs	SPA
102.	Cameron Reservoir	SPA
103.	Castle Loch, Lochmaben	SPA
104.	Cromarty Firth	SPA
105.	Din Moss - Hoselaw Loch	SPA
106.	Dornoch Firth and Loch Fleet	SPA
107.	Eilean na Muice Duibhe (Duich Moss), Islay	SPA
108.	Firth of Forth	SPA
109.	Firth of Tay and Eden Estuary	SPA
110.	Gladhouse Reservoir	SPA

111.	Glen Tanar	SPA
112.	Gruinart Flats, Islay	SPA
113.	Inner Moray Firth	SPA
114.	Inverpolly, Loch Urigill and nearby Lochs	SPA
115.	Kinveachy Forest	SPA
116.	Knapdale Lochs	SPA
117.	Laggan, Islay	SPA
118.	Lairg and Strath Brora Lochs	SPA
119.	Loch Eye	SPA
120.	Loch Ken and River Dee Marshes	SPA
121.	Loch Leven	SPA
122.	Loch Lomond	SPA
123.	Loch Maree	SPA
124.	Loch of Kinnordy	SPA
125.	Loch of Lintrathen	SPA
126.	Loch of Inch and Torrs Warren	SPA
127.	Loch Shiel	SPA
128.	Loch of Skene	SPA
129.	Loch of Strathbeg	SPA
130.	Loch Spynie	SPA
131.	Montrose Basin	SPA
132.	Moray and Nairn Coast	SPA
133.	Muir of Dinnet	SPA
134.	Rannoch Lochs	SPA
135.	Rinns of Islay	SPA
136.	River Spey - Insh Marshes	SPA
137.	South Tayside Goose Roosts	SPA
138.	Slamannan Plateau	SPA
139.	Upper Solway Flats and Marshes	SPA
140.	Wester Ross Lochs	SPA
141.	West Inverness-shire Lochs	SPA
142.	Ythan Estuary, Sands of Forvie and Meikle Loch	SPA

Annex G: Natura sites and their qualifying interests which have both a LSE, and are within the ZDA: and whether mitigation is required to avoid an adverse effect on site integrity (AESI).

Natura site	Habitat	Mitigation required to avoid an AESI?
Tayside area		
Ballochbuie SAC	Bog Woodland	N
	Caledonian forest	Y
	Otter	Y
Beinn a' Ghlo SAC	Alkaline fen	Y
Ben Heasgarnich SAC	Alkaline fen	N
Black Wood of Rannoch SAC	Caledonian forest	Y
Cairngorms SAC	Bog Woodland	N
	Caledonian forest	Y
	Clear-water lochs	Y
	Transition mires and quaking bogs	Y
	Otter	Y
Craighall Gorge SAC	Mixed woodland on base-rich soils associated with rocky slopes	Y
Dunkeld - Blairgowrie Lochs SAC	Clear-water lochs	Y
	Slender naiad	N
	Transition mires and quaking bogs	Y
	Otter	Y
Glen Coe SAC	Clear-water lochs	Y

	Alkaline fen	Y
Keltneyburn SAC	Mixed woodland on base-rich soils associated with rocky slopes	Y
Kippenrait Glen SAC	Mixed woodland on base-rich soils associated with rocky slopes	Y
Loch Lomond Woods SAC	Western acidic oak woodland	Y
	Otter	Y
Moine Mhor SAC	Western acidic oak woodland	Y
	Otter	Y
Morrone Birkwood SAC	Alkaline fen	Y
Rannoch Moor SAC	Clear-water lochs	N
	Transition mires and quaking bogs	N
	Otter	N
River Dee SAC	Freshwater pearl mussel	Y
	Atlantic salmon	Y
	Otter	Y
River South Esk SAC	Freshwater pearl mussel	Y
	Atlantic salmon	Y
River Spey SAC	Atlantic salmon	Y
	Freshwater pearl mussel	Y
	Sea lamprey	Y
	Otter	Y
River Tay SAC	Clear-water lochs	N
	Atlantic salmon	Y
	Sea lamprey	Y
	River lamprey	Y
	Brook lamprey	Y
	Otter Lutra lutra	Y

River Teith SAC	Atlantic salmon	Y
	Sea lamprey	Y
	River lamprey	Y
	Brook lamprey	Y
Shingle Islands SAC	Alder woodland on flood plains	Y
Tulach Hill and Glen Fender Meadows SAC	Alkaline fen	Y
Upper Strathearn Oakwoods SAC	Western acidic oak woodland	Y
Ballochbuie SPA	Scottish crossbill	N
Cairngorms SPA	Scottish crossbill	N
Firth of Tay and Eden Estuary SPA	Greylag goose	N
	Pink-footed goose	N
Loch Leven SPA	Pink-footed goose	N
	Whooper swan (non-breeding)	N
Loch of Lintrathen SPA	Greylag goose	N
Loch of Kinnordy SPA	Greylag goose	N
	Pink-footed goose	N
Rannoch Lochs SPA	Black-throated diver	N
South Tayside Goose Roosts SPA	Pink-footed goose	N
Knapdale area		
Tarbert Woods SAC	Western acidic oak woodland	Y
Taynish and Knapdale Woods SAC	Western acidic oak woodland	Y
	Clear-water lochs	Y
	Otter	Y
Tayvallich Juniper and Coast	Otter	N
Knapdale Lochs SPA	Black-throated diver	Y