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Dear Jane

Application for a licence to release European beaver, *Castor fiber*, for a trial re-introduction

On 6 November 2001, the Board agreed that SNH should make an application to the Scottish Executive for a licence to release European beaver, *Castor fiber*, for a trial re-introduction in Knapdale, Argyll. Up to four families (around 20 animals, depending on family size) will be released. The application has now been compiled and is enclosed for your consideration.

The application details the substantial preparatory work that SNH and our partner organisations have undertaken on the project to date. Particular note should be given to the provision of a suitable trial site, Knapdale Forest, by Forest Enterprise, a major external funding contribution of £150,000 from Mammals Trust UK (plus a further £10,000, to date, towards visitor interpretation costs), the positive outcomes of the national and local consultations and the identification of a source of animals in southern Norway.

We understand that you may approach the Advisory Committee on Releases to the Environment (ACRE) for advice over the SNH proposal. For your information, we have been informed that the ACRE meeting dates over the next few months are January 24, February 21 and March 21.

If you require any further information please contact myself or Colin Galbraith or, for detailed aspects of the application, the relevant project officer:

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We look forward to receiving the outcome of your considerations.

Yours sincerely,

Roger Crofts



**APPLICATION TO SCOTTISH EXECUTIVE BY SCOTTISH
NATURAL HERITAGE FOR A LICENCE UNDER SECTION 16(4)
OF THE WILDLIFE AND COUNTRYSIDE ACT 1981, AS
AMENDED, TO RELEASE EUROPEAN BEAVER, *Castor fiber*,
FOR A TRIAL RE-INTRODUCTION IN KNAPDALE, ARGYLL**

Scottish Natural Heritage

7 January 2002

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4 SUMMARY

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This is an application to Scottish Executive by Scottish Natural Heritage (SNH) for a licence under section 16(4) of the Wildlife and Countryside Act 1981, as amended, to release European beaver, *Castor fiber*, for a trial re-introduction in Knapdale, Argyll.

Evidence suggests that the European beaver was resident in Scotland until about the 16th century, when it was persecuted to extinction by over-hunting. Since 1995, SNH has been investigating the potential for restoring this species to the native fauna of Scotland. This work is in line with requirements on the UK Government, under Article 22 of the 'Habitats Directive'. If re-introduced, evidence suggests beavers could have a beneficial effect on Scotland's wider biodiversity as a result of the effects of their foraging and engineering activities on woodland and aquatic habitats.

SNH have compiled a suite of information with regard to the scientific plausibility and desirability of conducting a re-introduction. A national consultation commissioned by SNH in 1998 demonstrated that a majority of the public were in favour of a re-introduction although some concerns were expressed by certain interest groups. Therefore a scientifically monitored, time-limited and site specific trial re-introduction is proposed by SNH in order to:

- Study the ecology of the beaver in the Scottish environment
- Assess the effects of beaver activities on the environment, including a range of land uses

A good quality site for a trial re-introduction has been identified at Knapdale, mid Argyll, which is managed by Forest Enterprise. A satisfactory level of support for a trial re-introduction at Knapdale has been received during a local consultation. A suitable donor population has been identified in Norway and Norwegian expertise is available for the capture of animals. Quarantine requirements are being progressed and the aim is to construct quarantine facilities in time for the collection of animals in autumn 2002. Strategies to ensure the proper management of the beavers at Knapdale, including their containment within the trial site, have been drawn up on the basis of advice received from European specialists. A research, survey and monitoring programme has been designed.

The proposal is to collect beavers from the donor country in autumn 2002. There will then follow a six month period of quarantine. Three beaver families will then be released at Knapdale in spring 2003. They will be studied for a five year period until spring 2008. They will then remain at Knapdale for the following year while the results of the trial are evaluated by SNH, in consultation with other appropriate parties, and a report produced for consideration by Scottish Executive. A decision on the future of the beavers in the trial area, and in the wider countryside, will then be made.

The cash cost of the core scientific project (i.e. those aspects which address the key aims of the trial) is £490K for the seven year period beginning April 2002. To date

SNH has committed £250K and significant external funds of £150k have been committed by the Mammals Trust UK. Further sources of cash or 'in kind' support have been identified and are being followed up. There are also additional opportunities to add further research, educational and interpretative elements to the project and increase its overall value to SNH, its partner organisations and the general public and for which a further £35K has been committed by SNH and Mammals Trust UK to date.

SNH consider that a trial at Knapdale is the appropriate way to proceed to help determine the suitability of the re-introduction of beavers to Scotland. The proposed trial incorporates adequate safeguards for the natural heritage and land and water interests and its scientific approach will provide sound information to help guide future decisions. Up to four families (around 20 animals, depending on family size) will be released. SNH requests that Government grants a licence for the trial release of European beaver into the wild in Scotland at Knapdale, Argyll, under Section 16(4) of the Wildlife and Countryside Act 1981 as amended.

1 INTRODUCTION

The European beaver was resident in Scotland until the 16th century, when it was persecuted to extinction by over-hunting. Since 1995, Scottish Natural Heritage (SNH) has been investigating the potential for restoring this species to the native fauna of Scotland. This investigation has compiled a suite of information with regard to the scientific plausibility and desirability (both local and national) of conducting such a re-introduction. A summary of this work is provided in this document.

Re-introduction of a mammal to the wild in Scotland is subject to licensed approval from Government (under section 16(4) of the Wildlife & Countryside Act 1981 (as amended)). On 6 November 2001 the SNH Board approved the recommendation that SNH apply for such a licence. The following therefore presents the case for a licence application by SNH for a trial re-introduction of the European beaver *Castor fiber* to the wild at Knapdale, mid-Argyll.

1.1 Aims

To undertake a scientifically monitored trial re-introduction of the European beaver to Knapdale, mid-Argyll, for a five year period in order to:

- Study the ecology of the beaver in the Scottish environment
- Assess the effects of beaver activities on the environment, including a range of land uses

1.2 Justification

1.2.1 Historical evidence

Written and archaeological evidence suggests that the European beaver was once widely distributed throughout mainland Scotland. Beaver remains are not well preserved and these records provide limited information on the precise distribution and population status of the species in Scotland before they became extinct. However, an investigation into its history shows that the beaver was resident in Scotland until the 12th century, although there is strong evidence that it persisted until a much later date, possibly the 16th century (Conroy & Kitchener 1996).

The extinction of beaver in Scotland, and across the whole of Britain, has been attributed largely to hunting for its valuable pelt and the medicinal properties of the secretion from the castor sacs (the 'castoreum'). Habitat destruction is considered to have been a contributory factor in the decline although this was probably secondary to the effects of hunting.

The demise of the species in Scotland mirrors the pattern of decline elsewhere in Europe and, by the end of the 19th century, the European beaver was close to extinction across its range. Only three small and isolated relict populations survived in western Europe at this time (in Norway, France and Germany). However, re-introductions and translocations of the species have now taken place in 21 European countries.

1.2.1.2 Legal framework

The work SNH has undertaken during the European beaver project is in line with

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requirements on the UK Government, under Article 22 of the European Community Directive on the ~~e~~Conservation of ~~n~~Natural ~~h~~Habitats and of ~~w~~Wild ~~f~~Flora and ~~f~~Fauna (Council Directive 92/43/EEC, the 'Habitats Directive'). It states that Member States shall;

'study the desirability of re-introducing species in Annex IV that are native to their territory where this might contribute to their conservation, provided that an investigation, also taking into account experience in other Member States or elsewhere, has established that such re-introductions contributes effectively to re-establishing these species at a favourable conservation status and that it takes place only after proper consultation of the public concerned.'

European beaver is listed on Annex IV. ~~s~~ No work is currently planned for the restoration of any other species listed in Annex IV of the Habitats Directive.

Because the Habitats Directive requires that any restoration should take place only after 'proper consultation of the public concerned' SNH undertook a national consultation in 1998 in order to gather views on the desirability and acceptability of restoring beaver to Scotland. The results of this consultation were published by SNH (Scott Porter Research & Marketing Ltd, 1998). A further local consultation was undertaken in 2000 once the proposed Knapdale trial site had been announced. Both these exercises demonstrated a majority of the public in favour of the re-introduction proposals. Details are given below.

The proposal presented by SNH is for the release of a small number of European beavers at Knapdale Forest to allow a trial re-introduction scientific study. Domestic legislation makes it illegal to release into the wild any animal which is of a kind not ordinarily resident in Great Britain (Section 14 of the Wildlife & Countryside Act 1981 (as amended)). Any restoration, therefore, is subject to approval and licence under Section 16 of this Act.

1.4.1.2.3 Biodiversity

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In the 1997 document *Biodiversity in Scotland: The Way Forward*, produced by The Scottish Office, it states that 'The Government is committed to taking action in partnership with others to safeguard and where possible to enhance Scotland's biodiversity'. This commitment is further emphasised in Scottish Executive's 2001 policy statement *The Nature of Scotland* ; 'We are committed to sustainable development as part of all our policies, and a commitment to Scotland's biodiversity is an essential part of that'.

Beavers are a missing element of our native biodiversity and were lost due to human activities. Arguments have been proposed, therefore, that we have a moral responsibility to consider their restoration. However, beavers are also important keystone species in forest and riparian ecosystems. Their role as waterway engineers - modifying their environment to make it more suitable for them to live in - has measurable benefits to other species. This is perhaps most significant through the creation of beaver ponds behind dams, and through their foraging habits. Beaver ponds can act as sediment traps on rivers, help to reduce floods by increasing water storage, help to neutralise acid run-off, provide extra food and pools for fish, and create additional habitat for other aquatic wildlife. Their foraging behaviour can result in a coppiced woodland-type habitat in riparian areas, prevent the invasion by scrub of valuable wetlands and provide dead wood for invertebrates. Therefore if re-introduced they would have a beneficial effect on Scotland's wider biodiversity also. ~~If re-established, opportunities for public viewing are likely and a~~

~~re-introduction would therefore contribute positively to the rural economy.~~

2.41.3 The national consultation and research to date

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Work was completed initially to confirm the historical presence of beavers in Scotland (Conroy & Kitchener, 1996). This was followed by research to identify the extent of habitat suitable for beavers across Scotland (Webb *et al.* 1997) whilst a desk-based research study was conducted simultaneously to develop a method of assessing specific sites against the suitability for supporting viable beaver populations (Macdonald *et al.* 1997). The likely impacts of beaver occupation on local hydrology and native fish populations were investigated through literature reviews and collation of information from countries where beavers are already resident (Gurnell, 1997; Collen, 1997).

This information was used to support the conduct of the national consultation held in 1998 (Scottish Natural Heritage, 1998). During the national consultation, the proposal was put that a 'full' re-introduction of the European beaver take place. Three types of survey were undertaken during the consultation;

1. In a 'passive public' opinion survey involving 2,141 interviews, 63% of the general public supported a re-introduction, 12% were against, and 25% had no view.
2. A total of 1,944 written responses were received during a 'pro-active public' survey. Overall, 86% of this sample were in favour of the re-introduction. A smaller majority of land managers and those with interests in forestry supported re-introduction. However there was a lack of support from those with interests in fishing and agriculture.
3. A total of 281 consultees were also approached of which 144 (51%) responded. Reactions were mixed. Conservation and academic sectors were the most supportive, fishing/angling interests the least supportive.

The outcome of this consultation was subsequently placed in the public domain for discussion (Scott Porter Research & Marketing Ltd, 1998). The consultation demonstrated that a majority of the public were in favour of a re-introduction but certain interest groups raised a number of specific concerns. Consequently, the SNH Board agreed in November 1998 to progress with the development of a scientific trial re-introduction for a fixed period and in a limited area to test the feasibility and effects of beavers being re-introduced to a Scottish environment. During the national consultation process, the Forestry Commission (FC) had suggested that the FC estate could be used for a trial, subject to certain conditions, and this proposal was re-visited at a later stage (see below).

Following the Board decision, further work (Kitchener & Lynch, 2000) was conducted to investigate the most suitable source of beavers for re-population of Scotland through the comparison of fossil remains in Britain with extant populations in Europe and Scandinavia. A review, commissioned jointly with the FC, collated the evidence on the likely impact of beaver presence on woodland habitats (Reynolds, 2000) and a predictive model was developed to ascertain the number of animals required for a re-introduction and the potential survival of the released animals (Rushton *et al.* 2000). All of the above information has been published.

Prior to confirming the site currently proposed (Knapdale Forest), SNH commissioned a GIS study to identify sites which were suitable for a trial release

(Carss *et al.* 1999). This work refined the earlier assessment of suitable habitat, setting additional criteria specific to a trial situation, e.g. containment, provision for research on impacts of land uses. Following this, in 1999, SNH entered discussions with the FC over the possibility of conducting a trial on its land-holding. Two potentially suitable sites were identified through GIS-analysis (see Section 2.1) and were subsequently examined in greater detail (Daniels *et al.* 2000). Of these, Knapdale Forest was considered to be the most suitable. An approach was made to the FC on this basis whereupon the Forestry Commissioners ~~Forestry Commission~~ agreed in principle to host a trial conducted by SNH, subject to a number of conditions which will be linked to a lease agreement for the site in Knapdale Forest. The trial will therefore take place on the FC's estate at Knapdale which is managed by FE (Forest Enterprise) Agency, and it was agreed that FE staff will be the main point of contact during the trial.

In order to ascertain the views of the local community SNH conducted a local consultation exercise in November 2000. The results of this are presented in Section 2.4.

2 LOCATION

3.42.1 Site identification

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Work to identify a specific trial site on FE land-holdings was undertaken in 2000. This involved an in-house GIS analysis using data sets produced by the ITE (Webb *et al.* 1997). A key enhancement of the analysis was that an improved woodland dataset (the Millennium Woodland Database) was available and used in preference to the poorer resolution woodland data extracted from LCS88 (Land Cover of Scotland 1988). However, the Millennium Woodland Database was geographically limited in that, at the time of the analysis, it did not have information on woodland coverage south of the Central Belt. Even so, this was not believed to be a major problem as other sources of information suggest that there are no obvious FE landholdings currently suitable for a trial project in this part of Scotland.

The GIS analysis highlighted suitable beaver habitat across Scotland north of the central belt. This distribution was overlaid with FE land-holdings data. From this a short list of FE sites was identified, and for each site a preliminary assessment was made as to its ecological and practical suitability. Following further examination and discussions between SNH and FE staff, the initial list was shortened to three specific sites; Knapdale, Loch Awe and Loch Shiel.

The next stage of the assessment involved field visits to the three shortlisted sites in order to assess their suitability and discuss trial suitability with relevant local FE staff. Following this, it was decided that the Loch Awe site, although it had habitat which could be used by beaver, was not suitable for the purposes of a trial. SNH then commissioned ~~a contractor (Bidwells) to undertake~~ surveys of the Knapdale and Loch Shiel sites in order to assess their suitability for beaver using standardised protocols developed during a previous SNH-commissioned project (Macdonald *et al.* 1997). The results of these surveys (Daniels *et al.* 2000) were that both sites were found to have similar scores of suitability for beaver. However Knapdale was finally judged to be more suitable for a trial for additional practical and logistical reasons outlined below. The main problems with the Loch Shiel site are that it is far less accessible for field workers and that it would be much harder to ensure the beavers are 'contained' within the trial area.

3.22.2 Knapdale

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The Knapdale peninsula (see map in annex 1) in mid Argyll is bounded to the north by the Crinan Canal, the south by east and west Loch Tarbet, on the east by Loch Fyne and on the west by the Sound of Jura. The landform of the northern part of the locality containing the trial site, Knapdale Forest, is dominated by a unique landscape comprising a whole series of north-south ridges (knaps) and small valleys (dales) which range in altitude from sea level to 276 m. The western sea bound and central sections of Knapdale Forest (the 'core area' where the beavers will be released, OS grid reference NR7990) are heavily dissected by a series of north-south running sea and freshwater lochs. The freshwater bodies extend from small lochan up to 2 km long lochs which are interconnected by small burns streams draining to the sea in a southern direction.

The semi-natural vegetation of Knapdale in the late 19th century comprised a complex mosaic of broadleaf woodland dominated by abandoned oak coppice and small patches of improved grazing (and arable fields). The higher elevation land was comprised of *Calluna/Molinia* dominated sheep walks. 20th century afforestation by the FC mainly in the 1920s-50s, but continuing up until the early 1980s, resulted in Knapdale Forest. A range of conifer species primarily Norway and Sitka spruce were established on open ground and as a replacement for broadleaf woods which were felled, inter and under planted. From 1985 onwards following a major review of broadleaf forest policy a major programme of conifer harvesting and felling to recycle has taken place in the core area of native woodland in Knapdale. This has been accompanied by a major effort by FE forest ranger staff to reduce the resident deer population by half from levels in excess of 16-20 deer per km². This has resulted in significant levels of natural regeneration of native woodland. Broadleaves, predominantly birch *Betula* spp., and to a lesser extent willow *Salix* spp., alder *Alnus glutinosa* and hazel *Corylus avellana* are mainly associated with the lochs. Oak *Quercus* spp., sycamore *Acer pseudoplatanus* and aspen *Populus tremula* also occur but are mostly confined to the Fairy Isle and Bàrr Mor peninsulas to the south west.

The core area of the site for the beaver trial, which is dominated by the interconnecting freshwater loch system and associated broadleaf-dominated woodland, covers approximately 15km². Within this there is currently about 15km of riparian habitat suitable for beaver. This figure will increase as FE continue their programme of habitat restoration. The landform and resultant hydrology coupled with the distribution of forest and riparian habitats suitable for beavers will provide a reasonable prospect of natural containment. The escarpment along the north boundary, the conifer plantations to the east and west and the saltwater lochs to the south and west are the main barriers to beaver movements. The short watercourses are the likely routes for beaver movement around the site although beavers have been recorded moving short distances across seawater when dispersing.

The site has been notified as a SSSI and is part of a wider cSAC (Taynish and Knapdale Woods) put forward for its oak woodland, freshwater loch, marsh fritillary butterfly *Euphydryas aurinia* and otter *Lutra lutra* interests. The area also lies within the North Knapdale National Scenic Area. The forest also hosts a number of low key FE recreation facilities comprising an information and interpretation point, a series of walking and cycling trails with onsite interpretation. The lochs are fished by local angling associations. The whole site is subject to FE's policy of open access exercised under the FC bylaws. These access and recreational opportunities are important locally as a resource for communities and tourists. Knapdale is a working

forest where a range of forest operations will be ongoing. These will be undertaken in accordance with a forest design plan approved by the FC following consultation with key stakeholders (including SNH) and local communities. The SSSI/pSAC are managed in accordance with a specific plan agreed by SNH. All forest management is undertaken to the standards set by the UK Forest Standard and UK Woodland Assurance Scheme independently audited by Forest Stewardship Council (FSC).

FE is continuing with their programme of conifer removal within much of the potential trial area; the deer population is under control and regeneration of native woodland is good. It has the following advantages as a trial site:

- it is ecologically suitable for beaver;
- it provides a range of terrestrial and freshwater habitats and species which can be evaluated
- natural containment is relatively good;
- it is a working forest, which will allow an assessment of beaver presence on forestry practices;
- there is one main owner, FE;
- there is good access for field workers;
- local SNH and FE offices are nearby;
- local people are generally supportive and interested (see details below);
- visitor facilities are already on site;
- visitor disturbance is likely to be low in the core part of trial site;
- Knapdale is a candidate Special Area of Conservation (cSAC) and therefore there may be opportunities to seek relevant European funding.

3.32.3 Release points

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Three beaver families will be released in Knapdale at suitable release points. At this stage, the precise location of the release points (e.g. where to build artificial lodges etc.) have not been determined since this level of detail is not required yet. However, approximate locations of the release points have been identified. This has to take into account the fact that beavers set up a territory that they will defend. Territory sizes vary depending on a number of variables but colony densities of 1.5, 0.5 and 0.1 colonies per km length have been estimated in good, quite good and mediocre beaver habitat in Europe (equivalent of 1 beaver colony per 0.7, 2 and 10km of habitat). Based on published information and the views of Norwegian specialists who have seen the site, the quality of habitat at Knapdale is considered to be relatively good, but it remains to be seen what territory size the beavers establish. It is important that the beavers are released sufficiently far apart to provide each colony with enough riparian habitat in its territory.

The three initial release points are:

1. Creagmhor Area

This site comprises Creagmhor Loch (about 1.2km of bank) and an 'un-named loch' (about 0.5km of bank) immediately to the west, together with associated inflow, outflow burns. The un-named loch has softer banks than Creagmhor and probably provides a greater extent of suitable riparian bank into which the beavers could burrow. The south west outflow end of Creagmhor provides the greatest extent of soft riparian bank in this water body. The two lochs are not connected but are separated by about 70- 80m and a gentle ridge dominated by mature heather. It is likely that the beavers will be able to move between these two water bodies - however, if released at Creagmhor, it may take some time for them to move to the

un-named loch since there is no connecting burn. Movement by beavers from Creagmhor may also take place along the outflow burn in a SW direction.

The un-named loch is close to Loch Fidhle to the west, and is connected by its outflow stream. However there is a steep 25-30m drop between the two water bodies which may be sufficient to put off beavers moving downstream.

2. Loch Linne Area

The site comprises Loch Linne and the connected Loch Fidhle (about 4km of bank). There is a peaty peninsula between the two lochs that may be particularly suitable for a burrow/lodge site. The loch is extensive and appears to have good quality habitat, perhaps even sufficient to hold two or, even, three colonies.

3. Loch Coille Bharr

The proposed release site is at the south end of Loch Coille Bharr (at least 5km of bank for whole loch). This part of Coille Bharr is well sheltered and has more areas of suitable riparian bank. A footpath goes around the loch but is quite distant from the shore at some sections at the SW end. Beaver specialists from Norway have suggested that this loch will be able to support two colonies of beavers (Duncan Halley, pers. comm.).

The extent of suitable habitat has been shown to be more than adequate for the three beaver families to be translocated to the site, and will allow for some expansion of the population within Knapdale. This has been confirmed by beaver specialists who have seen the site. The site should be sufficient to allow for any expansion of the beaver population over the five year field trial period. Experience with other European re-introductions has shown considerable variability in population increase rates.

Knapdale has relatively good natural containment. It is bordered to the north by a ridge, with water flowing in a general southerly direction towards the coastline. The west and east sides are bordered by high density conifer plantation and are not suitable beaver habitat. Since beavers tend to restrict their movements to riparian areas, it is hoped that they will therefore stay within the Knapdale catchment while the carrying capacity of the site allows.

3.52.4 Local Consultation

SNH decided that local support would be required in order for the proposal to be taken forward to its next stages and so consequently it carried out a local consultation on the proposal for a trial re-introduction of European beaver to Knapdale.

SNH issued a press release on 19 ~~xx~~ September 2000 to the local papers covering the Mid Argyll area prior to national release, and there was a lot of information in the local press before the local consultation formally began.

The local consultation process was initially to run for six weeks, ending on 30 November but this was extended to 12 December to allow everybody who wished to respond. An 'information day' was held on 13 October for:

- Individual land and water owners/managers adjacent to the trial area
- Community Councils

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- Representatives of local, area and national bodies/organisations whose interests might be affected

An 'open day' was held on Saturday 14 October for any members of the public to attend. This meeting was advertised locally and approximately 200 people attended (a considerable audience for the area). Preliminary indications confirmed considerable support for the proposed trial during this day. The majority of attendees were local people from Mid Argyll. The event was attended by 'The Argyllshire Advertiser' and an article appeared in the next edition of the paper publicising the local consultation further. Response forms were made available at the open day and subsequently distributed in the local area.

3.5.12.4.1 Consultation Process

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(a) Public

SNH received a steady return of responses and queries from local people. The project elicited only one letter to the local paper expressing opposition. SNH addressed a meeting of North Knapdale Community Council, which includes the whole of the trial area.

Responses were received from:

- local residents
- land owners/managers adjacent to the trial
- land owners/managers in the general area of the trial

Table 1 Results of Mid Argyll Responses Received

Category	Number of responses	% of total
For	38	64.4
Against	14	23.7
Others	7	11.9
Total	59	

A large majority of respondents (nearly two thirds) were in favour of the project and less than a quarter against. This is in accord with the reactions of the c200 people who attended the open day. SNH Area staff in the course of other work ~~work have not found~~ did not find beavers to be a topic of wide concern nor of discussion.

(b) Analysis of Responses

Of the 38 Mid Argyll respondents who were in favour of the proposed trial re-introduction there were not ~~any~~ general themes that occurred in the responses, and respondents did not provide any lengthy detail over the reasons for their support. However there were some points which arose on several occasions such as restoring part of the lost wildlife of Scotland, increasing biodiversity, references to

benefits for tourism and the benefits of a well managed trial.

Most people who objected provided one or more specific reasons and these are summarised in Table 2.

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Table 2 Objectors' Reasons for Opposing a Trial (note that some of the 14 objectors had more than one reason)

Reason	Number	Details
1 Beaver re-introduction	10	Objected to re-introduction per se
2 Cost	7	Too expensive and/or money better spent elsewhere
3 Existing wildlife	6	Potential negative impact on existing species and habitats
4 Tourism	5	No tourism potential or would cause more problems than benefits
5 Other introductions/mink	4	Would cause similar problems to introductions e.g. mink
6 Salmon fishing	4	Damage to salmon
7 Health risks	3	Risk of disease transmission

(c) Responses from Organisations/Bodies

SNH also consulted a range of organisations/bodies of a local nature or where regional/national bodies had a remit/locus which either involved the trial area or the work of the trial. Meetings were held with Argyll and Bute Council, Lochgilphead Angling club and west of Scotland Water. Their responses can be summarised below;

Table 3 Views of Organisations/Bodies with a Local Interest

Body	View
Argyll and Bute Council	Very supportive
West of Scotland Water	Content if suitable monitoring
Argyll and the Islands Enterprise	Supportive
British Waterways	Supportive
Mid Argyll NFUS	Opposed
Lochgilphead Angling Club	Content
SEPA	Content
North Knapdale Community Council	Unable to provide one community view

(d) Responses from Adjacent Landowners/Managers

The responses from individual adjacent land and water owners/managers have been included in Table 1. However as the trial might impinge on their interests more than on those of private householders their views are considered in more detail.

Two owners/managers were supportive, three were content for the trial to go ahead and one did not respond despite repeated requests. Four owners objected, for two of them their concerns were ones that would be addressed by the trial and accompanying monitoring programme.

After the special NFUS Branch meeting of 5 November 2001 meeting a number of the members discussed the situation and then informed SNH that the Branch were opposed to the trial going ahead but that if it did proceed then they would wish to discuss compensation and containment issues.

The main individual objection was primarily based on the grounds of damage to salmon interests on the river Add. The objector has concerns over the potential impact of straying beavers particularly on the spawning areas of the river Add. However the spawning areas identified by him are in a large block of commercial sitka spruce which has an extremely low percentage of broadleaved woodland. With this lack of broad leaved riparian woodland the Add would not offer suitable habitat for beaver, and is only likely to be marginal at best. The trial would be managed with the aim to prevent any damage by dealing with any beaver problems at an early stage. Evidence from Europe and North America indicates that beavers would not have an adverse impact on all the spawning grounds of a river system and its tributaries.

(e) Conclusion

The level of support received for the proposed trial, both from the local community and the bodies/organisations with interests in the area, was comparable to that received through the national consultation. Consequently, SNH consider that the level of support is sufficient to justify proceeding with the trial.

The concerns of the majority of the objectors will be met by the mechanism of the trial, in particular the monitoring and the exit strategies. Staff will attempt to continue to include the main objector in the trial procedure and would hope to establish a working relationship with him. In the wider context liaison with the local NFUS Mid Argyll branch, and to a lesser extent with their Kintyre branch, will continue and be part of the project. Proposals by which SNH will seek to engage with the local community are provided in Section 6.

2.5 Appropriate assessment of the proposed trial at Taynish and Knapdale Woods cSAC

An 'appropriate assessment' was undertaken, in terms of Articles 6.3 and 6.4 of the Habitats Directive, as enacted through Regulations 48 and 49 of the Conservation (Natural Habitats etc.) Regulations 1994 (the 'Habitats Regulations'), for the trial re-introduction of the European beaver *Castor fiber* to Taynish and Knapdale Woods cSAC. The full report is given in Annex 2. On the basis of the analysis undertaken, it was considered there will be no adverse impact on site integrity as a result of the trial re-introduction of the European beaver to Knapdale. To provide further reassurance, particularly regarding cumulative impacts which cannot be precisely modelled in advance, a monitoring programme will form an integral part of the trial. This will measure overall changes, if any, in each qualifying feature against baselines established before the trial begins. The results will be formally assessed against the conservation objectives every 6 months by SNH specialist staff. An exit strategy (see Section 7.6) for the project has been incorporated into the project in case the trial needs to be terminated at any time.

43 BUSINESS CASE

The cash cost of the core scientific project is £490K for the seven year period beginning April 2002. To date SNH have committed £250K and the Mammals Trust UK have committed £150K, leaving a shortfall of £90K. Further sources of cash or 'in kind' support have been identified and are being followed up. Full details are provided in the business case in Annex 3. This annex also highlights the additional opportunities to add further research, educational and interpretative elements to the project and increase its overall value to SNH, its partner organisations and the general public and for which a further £35K has been committed by SNH and Mammals Trust UK to date.

54 LEGISLATION

5.14.1 Current legislation

The beaver is not currently resident within the UK and is not, therefore, included under any domestic legislation. Consequently it receives no specific legal protection

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in Scotland.

Current domestic legislation makes it illegal to release to the wild any animal which is not ordinarily resident in Great Britain (Section 14 of the Wildlife & Countryside Act 1981 (as amended)). Any release, therefore, would have to be approved and licensed by Government.

The European beaver is currently listed on Annexes II (animal and plant species of Community interest whose conservation requires the designation of Special Areas of Conservation) and IV (animal species of Community interest in need of strict protection) of the Habitats Directive. This confers wider protection on the European beaver where it is currently resident on the Continent but does not oblige protection in Britain for a non-resident species. Given the very limited nature of the current study, no proposals are being presented nor thought necessary for any amendments to domestic legislation at this stage.

However, in view of this, consideration must be given to the long-term status of the species in Britain should the trial be successful then it may become appropriate that a case be considered for the addition of the species to the appropriate schedule of both the Wildlife & Countryside Act 1981 (as amended) (Schedule 5) and ~~the~~ The Conservation (Natural Habitats, &c.) Regulations 1994 (Schedule 2). The former would be required to implement the Bern Convention in Britain whilst the latter would be required to comply with the obligations of the Habitats Directive for a resident species. Decisions on this matter would be a subject for the Scottish Executive to consider.

The current proposal for a study is in line with requirements on the UK Government under Article 22 of the Habitats Directive to consider the desirability of re-introducing species listed on Annex IV. No work is currently planned for any other species listed on the Directive.

5.24.2 Legal position

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As the European beaver is not resident in the wild in Scotland, any animals which are released will receive no specific protection under domestic conservation law. However, it is considered that Forestry Commission Byelaws (FC, 1994) make provision for the protection of the animals whilst on FE land (specifically byelaws 5(xviii) and (xx)). This would not apply to animals straying beyond the accepted boundaries of the trial site, where they would be open to control or legal removal by landowners.

Given the mobile nature of the species, it is anticipated that animals may stray beyond the trial site. Whilst every effort will be made to detect these animals as rapidly as possible (see Section 7.5), provision will be made by SNH to recompense local landowners for economic damage caused by the trial animals. Assessment of such cases will be dealt with sympathetically.

Trial animals will remain the property of SNH until such times as they are removed (if the trial is unsuccessful) or they are considered to be a resident part of the British fauna. The latter will require an assessment of the species' status following the period of the trial. This will require full scientific support for consideration by the Executive.

65 PUBLIC HEALTH

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6.45.1 Disease and water quality

Beavers, like all wild mammals, have the potential to transmit disease. They have been associated in the public press with the human water borne diseases caused by Giardia, and Cryptosporidium, and the fish parasite *Gyrodactylus salaris*. The former two are already present in Scotland and are an issue in terms of public health whilst the latter is an issue for fisheries. It is difficult, of course, to assess to what extent, if any, beavers will pose an increased/additional risk to public health through the spread of disease as there is little information from Europe on this subject. However, the pathogens listed above will be sampled for during the course of the quarantine period of the beavers to ensure that the released animals are disease free.

The question of disease-free animals being infected after release to the wild obviously poses a question of whether their presence enhances transmission of disease above that usually encountered. For this reason, SNH has secured the partnership of the Public Health Department of Argyll and Bute Council, who are conducting regular monitoring of the area as part of the regime of public health control. Sampling began in 2001 prior to any approval to release of beavers in order to obtain baseline data for comparison. A range of pathogens will be tested for within this programme. The design of protocols for public health monitoring is being led by and Argyll and Bute Council. In terms of any impacts on water quality and/or water supplies SNH will be guided by advice from ABC and WOSWA.

The concern has also been raised that the introduction of beavers will result in the spread-introduction of *G. salaris* to our native population of salmon. However, the advice received indicates that this is a parasite of fish which requires a fish host/morphology to survive. Beavers are considered to be only potential external carriers of the parasite (i.e. *G. salaris* does not parasitise beavers). Government precautions will be followed to ensure that any animals are free from the parasite before leaving quarantine. Subject to approval of this licence application, animals will be taken from a Norwegian population which is currently reported as being in an area free of *G. salaris*.

76 PR AND ENVIRONMENTAL EDUCATION

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7.46.1 Public relations

SNH, in collaboration with its partner organisations, aims to keep the local community and wider public informed about the trial in the following ways:

- regular issue of press releases to local and national media throughout duration of trial. In general we aim to establish a good and open relationship with the media, particularly locally;
- co-operate as far as possible with the makers of television documentaries who are interested in the project;
- regular issue of a newsletter to the local community throughout the trial;
- the provision of interpretation and educational materials.
- involvement of universities in research projects at Knapdale e.g. for student dissertations.

SNH and its partners also aims to seek local engagement in project by:

- provision of local interpretation and education for interest groups on-site and off-site;
- involvement of the local schools in the project.
- | • the establishment of a local forum

7 PROJECT PLAN

8.4.7.1 Donor Country

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8.4.7.1.1 The options

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The IUCN Guidelines recommend that, as far as possible, the taxonomically closest population should be used in any re-introduction. SNH are following these guidelines, hence a report (Kitchener & Lynch, 2000) was commissioned to study the morphometric comparison of the skull of fossil British and extant European beavers, *Castor fiber*. The general conclusion of this study was that the skulls of Scandinavian beavers are the most morphologically similar to fossil British beavers. Beavers are currently present in all Scandinavian countries. However, they have only recently been re-introduced to Denmark hence this country is not considered a viable source. Similarly, although Finland supports a population of both European and Canadian beavers, the European species population is thriving at a low level in comparison to the North American species. The reasons for this are unknown, hence Finland is not considered a suitable source. Consequently the options are reduced to Sweden or Norway.

8.4.7.1.2 Genetics

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A concern about using Scandinavian beavers for a re-introduction is that they are based on few founders from a Norwegian relict population and display low genetic diversity. However, researchers have not observed any problems in an intensively studied population in southern Norway that can be linked to low genetic diversity.

8.4.7.1.3 Environmental factors

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Kitchener & Lynch (2000) recommended that it would 'perhaps be beneficial to select animals which survive in a similar climate with a similar selection of food plants and trees'. Telemark County, the proposed location of the source of beavers for the project, is in a relatively mild region of Norway and, although winter temperatures are lower than mid Argyll, it is anticipated that animals from this area will readily adapt. Beavers are highly opportunistic with respect to food plant choice would be able to utilise similar vegetation types in Scotland. Another advantage of using Scandinavian animals is that they will have adapted to a similar pattern of photoperiodism as found in Scotland.

8.4.7.1.4 Practical issues

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Help has been offered from Norwegian researchers based at Telemark College, Norwegian University of Science and Technology, to collect donor stock for the Knapdale project. This offers a number of benefits:

- The participation of experienced and respected beaver ecologists
- The availability of animals which have a known life history. This may include the possibility of obtaining animals which are already implanted with radio transmitters (subject to equipment compatibility), thus reducing such intervention at a later stage. Many of the animals will also be tagged externally (ear-tags);
- Genetic variation may be maximised by selecting animals of known family history;
- The opportunity to select animals from rivers known to be free of diseases, such as *Gyrodactylus salsii* and *Giardia*;

- A history of co-operation on re-introduction work has been developing between Norway and Scotland. Most recently, Norway provided donor stock of White-tailed Sea Eagles for the Scottish re-introduction.

In addition, the British Embassy, Oslo, has already expressed an interest in contributing to the current project, for example, through the establishment of Norwegian-Scottish school exchanges.

The main issues which will arise with the use of Norwegian animals is the more complex importation requirements due to the non-EU status of Norway. As a non-EU country, importation of animals from Norway will be subject to the restrictions of the Balai Directive (Council Directive 92/118/EEC). This limits the number of ports of entry through which the animals can be transported into Scotland. The current information received is that animals could be imported into Scotland through Glasgow Airport (and there are other approved airports in England).

7.1.5 Conclusions

In conclusion that Norway, specifically southern Norway where environmental conditions are generally similar to Scotland, provides the donor population. This satisfies the recommendations of the IUCN Guidelines.

8.27.2 Capture and Timing

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On the basis of expert advice received from Norway and other European countries, autumn is the optimum period for the collection of beavers. This takes into account the difficulties of winter capture and the avoidance of problems due to capture during the breeding season. Animals captured and transported during autumn would be retained in quarantine for six months, with a view to a release in spring the following year.

It is the intention of the project to establish three family groups of beavers within the trial site. Three potential areas have been identified within Knapdale as suitable for the release of, and occupancy by, beavers (see below). Based on information received from specialists working on the beavers in Telemark, family units of beavers consist of four to six animals on average (an adult pair, and up to two or three offspring of the current year and one or two offspring of the previous year). This would result in the release of up to about 18 animals at the site.

There is inevitably some risk that during the quarantine period there may be some animal mortality. SNH, after consultation with relevant specialists, would consider not releasing any family to Knapdale which loses one or both adults during the quarantine period (the surviving animals from these families would instead have to be returned to the donor country or housed in a collection). Therefore, in order to ensure that three families are available for release at the same time in spring 2003, the costs for the capture, importation and quarantine of four beaver families are catered for in the project budget, rather than three families. This is to ensure that there is a spare family which would only be released at the trial site in the event of any adult mortality in the other three beaver families during the quarantine period. If the additional family is not required, then the animals could be returned to the donor country or accommodated by the providers of the quarantine facility as part of their collection. It is possible that they could be released at Knapdale but that will depend on the outcome of predictive modelling work which will assess whether the carrying capacity of the trial site will be sufficient (see Section 7.7.1).

Norwegian researchers currently use hand-netting as their preferred means of capturing animals. This is considered to be an efficient and safe means of obtaining target animals whilst they are fully visible (thereby minimising capture stress and risk). The use of targeted hand-netting may, however, incur additional time and expense to ensure the capture of whole family units. All efforts will be made to ensure whole family units are collected.

8.37.3 Quarantine

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The importation of beavers falls under the Rabies (importation of Cats, Dogs and Other Mammals) Order 1974 (as amended). Consequently imported animals would be subject to statutory containment in approved quarantine facilities for a period of six months.

8.3.47.3.1 The options

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There is currently no registered site for beaver quarantine in Scotland. Consequently there are three options:

1. Quarantine animals in existing approved facilities outwith Scotland.

Beavers have recently been imported to England from Poland and more recently Norway. Quarantine facilities, complying with MAFF requirements, were established for this purpose at the site of the collection. The manager of this site has offered to make these facilities available to SNH for the purpose of the beaver re-introduction. To date this facility has been used to house only 9 animals. Consequently the necessity for modification to house up four families would have to be investigated.

2. Modify existing facilities.

Although there are no facilities registered for beavers in Scotland, other facilities to house aquatic/semi-aquatic mammals are available. Under these circumstances, it may be possible to modify existing facilities to meet the husbandry requirements of beavers within the guidelines of ~~Scottish Executive Government~~ approval.

3. Build new facilities.

Several factors need to be taken into account when establishing a quarantine facility. These include husbandry requirements, location and cost. Whilst existing facilities may be available for modification, circumstances may arise where it is more cost-effective and suitable to establish a new facility. Consequently, consideration has been given to this option also.

8.3.27.3.2 Recommendation

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Whilst the option for quarantining in England must be considered, on balance this is not a favoured approach in view of the distance over which the animals would need to be moved to the release site immediately prior to a release. Beavers should only be contained in very close confinement for a maximum of three days. Whilst transport itself may take only one day, provision would have to be made to allow the animals to settle near the site prior to release. This would require additional facilities to be established. In view of this, modifying existing or building new facilities in Scotland are the preferred options being investigated. Advice will be sought from the specialists in England who have experience of constructing approved quarantine

facilities for beavers. To date, SNH has received expressions of interest from three facilities within Scotland who are willing to undertake the necessary construction/modification works.

8.47.4 Release

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Two options are available for the release of animals: 'hard release' or 'soft release'. 'Hard release' involves the direct release of animals to the wild from the transit cages. It presents a more cost-effective method of release but has the potential to expose the animals to greater stress, and thereby possibly enhanced susceptibility to disease and mortality factors. 'Soft release' involves the use of artificial structures to provide shelter for released animals. Whilst this is a more expensive and time-consuming method, it provides the potential to i) reduce stress to the animals by providing instant shelter and ii) reduce the need for animals to seek out shelter iii) reduce the risk of animals moving away from the specific re-introduction loch site. The 'soft release' option is preferred and costings have been prepared for the construction of artificial lodges at all three release areas.

7.5 Beaver Management

7.5.1 Containment options

The primary aim of the trial is to establish, for study, a population of beavers within an agreed study site. However, as the beaver is a mobile species, there can be no guarantee (despite the provision of artificial lodges) that they will remain faithful to this particular site on release. Consequently provision is in place for deliberate containment of the animals.

Several methods are available by which the movement of released animals may be restricted (see below). Each of these methods presents some risk of animals escaping from the site undetected. Consequently, it must be recognised that there is no absolutely assured method of confining the animals. In accepting this principle, a priority of the trial is to ensure sufficient staff and resources are available to enable efficient monitoring of each of the animals following release.

There are three main approaches to containing released animals:

- physical barriers, e.g. fencing,
- habitat manipulation or
- capture and removal of animals straying beyond the accepted boundaries of the study.

Given the size of site which is required to investigate the characteristics of dispersal, it is unlikely that the integrity of a fence of sufficient length could be maintained at the standard required for containment. Nor is it desirable given that the primary purpose of the trial is to study beavers in the wild. Thus, whilst fencing may be suitable for fencing the outflows of the release lochs initially and for small areas ~~may be an option~~ for other management reasons, this is not a viable option to restrict animal movement over, or from, the whole study site.

Habitat manipulation to deter/attract beavers along preferred routes has also been considered. However, given the capacity of the species to modify its environment to suit its needs, such an approach is likely to be costly and meet with limited success. Consideration should be given to investigating this method as a tool in long-term management, but it cannot be relied upon as a sole method of containment.

The third option, for the identification and removal of animals straying beyond the

agreed boundaries of the study, although expensive, is potentially the most reliable and efficient method of containment available. This is the option which will be used at Knapdale. All the released adult animals will be radio tagged individually for the purpose of identification and tracking, which will significantly increase the likelihood of detecting individual movements over an extended period of time (consideration is also being given to the use of remote data logging equipment capable of storing data from a number of antennae simultaneously).

7.5.2 Movement of animals outwith the trial area

A dedicated SNH field officer will monitor the movements of the animals. The likelihood of individual detection by this method is particularly feasible given the limited number of animals which are required for the trial study.

It is still very likely that some animals will try to move outwith the trial area. The released animals will be radio-tagged and so any such movements should be detected, whereupon they will be trapped and retrieved. However, due to the possibility of tags failing, or young animals dispersing prior to being tagged, the possibility of un-tagged animals moving beyond the area must be considered. The tendency of the animals to remain close to the water and leave obvious feeding and engineering signs will assist with finding animals outwith the agreed boundary. In such cases, it is anticipated that the individual beavers would be reported to SNH within a relatively short period, aided by liaison with adjacent land owners and managers e.g. farmers, British Waterways staff (who manage Crinan Canal north of Knapdale), anglers, FE staff, etc.

Whilst every effort will be made to contain the animals within the study area, provision will be made for the rapid and efficient removal of animals straying outwith the trial area. This will be implemented where animals take up residence in an area against the wishes of the landowner, or are considered to be causing unacceptable levels of damage.

Beaver trapping techniques have been well tested on the Continent. The safest and most efficient techniques are netting and the use of a cage-type trap. The latter has been developed by beaver specialists in Germany and is based on traps used for foxes and badgers. It can be used on land or in shallow water, is easy to set, and does not harm the animals or people.

Netting techniques have been developed in Norway. This involves the use of hand held nets used from boats or on land to trap the beavers. Netting is generally undertaken at night and spotlights used to locate the animals. This, too, has been found to be an effective technique, particularly in lochs and large river systems.

Trapping will be by the use of live-traps set on beaver runs. Trapped beavers will be returned to the trial area. It is anticipated that most animals will be returned to the location from which they strayed. However, in the case of unidentified animals (see above), suitable sites will be sought within the study area for re-release. Radio-tags will be checked, or fitted to untagged animals, to investigate the incidence of repeat offenders.

Persistent offenders will be those that are caught repeatedly outside the trial area. They will be removed from the trial areas and agreement will be sought with European colleagues to return them to the donor country or to donate them to re-introduction programmes elsewhere. Movement of such animals will take into

account the social nature of the species and, therefore, the need for integration into existing areas or social groups. Alternatively they may be housed in a collection (previous agreement will be sought with the host quarantine facility to house a maximum number of straying animals). Under circumstances where these options are not available, the animals will have to be humanely destroyed (see below).

Whatever situation arises a holding enclosure will be made available for transfer of animals from the trial to the captivity site.

The situation may arise when trapping is either unsuitable or unsuccessful for the removal of beavers from outwith the trial site. In this situation, animals will be darted or shot (experience from mainland Europe indicates that beavers are easy to control in this way). Shooting would be used as a last resort for any 'untrappable' beavers, where a landowner/manager requests rapid removal of the animal (and the conditions preclude trapping as an efficient means), or where no other way is identified of dealing with the situation. The use of shooting to remove animals will be identified within the SNH/FE agreement and an arrangement will be made with a suitably qualified contractor to carry out the work as necessary.

7.6 Exit strategy

An exit strategy is an integral part of the project plan. This may be implemented either during the trial if major insurmountable problems occur, or at the end of the trial. The reasons for considering implementation of an exit strategy are as follows:

1. Unsustainable and detrimental effects arise as a result of the re-introduction of beavers to the trial area;
2. There is an insupportable level of mortality in released animals as a result of persecution, human intervention or natural mortality attributed to trial procedures;
3. The security of the site is compromised to the serious detriment of the animals.

These criteria apply equally to forestry, agriculture, fishery or conservation interests, as well as presenting options for implementation of an exit strategy where there appears to be serious risk to the health or status of released animals or their progeny.

There are four options described below:

7.6.1 *Option 1: Repatriation of animals to the country of origin/transfer to other re-introduction programmes.*

The opportunity for repatriation of animals will depend largely on the terms and conditions under which they were obtained and the reasons for their return. Conditions for repatriating animals may be included in the original negotiations with the donor country. However, it must be accepted that the donor country may not wish to receive any animals back. Similarly, the donor country would be under no obligation to accept animals which were born into the wild in Scotland. Consequently this option would become increasingly difficult to implement the longer the trial continued.

Problems of disease transmission must also be considered when considering repatriation, as animals living in the wild in Scotland may be exposed to pathogens which are not present in their area/country of origin. In view of this, full quarantine may be required (within Scotland) to satisfy import requirements for repatriation. Moreover, exposure to these pathogens may cause stress-induced problems imposed by further transportation. Such considerations would require full veterinary assurances prior to making arrangement.

Consideration may also be given to the transfer of animals to re-introduction programmes being conducted elsewhere.

7.6.2 *Option 2: Housing of animals in zoological collections*

This will depend on the facilities available and the number of beavers which require housing. The latter will depend greatly on the length of time for which the trial continues and the success of breeding during this period. It is likely that this option is feasible only if the exit strategy is implemented early in the trial (or if the mortality of the trial animals is high/breeding success is low.) It is unlikely that sufficient places will be available to house all the animals in the longer term, or at short notice.

7.6.3 *Option 3: Capturing, neutering and returning animals to live their life span in the wild.*

Animals may be sterilised, in order to stop population growth, but be allowed to live out their natural life span in the wild. Although an attractive options for those opposed to humane destruction, this option presents several welfare issues which need to be taken into account when considering whether it is feasible. For example, does sterilisation affect the natural life-cycle of the animals? How humane is this process to the last surviving animals given the communal nature of the species and the solitary existence which would be imposed by the gradual demise of animals? Is this acceptable given the alternatives?

In addition to welfare considerations, the reasons underlying implementation of the exit strategy need to be taken into account. This is of greatest importance where the strategy was implemented because of adverse impact on the environment, as it is likely that these will continue as long as the animals remain in the wild. Consequently, this option may not be acceptable to all partners.

7.6.4 Option 4: Humane control of animals

Methods of humane control are well known and the option would require the collection, or hunting, of all known animals for destruction.

Although relatively easy to implement, the ethical issues surrounding the control of animals introduced for the purpose of a scientific experiment need to be considered carefully.

7.6.5 Recommendations

Each of the options has advantages and disadvantages. In addition to the disease and other practical problems of repatriation, there is an inherent ethical question attached to a mechanism which delegates responsibility for the care or destruction of animals back to the host country, whilst subjecting the animals to the additional stress of further transportation. Consequently, this method is not recommended either on the basis of its feasibility or acceptability.

Similarly, without prior assurance of places for all animals received or born into the trial, it is not anticipated that sufficient places could be found to house all the trial animals within existing collections. Where this is possible, opportunities should be taken. However, it is not recommended that this should be relied on as the sole method for the exit strategy.

Neutering and release has limited advantages as this requires the continuation of the experimental protocol (e.g. monitoring, mediation for damages, etc.) for several years after the decision has been made to terminate the study. Given this, together with the welfare implications of a depleting population through time, this method is not recommended.

Although every effort will be made to arrange for animals to be returned to the donor country, sent to other re-introduction projects and/or captive collections, the option of humane control of animals will be used if necessary since it is the most effective method for disposing of animals in the wild. This is in accordance with the principles of species management and acceptance of this is essential to underpin the validity of the trial. The two most likely methods of humane control will be trapping and killing of animals by veterinary surgeons and shooting in the wild.

8.67.7 Research and monitoring strategy

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An effective monitoring programme is imperative to ensure that sufficient and appropriate information is collated during the trial to underpin an informed decision on the feasibility and viability of restoring a widespread population of beavers to Scotland. Moreover, in order to ensure that the monitoring programme is effective, protocols for this will be in place prior to the release of any animals to the study area. Regular measurements will be made on the health and status of the beaver population, their behaviour and changes to environmental conditions locally both prior to and following the release of beavers. Subsequent comparison of this information will identify changes to local landscapes which may be attributed to specific aspects of beaver occupation or behaviour.

The use of GIS will play an important role throughout the whole project in the interrogation, analysis and presentation of data. Initially all existing survey information will be collated and, where appropriate, placed on GIS.

A paper entitled 'Trial Re-Introduction Of The European Beaver To Scotland: Scientific Issues' was submitted to SNH's Scientific Advisory Committee (SAC) for consideration during their meeting of 4/10/01. The SAC was content with the design of the scientific element of the project. Some advice was provided on quarantine arrangements which will be acted on.

8.6.47.7.1 Predictive model

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SNH has already undertaken a study to develop an individual-based computer-generated model to investigate the spread of beaver from theoretical release sites across Scotland (Rushton *et al.* 2000). The model uses information on the known ecological requirements and life-history strategies of beaver, as well as prevailing habitat conditions.

An additional contract will commence within the next month to enable this model to be refined, applied and field-validated specifically to Knapdale. Its primary aim will be to provide an assessment on how the beaver population may change during and after the proposed beaver trial. Information collated from initial baseline habitat survey will provide a basis for modelling the likely behaviour of the beavers over time at Knapdale.

Although interpretation of the model results will require considerable caution (given the capacity of the species to adapt to new circumstances) and, therefore, extrapolation to the Scottish context could not be absolute, such an approach could warn of potential conflicts which may arise at different stages of the trial. After the trial, the model will be developed following a comparison of the predicted outcome with the actual observed outcome of beaver population dynamics at Knapdale. This will then be used to investigate the capacity for new areas to support a beaver population, taking into account various habitat parameters.

7.7.2 Beaver ecology

Individual adult animals will be tagged, for the purpose of tracking and identification. Information on their health and status will be collected at regular intervals. This work will be largely undertaken by the SNH Field Officer. The following parameters will be measured:

- Survival;
- Breeding success/fecundity;
- Distribution/dispersal;
- Interactions with other species.

Measurements of these elements will be made using field observations. Tagging of new individuals will require trapping and handling at suitable periods. In addition, the information collated through practical observations and surveys will provide a dataset which may be used to refine the accuracy of the initial predictive population model.

The distribution and habitat use by beavers will be monitored, providing information on

- Feeding areas;
- Types of food;
- Use of burrows and lodges.

As well as observing the impact of beavers on land use, measurements will be made to ascertain the impact of such activities on beavers, e.g. forestry practice and angling activities.

7.7.3 Damming behaviour

In order to gauge the impacts of any dams built, it will be necessary to measure the frequency of construction and maintenance of beaver dams. Consequently, the following will be recorded during the course of the trial period:

- frequency of dam construction;
- seasonality of dam construction;
- method and dimensions of dam construction;
- the relative stability (longevity) of dams;
- the potential for major sediment pulses and downstream erosion as a result of single or multiple dam failures.
- effect of dam building on surrounding habitat (e.g. tree removal, flooding impacts)

Measurement of these elements will be carried out primarily through direct, non-invasive observations. Information on dam construction will be associated with habitat information (see below) to determine any characteristics commonly attributable to siting or construction of dams.

7.7.4 Terrestrial and aquatic habitats

As well as monitoring the success/failure of the establishment of the beaver population, information will be collated at regular intervals from which to assess the ecological effects of beaver occupation locally. This will be measured on two scales; changes within the core range of beaver colonies, and gross changes at the level of the study site.

Terrestrial vegetation surveys will be undertaken in the riparian areas, and more detailed information will be collected on the distribution and abundance of tree species which beavers may use for food or engineering purposes. Detailed habitat maps prepared prior to the release of beavers will be used to record changes to the landscape during the course of the study. These will take into account any seasonal effects or trends in foraging behaviour noted throughout the course of the trial period (tracking changes through release and establishment phases). Existing information is currently being collated and new surveys are planned for spring 2002.

A co-ordinated programme of work to effectively monitor the aquatic and semi-aquatic habitat over the trial period will be developed by April 2002. This will include the development of methods for monitoring aquatic/semi-aquatic macrophytes, water chemistry/quality and freshwater invertebrates at Knapdale during the trial period which will contribute towards an assessment of the effect of the beaver re-introduction to Knapdale. The programme will ensure the monitoring of these aquatic

features is done in an integrated and cost-effective manner and that they link to other monitoring studies being undertaken at Knapdale as part of the beaver project. An initial baseline survey for aquatic macrophytes will be undertaken in summer 2002.

Physical 'in-river' and loch habitat parameters will also be measured. Primarily these will address:

- levels of sediment transport along the water course;
- the source of sediment stored/accumulated within beaver ponds;
- any changes in water level locally;
- the stability of banks occupied by beavers;
- alterations to the watercourse network attributable to the creation of beaver canals or re-routing existing watercourses;

7.7.5 Species of conservation interest

Baseline monitoring of the resident otter population will begin prior to the release of beaver. Otters are valued by the local community and the effect of beavers on the otter population was raised as a concern during the local consultation.

The site is notified as an SSSI for its dragonfly interest, particularly *Brachytron pratense*. It is predicted that *B. pratense* may benefit from the activities of beavers, such as the opening up of riparian areas and the increase in availability of dead vegetation for egg laying. The monitoring of dragonfly species will also be undertaken, again in co-ordination with Site Condition Monitoring requirements.

7.7.6 Disease

See Section 5.

7.7.7 Land uses

One of the key aims of the trial is to investigate the potential effect of beaver occupation on the landscape and current land uses. Knapdale will provide an excellent opportunity to examine beavers alongside ongoing forest management. It will include effects on infrastructure such as culverts, roads and ditches. Knapdale also has some small areas of rough grazing land within private land holding which could perhaps allow some examination of how they utilise this land use type. Land use information will be mapped prior to the release of beavers.

Biotic factors which influence freshwater loch fisheries will be monitored at Knapdale. Consequently, research on these topics will provide a basis for developing an understanding of the impact of beavers on water bodies, for example the change in water conditions around a beaver dam. It could be argued, however, that this research will be conducted largely on static water systems and, as such, will have limited applicability to flowing systems, such as salmonid rivers. Consequently alternative options to allow the study of beavers alongside salmonid river fisheries are currently being investigated. For example, SNH will investigate the possibility of collaborating with an existing study on the effects of beaver dams on native fish movements in Norway.

8.9.7.8 Compensation

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8.9.17.8.1 General SNH Policy

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SNH will pay compensation for proven loss or damage by the same principles as are available under other management agreements, i.e. use of a land agent to negotiate and pay ~~other~~ the other party's costs. However, the aim will be to avoid loss or damage occurring in the first instance by removing the source of the problem (e.g. a dam) at an early stage, or by fencing of vulnerable areas to protect from beaver damage in certain situations. However, the process of identifying, evaluating and paying compensation will be set in place prior to commencement of the trial to enable rapid action by both the affected landowner and appropriate SNH departments where required.

8.9.37.8.2 Scenarios when SNH might have to pay compensation

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There are several circumstances under which SNH would consider the payment of compensation for damage. These are identified below.

Damage to agriculture

This may occur either through flooding of ground (through the construction of dams) or through inappropriate feeding behaviour. Given the limited number of burns within and adjacent to the trial area, it is anticipated that flooding would be unlikely to present a major problem. However, monitoring of vulnerable sites should allow the early detection of dam building behaviour and/or the identification of offending animals. Flooding effects can be tempered by the use of pipes although experience from the Continent suggests that this only delays the problem as beavers may construct another dam adjacent to this.

Feeding on ~~g~~-grass or crops is only likely to occur when they are within close vicinity of freshwater (20-60 metres). Feeding on agricultural grass crops is unlikely to be a problem given their wide range of food plants and their preference to graze on plants in or adjacent to water.

Damage to forestry (both FE and private interests) ~~Again,~~

The flooding of forestry land is not anticipated to present a significant problem given the limited number of burns within and adjacent to the trial area. Also, the same principles of early detection apply as above. FE staff will also be present within the trial site to assist project staff in the early detection of potential problems.

It is not anticipated from experience elsewhere that there will be much, if any, direct damage to the commercial conifers of Knapdale Forest.

Monitoring of riparian and other broadleaves will be carried out in the trial area as part of the project and if unacceptable damage occurs remedial action will be taken which could include removal of offending beavers and/or fencing of vulnerable areas.

Liaison will be maintained with neighbouring land managers to detect flooding and tree damage at an early stage.

Amenity interests

The main interests in this respect include ornamental trees (mainly in gardens, and not likely to be numerous adjacent to water in mid-Argyll), fruit trees (again, not likely to be numerous in mid-Argyll), vegetable gardens (not many in mid-Argyll) and willow for coppice adjacent to water.

The monetary value of these interests is difficult to quantify. Whilst SNH are content to include these in the provision for compensation payments, it is considered more appropriate to identify vulnerable areas and provide some form of barrier protection to deter problems, e.g. wire guards around vulnerable trees, before damage occurs.

Fishing interests

Liaison with the local angling club which has a lease on most of the trial lochs will be a key part of the project and should help to identify any problems at an early stage. In addition the anglers have other sites in the local area, outwith the trial area, and will be able report any signs of straying beavers. Problems which will be provided for include dams on spawning areas and damage to banks.

Water supplies

Private water supplies that might be at risk from dams, e.g. burn supplies, will be regularly checked by project staff and dams and offending beavers removed. Any problems in water quality or pathogens will be detected via the monitoring carried out for SNH by Argyll and Bute Council, and necessary remedial action taken on their advice.

British Waterways

Close liaison with British Waterways staff will be a key part of the project in order to identify potential problems at an early stage. Potentially vulnerable sites, e.g. supply lochs and inflow/outflow burns, will be checked on a regular basis by project staff, and there will also be regular liaison with British Waterways staff.

8.447.9 Post-project assessment – criteria for success/failure

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Following completion of the trial period, information will be collated, both on the scientific and socio-economic implications of the trial, and presented for consideration by the Management and Project Groups. This information, and the views of the Groups, will subsequently be presented to SNH for consideration on whether the trial has been successful or demonstrated limitations. Then SNH will make a recommendation over future action and consult external parties and the Scottish Executive to agree the way forward.

Draft criteria for success:

- Survival of introduced animals is similar to successful re-introduction programmes elsewhere in Europe at similar period of population establishment.
- A stable or increasing core population is achieved within the limits of the study site.
- Beaver re-introduction is integrated with habitat management/restoration.
- An assessment of the positive impact of the economy of the area as a result of the presence of beavers.

Draft criteria for failure:

- Mortality levels preclude establishment of a population.
- Significant and unsustainable damage is incurred by the ecosystem within the study site.
- The area suffer significant economic loss as a result of beaver activities
- Costs of project/damage/management significantly exceed expectations

8.427.10 Post-project options

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The purpose of the trial is to determine, in lieu of a full re-introduction, the likely extent of impact of restoring the European beaver to Scotland. Consequently, there are several possible likely outcomes of the trial:

- Option (i) The trial is a success and a full re-introduction of beavers to Scotland is recommended: Beavers to be allowed to naturally colonise out of Knapdale.
- Option (ii) The trial is a success and a full re-introduction of beavers to Scotland is recommended: One or more new populations to be established throughout Scotland.
- Option (iii) The trial is a success but it is concluded that additional information is required before a decision can be made as to whether to proceed with a full re-introduction. Maintain only the population within Knapdale.
- Option (iv) The trial is a success but it is concluded that additional information is required on the effects of beaver presence on salmon rivers before a decision can be made as to whether to proceed with a full re-introduction. Set up a new trial site
- Option (v) The trial is a success but continuation of the Knapdale population opposed: Beavers translocated from Knapdale to a new Scottish site(s).
- Option (vi) The trial demonstrated insurmountable problems and/or levels of damage and is deemed a failure. Under these circumstances, implementation of the exit strategy would be recommended.

Combinations of some of the above options are also possible.

7.11 Project management structure

The Project involves a number of groups with responsibility or input to overall management and liaison. Groups which have been constituted for this purpose are:

- SNH Beaver Project Group – this facilitates access to a wide range of in-house specialist expertise in addition to local staff representation and management. The function of this group is to oversee implementation of the re-introduction project in accordance with the principles and practices discussed with other relevant parties and agreed under the licence.
- ~~Local Management Group~~ Knapdale Beaver Management Group – comprises representatives ~~or stakeholders~~ FE, SWT, ABC and SNH. The function of this group is to provide strategic input to operation decisions in the context of local landowner/manager procedures and practice.
- A Local Forum ~~Local Forum – an annual event which facilitates access to the project for any interested party. This operates an open door policy to allow comment or contribution on the project on an on-going basis.~~ which will be established if the SE approves this licence application

SNH, as the licence holders, will be responsible for implementation of the project. A legal agreement between FC and SNH will be drawn up which specifies the role of the two organisations in the working of the trial. FE staff will exercise this agreement via the Knapdale Beaver Management Group.

8.147.12 Staffing

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The project will employ a dedicated member of staff during the period of the trial. This officer will be employed to conduct field monitoring and tracking of the animals, taking responsibility for periodic monitoring of the health and status of the beaver population on site. This post will also be responsible for maintaining a record of distribution, and ensuring the trapping, return or humane destruction of aberrant animals.

An existing member of SNH staff will be appointed as Project Manager to oversee implementation of the Project Plan. This will include establishment and maintenance of the necessary management agreements, coordination of research and monitoring, local liaison, PR and finance.

~~In addition to the Field Officer, a Project Officer will be employed to oversee implementation of the Project Plan. This will include establishment and maintenance of the necessary management agreements, as well as local liaison, PR and finance. It is anticipated that this post will initially be employed as full time, dropping to half time a year after the release has taken place. This would increase to full time towards the end of the project, to assist with the collation of data and information for decision making.~~

8.157.13 Health & Safety

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SNH has a responsibility to secure the health and safety of all staff and others who may be affected by its operations. This includes project staff working on the project. SNH will seek guidance from the Health and Safety Executive over novel aspects of the project.

FC as the landlord will place certain responsibilities upon SNH as tenant. Equally FE will have responsibilities as landlord to SNH and other tenants, contractors and the public. These arrangements will be vested in the lease to be drawn up between the two organisations.

SNH will provide guidance on methods which should be adhered to ensure safe working conditions for all staff. This will include methods of handling animals and conducting experimental tests. Protective equipment, including radio equipment, will be provided to staff working in the field.

8 TIMESCALE

- Autumn 2002 – beavers captured and brought to Scotland for quarantine
- Spring 2003 – beavers released at Knapdale.
- Spring 2003-Spring 2008 – 5 years of trial period monitoring effects of beavers.
- 2008 – evaluation of trial by SNH, in consultation with other appropriate parties and production of report for consideration by Scottish Executive.
- 2008/09 – decision on beavers in trial area (beavers remain at Knapdale during 2008/9 until decision made).

409 CONCLUSION

SNH consider that a scientific trial at Knapdale is the appropriate way to proceed to help determine the suitability of the re-introduction of beavers to Scotland. The proposed trial incorporates adequate safeguards for the natural heritage and land and water interests and its scientific approach will provide sound information to help guide future decisions. SNH requests that Government grants a licence for the trial release of European beaver into the wild in Scotland at Knapdale, Argyll, under Section 16(4) of the Wildlife and Countryside Act 1981 as amended.

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ANNEXES

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| Annex 1 | Map of Knapdale Trial Area |
| Annex 2 | Trial Re-introduction of European Beaver to Taynish and Knapdale Woods cSAC: 'Appropriate Assessment' |
| Annex 3 | Business Case and Finance Spreadsheet |

APPENDIX i. Beaver Reintroduction Project Budget Summary

	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Year 5 Total	Year 6 Total	Year 7 Total	Project Total Total
Total Project Costs								
Core Scientific Project	99147	77258	54836	58490	59778	80841	59820	490171
	99147	77258	54836	58490	59778	80841	59820	490171
Total Project Funding								
Agreed Funding (as at Nov 2001)								
SNH core scientific project funding	39945	39951	17530	25184	26728	60841	39820	250000
Mammals Trust UK (PTES) (£20k/yr for yr. 1-7)	20000	20000	20000	20000	20000	20000	20000	140000
Mammals Trust UK (PTES) support for quarantine costs	10000	0	0	0	0	0	0	10000
Funding identified, but not yet secured (as at Dec 2001)								
Corporate Sponsorship	23482	1587	1586	1586	1586	0	0	29827
In Kind sponsorship	5720	5720	5720	5720	5720	0	0	28600
Shortfall no source as yet identified (as at Dec 2001)	0	10000	10000	6000	5744	0	0	31744
	99147	77258	54836	58490	59778	80841	59820	490171

Project 'starts' on the ground on 1 April 2002 Year 1

Core project costs								
Legislation	0	0	0	0	0	0	0	0
Site preparation/ management agreements	100	100	100	100	100	100	100	700
Donor stock	4270	0	0	0	0	0	0	4270
Importation	1647	0	0	0	0	0	0	1647
Transport	6614	0	0	0	0	0	0	6614
Quarantine	27000	0	0	0	0	0	0	27000
Release (soft release option)	0	2650	0	0	0	0	0	2650
Tracking/ Site personnel	32166	50983	37961	40840	44878	49116	49765	305709
Research and Monitoring	25000	15000	12000	15000	12000	27000	3000	109000
Mitigation/ Compensation	0	1600	1600	1700	1700	1700	1700	10000
Whole Habitat Provision	1125	375	375	375	375	375	0	3000
Project Management	1225	550	800	475	725	550	800	5125
Exit Strategy (humane destruction)	0	0	0	0	0	0	4456	4456
Publicity	0	6000	2000	0	0	2000	0	10000
	99147	77258	54836	58490	59778	80841	59820	490171
Core project funding								
Agreed Funding (as at Nov 2001)								
SNH core project funding	39945	39951	17530	25184	26728	60841	39820	250000
Mammals Trust UK (PTES) (£20k/yr for yr. 1-7)	20000	20000	20000	20000	20000	20000	20000	140000
Mammals Trust UK (PTES) Contribution to quarantine	10000							10000
Funding identified, but not yet secured (as at Dec 2001)								
Corporate Sponsorship								
Beaver transport from Norway sponsor @ 100%	3482	0	0	0	0	0	0	3482
Tracking sponsor @ 50%	4000	1587	1586	1586	1586	0	0	10345
Site vehicle sponsor @ 100%	16000	0	0	0	0	0	0	16000
In Kind sponsorship								
Veterinary services in kind @ 50%	5720	5720	5720	5720	5720	0	0	28600
Shortfall no source identified (as at Dec 2001)		10000	10000	6000	5744	0	0	31744
	99147	77258	54836	58490	59778	80841	59820	490171

Additional parallel projects								Total indicative costs
With the exception of some of the education and interpretation, all costs are very approximate								
Each element is stand alone, although there may be opportunities for joining projects together for funding bids								
Interpretation & education work, including visitor facilities								
minimum	0	11550	27550	6550	5050	5050	0	55750
maximum (including upgrade of visitor centre)	0	11550	27550	106550	10000	5050	0	160700
Student Exchanges	3000	3000	3000	3000	3000	3000	0	18000
Extended Community Involvement	2500	2500	2500	2500	2500	2500	1000	16000
Salmonids research	0	15000	15000	0	0	0	0	30000
Extended research programme (University)	15000	30000	30000	30000	10000	10000	0	125000
Filming	10000	15000	10000	15000	10000	5000	0	65000
Other related conservation projects	20000	20000	20000	20000	20000	20000	20000	140000
Additional parallel project funding								
Funding agreed in principle								
Scottish Natural Heritage								25000
Mammals Trust UK (PTES)								10000
Potential sources of funding identified (no approaches been made to date)								
Argyll and the Islands Enterprise								0
Argyll and Bute Council								0
Forest Enterprise								0
Research Councils								0
Norwegian Embassy								0
British Council								0
EU Transitional Funding								0
Limited potential for commercial sponsorship, lottery (HLF) and charitable trust funding								0

ANNEX 2

TRIAL RE-INTRODUCTION OF EUROPEAN BEAVER TO TAYNISH AND KNAPDALE WOODS cSAC: 'APPROPRIATE ASSESSMENT'

1. Introduction

This paper deals with the 'appropriate assessment', in terms of Articles 6.3 and 6.4 of Council Directive 92/43/EEC (the 'Habitats Directive'), as enacted through Regulations 48 and 49 of the Conservation (Natural Habitats etc.) Regulations 1994 (the 'Habitats Regulations'), for the trial re-introduction of the European beaver *Castor fiber* to Taynish and Knapdale Woods cSAC.

The proposal is not directly connected with or necessary to site management for nature conservation.

The Annex I habitats and Annex II species for which the site has been recommended as a cSAC are shown below.

Annex I habitats and Annex II species for which the site has been recommended as a cSAC	Abbreviated term used in this paper
<i>Euphydryas (Eurodryas, Hypodryas) aurinia</i> – marsh fritillary butterfly, for which Taynish and Knapdale Woods cSAC is considered to be one of the best areas in the UK	MARSH FRITILLARY BUTTERFLY
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles - for which Taynish and Knapdale Woods cSAC is considered to be one of the best areas in the UK	WESTERN ATLANTIC OAK WOODLAND
<i>Lutra lutra</i> – otter, for which Taynish and Knapdale Woods cSAC is considered to support a significant presence	OTTER
Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littoreletea uniflorae</i> and/or of the <i>Isoeto-Nanjuncetea</i> - for which Taynish and Knapdale Woods cSAC is considered to support a significant presence	LOCHS WITH AQUATIC VEGETATION

The European beaver is also an Annex II species but will not be considered as 'ordinarily resident' in Britain while the trial is taking place. Consequently it is not, at the present time, being considered as a qualifying interest for the

cSAC. European beaver is also listed on Annex IV as an 'animal species of Community interest in need of strict protection'.

This consideration will be restricted specifically to the proposed trial which will, subject to approval, be licensed by Scottish Executive i.e. the reintroduction of European beavers to Knapdale in Spring 2003 where they will be managed for a six year period (further details in section 3 below). Once the trial has been completed, the future of the beavers at Knapdale will be considered as part of a wider consideration as to whether beavers should be re-introduced to Scotland. At this time, a consideration of the effects of the retention of beavers at Knapdale on the qualifying interests of the cSAC will be undertaken, and this will use the results of the detailed research and monitoring programme of the trial to inform any decision.

The consideration of this proposal is addressed as follows in the sections below:

- Background to the trial re-introduction
- Summary of the proposal
- European experience
- Conservation objectives
- Test for significant effect
- Test of effect on site integrity
- Conclusions

2. Background to the trial re-introduction

The European beaver *Castor fiber* was resident in Scotland until about the 16th century, when it was persecuted to extinction by over-hunting. Since 1995, SNH has been investigating the potential for reintroducing the species following IUCN guidelines. This is in accordance with Article 22 of the Habitats Directive which states that Member States shall 'study the desirability of re-introducing species in Annex IV that are native to their territory where this might contribute to their conservation, provided that an investigation, also taking into account experience in other Member States or elsewhere, has established that such re-introduction contributes effectively to re-establishing these species at a favourable conservation status and that it takes place only after proper consultation of the public concerned'.

In March 2000, the SNH Board agreed that SNH should undertake a carefully controlled field trial re-introduction of the European beaver in collaboration with a partner organisation with appropriate land holding, subject to a number of conditions. Following this, discussions took place between SNH and Forest Enterprise (FE) as they offered the use of one of their land holdings for the purposes of a trial. After several months work, involving GIS analysis, field work and discussions with relevant FE and SNH staff, Knapdale was selected as a suitable site for the trial.

During a further meeting on 5 September 2000, the SNH Board approved the selection of Knapdale as the trial site, subject to public consultation. This

consultation was completed in early 2001. Shortly after the SNH Board met, the Forestry Commissioners approved unanimously that the trial could proceed on their land at Knapdale.

Under domestic legislation, it is illegal to release into the wild any animal which is of a kind not ordinarily resident in Great Britain (Section 14 of the Wildlife and Countryside Act 1981). In order for the trial re-introduction to proceed at Knapdale, a licence is therefore required from Scottish Executive. The SNH Board met again on 6 November 2001 and gave approval for SNH to formally apply for such a licence from SE. It is expected that a licence application will be submitted to SE by the end of 2001.

3. Summary of the proposal

The primary aims of the trial re-introduction of European beaver to Knapdale are to:

- Study the ecology of the beaver in the Scottish environment
- Assess the effects of beaver activities on the environment, including a range of land uses

The trial site is the Knapdale forest area managed by FE. Part of this area falls within the northern, Knapdale component of the Taynish and Knapdale Woods cSAC. It is not proposed to release beavers within the southern, Taynish component of the cSAC which is separated from the Knapdale component by approx. 0.5km of sea.

Subject to a licence from SE, it is anticipated that beavers will be captured in Norway in autumn 2002, placed in quarantine for a six month period and then three to four families will be released at Knapdale in spring 2003 (approx. 12-24 animals depending on family size and the number of families used). This will be followed by a five year field study which will run until Spring 2008.

Release sites have already been identified. One family will be released on Loch Coille Bharr, one on Loch Linne/Loch Fidle, one on Creagmhor Loch/small unnamed loch immediately to the west. Artificial lodges will be built at these sites to help the animals settle. The fourth family is being brought over to cover any possible mortality during the quarantine period and will probably be returned to the donor country if it is not required.

Some limited and initial baseline survey work started in 2000 with more planned for next year i.e. in the year prior to release of animals. Monitoring work within the study will continue for a period of 5 years following release of the first animals in order to detect any changes in habitat structure or other impacts attributable to beaver presence. Reviews of the information collated will be conducted annually, with provision for terminating the project at any time should unforeseen and unmanageable impacts arise. A final review will be conducted following the fifth year of monitoring to assess the success or failure of the experiment overall. This means that, for the purposes of the trial to be licensed by SE, it is proposed that beavers will be present at Knapdale

for five years while they are studied and a further one year while the outcome of the study is assessed.

A Field Officer will be employed full time to conduct field monitoring and tracking of the animals, taking responsibility for monitoring of the health and status of the beaver population on site and dealing with management issues.

Knapdale has relatively good natural containment. It is bordered to the north by a ridge, with water flowing in a general southerly direction towards the coastline. The west and east sides are bordered by high density conifer plantation and are not suitable beaver habitat. Since beavers tend to restrict their movements to riparian areas, it is likely that they will therefore stay within the Knapdale catchment while the carrying capacity of the site allows.

Radio transmitters will be attached to the adult beavers for the purpose of identification and tracking. Any strays will be caught and returned to the trial area. It is possible that some radio transmitters may fail but beavers leave very obvious field signs (characteristic gnawing on woody plants and engineering constructions) and any reports of beaver activity outwith the trial area will be followed up by the full time Field Officer. Individual animals will then be trapped and returned to the trial area. Trapping techniques are effective and have been well tested on the Continent. The safest and most efficient techniques are netting and the use of a cage-type trap.

An exit strategy is an integral part of the project plan. This may be implemented at one of two points in the trial: during the trial if major insurmountable problems occur, or at the end of the trial. The reasons for considering implementation of an exit strategy are as follows:

- Unsustainable and detrimental effects arise as a result of the re-introduction of beavers to the study area(s). This applies equally to forestry, agriculture, fishery or conservation interests (we will use SNH specialists, and consult with external specialists, in making any assessment) .
- There is an insupportable level of mortality in released animals as a result of persecution, human intervention or natural mortality attributed to trial procedures
- The security of the site is compromised to the serious detriment of the animals.

The humane destruction of animals is recommended as the most effective method of implementing an exit strategy and is in accordance with the principles of species management. The two most likely methods will be trapping and killing of animals by veterinary surgeons and shooting in the wild. However, other methods may also be used if the opportunities arise:

- Repatriation of animals to the country of origin/transfer to other re-introduction programmes.
- Housing of animals in zoological collections.
- Capturing, neutering and returning animals to live their life span in the wild.

4. European experience

As stated above, the European beaver is an Annex II species on the EC Habitats Directive. A brief analysis was therefore undertaken to ascertain whether European beaver was identified as a qualifying species on any cSACs in Europe where the qualifying interests at Knapdale and Taynish Woods cSAC also occurred. The results are given below.

A	B	C	D	E
EC Member State	No. of cSACs where beaver a feature	No. of cSACs in column B where otter also a feature	No. of cSACs in column B where lochs with aquatic vegetation* also a feature	No. of cSACs in column B where otter <u>and</u> lochs with aquatic vegetation* also a feature
Austria	11	4	5	3
Belgium	4	0	0	0
France	68	18	20	9
Netherlands	2	0	0	0
TOTAL	85	22	25	12

*Fully defined in Section 1 of this paper.

Note that these figures may change as a result of the recent SAC moderation exercise. Sweden and Finland have an exemption for beaver so there are no sites proposed in Scandinavia. Beaver also occurs in Denmark and Germany although it is not known why no beaver cSACs have been put forward in these countries yet (although in the case of Denmark, probably because the re-introduction was only undertaken very recently).

The analysis was not undertaken for marsh fritillary butterfly for the reason specified in Section 6. The analysis could not be undertaken with Western Atlantic oak woodland as this habitat only occurs in the British Isles. However, 82 out of the 85 beaver cSACs also have at least one Annex I forest habitat type as a feature.

Although the details of the specific European sites are not known, this analysis does demonstrate that European beaver occurs in sites where otter and lochs with aquatic vegetation interests are also of sufficient quality to be qualifying interests.

5. Conservation objectives

Conservation objectives for the cSAC, in relation to Article 6 of the Directive, and Regulation 48 of the Habitats Regulations, are given below.

Subject to natural change, maintain Taynish and Knapdale Woods candidate Special Area of Conservation in a favourable condition, such that:

- The extent, distribution and quality of habitat suitable for **MARSH FRITILLARY BUTTERFLY** is maintained.
- The distribution, structure, regeneration potential, composition and woodland community diversity of **WESTERN ATLANTIC OAK WOODLAND** is maintained.
- The total extent of **WESTERN ATLANTIC OAK WOODLAND** is increased on areas previously occupied by sitka spruce plantations.
- The extent, distribution, nutrient status, species richness and water quality of **LOCHS WITH AQUATIC VEGETATION** is maintained.
- The extent, distribution and quality of habitat suitable for **OTTER** cover, holts, foraging and bathing is maintained.
- Significant disturbance to **OTTERS** arising from anthropogenic activities is avoided.

6. Test for significant effect

In order to address Regulation 48, SNH has first to examine whether the proposal to reintroduce European beaver is likely to have a ‘significant effect’ on the site. The table below lists the likely effects and identifies those that are and are not considered to contribute to significant effect in the context of Regulation 48 (1). Since some likely effects are considered to contribute towards significant effect, an ‘appropriate assessment’ is then required. The appropriate assessment is undertaken in Section 7 below. The aim of the appropriate assessment is to assess the implications for the sites conservation objectives and specifically to provide the information necessary to ascertain whether it will not adversely affect the site’s integrity.

One of the Natura qualifying interests on the cSAC, **MARSH FRITILLARY BUTTERFLY**, does not occur in the trial re-introduction area (it only occurs on the Taynish component of the cSAC). Therefore this interest is not considered further in this assessment as the proposed trial is not considered to contribute to significant effect in the context of Regulation 48 (1).

Note that the following test of significant effect is restricted to likely effects resulting from the field trial. Likely effects resulting from associated impacts of visitors (e.g. use of trails and minor constructional work for facilities) will be dealt with at a later date once specific designs have been agreed and if the trial receives a licence from SE to proceed (see 12 below).

Likely effect	Mitigation measures proposed	Contribution to significant effect
1. Construction of 3-4 artificial lodges in qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) to reduce risk of initial dispersal	<p>Building work restricted to small area. Lodges will be located to avoid sensitive areas (e.g. species rich areas, location of otter holts etc.). Materials to be brought in on existing vehicle forest tracks and/or boats and by hand. Most materials to be brought in from outwith cSAC.</p> <p>Best practise to be followed to avoid damage.</p>	<p>Negligible direct impact on any of the qualifying interests, each lodge of approx. dimensions 2m x 2m x 1m and with disturbance to qualifying habitat covering no more than 6m². Lodges could be removed completely at end of trial, with negligible long-term impact on any of the qualifying interests. Alternatively, if left in situ, OTTERS may take over the lodges.</p> <p>This is not considered to contribute to significant effect in the context of Regulation 48 (1).</p>
2. Construction of temporary fencing in qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) to reduce risk of initial beaver dispersal. Fencing to be removed after few weeks.	<p>Fenced areas not to enclose any known otter holts.</p> <p>Route of fenceline chosen to avoid crossing any obvious otter tracks.</p> <p>Route of fenceline chosen to avoid felling or lopping of native broadleaved trees.</p> <p>Fencing a temporary measure and to be removed after few weeks once beavers have settled in.</p>	<p>Likely to be single lengths of fence across loch inflows/outflows, approximately 50m length and 1m high. Fence will not be buried. Negligible impact on any of the qualifying interests.</p> <p>This is not considered to contribute to significant effect in the context of Regulation 48 (1).</p>
3. Winter feeding of beavers on terrestrial (mainly woody) plant species in qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) . Possible removal of approximately 2 metric tonnes of wood per adult beaver per year in a zone extending a maximum of 100m from the water edge in the beaver territory . Preferred tree species are expected to be birch, willow, oak and rowan, 3-8cm diameter.	Monitoring and contingency remedial measures, including relocation or removal of beavers.	<p>Effect on WESTERN ATLANTIC OAK WOODLAND certain and not trivial. Extensive European literature suggests beavers will produce a 'coppiced' appearance in affected areas of established native woodland, reducing the density of stems but not removing the canopy altogether. Effects likely to be greatest within 10m of water edge . Total area affected difficult to predict as heavily dependent on beaver population dynamics in Knapdale, but unlikely to exceed 1% of existing area of semi-natural woodland in the cSAC (estimated at 587Ha). Feeding on woody species may be less than observed in some Continental populations due to milder climate and relatively longer growing season of herbaceous species.</p> <p>Regeneration of natural woodland (which is mainly birch in the early stages) on areas previously occupied by sitka plantations may be preferentially targeted, especially where stems are of optimal size for beavers.</p> <p>Both effects reversible in the medium term if beavers removed.</p> <p>Negligible impact on other qualifying interests.</p>

		Considered to contribute to significant effect in the context of Regulation 48 (1).
4. Disturbance caused to ground and field layer vegetation in qualifying habitat by grazing activity, trampling etc. throughout the year (WESTERN ATLANTIC OAK WOODLAND).	Woodland areas holding terrestrial plant species of conservation interest (e.g. <i>Cephalanthera longifolia</i>) to be mapped and, if necessary, fenced off before beavers introduced.	<p>Effect on WESTERN ATLANTIC OAK WOODLAND certain and not trivial, and likely to include browsing damage and some limited tracking/poaching. Effects likely to be greatest in immediate vicinity of lodge sites. Modification to NVC types possible. Total area affected difficult to predict as heavily dependent on beaver fecundity & survival in Knapdale, but unlikely to exceed 1% of existing area of semi-natural woodland in the cSAC, in substantially the same locations as indicated in Row 3 above.</p> <p>Effects reversible in the medium term if beavers removed.</p> <p>Negligible impact on other qualifying interests.</p> <p>Considered to contribute to significant effect in the context of Regulation 48 (1).</p>
5. Summer feeding of beavers on aquatic plants in qualifying habitat (LOCHS WITH AQUATIC VEGETATION). Preferred food species in Knapdale setting unknown.	Baseline aquatic plant diversity and abundance determined before trial commences, with detailed monitoring and contingency remedial measures, including relocation or removal of beavers.	<p>Some effect on LOCHS WITH AQUATIC VEGETATION certain. Existing literature suggests that a wide range of aquatic plant species are likely to be eaten by beavers. Effects may be reversible in the medium term provided that species diversity has not been reduced. Beavers occur in cSACs on the Continent where LOCHS WITH AQUATIC VEGETATION a qualifying interest.</p> <p>Considered to contribute to significant effect in the context of Regulation 48 (1).</p>
6. Modification of qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) through harvesting of broadleaved tree species to construct dams and shelters.	All adult animals radio tagged, with monitoring of beaver activity throughout the re-introduction area. Tree felling behaviour monitored, with contingency remedial measures, including relocation or removal of beavers.	<p>Some beavers are expected to settle away from the loch shore release sites. These animals may fell broadleaved trees to construct dams and shelters. Effect on WESTERN ATLANTIC OAK WOODLAND likely, and not trivial, but reversible in the medium term if beavers removed from site. Areas likely to be felled are difficult to model, but not expected to exceed 0.5% of woodland within the cSAC. There is likely to be some overlap with areas affected by activities described in Rows 3 and 4 above. Felling is expected to be selective, with overall canopy cover retained.</p> <p>Considered to contribute to significant effect in the context of Regulation 48 (1).</p>
7. Modification of qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) through damming behaviour of beavers.	All adult animals radio tagged, all dam construction located and effects on qualifying habitat closely monitored. Contingency remedial measures, including removal of dams, relocation or removal of beavers.	<p>Damming of small streams leading to localised inundation of WESTERN ATLANTIC OAK WOODLAND. Effect likely and not trivial, but frequency and distribution of dams, and consequent effects on woodland, are difficult to model. Studies of beavers in Europe suggest that up to 2Ha may be inundated by the end of the trial period – less than 0.5% of the existing area of semi-natural woodland in the cSAC. These are likely to be in additional locations compared with areas affected by activities described in Rows 3, 4 and 6 above.</p> <p>Considered to contribute to significant effect in the context of Regulation 48 (1).</p>
8. Modification of hydrological regimes of qualifying habitat	All adult animals radio tagged, all dam construction located and effects on	Beaver damming is unlikely to affect overall water inputs and outputs from LOCHS WITH AQUATIC VEGETATION , however, there may be minor localised alterations to quantities

(LOCHS WITH AQUATIC VEGETATION) through damming behaviour of beavers.	qualifying habitat closely monitored. Contingency remedial measures, including removal of dams, relocation or removal of beavers.	and timing of silt inputs to lochs. Beaver damming activities will tend to take place on narrow burns and unlikely to effect water levels of the lochs themselves. This is not considered to contribute to significant effect in the context of Regulation 48 (1).
9. Effect of beaver activity on OTTER holts, bathing areas and prey availability	All adult beavers radio tagged, all dam construction located and effects on habitats closely monitored. Contingency remedial measures, including removal of dams, relocation or removal of beavers.	European experience suggests that new pools created behind beaver dams will increase availability of OTTER prey. Pools may also give additional OTTER freshwater bathing areas (important for coastal otter populations). Abandoned beaver lodges and shelters may be used by OTTTERS as holts. Such positive effects are probably not significant, given the large ranges occupied by otters in relation to the relatively small geographic scale of the trial re-introduction area. This is not considered to contribute to significant effect in the context of Regulation 48 (1).
10. Fieldwork activities of beaver project officers, and external academic researchers.	All staff to be made aware of sensitivity of qualifying features. Vehicle use confined to existing tracks. All other access on foot or boat. Individual activities planned and assessed to avoid or minimise damage and disturbance. 'Sensitive' areas of conservation interest to be avoided by field workers where possible.	Any effects likely to be trivial and temporary. This is not considered to contribute to significant effect in the context of Regulation 48 (1).
11. Effects caused in event of problems with trial protocols e.g. movement of beavers outwith trial area, radio tag failure etc.	Adults will be radio-tagged which will allow animals to be tracked. Animals also leave obvious field signs and Field Officer will liaise with neighbouring land owners/managers and follow-up any reports of beaver signs outwith trial area. The exit strategy will be deployed in cases of unsurmountable difficulties during trial.	It is possible that radio tags will fail and the ability to track adults could therefore be affected. However, beavers leave obvious field signs and the Field Officer will follow up any reports of beavers outwith the trial area. Since the surrounding area is outwith the cSAC, any effects caused by escaped animals will not be relevant to the qualifying interests of the site. The exception to this is the Taynish component of the cSAC. The current plan is that beavers entering this site during the trial will be returned to Knapdale. There are established and highly effective techniques used in the humane capture of beavers (primarily nets or cage-type traps). In the event of unsurmountable problems occurring during the trial (see section 3 of main text), the exit strategy can be deployed. This is not considered to contribute to significant effect in the context of Regulation 48 (1).

12. Effects of increased visitor pressure on all qualifying interests – trampling of vegetation, disturbance.	To be decided at later date (likely to include visitors guided to use existing footpaths and car parks, dedicated beaver viewing areas provided in locations chosen to minimise damage or disturbance to qualifying features etc.)	<p>NOTE: If a licence is received from SE to undertake a trial re-introduction of European beaver at Knapdale, the contribution to significant effect and an appropriate assessment will be undertaken for the provision of visitor facilities as a separate exercise. At this stage, details can not be given as the design of visitor facilities have not been agreed or finalised.</p> <p>CONTRIBUTION TO SIGNIFICANT EFFECT, AND AN APPROPRIATE ASSESSMENT IF NECESSARY, WILL BE UNDERTAKEN AT A LATER DATE IF THE PROJECT PROCEEDS.</p>
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7. Test of effect on site integrity

Likely effect	Implications of effects (including mitigation where appropriate) in view of conservation objectives and effect on site integrity
3. Winter feeding of beavers on terrestrial (mainly woody) plant species in qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) .	<p>For existing broadleaved stands, we expect no overall loss of qualifying woodland habitat, rather a change in its structure and species composition in some localised areas. No known 'typical species' are likely to be lost. Speed of regeneration of natural woodland from previous sitka stands may be slightly checked – but such effects are likely to be very localised. Much regeneration is on the drier areas of the cSAC, so unlikely to be targeted by beavers which tend to forage close to the water edge.</p> <p>Beavers were once a natural component of WESTERN ATLANTIC OAK WOODLAND and the trial will result in the restoration of what was likely to have once been one of the 'typical species' (as described in Article 1 (e) of the Habitats Directive) of this habitat type.</p> <p>No adverse impact on site integrity</p>
4. Disturbance caused to ground and field layer vegetation in qualifying habitat by grazing activity, trampling etc. (WESTERN ATLANTIC OAK WOODLAND) .	<p>Woodland at the cSAC is already characterised by a wide range of ground and field layer vegetation. Further diversification, on a small scale, of these woodland layers through beaver activity is considered to be compatible with the conservation objectives. No loss in area of qualifying woodland interest.</p> <p>No adverse impact on site integrity</p>
5. Summer feeding of beavers on aquatic plants	Experience in Europe demonstrates that cSACs which have LOCHS WITH AQUATIC

<p>in qualifying habitat (LOCHS WITH AQUATIC VEGETATION).</p>	<p>VEGETATION as a qualifying interest can also host European beaver. The presence of beavers has an effect on the aquatic plants in this habitat type, but it does not appear to be detrimental. Beavers are a natural component of this type of freshwater ecosystem.</p> <p>Loch survey before beaver re-introduction will map any 'hotspots' of aquatic plant interest, which would then be targeted for monitoring of beaver effects. Some modification of plant species abundance in lochs would be compatible with the conservation objectives. Removal of beavers will be possible if major deviations from existing plant community structure occurred.</p> <p>The most diverse area of qualifying habitat in this cSAC, Lochan Taynish, is outwith the beaver re-introduction area.</p> <p>No adverse impact on site integrity</p>
<p>6. Modification of qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) through harvesting of broadleaved tree species to construct dams and shelters.</p>	<p>Similar assessment to 'winter feeding' effect in row above.</p> <p>No adverse impact on site integrity</p>
<p>7. Modification of qualifying habitat (WESTERN ATLANTIC OAK WOODLAND) through damming behaviour of beavers.</p>	<p>The precise effect depends on beaver population dynamics, dispersal and habitat utilisation within the site, to be monitored during the trial. Qualifying woodland areas already contain significant proportions of non-woodland habitat types (including marshy grassland, wet heath, valley mire and seasonal pools) as intricate mosaics with woodland stands – heavily influenced by site topography. The overall site consists of a series of hills and valleys and so much of the qualifying woodland is on land above the height which would be affected by any flooding. Long-term transformation of around 0.5% of woodland to localised areas of standing open water and associated wetlands would not affect the integrity of existing patterns of natural woodland development and, indeed, could increase the overall conservation value of the site – therefore, such changes would be compatible with the conservation objectives of the site. In the unlikely event that the integrity of woodland stands was threatened, dams could be removed and would revert to qualifying woodland in the medium term.</p> <p>No adverse impact on site integrity</p>

8. Conclusions

On the basis of the analysis undertaken, there will be no adverse impact on site integrity as a result of the trial re-introduction of the European beaver to Knapdale. To provide further reassurance, particularly regarding cumulative impacts which cannot be precisely modelled in advance, a monitoring programme will form an integral part of the trial. This will measure overall changes, if any, in each qualifying feature against baselines established before the trial begins. New research activities (item 7.11 above) will also be included. The results will be formally assessed against the conservation objectives every 6 months by SNH specialist staff. An exit strategy for the project has been incorporated into the project in case the trial needs to be terminated at any time.

David Wood and Martin Gaywood,
12 December 2001

ANNEX 3

BUSINESS CASE FOR A TRIAL RE-INTRODUCTION OF EUROPEAN BEAVER TO KNAPDALE, ARGYLL

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1. Summary

1.1 This submission proposes a pilot demonstration project to re-introduce European beaver *Castor fiber* to a site at Knapdale in Argyll at an estimated cash cost of £490,000 over seven years. As this is a pilot project to assess the efficacy of a full reintroduction of the European beaver in Scotland and elsewhere in Britain, one of the outputs of this project will be an evaluation of the feasibility of an extended reintroduction process.

1.2 Project funding will come from a number of sources including a charitable trust and commercial sponsorship, in cash and in kind. It has been agreed that the proposed SNH cash contribution of £250,000 can be met from SNH resources over the lifetime of the project. In addition to the cash costs SNH will commit complemented SNH staff posts amounting to the equivalent of 1.25 persons/annum for the seven year period to the overall management and content of the project.

1.3 This work is in line with requirements on the UK Government, under Article 22 of the European Union's *Council Directive on the conservation of natural habitats and of wild flora and fauna* (Council Directive 92/43/EEC) to consider the desirability of re-introducing certain native species which have been lost from their territory. It is also in accordance with the principles of the United Nations Convention on Biological Diversity which seeks to conserve biological diversity, and which is implemented through the UK Biodiversity Action Plan. Pursuance of this work will contribute to fulfilling SNH Corporate Plan objectives under Maintaining and enhancing biodiversity (through Species and Habitat Action Plan development and implementation) by addressing targets to take forward work on priority species which do not have a specific UK Biodiversity Action Plan.

1.4 SNH intends the project to meet the following key success factors:

- **To undertake a study of the ecology of European beaver in the Scottish environment**
- **To assess the effects of beaver on natural habitat and species**
- **To assess the effects of beaver on current land uses**
- **To provide information to underpin a decision on the feasibility and cost of a full reintroduction**
- **To disseminate findings amongst other European countries where European beaver re-introductions are also taking place**

2. Approvals

2.1 SNH Management Team and Main Board have considered the project proposal, including the associated licence application, and confirmed in November 2001 that they are prepared to approve the core scientific project subject to SNH's cash contribution of £250,000.

2.2 This business case seeks Scottish Executive authority to commit new money of £250,000 over seven years to carry out the project. While this level of expenditure is less than current SNH financial delegations of £300,000, Scottish Executive [approval](#) is not required on this criterion. However, the total project costs relies on as yet unsecured external funding of £90,000, Scottish [Executive](#) authority is sought at this stage for the total exposure of £340,000.

2.3 The proposal has been discussed with The People's Trust for Endangered Species (PTES) and they have confirmed that they wish to support the project. A sum of £150,000 from the PTES, to be channelled through the Mammals Trust UK (a subsidiary of PTES), has been included in the project income calculations. Discussions are taking place with a number of organisations about sponsorship opportunities to cover the current shortfall of £90,000.

3. Natural Heritage Context

3.1 The European beaver was present in Scotland until the 16th Century when it finally became extinct through over-exploitation. In 1995, SNH announced the inclusion of this species in the SNH Species Action Programme, and began an investigation into whether it was ecologically feasible, and desirable, to restore the species to Scotland. Subsequent research confirmed the former and a public consultation in 1998 confirmed a substantial level of support for a restoration project to proceed (Scott Porter Marketing and Research Ltd, 1998). On the basis of this, in November 1998, the SNH Board approved, in principle, a time-limited, geographically-restricted trial re-introduction programme. Subsequent development of a Framework for development of an operational plan for this trial [has been was](#) undertaken through a Steering Committee chaired by Professor Roger Wheeler and comprising representatives of fishery, forestry, agriculture, landowner and conservation sectors.

3.2 The beaver has been absent from the native fauna of Scotland for approximately 400 years. However, where it does occur, or has been restored, in other countries, it is widely cited as a 'keystone' species with important roles in the establishment and maintenance of wetland habitats as well as the management of riverine and riparian habitats. As such, it has considerable potential for complementing or supplementing management practices currently used in Scotland to achieve these goals. Thus, restoration of the beaver offers significant benefits to other natural heritage interests and will serve as a flagship species for riparian woodland restoration and aspen conservation. The project can also be linked to the initiatives of partner organisations (e.g. WWF Wild Rivers Initiative) in terms of achieving their objectives, [and overall the financial support required](#)

4. Assessment of Natural Heritage issues

4.1 The reintroduction would restore a species which has significant benefits to the biodiversity of wetland and riparian woodland habitat. It also restores the European beaver to the north western part of its former natural range, which would not be possible without human intervention.

4.2 It will also be the first reintroduction of a mammalian species in the UK, and will be underpinned by the seven year trial. This will help to set standards for any future re-introductions of mammal species.

4.3 During the national consultation process, issues raised were possible adverse impact on riparian woodland, aspen, forestry and salmonids. Therefore the aim of the trial will be to provide an opportunity for some of these issues to be tested in a Scottish field environment before a full re-introduction is progressed.

4.4 The way in which the project contributes to other UK and Scottish priorities is explained in the next section.

5. Objectives

5.1 The project proposal aims to contribute to the following natural heritage objectives:

5.2 SNH High Level Objectives: The Project contributes to three of SNH's high-level Themes that have been agreed with the Department. These are:

Theme 1. Caring for the natural world: more effective care of the natural heritage (specifically the sub-themes *Natural diversity and natural processes* and *Trends and changes*);

Theme 2. Enriching people's lives: fostering the role of the natural heritage in adding to the quality of all our lives (specifically the sub-theme *Understanding, involvement and commitment*)

Theme 4. Delivering the targets: underpinning the main themes are SNH's three operating principles; working with partners; operating in a devolved way; being open & accountable. These set the tone for all our operations and carry implications for our staffing and expenditure decisions (specifically the sub-themes *Working with partners* and *Being open and accountable*)

5.3 EU Directives: This work is in line with requirements on the UK Government, under Article 22 of the European Union's *Council Directive on the conservation of natural habitats and of wild flora and fauna*, to consider the desirability of re-introducing certain native species which have become extinct. The European beaver is an annex II and IV species and therefore restoring it to the north western part of its range in the UK would be a key contribution towards its favourable conservation status.

6. Appraisal Process

6.1 The re-introduction of the European beaver has been under consideration within SNH for almost ten years. During that period extensive preliminary research work has been undertaken, including an examination of re-introduction projects undertaken across Europe. A full examination of the ecological feasibility and desirability of reintroducing the European beaver has been undertaken, specifically looking at:

- Fish and fisheries
- Hydrology
- Public consultation
- Forestry and woodland
- Habitat in Scotland
- Suitable sites in Scotland
- Framework for re-introduction

6.2 In March 2000, one of the conditions of the SNH Main Board was that SNH's own contribution to the project should not exceed £250,000. Since the total cash total of the project was considerably in excess of this figure (c. £490,000) staff in SNH commenced a search for appropriate external funding sources to cover the balance of £240,000. By November 2001, £150,000 had been secured from the Mammals Trust UK (PTES). Sources of funding for £58,000 of the shortfall have been identified with proposals drawn up for cash and in kind support from the corporate and public sector. However sources for the remaining £32,000 have yet to be identified.

6.3 This business case should be seen in the context of the licence application to SEERAD wherein is contained much more detail on the background to the application - the scientific methodology and justification, including the extensive local and national consultation

7. Options

7.1 There are two main options. There is the 'do nothing' option and there is the option which would address the full core scientific trial aims, the funding of which is described below. Further details on these options are provided below.

Option 1: Do nothing, i.e. cancel the project

The benefits are:

- No further cost to SNH plus a freeing up of staff resources and no longer term possible costs resulting from a reintroduction
- No further criticism of SNH by opponents of beaver reintroduction

The disadvantages are:

- Loss of opportunity to restore a key missing element of Scotland's riparian ecosystems

- Significantly increased likelihood of less managed and less controlled future re-introductions by third parties
- Failure to secure full value of sunk project costs
- Negative impacts on other future re-introductions
- Criticism of SNH for failure to meet raised expectations
- Adverse impact on partners, in particular FE
- Failure to realise the opportunity for European beaver reintroduction as identified in the Habitats Directive.

Option 2: Obtain funding from a variety of sources to carry out the project.

SNH would seek further external funding or in-kind support of c£90,000 to add to its own cash contribution of £250,000 and £150,000 from the charitable trust, all over seven years to carry out the project.

The advantages of this option are:

- Delivers a robust scientific trial
- Will provide new information to help inform the decision over wider reintroduction in Scotland
- If the external funding package is completed, the project will secure support of c£240,000 (of which £150,000 already confirmed) to a major conservation project in Scotland
- Restricts SNH cash contribution to £250,000
- Provides wider biodiversity benefits
- Reduces conservation management costs at Knapdale which would otherwise have to be undertaken by FE (e.g. beavers will contribute in scrub removal in wetland areas)
- Maintaining credibility with partners, for example FE, the Mammals Trust UK (PTES), SWT etc.
- Provides a good demonstration of a partnership approach which would encourage other joint initiatives relating to the natural heritage in Scotland in the future
- Provides additional opportunities for developing education, interpretation and community involvement and obtaining further external funding (of which £10,000 already confirmed in addition to core project funding)
- Creates eco-tourism potential which could have a significant impact on the local economy, and provides limited new employment through the creation of a Field Officer post based in mid Argyll

The disadvantages of this option are:

- SNH is required to confirm its commitment of £250,000, and carries a financial risk for up to a further £90,000 not yet fully secured (potential sponsorship and savings indicate that the current financial risk may be nearer £32,000).
- May continue to attract some criticism from some land use interests
- The project will also require some commitment of existing SNH staff resources amounting to 1.25 posts per annum for seven years.

7.2 In summary, Option 2 at a cash cost to SNH of £250,000 over seven years is recommended. It will result in a robust scientific project which will address the primary aims of the trial, prove more acceptable to SNH's partners in the trial, and to others who are awaiting its outcome. Costs to SNH over the time scale are relatively low (average of c£36,000 per annum) for a project which will bring in extra external funds, generate considerable public interest and result in the benefits identified above. The most significant risk to the project delivery at this stage is the failure to secure the remaining external funding shortfall, although some potential sources have been identified. However, the substantial financial contribution from the Mammals Trust UK (PTES), together with the backing of the SNH Board, will significantly increase the likelihood of obtaining further external funds.

7.3 The resources required to fund option 2 are as follows.

Funding source	Amount
<i>Agreed :</i>	
SNH cash contribution	£250,000
Mammals Trust UK (PTES)	£150,000
<i>Funds remaining to be found (proposed sponsorship or 'in kind', identified but not secured):</i>	
Beaver air transportation, tracking & monitoring	£13,827
Field vehicle	£16,000
Possible cost savings	
Veterinary services provided in kind	£28,600
Others, for which no funding sources have been yet identified	£31,744
Total cost of core project	£490,171
(of which total funding confirmed to date)	£400,000)

8. Non-monetary Utility Criteria

8.1 In natural heritage projects, it is more difficult to quantify the return on investment in financial terms as a pure cost/-benefit evaluation. No acceptable model has yet been created to do this. Therefore, the business decision is reached by internal discussion and approval of the project's objectives, its broad contribution to key success factors and specific desired outcomes, when related to its estimated cost. The business decision is therefore underpinned by multi-criteria analysis. An analysis follows, involving a scoring, weighting and ranking method, as highlighted in 'The Green Book'. Six non-monetary criteria have been identified:

Impact on biodiversity covers the restoration of an extinct species (the European beaver) plus the effects that its foraging and engineering activities

will have on aquatic and woodland habitats and the associated species in those habitats. As the most important, it has been given a weighting of 30. Beavers are a 'keystone' species in these habitat types and can have a significant effect on biodiversity, and this will be assessed during the trial.

Satisfying educational and public interest embraces the educational opportunities that this project could provide, together with the broader opportunities associated with wildlife viewing etc. It has been given a relatively high weighting of 22. This is in line with the amount of public interest that has been generated by the proposed project, as demonstrated during the public consultation exercises.

Addressing EU Directives relates to Article 22 of the Habitats Directive which states that Member States shall 'study the desirability of re-introducing...' certain species such as the European beaver. It has been given a medium/high weighting of 20 since there is a commitment on the UK to consider the re-introduction.

Profile for SNH is in recognition of the great public and institutional interest this project has generated and which SNH has led on developing. It has a lower score of 10 as it is not considered as important as the above criteria.

Reduction in conflict with other interests. Some interest groups have voiced their concerns with the project, others have supported the proposal to undertake a trial. A relatively low score of 9 has been given to this, as the project is a proposed trial to address the concerns of some of these groups, rather than a full re-introduction.

Partnership working relates to the significant development of this practice during the project. It has a relatively low score of 9 as partnership working, in itself, is not a primary purpose for undertaking the trial but has been a feature in the development of the project.

Criteria			Option 1		Option 2
	Weighting	Score	Total	Score	Total
Impact on biodiversity	30	2	60	8	240
Satisfying educational and public interest	22	2	44	8	176
Addressing EU Directives	20	3	60	7	140
Profile for SNH	10	1	10	9	90

Reduction in conflict with other interests	9	6	54	4	36
Partnership working	9	3	27	7	63
Grand Total	100		255		745
Ranking			2		1

8.2 Conclusion: As might have been expected, Option 2 scores much higher than Option 1. Although the 'do nothing' enables it to score moderately well, it is still well below Option 2.

9. Assessment of Value for Money

9.1 Option 2 delivers a scientifically valid trial at a cost to SNH of £250,000 and clearly offers SNH better value for money for the reasons stated in para 7.2 (*'Green Book' methodology states that costs of projects should be discounted at the Government test rate of 6% per annum over the life time of the project. However since there is only one positive option for delivery this exercise would not affect the quality of the overall business decision*).

9.2 Option 1, whilst saving SNH a cash cost of £250,000 plus staff time over seven years, does not deliver the project outputs of option 2 and would result in a lost opportunity in attracting substantial external funds for a high profile conservation project.

10. Assumptions, risks and uncertainties

10.1 Attached as Appendix (i) is the indicative summary project budget for option 2, with all of its constituent elements including the two most significant cash items of tracking and site personnel (£305,709) and research and monitoring (£109,000). A more detailed breakdown of costs can be provided if required.

10.2 All costs have been stated at 2001 level, including an allowance for the SNH Pay Review. Costs are exclusive of any VAT and include beaver release and an exit strategy on the basis stated on the summary page.

10.3 Strict budgetary monitoring regimes will be put in place inside SNH. There will be a minimum of six monthly reporting to ensure that the project budget is not exceeded or, if there is a likelihood of that, that swift management action can be taken to minimise the impact.

10.4 The most significant risk to the project delivery at this stage is the failure to secure further external funding totalling c£90,000. Whilst the Mammals Trust UK (PTES) has offered £150,000 against the preferred option 2, and other sponsorship and savings opportunities have been identified, there is still a £90,000 shortfall.

10.5 As a demonstration project, there are the usual inherent risks involved in working with wild animals. High rates of mortality in quarantine would place the project at risk. To address this, an additional beaver family is being imported. Other risks associated with mortality in the wild (breeding, behavioural problems) are essentially what this demonstration project is being established to assess and are therefore not risks in the truest sense of the word. The project contains a significant research and monitoring element aimed at assessing the impact of beavers on the local habitat. Efforts will also be made to ensure animals are kept within the trial site area. Options on an exit strategy have also been considered and costed.

11. Sensitivity Analysis

11.1 This is used to analyse risk, by seeing how variations across the plausible range of the important uncertainties could affect the relative merits of the options being compared. However, it does not seem sensible to carry out a full sensitivity analysis in this case as there is only one positive option.

11.2 The costs of the project have been carefully assembled by the project team, and at this stage, are regarded as very robust. For example, they even include the impact of the recent SNH Pay review.

11.3 The greatest uncertainty at this stage remains the challenge of securing the remaining external funding of £90,000. However, this could now be made much easier, with SNH approval in place and, in due course, the SEERAD approval for the licence application, without which the project cannot proceed, nor further funding secured.

12. Adding value to the project

12.1 The budget of £490,000 will deliver the core scientific project. Priority will be given to ensuring that further external funds will be obtained to meet the remaining shortfall. However it is recognised that there are opportunities to add further research, educational and interpretative elements to the project and increase its overall value to SNH and the wider public. Examples of these 'additional projects' are listed below, although they have still to be prioritised in discussion with our partners.

12.2 *Interpretation work.* The improvement of visitor facilities at Knapdale, specifically in relation to the beaver population (e.g. remote live video links to the beaver sites) would increase the general educational value of the project and could lead to increased visitor numbers to the area. Some additional external funds (approximately £10,000) from the Mammals Trust UK (PTES) have already been sourced for this work.

12.3 *Educational opportunities and exchanges.* The educational value of the project has great potential, particularly in relation to schools local to the trial site. The British Embassy in Oslo has already made an initial approach to SNH (on the basis that trial beavers will come from Norway) offering

assistance in arranging joint Norwegian-Scottish educational projects, such as school exchanges, which would be related to the beaver trial.

12.4 *Extended community involvement.* Information updates will be provided regularly to the local community as the core project progresses. However, if additional projects are proposed which have wider educational and interpretation roles, then a local forum could be set up to allow the local community to play an active role in their development.

12.5 *An investigation into the effect of beaver dam presence on migratory salmonid fish.* This would be a field experiment undertaken at existing beaver sites in Europe in collaboration with resident institutions, building on some preliminary work on this subject undertaken in Norway.

12.6 *Extended research programme.* The introduction of beavers at Knapdale will provide an excellent opportunity to undertake a wide range of ecological and behavioural research beyond that which already forms the core scientific component of the trial. Universities and other academic institutions may be interested in collaborative projects, possibly involving studentships. External funding from the research councils and academic institutions may be available for such work.

12.7 *Filming.* The recording of the project on video and film could be used in a wide variety of ways and increase the publicity value of the project. We have been approached by a number of companies interested in making such a film.

12.8 *Other conservation projects.* The project could be used as an opportunity to stimulate the development of other conservation projects, in particular those relating to riparian woodland and aspen, both at Knapdale and in the wider countryside. Since riparian woodland is an important component of beaver habitat, and beavers will feed on aspen when available, then the beaver project could be used as a 'lever' to promote other projects which contribute towards their management and conservation.

12.9 These additional projects are still a draft stage since the priority has been to finalise the core scientific project. However, very preliminary and approximate costings of the additional projects are provided in Appendix (i) for indicative purposes. To date, SNH is prepared to commit a further £25,000 towards additional projects, subject to obtaining at least matching funds from external sources. Any further funding of additional projects by SNH will require Board (and possibly SE) approval. Furthermore, the Mammals Trust UK (PTES) have promised £10,000 towards visitor interpretation facilities (this is in addition to the £150,000 they will contribute towards the core scientific project). It is also planning a beaver-related fundraising campaign targeted at the general public (the first is planned for 2002) and possibly at potential corporate or trust donors.

12.10 Potential sources of funding identified for the additional projects are listed below. However, no approaches have been made to these sources to date.

- Argyll and the Islands Enterprise
- Argyll and Bute Council
- Forest Enterprise
- Research Councils
- Norwegian Embassy
- British Council
- EU Transitional Funding
- Limited potential for commercial sponsorship, lottery (HLF) and charitable trust funding

13. Recommendation

13.1 Following preparation of costed options, their preliminary assessment in terms of advantages and disadvantages, a value for money assessment and sensitivity analysis for feasible factors, it is recommended to Scottish Executive that option 2 is implemented.

14. Implementation, monitoring and evaluation

14.1 Following completion of the field trial period (in year six), and during the seventh and final year of the project, information will be collated, both on the scientific and socio-economic implications of the trial, and presented for consideration by the relevant Project Groups. This information, and the views of the Groups, will be presented to the SNH Board for consideration on whether the trial has been successful or has demonstrated limitations. Then SNH will make a recommendation over future action and consult external parties and the Scottish Executive to agree the way forward. The draft criteria for success are as follows.

- Survival of introduced animals is similar to successful re-introduction programmes elsewhere in Europe at similar period of population establishment.
- A stable or increasing core population is achieved within the limits of the study site.
- Beaver re-introduction is integrated with habitat management/restoration.
- An assessment of the positive impact of the economy of the area as a result of the presence of beavers.

14.27 A monitoring programme has been drafted for the project which will provide an [Eopportunity to assess](#) the effects of beaver presence on, for example, ~~—assessment of individual~~[natural heritage interests, land use interests](#) etc. at regular intervals.

15. Project Funding

15.1 As presented, the preferred recommended option 2 assumes full SNH financing up to a maximum amount of £250,000.

15.2 The balance of £240,000 will be sought from external funds, £150,000 of which has been secured, as of November 2001.

16. Wider socio-economic benefits and implications

16.1 The project will provide limited new employment through the creation of a field officer post. However, the tourism potential of the project could have a significant impact on the local economy.

LETTER FROM SE TO JOHN MARKLAND, 20/12/02

Dear John

I am sorry for the delay in replying to your letter of 18 July about your proposal to undertake a trial re-introduction of the European Beaver to Knapdale, Argyll.

First let me acknowledge the significant effort SNH have put into developing this proposal, and in particular that your officials have attempted to address the wide range of complex legal, ecological and economic issues required in such an application. However, after having considered the matter carefully, I am afraid, for the principal reasons set out below, that I am currently unable to grant approval for a licence under section 16(4) on the Wildlife and Countryside Act 1981 on the basis of the information presented to Ministers by SNH in the application.

As you will appreciate, in considering the application, Ministers must of course have regard to all relevant issues, including the UK's obligations under the Habitats Directive. In terms of section 57(2) of the Scotland Act 1998, the Scottish Ministers must ensure that they act compatibly with Community law obligations. My concern here is that the application at this stage does not appear to fully meet the requirements under Article 22(a) of the Habitats Directive. This obliges Member States to study the desirability of reintroducing species such as the European Beaver that are native to their territory where this might contribute to their conservation.

Article 22(a) requires Member States to take into account the experience gained elsewhere when considering trial re-introduction of a species that is native to its territory. This species has been re-introduced, by translocation or other means, into some 20 European countries but I am not clear how lessons learned from these programmes support the case for a similar trial to take place in Scotland. It would therefore be helpful to know more about the experiences of other European countries including any longer term impacts on which evidence is available.

Article 22(a) also places an obligation upon Member States to study the desirability of re-introducing species such as the European Beaver where this might make a contribution to the favourable conservation status of the species, and requires this to be assessed on an EU wide basis. I accept that the re-introduction proposal would extend the range of the species but would find it very helpful to know how this would contribute to favourable conservation status, given as I understand that the European population already exceeds 400,000.

More generally, I should like to know how the proposed re-introduction would achieve a positive impact on Scotland's biodiversity and, more particularly, how the trial results could be used to demonstrate wider benefits to it outside the trial area.

Article 22(a) also makes it clear that a re-introduction should only take place "after proper consultation of the public concerned". I appreciate that SNH has made a serious attempt to obtain opinion for the proposal at both local and national level. I should be grateful however if you would provide additional details of the consultation process undertaken and of how the views of consultees have been taken into account in relation to the proposal or its potential wider impact.

In addition, there are a number of other aspects of the trial re-introduction to which I should be grateful for further attention to allow me to consider the proposal further. These are:

Financing and management of the trial

Under the terms of your Financial Memorandum, I consider this to be a “novel and contentious” proposal and will wish to satisfy myself that the financing and management of the trial re-introduction is sound. The SNH board have agreed an absolute maximum contribution to the project over a 7 year period and you have an offer of funding from the People's Trust for Endangered Species. However, this still leaves a significant funding gap which does not include the new interpretative or educational facilities which are viewed as core to the success of the proposal. It would be helpful to know the source of this gap funding for the duration of the project and to have any further supporting information that would allow me to satisfy myself that value for money would be achieved.

Potential risk to agricultural, forestry and salmon interests

Agricultural

While I accept that one of the aims of the trial is to determine the potential effect on current land use of the site, I feel that further information is necessary at this stage on the potential risks to agricultural interests. This is one aspect where lessons learned from introductions in other European countries might have been brought to bear, particularly with regard to the possible flooding of ground through the building of beaver dams.

I should also be grateful for more information on the risk of beavers feeding on nearby grass and crops.

Forestry

I note that the application identifies two main risks: the flooding of forests and the damage to trees and that you propose mitigation measures. In view of the site's cSAC status, I wonder whether the proposal is compliant with Article 6 of the Habitats Directive. It would be useful to have your thoughts on this.

Salmon

Given the significance of the salmon industry to Scotland, it is particularly important to have an assessment of the potential impact of the proposal on Scottish salmon interests. As the trial area does not contain any salmonid river, it would be difficult to determine the impact which a fuller introduction might have upon salmon stocks elsewhere in Scotland. I look forward to seeing the evidence from the work which I understand you are undertaking with your Norwegian counterparts on this aspect of the proposal.

Public health risks posed by the trial

Public health issues are also an important consideration. It would be helpful to have a thorough assessment of the risk to water contamination through beavers' faeces, particularly in light of the use of private water supplies drawn from a source flowing from the proposed trial site.

Whilst beavers are not a common public health problem, certain zoonosis offer potential risk to the human population should they be released into the wild. A further health problem might also be bites associated with beavers. I should be grateful for your assessment of these risks.

Conclusion

I realise that this response will be disappointing to you, your Board and the officials who have invested heavily in preparing this proposal, and a lot of good work has been done. However as I have indicated there are a number of areas where further information is required before I would be in a position to grant approval to the licence application. It would be helpful if our officials were to meet early in the New Year to discuss the way ahead.



APPENDIX 1

Application to Scottish Executive by Scottish Natural Heritage for a licence under section 16(4) of the Wildlife and Countryside Act 1981, as amended, to release European beaver, *Castor fiber*, for a trial re-introduction in Knapdale, Argyll:

RESPONSE TO THE MINISTER'S LETTER OF 20 DECEMBER 2002

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1. STRUCTURE OF THE DOCUMENT

This document provides further background to the SNH proposal for a trial reintroduction to Knapdale. Section 2 provides general background information and emphasises that the licence application is for a trial reintroduction rather than a full reintroduction. Section 3 provides some information on experiences of different types of reintroduction in a selection of other European countries (more information on the European experience is provided throughout the remaining document). The rest of the document addresses the more specific points raised in the letter of 20/12/02 to John Markland, in particular the requirements of Article 22(a) of the Habitats Directive, the potential effect of beavers on biodiversity, the potential effects on agriculture, forestry and salmon interests, public health issues, financing and management of the trial, interpretation and education.

2. THE TRIAL

2.1 The Need For A Trial

It should be re-iterated that our proposal is for a trial reintroduction and not for a full-scale reintroduction of the European beaver to Scotland. The clear difference between the proposed trial and any form of full reintroduction is that animals will be quickly removed if the need arises. An exit strategy is a fundamental part of the project plan. This exit strategy can be operated either during the trial, or at the end of the trial, if a decision is made not to proceed with any further work (see the licence application for details of the exit strategy). This trial approach will allow us to investigate how beavers interact with the Scottish environment, and was developed in response to the outcome of the national consultation process undertaken by SNH in 1998 (public consultation is recommended under Article 22(a) of the EC 'Habitats Directive'. A further local consultation was also undertaken and a report published in 2001, see Appendix 2).

Although there was a substantial majority of consultees in favour of reintroducing the European beaver to Scotland, and studies indicated that the effects land uses were not significant, it was clear that a small number of individuals and interest groups held strong reservations. Accordingly, it was felt the best way to take forward the idea of reintroducing beavers and take account of the concerns which had been raised was to undertake a scientific trial. Apart from the case of Denmark (see below), this is a significantly more measured approach than that taken in other European countries where the pattern has been simply to release animals fully back into the wild (i.e. a 'full' reintroduction) with either limited or no further study.

The trial at Knapdale would involve an investigation of:

- The effect of beavers on;
 - Riparian habitats (particularly woodland)
 - Aquatic macrophytes and macrophyte communities
 - Freshwater fish in standing waters and burns
 - Freshwater invertebrates
 - Species of conservation interest (e.g. otter, water vole, dragonfly species)
 - Natura qualifying interests
 - Biodiversity

- Water chemistry
- Channel geomorphology
- Hydrology
- Forestry woodland and associated management operations
- Water quality in terms of public health
- Beaver ecology and behaviour in a Scottish environment, for example;
 - Population dynamics
 - Territory size
 - Movement and dispersal
 - Food selection
 - The testing of predictive population models to estimate population change over time

The information will help to determine any effect of beavers on the Scottish environment and, taken together with information and experience from elsewhere in Europe, will significantly help to inform any future decision as to whether a reintroduction of beavers should take place in Scotland.

It should be noted that the 1992 Convention on Biological Diversity states in Article 9 that *'Each Contracting Party shall, as far as possible and as appropriate, and predominantly for the purpose of complementing in-situ measures:...(c) Adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats under appropriate conditions'*. Furthermore, Article 8 states *'Each Contracting Party shall, as far as possible and as appropriate:...(d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; (f) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies.'* We believe the proposed trial will contribute towards addressing these requirements.

2.2 The Choice of Trial Site

The choice of the trial site at Knapdale followed a wider analysis of site suitability and an offer by the Forestry Commission (FC) to host the trial on one of their land holdings if a suitable site could be identified. Both SNH and FC considered that a vital element of a successful trial was the selection of a site which would allow relatively good natural 'containment' of the beaver population during the trial period.

Knapdale was therefore selected as it provides relatively good natural containment for a trial population of beavers. It also has a number of other advantages (such as a mix of publically accessible and quieter areas within the trial area) as described in our original licence application, and provides the opportunity to monitor a range of environmental factors. The effects of beaver activity on Forest Enterprise (FE) operations on site will also be monitored. It is anticipated by FE that beaver will provide a habitat management role and contribute towards FE's aims of reducing scrub encroachment and pond succession. However, no site is perfect, and we are aware that the trial will provide limited direct information on the effect of beavers on intensive agriculture and on wild salmon in Scotland. What the trial will be able to provide though, is a range of information that will be applicable to these issues (e.g. the effects of beavers on riparian habitats and the forestry infrastructure are also

relevant to these interests). We are also continuing to examine research in other countries in relation to beavers and salmon.

3. EUROPEAN EXPERIENCE OF BEAVER REINTRODUCTION

3.1 Introduction

In responding to the specific points of your letter, we have included further relevant experience and information from other European countries here and in Section 4 onwards. This supplements the information we have collated on European work in our SNH Research, Survey and Monitoring Reports and SNH Review Reports (a reference list is provided in the licence application), the 1998 *Re-introduction of the European Beaver to Scotland: A Public Consultation* document, and the January 2002 licence application. We want to emphasise that, from the outset, SNH has carefully considered those beaver reintroduction projects, which have been, or are currently being, carried out across Europe. We have therefore benefited from the considerable experience which has already been built up (e.g. ecological methods for studying beaver and its habitat, beaver management techniques, conservation issues, education and interpretation methods, information on the effects of beaver on land use and the environment etc.). However, it should be noted that the vast majority of other European countries have undertaken “full” reintroductions without detailed scientific monitoring, and so their work cannot always be directly compared with the scientific *trial* reintroduction approach as proposed by SNH. The main comparable work which has been carried out is from Denmark. We are taking a more precautionary approach than the other European countries (even Denmark) which have reintroduced the beaver.

There are now 24 European countries which have undertaken reintroductions, and there have been at least 157 recorded reintroductions outside the former Soviet Union (beaver were also extensively translocated within the former Soviet Union but details are not available). Although we have provided a range of European examples throughout this document, the next four sub-sections give details of four very different types of reintroduction; the Danish ‘trial’ reintroduction, the Dutch ‘full’ reintroduction, the Brittany reintroduction using animals from elsewhere in France, and the Belgium “unofficial” reintroductions. We have concentrated on these four countries here as they are towards the western edge of the natural range of beaver (like Britain) and are some of our closest neighbouring EU countries which have undertaken reintroductions. The Danish, Dutch and Belgian cases are also among the most recent reintroductions, whereas the Brittany reintroduction was undertaken about 40 years ago.

3.2 The Danish Experience – A Trial Reintroduction

It is believed beavers became extinct in Denmark between one and two thousand years ago. The Danes decided on a reintroduction in order to restore beavers to their native fauna, and for the ability of beavers to “manage” their habitat, which can benefit other species. The Danes looked at experience elsewhere, particularly in relation to any effects on land uses (including information collated in the research and review reports produced by SNH during the 1990s). They concluded that there would be only minor localised effects, such as some limited flooding. However they believed that any effects could be mitigated through a variety of mechanisms.

A national beaver plan was drawn up which was subject to consultation and release sites were proposed. This was organised by the Danish Forest and Nature Agency. One of the sites was Klosterheden in west Jutland where a limited, local consultation was undertaken. During this process, a national fishery organisation raised concerns over a reintroduction. Therefore a scientifically monitored, time limited trial reintroduction was proposed and a release at Klosterheden took place in October 1999 with the trial ending in late 2003. The results of the trial were reported to the relevant Minister and in 2004 he granted permission for beavers to be retained in Denmark subject to certain conditions (e.g. that the Danish Forest and Nature Agency produce an appropriate management plan).

The release site has some similarities with Knapdale, such as the fact that it is a working conifer plantation and is managed by the state forest service (within the Danish Forest and Nature Agency). However, the release site does not have good natural containment and lies at the upstream end of a river system. The landscape is more gently rolling than Knapdale. During 1999, 18 beavers were released at six localities within the forest. There was no attempt to confine them to a defined area, nor was any radio tracking used. By autumn 2003 there was a minimum of 51 animals, in 13 territories. Five of the territories were in the forest, the remaining eight were on adjacent private farmland. In 2003 one beaver was seen in a new river catchment some 25-30 km downstream from the reintroduction area.

Monitoring was undertaken by NERI (Natural Environment Research Institute) at Klosterheden for;

- Beaver numbers, territories, diet
- Vegetation
- Otters
- Fish
- Freshwater invertebrates
- Amphibians
- Bats
- Birds
- Dead wood invertebrates
- Water chemistry
- Information on the effect of beaver activity on forestry, private owner and angler interests

Results from the study (both published and reported to us in person by NERI staff) indicate;

- An overall positive effect of beaver on habitats and populations of aquatic invertebrates, dead wood insects, amphibians, breeding birds (especially water birds). Increase in suitable hunting grounds for Daubenton's bats
- No observable conflict with otters (number of locations with evidence of otter presence has increased throughout the catchment)
- Localised reduction in willow scrub and, therefore, shading
- Temporal effects on sea trout movements and an assumption made that populations may become isolated upstream of dams (salmon were not present at the site, but the researchers believe the species would not be affected in this way). The barrier effects of dams will constantly change as the

formation of bypasses and lack of maintenance of the dams by the beavers is a dynamic process

- Minimal effects on populations of eel and brook lamprey expected based on results to date. Populations of certain fish species, such as roach and sticleback, may benefit from beaver ponds in longer term
- Relatively minor management problems on private land. Private landowners generally react positively to the presence of beavers.
- A large increase in numbers of visitors to the forest

(see www2.dmu.dk/1_viden/2_Publikationer/3_fagrappporter/rapporter/FR489.pdf for full report)

The state forest service has frequent contact with owners of private land where beavers have set up territories. Private land owners appear, on the whole, to be tolerant of minor localised flooding on agricultural land as the land in areas selected by the beavers tend to be undisturbed semi-natural bogs and fens and therefore wet already, difficult for tractors, and often only suitable for grazing. The raising of the water table affects relatively small areas immediately adjacent to the burns. If there is no woody riparian vegetation, and therefore no suitable habitat, then beavers just pass through the areas. Any dams are in the vicinity of areas where woody materials are available. Beavers do not use intensively farmed land.

At three sites where there has been a problem with dams flooding land, pipes have been placed in the dams to lower the water level (the use of pipe systems or 'beaver deceivers' is a standard method of controlling beaver pond water levels), and at another two sites the dams have been repeatedly removed. A few clogged culverts under roads, and the inlet gate to a fish farm, have had to be cleared. Fencing material has been provided by the forest service to private owners to protect vulnerable trees.

There have been guided tours within the forest for local and other people with increasing numbers of people attending the tours (e.g. there were >70 trips with a total of >2300 people on beaver tours in 2002 alone). Even if beavers are not seen during tours, there are opportunities to see beaver signs such as pathways and footprints, scent points, grazed trees, dams, ponds, lodges and canals. Trips are organised by both the forest service and privately. Viewing platforms are used in some locations to reduce disturbance.

Beavers have contributed to the local economy through tourism. Although the forest service has not promoted them widely, the local tourist association has publicised them. The forest service did not plan for visitors before the release, although release sites were selected where people may have a better chance of seeing animals. There is a small 'hut' containing informal beaver interpretation material in one of the main car parks by a beaver release site. Another positive benefit identified by the forest service has been "public health" with the presence of beavers encouraging people to visit the forest and therefore to exercise.

The river habitats and otter population at Klosterheden have been put forward as qualifying interests for a cSAC . The cSAC proposal was made after the beavers had

been released. The view of Danish Forest and Nature Agency is that the cSAC can be maintained in the presence of beavers.

3.3 The Dutch Experience – A Full Reintroduction

The reintroduction project is led by the Dutch Forestry Commission. There was a long period of consideration, c5 years, before the Dutch decided to reintroduce beavers. Dutch forestry staff examined the situation on the Elbe in Germany. They initially took journalists to see beaver sites and their effects to ensure that there was information in the Dutch media to help inform people. Forestry staff visited all the towns and villages in the proposed release areas to provide information to the local community. Initially there were objections from agricultural interests in the Biesbosch area but fears were allayed when compensation was promised for any damage.

The reasons for reintroducing beavers to the Netherlands after c200 years were:

- Beavers were needed as natural habitat managers in nature areas (foresters also use cattle, ponies, deer, etc. as habitat managers so they argued beaver should be used too)
- There is a wish to restore extinct species as part of the natural ecosystem

There are two intentional re-introduction sites, Biesbosch and Gelderse Poort, on state forestry land (a third unplanned 'escape' re-introduction site, Flevoland, is on private land and not managed by the Dutch Forestry Commission). Fifty two animals were released at Biesbosch during 1988-92 and about the same number at Gelderse Poort during 1994-2000.

Since the reintroductions took place, the populations at both the reintroduction sites have increased much slower than expected and the animals are still in the same general release areas. Both reproduction and mortality is low. The populations are now c60-70 at Gelderse Poort and c100 at Biesbosch. For some reason the juveniles are not emigrating from their home territories to look for mates and set up new territories. There appear to be no topographical or other barriers to their dispersal.

Scientific work was carried out at the time of release but little systematic work has been done since. There is no overall plan for the reintroduction and no contingency plans for the slow population growth and dispersal. There has been no long-term management plan considered for beavers in the Netherlands. At the present time, limited research work and little monitoring is being carried out.

No work has been done to ascertain impacts, either positive or negative, on biodiversity. However, during drought conditions in 2003, local staff considered that pools excavated by beavers in the drying ponds helped fish to survive.

Prior to release, possible damage to dykes and riverbanks was not considered a problem. Before reintroduction the government agreed to pay for all damage to agriculture and dykes but they predicted it would be very little, as has since proved to be the case. Since release there had been very limited damage to agriculture and only 250 Euro (c£180) had been paid in compensation up to summer 2003.

In terms of effects on crops, only small areas of maize adjacent to water have been affected. This damage has been minimal due to large field sizes and farmers have not complained. There have also been minor problems with fruit trees and sugar beet. Farmers were able to obtain fencing, including electric fencing, for fruit trees in the early years but it is not considered necessary now. This cost 10,000 Euros (c£7,200) in total.

As well as the official reintroductions there was an unplanned “escape” reintroduction in Flevoland from a wildlife park. The park has had European beavers since 1988 in a large fenced enclosure. The beavers bred successfully and numbers increased. Eventually animals escaped from the park around 1990. Local farmers objected to the escapes and so the Agricultural Ministry instructed the park to recapture them. Some were caught but others set up territories outside and adjacent to the park. When the official reintroduction programme in the Netherlands reached its main release phases around 1994, these escapes came to be regarded, de facto, as a third reintroduction site, albeit an unofficial one. The concern expressed by agricultural interests then died down. The park is immediately adjacent to intensive agriculture but no significant damage has occurred. There was some limited grazing of maize in a large field, up to 10m from the water edge, with no overall impact on crop yield.

3.4 The Brittany Experience – A Local Reintroduction

A relict population of 30 individuals survived in the lower Rhone and has formed the source population for all reintroductions within France. Beavers were reintroduced into the River Ellez catchment of Amorique Regional Park, Brittany, from the Rhone in the late 1960s. They were released onto private land without official permission and without any subsequent monitoring. The population has increased slowly over the last 30+ years and now numbers c60 animals. The beavers have to a large extent been contained in the release area by the topography and large artificial dams on the main river, and their rate of spread has been slow. However around five years ago beavers began to colonise another catchment area. The Ministry of Agriculture does not regard them as a major problem and there have only been two cases of damage, to conifers and poplars, in the last 13 years. The Ministry encourages preventative action in the form of barriers or fencing. The only other reported problem is flooding of a minor road. A local farmer receives agri-environmental funding for the management of his land, including areas that have been affected by beaver activity. Access for the public is difficult but an NGO takes visitors across private land to see beavers and their signs.

3.5 The Belgium Experience – Unofficial Reintroductions

Some natural colonisation of Wallonia (southern Belgium) has taken place from Germany since 1997. In addition, however, there have been a number of unofficial reintroductions since 1998. These releases have often taken place in unsuitable habitats and in some cases have resulted in animals moving large distances (up to 80 km) and being killed by traffic. There are 60 known release sites, nine of which have had minor problems (four related to bank holes, three related to dams, two related to landowners who were unhappy with the presence of beaver). It is now the responsibility of the local government, operating via an NGO, to deal with the resultant situation. Beavers are now in the Flanders part of Belgium following further unofficial releases and colonisation by animals from Wallonia.

3.6 Summary

- Only one country, Denmark, has undertaken a 'trial' reintroduction
- The extent of pre and post-release monitoring varies. Where monitoring has taken place, it suggests that beavers have generally positive effects on biodiversity
- Rates of population increase and animal dispersal can vary. Reasons are not always obvious, although landscape topography can have an effect in "containing" populations for certain periods of time.
- There have been some local detrimental effects on agriculture, forestry etc. but these are relatively few and there are established mitigation methods that can be applied. Beavers have proved to be a popular wildlife attraction at well managed sites
- "Unofficial" releases can result in an increased number of problems, and be detrimental to the beavers themselves.

4. ARTICLE 22a

4.1 Introduction

We will now address the specific questions raised in the letter of 20 December 2002, starting with the issues relating to Article 22(a) of the Habitats Directive. The article states:

'In implementing the provisions of this Directive, Member States shall:

(a) study the desirability of re-introducing species in Annex IV that are native to their territory where this might contribute to their conservation, provided that an investigation, also taking into account experience in other Member States, or elsewhere, has established that such re-introduction contributes effectively to re-establishing these species at a favourable conservation status and that it takes place only after proper consultation of the public concerned.'

Annex IV of the Directive lists "Animal and plant species of Community interest in need of strict protection". "Species of Community interest" are defined in Article 1(g) as species which, within the European territory of the Member States, are "endangered", "vulnerable", "rare" or "endemic". European beaver is identified in Annex IV (and Annex II) as such a "species of Community interest".

SNH believes that the licence application fully meets the requirements under Article 22(a) of the Habitats Directive. We have undertaken considerable study into the desirability and practicality of reintroducing beavers to Scotland. This has taken into careful account experience in other member states and elsewhere where successful projects have gone ahead. In addition we have undertaken consultations with the general public, key interests, and with local people in the vicinity of the proposed trial. Please note that we have consulted our solicitors, Archibald Campbell and Harley, for advice over this issue. They have advised us that we have addressed Article 22(a) fully.

The requirements of the Directive have been considered as follows (full reference details for the SNH reports identified are provided on page 33 of the January 2002 licence application):

“...study the desirability of re-introducing...” A report was commissioned which provided evidence of the previous occurrence and eventual extinction of European beaver in Scotland (Conroy and Kitchener 1996). An assessment was made which demonstrated that the Scottish countryside could support a viable population of European beaver if it was ever reintroduced (Webb *et al.* 1997). Other information is provided in various commissioned SNH reports on topics such as investigating beavers and their effects on fish and fisheries, hydrology and woodland habitats (Collen 1997, Gurnell 1997, Reynolds 2000). This and other information has been collated in the 1998 *Re-introduction of the European Beaver to Scotland: A Public Consultation* document, the January 2002 licence application and in this document.

“...taking into account experience in other Member States...” Extensive correspondence and meetings with European colleagues, and inclusion of information on European work in SNH reports listed on page 33 of the January 2002 licence application (some of this is collated in the 1998 *Re-introduction of the European Beaver to Scotland: A Public Consultation* document). Also see Sections 3 and 5-9 of this document plus general references in the licence application.

“...such re-introduction contributes effectively to re-establishing these species at a favourable conservation status...” Once again please note that the current proposal is to undertake a time-limited trial which, on its own, will not address favourable conservation status significantly. However a trial is required before further action can be considered.

“...it takes place only after proper consultation of the public concerned” Please see Section 4.4 of this document which we believe demonstrates that this project has now been involved in extensive and thorough public consultation.

The following sections 4.2-4.4 provide extra supporting information.

4.2 The SNH Approach to Addressing Article 22a - A Trial Reintroduction

SNH has taken a precautionary approach to the issue of the reintroduction of European beaver to Scotland, notably by proposing to undertake a scientific trial rather than a full reintroduction. We have undertaken the most thorough and detailed investigation into the feasibility and desirability of reintroducing the beaver of any European country.

The European beaver was formerly one of the most widespread Palearctic mammals and was found across Europe and Asia from its western extreme in Britain to eastern Siberia. The natural range of the European beaver in the EU at the present time is much reduced, particularly in the west. Sweden, France and Germany have relatively well-established populations in the west, the Baltic States and Poland in the east. Austria and Finland, have low populations (1000-2000 animals), whilst the others (Spain, Belgium, Denmark, Luxembourg, Netherlands, Czech Republic, Hungary, Slovenia, Slovakia) are still at the early stages of reintroduction and/or recolonisation. A major gap in their natural range in the EU is at

the western edge, Britain. Ample evidence exists to show that the species was formerly widely distributed in Britain, including across Scotland. However it is not possible for European beaver to recolonise Britain naturally (although they will swim in the sea for limited distances they would not cross the channel or the North Sea in normal circumstances). Therefore the only way for Britain to contribute to the re-establishment of beavers to their former range is by active reintroduction.

The trial project proposal includes extensive pre- and post-release monitoring and the results of the trial will help inform any future decision about the reintroduction of European beaver to Scotland. Thus SNH, having followed the consultation process recommended in Article 22(a) and, in the light of European experience, both within and outwith the territory of the member states, and noting the contribution of a Scottish reintroduction to favourable conservation status of the species, has not followed the Continental approach but has taken a more precautionary line to reflect Scottish concerns.

4.3 Favourable Conservation Status

4.3.1 European Context

The European beaver was reduced to c1200 animals in eight isolated populations across Eurasia by the beginning of the 20th century. Within the area covered by the current EU member states there were only two relict populations; on the river Rhone in France and the river Elbe in Germany. Since then beavers have increased in numbers in the countries where they persisted, and have spread by natural colonisation, translocation and, primarily, re-introduction. The species now occurs in more than 20 European countries (Table 1), although it does not yet occupy its historic range across Europe.

Table 1. Reintroduction History of European Beaver

Country	Occurrence of beavers in the early 20th century	Translocation/ re-introduction	Additional natural recolonisation
*Austria	N	1970-90	
Belarus	Y		
*Belgium	N	1998-2001	Y
Bulgaria	N	Planned	
Croatia	N	1996-98	
*Czech Republic	N	1991-92, 1996	Y
*Denmark	N	1999	
*Estonia	N	1957	Y
*Finland	N	1935-37, 1995	
*France	Y	27 translocations 1959-95	
*Germany	Y	1936-40, 1966-89, 1999-2000	
*Hungary	N	1991-93, 1996-2003	Y
Kazakhstan	N	-	Y

*Latvia	N	1927-1952, 1975-84	Y
*Lithuania	N	1947-59	Y
*Luxembourg	N	-	Y
Mongolia and China	Y	1959-85	
*Netherlands	N	1988-92, 1994-2000	
Norway	Y	1925-65	Y
*Poland	N	1943-1949, 1975-86	Y
Romania	N	1998-1999	
Russia	Y	1927-64	
Serbia	N	2004	
*Slovakia	N	1995	Y
*Slovenia	N	1999	Y
*Spain	N	2003	
*Sweden	N	1922-1939	
Switzerland	N	1956-77	
Ukraine	N	Y (no dates)	Y

Y = Yes, N = No

* = EU Member States. Favourable conservation status applies at the EU level and so EU Member States are identified.

Reintroductions and translocations have taken place since 1922, both in EU member states and other European countries. Britain is one of a very small number of European countries where beavers were formerly present and where reintroduction has not taken place. Since the Habitats Directive took effect in 1992, Denmark and Spain have begun reintroduction programmes and Germany and the Netherlands have continued their schemes. Some of the recent “Accession States” are also continuing programmes which they had started before joining the EU on 1 May 2004. The majority of reintroductions pre-date the Habitats Directive and therefore there is limited European experience of how other member states have complied with Article 22(a).

Throughout Europe reintroductions of the European beaver to parts of its former range have taken place with the primary conservation aim of species restoration. They have all taken place as “full” reintroductions (apart from Denmark, see earlier section), with no form of trial nor exit strategy should problems arise. There has been relatively limited consideration of the medium and long-term effects of the presence of beavers. However we have found no evidence of reintroductions or translocations being halted or reversed because of adverse effects. In Bavaria, where some problems have been reported (see later section), some beavers have been removed and used for re-introduction projects elsewhere. However, there are no plans to remove beavers completely.

The longer-term effects of beaver presence on land and water uses are dealt with in later sections. However, in summary, although some adverse effects on land use interests have been reported at a local scale, we have not come across reports of

adverse significant impacts at a national scale. The beneficial effects of beavers have also been reported to us and these, too, are dealt with in later sections.

It appears also that little pre-release study or monitoring has taken place in continental re-introduction projects. The exception is Denmark where limited pre-release studies were undertaken at Klosterheden. Post-release monitoring work has most commonly concentrated on beaver ecology (e.g. population change and dispersal).

Unlike Scotland, with some exceptions there seems to have been either no or minimal public consultation, either national or local, on the Continent. In many countries reintroduction has taken place into a protected site, for example a national park, with limited involvement of the surrounding communities. Subsequently beavers have dispersed and colonised areas outwith the management control of the protected area.

In summary, the reintroduction of beaver to nearly all parts of its natural range in Europe has involved the following;

- a “full” reintroduction without the need for any trial
- limited public consultation
- very limited pre-release, and varying degrees of post-release monitoring
- localised detrimental effects, but also neutral/positive effects
- a general view that, overall, the ongoing restoration of the species is continuing to improve the conservation status of the species

The result has been that reintroductions to nearly all the countries where beaver was formerly present, appear to have been successful. Also they have generally been considered neutral/successful from the wider socio-economic viewpoint.

4.3.2 Contribution to Favourable Conservation Status

It is important that the trial in Scotland is treated on its merits and no further action should take place until after completion. However it seems clear that reintroduction of European beaver to Scotland would make a contribution to the favourable conservation status of the species in the EU as a whole by extending the range of the species considerably. The term, favourable conservation status, is defined in the Habitats Directive as follows;

Article 1

‘For the purpose of this Directive:

(i) conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2;

The conservation status will be taken as ‘favourable’ when:

- *population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis:’*

In terms of the Directive the population, range and extent of habitats of a species outside the EU is irrelevant.

The best estimates of the current national populations of European beavers are given in Table 2 and the total populations in Table 3.

Table 2. National Populations of European Beaver in Europe and Asia

Country	Population
*Austria	>1300
Belarus	24,000
*Belgium	200-250
Croatia	180
*Czech Republic	500
*Denmark	51-70
*Estonia	11,000
*Finland	2,000
*France	7,000-10,000
*Germany	8,000-10,000
*Hungary	>400
Kazakhstan	1000
*Latvia	>100,000
*Lithuania	50,000-70,000
*Luxembourg	1
Mongolia & China	800
*Netherlands	177-227
Norway	70,000
*Poland	18,000-23,000
Romania	>170
Russia	232,000-300,000
Serbia	30
*Slovakia	>500
*Slovenia	<6
*Spain	18
*Sweden	>100,000
Switzerland	>350
Ukraine	6,000

* EU Member States

Table 3. Total Populations of European Beaver

Area	cMinimum Population	cMaximum Population
World	634,000	732,000
EU	299,000	329,000

The total world population is 634,000-732,000 but this is heavily weighted towards Eastern Europe, especially Russia with 232,000-300,000 and the Baltic States with

>161,000-181,000, and the Scandinavian countries of Sweden and Norway with >170,000.

Of the 25 EU Member States 18 currently have European beaver; Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Slovakia, Slovenia, Spain and Sweden. The EU total population is 299,000-329,000 of which the vast majority is within seven countries (>100,000 are in Sweden, >161,000-181,000 in the three Baltic States, 18,000-23,000 in Poland, and 15,000-20,000 in France and Germany). This partly reflects the earlier reintroductions to these countries, the fact that France and Germany had surviving remnant populations into the 20th century, and the availability of suitable habitat. The remaining c5,200-5,300 animals are spread between eleven countries (mainly Austria and Finland) but represent just 1.7% of the EU population. Belgium, Denmark, the Netherlands, Hungary, Slovenia, Luxembourg and Spain are all in the early stages of reintroduction (or recolonisation in the case of Slovenia and Luxembourg) and their populations cannot be described as established. Therefore the current EU population is heavily skewed in terms of beaver distribution.

The addition of the Accession States following EU enlargement has resulted in an increase in the range of the beaver within the eastern component of the EU territory but it has not affected its range in the west of the EU. There is therefore still a need to ensure the success of recent reintroduction projects, particularly in the western EU countries, and to consider re-establishing beaver in the north-western part of its range (i.e. Scotland/Britain). Virtually all EU countries within the historical range now have beavers (although populations are still low in some cases) and the major gap lies in the north west.

The present EU population and distribution data indicates that further work is required in many countries to ensure that beavers are maintaining themselves “*on a long-term basis as a viable component of its natural habitat*”. Certain parts of the EU (e.g. Estonia, Latvia, Lithuania and Poland) have relatively large populations which can be assumed to be maintaining themselves on a long-term basis. However this contrasts to the situation in the west (e.g. Denmark, Netherlands, Belgium and Spain) and other eastern countries (e.g. Czech Republic, Hungary, Slovenia and Slovakia) where populations are at a low level and in the early stages of reintroduction and/or recolonisation and where viable populations have not been yet established. A successful reintroduction to Scotland would help towards maintaining the population in the north-western part of its range in the long-term.

In terms of “*long-term distribution and abundance of its populations within the territory*”, the present distribution and abundance of European beaver has been largely achieved by active reintroduction and translocation by member states together with some limited natural recolonisation. However this distribution and abundance could not have been achieved by natural colonisation alone during such a short time scale. Therefore the long-term distribution and abundance can only be achieved through further reintroduction programmes into those parts of the EU where natural distribution would not be achieved or where population levels are still low. As far as Britain is concerned, there are several means by which wild populations of European beaver could be established:

- (i) Escapes from captive collections
- (ii) “Unofficial” releases
- (iii) Natural colonisation
- (iv) Reintroduction

Options (i) and (ii) are obviously not acceptable for a range of reasons (they would not be legal, animals could become established in unsuitable habitats and may not be viable on a long term basis, no pre-release public consultation would be involved, animals would not be monitored or managed in a coordinated way etc.). Natural colonisation is unlikely for millenia because of the current marine barrier to beaver movement. Therefore the only way to ensure restoration to Britain is through reintroduction.

There is some evidence from work undertaken in Sweden that reintroduced beaver populations may exhibit an irruptive pattern of development. Recent beaver reintroductions tend to exhibit some degree of population growth and expansion but data from some longer established populations have shown negative changes in beaver population density. So although some European populations appear to be increasing well at the moment, there is a concern that this could reverse in the longer term.

Preparatory research work by SNH prior to the 1998 consultation demonstrated that there was sufficient habitat to support a population of beavers in Scotland (based primarily on 1988 survey data). Since then the habitat, in terms of extent and quality, has probably increased as a result of various habitat management initiatives. This is likely to increase still further by the time a trial has been approved and run, and riparian habitat restoration boosted by linking it with beaver habitat creation programmes (also see section 5). Therefore SNH consider that there would be “*a sufficiently large habitat to maintain its population on a long-term basis*” within the Scottish component of the EU territory should the results of the trial indicate that a reintroduction to Scotland could take place.

In conclusion, a trial reintroduction is judged to be a suitable, precautionary approach at this stage. Any subsequent managed full reintroduction to Scotland (and therefore Britain) would make a contribution to “*re-establishing...*” the “*...species at a favourable conservation status*”.

4.4 Proper Consultation of the Public

4.4.1 The National Consultation

The full details of the 1998 national consultation and its results have already been provided (Scott Porter Research and Marketing Ltd., 1998). It was the results of this consultation that indicated the strong public backing of beaver reintroduction. The Main Board of SNH subsequently approved a time limited trial over a specific area. This, in turn, led to Knapdale being chosen as the most suitable site owned by the Forestry Commission. The Main Board decided that the trial project should be progressed, subject to local public consultation. Therefore a local consultation took place, the details of which are summarised in the 2001 local consultation report (the local consultation report was released to the public and interested bodies). However further clarification was requested in the letter from the Minister about this consultation and this is provided below.

4.4.2 The Local Consultation

The local consultation was based on the Mid Argyll Area and on the North Knapdale Community Council (NKCC) area in particular, to ascertain both the views of the public and also the views of individuals, bodies and organisations who might be affected.

Quantitative information was gathered by means of a survey questionnaire, which was widely available in the locale. Assessments of proportions of the consultees in favour or opposed to the project were derived from these questionnaires. However, we also gathered and reported on views and opinions expressed by other means. A summary of the local consultation process is provided in the January 2002 licence application.

The Mid Argyll Branch of the NFU Scotland was initially content with the trial proceeding and this was included in the March 2001 consultation report. However NFU Scotland nationally opposed the trial, and the local branch later, in November 2001, objected to the trial. This information was communicated to SNH Main Board before they made their decision on the submission of a licence application to Scottish ministers.

For the local respondents who were in favour of the proposed trial re-introduction there were not any general themes that occurred in the responses, and generally respondents did not provide any lengthy detail over the reasons for their support. The key reasons, when any were provided, were:

- restoring part of the lost wildlife of Scotland;
- increasing biodiversity,
- benefits for tourism; and
- the benefits of a well managed trial.

Full details of the process are given in the local consultation report of March 2001 (this includes a November 2001 update regarding the NFUS position). The report was distributed to all those who had requested a copy at the time of the consultation. The results were also released to the press. The report was sent to SE shortly after the SNH licence application was submitted. However, a further copy is enclosed (Appendix 2).

4.4.3 Survey by the Argyll and Bute Community Planning Partnership Citizen's Panel

Since SNH submitted the original licence application in January 2002, a question on the beaver proposal was also put to the independently coordinated Citizens' Panel in Argyll by the Argyll and Bute Community Planning Partnership as part of a wider questionnaire in June 2002. The Citizens' Panel is comprised of 1000 residents recruited to provide a representative cross section of the population in Argyll and Bute. Profiling variables include geographic area, age and gender. The question was *'Do you agree or disagree with the following statement? – Scottish Natural Heritage should undertake a trial re-introduction of the European beaver in Knapdale'*. There was a 68% return (681 questionnaires returned), and the results are given in Table 5.

Table 5 Results of Argyll Citizens Panel Survey

View of Respondents	Percentage	
	Argyll & Bute	Mid Argyll & Kintyre*
Strongly agree	14	10
Agree	32	35
Neither agree nor disagree	33	28
Disagree	11	9
Strongly disagree	10	19

(*Figures not available for Mid Argyll separately. Note the figures do not add up to 100% but are taken from the published report)

Therefore 46% agreed and 21% disagreed for the whole of Argyll and Bute (33% unconcerned either way), while for Mid Argyll and Kintyre 45% agreed and 28% disagreed (28% unconcerned either way). These are similar to the figures obtained by SNH in the local consultation.

4.4.4 Scotecon Study

In October 2003 the Scottish Economic Policy Network (Scotecon) publicised a report on public attitudes towards the control of wild animal species in Scotland. The report was based on an innovative method of valuing some of our rarest wildlife. Willingness to pay for wildlife control measures was assessed using the *CV Market Stall* technique, incorporating a traditional quantitative approaches with an innovative qualitative approach which allows a detailed understanding of attitudes towards wild animal control to be recorded.

The study involved 71 participants. The reintroduction of the beaver was supported by 72% of participants (14% did not support it and 13% were not sure either way). There was also an average willingness to pay of £24 per household per year for 10 years to fund a pilot beaver reintroduction project.

The study concluded that *'Scottish Parliamentarians should be reassured that public expenditure on wildlife management conservation, despite the largely negative press coverage such issues normally receive, represents good value for money. The future economic benefits associated with wildlife management, particularly given the*

close relationships between wildlife and the natural heritage of Scotland and tourism, should not be overlooked by government’.

Full details are available in the published report, (Philip, L.J. and Macmillan, D. (2003) Public Perceptions of Attitudes Towards the Control of Wild Animal Species in Scotland. Report to Scotcon.net, Department of Land Economy, University of Aberdeen)

4.4.5. Summary

Therefore, in summary, there has now been a national consultation, a local consultation, a Citizen Panel survey and a Scotcon study over SNH European beaver proposals. We are unaware of any other species reintroduction project throughout Europe where such a high level of consultation has been carried out. In all consultations, objectors to the trial and/or reintroduction have been a minority and public support has been significant. This is a project which has captured the public imagination and gained widespread support.

5. BIODIVERSITY AND OTHER ENVIRONMENTAL BENEFITS

The experience from Europe of the effect of reintroduced beaver populations is that their presence can have a number of positive benefits on biodiversity and other environmental factors. Beavers are managers of their wetland ecosystems and as such are often termed a ‘keystone species’. Beavers introduce a dynamic aspect to the ecosystem leading to wetland creation and succession and woodland coppicing and succession. This modification of their habitat has a generally beneficial effect on other flora and fauna.

The trial, being geographically constrained and time limited, is expected to have a local beneficial effect. An aim of the monitoring programme is to identify some of the effects, of the trial on the local biodiversity at Knapdale.

Information gathered from specialists across Europe suggests that the presence of beavers in particular cases can have the following effects due to their water and woodland management activities;

- increase in abundance of wetland birds, and number of species e.g. ducks, water rail, etc.
- benefit to certain bat species e.g. creation of suitable hunting grounds for Daubenton’s bat
- benefit to otter
- benefit to water vole
- benefit to amphibians
- greater diversity of macro freshwater invertebrates
- habitats suitable for certain fish species
- increase in diversity of habitats along small river systems
- maintenance and increase of wetlands and associated vegetation communities
- increase in coppiced riparian woodland habitat
- increase in quantity of standing and fallen dead wood

In the Danish trial reintroduction, NERI staff informed us that the riparian willow scrub breeding habitat of some passerine bird species has declined in places due to localised flooding so they are now breeding in areas closer to the forest edge. There has been an increase in habitat for wetland bird species, such as kingfisher and moorhen. (Also see Section 7 regarding the effect of beavers of aquatic macrophytes). Examples of negative effects of beaver on local biodiversity are not common, although the results of a recent Russian study, as reported at the European Beaver Symposium (October 2003), in tributaries upstream of a very large reservoir suggested that the presence of beaver dams resulted in a localised decline in fish diversity and abundance.

There would also be more indirect positive effects on biodiversity. The beaver would become a very public symbol of biodiversity in Scotland and, more directly, on riparian habitats with the species being used to highlight the need for positive management of this habitat. Management of riparian habitat would not just benefit biodiversity but also fish and fishing interests. It could benefit land managers by being a priority aspect of the woodland grant scheme and Rural Stewardship Scheme. Beavers would also highlight the need, in particular, for positive management of aspen woodland that could be included in management schemes for land managers.

Beavers are already being used as “habitat managers” at three large, fenced sites in Britain. All three have started within the last two years, two in Perthshire on private land holdings, and one at Ham Fen in Kent. The Ham Fen site is a nature reserve and SSSI owned by the Kent Wildlife Trust where beavers are being used to control scrub invasion and restore the fen habitat.

There can be other environmental benefits arising from beaver activity not directly related to biodiversity, for example;

- beaver dams increase purification capacity of burns polluted from agricultural and urban sources thus protecting larger rivers and the marine environment downstream
- increased trapping of sediment and deposition upstream of dams (eventually resulting in ‘beaver meadows’ in areas of deposited soil), which also improves downstream water quality
- beaver dams store water which is then be released during dry periods, thereby moderating the detrimental effects of irregular flows
- beaver ponds provide deeper areas of water, raise the water table locally and slow the overall speed of the water flowing through the system

Many of these effects will obviously be proportional to the numbers of ponds and dams present in any system. Some workers have suggested the possibility of “harnessing” beavers to reduce erosion processes from areas of ploughed agricultural soils. A recent study in the Tatarstan Republic, Russia, examined the effect of 21 reintroduced beavers above a lake suffering from degradation resulting from agricultural soil deposition. The beavers created three dams which, during a flooding period, stopped an estimated 4,000 tons of sediment. The mass of sediments per litre of water downstream of the dams decreased by 53%. The role of beavers in improving water quality near urban areas has also been reported from Estonia.

It is extremely difficult to put a financial value to such potential benefits but they are likely to be significant in many areas (one Latvian specialist has estimated that the positive influences of beaver on the Latvian landscape was worth many millions of pounds).

6. AGRICULTURE

6.1 General Assessment

It is accepted that the trial site will yield predominately local information on the interactions between beavers and land use. However, information gained at Knapdale from the monitoring of, for example, any hydrological change, grazing activity in riparian zones, effects on the forest infrastructure (e.g. forest tracks, culverts etc.) and forestry activities will also be of relevance to more general agricultural situations.

There are a number of potential effects that beavers could have on agriculture if a full reintroduction took place, both positive and negative (although SNH are only proposing a trial reintroduction). Some of these are noted in the licence application. This section concentrates on reported negative effects, although the beneficial effects reported in other sections of this document must also be borne in mind. However beavers are hefted to the riparian zone and generally feed within c50m of the water's edge, usually much closer (the Danish study recorded most activity within 5m). Therefore it is only certain crops within that zone that may be grazed. Similarly, if localised flooding does occur as a result of dam building, it is likely that the immediate riparian zone will be most affected.

There is little published information available in Europe in relation to beavers and agriculture. However anecdotal information (see Section 6.2 for details) suggests that there can be localised problems in some individual cases but on a larger scale the level of damage is not significant. With other "full" reintroductions in Europe the impact on agriculture appears either not to have been considered or is regarded as slight. The lessons from elsewhere in Europe are that reintroductions have proceeded and the effect on the agriculture has not been seen as a significant problem. Local opponents of the proposed SNH trial have reported issues but no specific details have been provided to SNH to allow further investigation.

Beavers have an extremely catholic diet eating a wide range of herbaceous and woody species. Feeding is usually close to the water's edge and so herbaceous plants taken tend to be wetland or the riparian edge species. Thus it is unlikely that beavers would graze on agricultural grasses to any serious extent, unlike rabbits or deer. Intensively farmed fields simply do not provide good beaver habitat. There are no reports of beavers being a problem for grass crops but they have been reported feeding on orchard trees, maize, corn, oil seed rape, potatoes and sugar beet near riparian zones and causing some cases of localised flooding. In terms of good practice for riparian management "The Code of Good Practice for Prevention of Environmental Pollution from Agricultural Activity" (Scottish Office, 1997) and "The Four Point Plan" (SEPA) both encourage the use of buffer strips along water courses and the fencing off of water courses to livestock. Therefore it is assumed that in Scotland the ploughing and planting of crops close to the water's edge would not be

normal good practice. Bank damage, resulting from burrowing activities of beavers, can sometimes be a localised problem.

In the proposed trial area it is highly unlikely that beavers will graze on grass crops to any great extent, even if they were to leave the trial area. There is only the occasional arable crop now grown in the Mid Argyll area and the nearest is likely to be some 5-6 km from the trial boundary.

6.2 European Experience: Agriculture and Beavers

The information available to SNH on problems surrounding beavers and agriculture (plus additional information on the effects on forestry) is as follows. It is mainly derived from direct communication with specialist workers across Europe (both within and outwith the EU).;

Austria; some local damage from flooding, feeding on crops and grazing trees. In some areas of intensive agriculture (flat land, high water table and lots of drains) problems can occur when beavers build dams and flood riparian areas. In general management is carried out to keep them away from problem sites and compensation is only paid for damage in connection with habitat improvement or set-aside. As a last resort they use live trapping and removal or killing. Illegal killing has been recorded. The population is too small at present for sustainable hunting to be used as a management method. There are some complaints surrounding damage to commercially used broadleaved trees, such as ash, oak and alder, and some foresters claim to find it more difficult to cut and extract trees from riparian areas where beavers have worked.

Czech Republic; beavers have been present for 10-15 years and are now spreading, both from reintroduced stock and natural colonisation (population c400). As they have spread they have moved to more populated areas and there are some localised problems. There has been some flooding of agricultural land bordering waterways, and they have been reported eating maize and sugar beet on occasions. Compensation is paid as there is scope under national legislation in connection with endangered species. However all the problems are viewed as minor in the national scale.

The Czech Republic is still at an early stage in terms of establishing a viable beaver population but further on than Denmark, Netherlands and Spain. However they are producing a national beaver management plan, before there is a large increase in numbers, to try to take account of all contingencies. This plan will include five to six Special Areas of Conservation (SACs) with beaver as a qualifying species, areas for beaver colonisation and areas from which beavers will be excluded because of potential conflicts (e.g. areas with medieval fish ponds with sandy banks). The plan will also consider control mechanisms, compensation, who does the work, who administers the plan, etc.

Denmark; still at the early stages of reintroduction but beavers are present in intensively farmed areas adjacent to the release site. Some flooding of small streams in valley bottoms has extended areas of wetland but has not impacted significantly on cultivated land. The release site is a state forest and the presence of beavers there is viewed as beneficial by the forest service (e.g. advantageous to local

biodiversity, encouragement of game bird species, beaver grazing of willow scrub has reduced scrub removal costs to the forest service, educational and interpretive opportunities etc.). (Also see Section 3.2).

Estonia; beavers have colonised drainage ditches in flat areas dug during the communist period to increase crop production which are still being maintained to some degree. There is a licensing system to kill beavers if necessary. They are not a significant problem for forestry.

Finland: limited and localised problematic effects of beaver on land uses. These are mainly limited to grazing on individual trees in private land ownership and occasional flooding of agricultural roads but there are no real agricultural problems. No problems have been reported with salmon.

France; the beaver population is 7-10,000 animals. There are c40 claims per year for damage, 90% of these relate to damage to trees (mainly fruit trees) and the other 10% is damage to annual crops e.g. maize and sunflowers. In 80% of the cases damage to fruit trees occurs less than 10m from the water, and less frequently if there is a strip of natural vegetation between the watercourse and the trees at risk. Beavers are not seen as a major agricultural problem. Advice is provided on management measures to try and prevent damage, as no compensation is paid for damage by protected species (except wolf, lynx and bear) though some regions fund protection measures. The impact on natural vegetation, especially willow, is considered beneficial because the cutting of woody vegetation results in bushy growth which stops the development of large trees which could otherwise destabilise riverbanks and contribute to erosion.

For information from Brittany see section 3.4.

Germany; in the Elbe area beavers have caused no major problems. Only a few localised problems have been reported, for example feeding on maize, corn and sugar beet in the summer and oil seed rape in the winter. Occasional reports of animals blocking streams and partially flooding maize fields. Compensation is not paid by the state government.

In Bavaria, the number of reports of problems appear to be higher than elsewhere in Europe. The region has a population of over 6,000 animals. There is an efficient system in place for dealing with beaver management issues. Burrowing into flood dykes, etc. is not an issue with beaver although such problems have been caused by muskrat and coypu. Even though muskrat and coypu may do a lot of damage, the remedial work is carried out by specialist beaver managers to ensure fast action. Consequently the view of the specialist beaver managers we have spoken to is that beavers are sometimes given the blame for damage created by the other species to ensure speedy remedial work is undertaken.

Beaver have caused occasional damage by breaching fish pond dams. There have also been localised problems with hydroelectric schemes in two ways; firstly by dams and breaches along open aqueducts and secondly by woody debris entering intakes and eventually into turbines. The former is not considered a major problem and the latter can be mitigated with better mesh guards over the intakes.

Agricultural damage is small scale (40 m² of grazed maize is typical at a problem site) but seen as a greater problem on smaller farms than on larger ones. During 2003 there was low rainfall and crops in areas behind beaver dams did well due to the availability of permanent water sources (although some farmers have complained of grazing on maize in these areas).

Management in Bavaria includes the removal of dams, electric fencing, the use of habitat management and removal of individual problem beavers (283 in 4 years) for reintroductions elsewhere.

Lithuania; reports of some flooding of agricultural fields but considered small-scale. Beavers sometimes block the drainage ditches of land which was once intensively farmed and which would naturally be wetland. Ten thousand beavers are killed each year and their pelts exported. Hunting will continue after accession as Lithuania will have a relevant derogation from the EC Habitats Directive.

Netherlands; still at the early stages of establishing reintroduced populations. Compensation is paid if necessary and so there have not been any problems with farmers. Damage has only occurred on a few occasions and there have been no problems with dams. There are no concerns regarding agriculture as the population and range increase. There are no concerns over impacts to dykes and other water level issues. (Also see Section 3.3).

Poland; in the densely inhabited Krakow area negative effects on agriculture and forestry are minor. In the Warsaw area dams have caused the flooding of low-lying meadows which would naturally be wet. Some compensation is paid to local farmers. We have one report of beavers eating potatoes in Poland.

Poland has a population of 18,000-23,000 beavers. A recent national survey of all 440 Polish forest districts and 100 selected communes and hunting association field units indicated that;

- 3,200 ha of forestry and agriculture was flooded by beaver activities (out of 27,472,000 ha of agricultural and forestry land in Poland)
- large areas had increased wildlife benefits (15,000 ha of wetland created and a further 21,000 ha of improved wildlife habitat by 2001) and increased “attractiveness” of woodlands to visitors as a result of beaver activity
- 200,000 Euro had been paid annually in compensation but the monetary value of environmental benefits which beavers brought are judged to outweigh the costs (each single ha of wetland created by beavers was considered to be worth 10,000 Euro). The view of the author of this survey is that the compensation scheme is poorly organised, inconsistently applied and that 80-90% of compensation payments should not be made.

Russia; studies have demonstrated the value of beaver dams in reducing sediment entering and degrading lake systems and in improving water quality by removing polluted material.

Sweden; there are some problems from flooding of forestry and culverts and also with tractors on undermined banks. However, overall there is no major problem reported from beavers.

Summary; The general experience from Europe seems to be that, nationally, beaver damage to agricultural areas is not a major problem. Where localised problems do occur they can sometimes be relatively serious to the individual affected. However there are a number of straight forward, tried and tested management techniques which have been developed over many years in both Europe and North America that can reduce the problem where necessary, such as;

- piping dams to lower the water level
- fence systems around culverts
- destruction of dams
- fencing of vulnerable trees or crops
- designing riparian woodland or crops to be unattractive
- live trapping and relocation
- sustainable hunting programmes

There is no evidence from any country that the possibility of agricultural damage stopped a reintroduction from taking place or that, if limited damage was subsequently experienced, that removal of all beavers was ever considered. The range of benefits that beavers can bring have been judged to outweigh any costs.

7. FORESTRY

In the letter of 20 December 2002, reference was made to the proposed trial site's cSAC status. The question was asked as to whether the proposal is compliant with Article 6 of the Habitats Directive. We can confirm that we have been careful to ensure that it is. Article 6.3 of the Directive states *'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives....'* Please see Annex 2 of the licence application which provides a detailed appropriate assessment as required. The assessment includes an examination of possible beaver-woodland interactions.

We have not subsequently revealed any studies which have indicated that beaver activity is a cause for concern regarding the conservation of aquatic vegetation habitats in Europe. Indeed, as noted in the appropriate assessment, there are French cSACs where both beaver and lochs with aquatic vegetation habitats are qualifying interests. The relevant French specialist (Patrick Rouland, ONCFS) we contacted told us he had no evidence of beaver having a negative effect on such loch habitats and the macrophyte communities. He reported that the beavers tend to concentrate feeding activities more in the loch edge/ riparian zones rather than in the more open loch areas. Furthermore, a team of freshwater ecologists from the University of Glasgow surveyed the lochs at Knapdale in 2002. They informed to us that, although beavers would be likely to feed on some of the aquatic plant species present, they did not *'...consider there to be any grounds for concern regarding threats posed by beaver to the survival of macrophyte vegetation in the lochs examined'*. However, as a precautionary measure, aquatic macrophytes will be

monitored as part of the trial and action (including implementation of the exit strategy) could be undertaken if the site integrity was being affected (see appropriate assessment for details).

8. SALMON

8.1 General overview

Section 2 described the sensitivity in selecting a suitable trial site, especially one which provided relatively good natural containment for the beaver population. SNH accept that the trial site selected does not contain a river in which Atlantic salmon are present, although initial surveys suggest one or two burns being used by sea trout. However if the trial took place on a salmon river, which tend to be in relatively large catchments, then the released beavers would have the potential to colonise any part of the whole catchment. Similarly a trial area would have had to be the whole catchment making the management of the project extremely difficult. We believe that a degree of natural containment is important for a trial site, hence the requirements are quite specific overall.

The previous SNH-commissioned review on the effect of European and North American beavers on fish and fisheries is relevant. This concluded that beavers can have positive effects on some fish species in some places and negative effects in others.

Experience and evidence from Norway (which has a population of approximately 70,000 beavers), a comparable situation to Scotland where salmon and other fishing is highly regarded both nationally and internationally, is that beavers have no significant adverse impact on Atlantic salmon.

Salmon and beavers co-existed in Scotland, and across Europe, for thousands of years in the past, albeit with larger fish populations (and beaver populations) than now. Beavers do not always build dams in burns/lochs where there is sufficient water depth and, when they do dam, only do so on smaller burns (maximum width of about 10m, but usually in narrower burns). Salmon are known to be able to negotiate natural and artificial barriers in burns and contend with dynamic and temporary effects on spawning areas, features which can sometimes also result from the presence of beavers. River flow rates also vary over the seasons and beaver dams become easier for fish to negotiate during periods of higher flow rate.

Indeed there could also be positive effects on freshwater and migratory fish in that it would provide the impetus for the management, enhancement and expansion of riparian woodland and other habitats. Without the beavers this is something that could take a considerable time. The presence of beavers could mean that public expenditure on this work would be more supported to the general public. Funding from NGO and other sources may also be more forthcoming with beavers used as a charismatic symbol of riparian woodland restoration.

8.2 Specific Experience

Norway: The only completed European study which specifically examined the effect of beaver dams on salmon (and trout) migration that SNH is aware of was a small

project carried out by scientists based in Norway with an interest in beavers. The lead scientist had applied to the Norwegian Department of Nature Management for funding but was refused on the grounds that the proposal did not address a significant Norwegian management issue (interestingly, funding is available for studies into otters and salmonids since the perceived threat from the expanding otter population to salmon stocks is deemed more important). Beavers are ignored as an issue by anglers in Norway with the odd report, less than one/year, of a dam causing a problem. There appears to be minimal conflict between beavers and salmon fishing interests.

The Norwegian study was carried out over one year on a tributary stream of a small river very similar to those on the west coast of Scotland. The spawning stream was 1.3m wide and shallow (c.25 cm) with pools and riffles on a gravel substrate and had riparian trees along the banks. There were four beaver dams on the stream along a 250m length. Using electro-fishing, 0+ and 1+ age group salmon and trout were found all along the stream, including between the dams and above the highest dam. There were young, growing, salmon above all the dams. The work is preliminary and from just one site but salmon in Norway commonly spawn in small streams, often in wooded areas.

A Masters dissertation project is currently being completed in Norway (Telemark University College) which involved a study on the effects of beaver on fish and fisheries, including salmon. Work has included an assessment of attitudes of fishermen and some fieldwork. We have been informed that the preliminary results are that most landowners who have beaver living on their tributaries do not perceive them as a fisheries problem, or any other sort of significant problem.

No work had been undertaken in Norway on the issue of beavers and salmon until recently because there were no obvious areas of conflict. The two recent studies were, instead, prompted by the discussions surrounding the proposed Scottish beaver trial reintroduction.

SNH will pursue the opportunity for joint research with Norway if the trial proceeds. The trial will provide a period in which not only to carry out joint work but also to examine in more detail beaver and fish interactions in Norway and other European countries.

(Denmark: The Denmark trial included the monitoring of fish species, including trout, but salmon are not present at the trial site (see 3.2)).

9. PUBLIC HEALTH

9.1 *Giardia* and *Cryptosporidium*

We have found no reported instances of European beavers causing health problems in humans from *Giardia* or *Cryptosporidium*. Based on the European experience, European beavers are not viewed as a significant human health problem. However as part of the trial, SNH, in conjunction with Argyll and Bute Council (ABC) and Scottish Water, are carrying out pre-release monitoring of the quality of the private water supplies (in terms of potential pathogens) and the water courses in the trial area to be able to assess the possible effect of beavers on public health. ABC are

undertaking a regular programme of water sampling and analysis to build up the picture of the water quality prior to releasing beavers to be able to compare it with the post-release situation. This will provide information on public health issues for consideration as part of all the issues at the end of the trial. One of the criteria for the exit strategy is risk to public health. In regard to public health risks SNH are guided by the Environmental Health Department of ABC and Scottish Water.

The results of the ABC public health monitoring undertaken to date will shortly be published by Morrison (in press) in an SNH report (Trial re-introduction of the European beaver to Knapdale: Public health monitoring 2001-3. Scottish Natural Heritage Commissioned Report F02AC327). Morrison states *"In public health terms, Giardia, Cryptosporidium and other microbiological parameters are naturally occurring in the environment and within animal and human populations. The general advice to reduce the risk to public health is to ensure hands are properly washed and water boiled before consumption."*

Also; *"The views of Professor G Morris, Scottish Centre for Infection and Environmental Health (SCIEH), were sought. He indicated that, subject to the beavers undergoing appropriate quarantine and screening, the introduction of a limited number of animals and the provision of monitoring and controls, the project will not pose a significant additional public health risk. He further indicates that the risk of increased human cases of Giardiasis is significantly low that it should not be considered an obstacle to beaver introduction."*

The work to date has established the water quality within the Knapdale area and provides a baseline for comparison purposes should the project receive Scottish Executive consent. Having considered the information to date, Argyll and Bute Council Public Protection Service are of the opinion that subject to controls, the introduction of the beaver will not pose a significant risk to public health. However, monitoring of public health issues will become a key priority at the time of introduction and effective screening, tracking and other controls and monitoring systems will be necessary to objectively assess the impact on public health."

The view of the Assistant Chief Veterinary Officer, WL Gardner, in September 1999 in a letter to SNH was that *'Apart from the common finding of mites on imported beavers which are readily treated with insecticides, and the possibility of rabies, we have no information to suggest that imported beavers would be affected by other conditions which would result in animal or public health problems. One of my colleagues Mr Honeyman has carried out further research into potential pathogens in beavers which may affect man and animals. Most of these conditions are either already present in the UK or are readily treatable and do not pose a serious problem.'*

It is worth comparing Scotland and Norway in terms of incidences of human Giardiasis to put the disease into perspective. In Scotland, which has a population of about 5 million, the SCIEH recorded 296-427 laboratory reports of infections in humans per year, during 1991-2000 (also 568-954 reports of *Cryptosporidium* per year). In Norway, population 4.5 million, there were 454 reported cases in 1999. Of these 399 (88%) were cases where people acquired the disease abroad. No waterborne outbreaks of Giardiasis have so far been registered in Norway, a country

with 70,000 beavers and a population well known for their pursuit of outdoor activities. Despite this large beaver population there have been no references to beavers being suggested as a source of *Giardia* infection. This is despite *Giardia* cysts being found frequently in Norwegian surface waters. It appears therefore that there is a similar level of Giardiasis in Norway as that in Scotland, despite no beavers being present in Scotland.

Information we have received from North American *Giardia* specialists has highlighted that the major source of *Giardia* infection in humans is from other human sources. The term “beaver fever” was apparently invented by a section of the press in the 1970s and indicates simply that beavers exist in the area where many people camp, hike and may, on occasion, become infected.

We are aware of one study where the incidence of *Giardia* and other pathogens have been examined in a resident European beaver population. This was undertaken in Norway where a large sample of beavers, 241 in total, were tested for *Giardia*. All were negative (also negative for other potential pathogens, *Cryptosporidium*, *Salmonella* and *Campylobacter*; 133-235 beavers tested).

If the proposed reintroduction does proceed then, in the light of the results of the above study on the incidence of *Giardia* on the donor population, and the fact that the animals will be quarantined for 6 months during which they would be treated for any *Giardia* present, we can be fairly confident that any released beavers will be *Giardia*-free. However, they may not remain free of *Giardia* if they should pick up the parasite at Knapdale (*Giardia* and *Cryptosporidium* have been recorded in the Knapdale area, as they are across Scotland, indicating the presence of animal excretors in the area e.g. sheep, deer). The area is used by local visitors and tourists and is also used by domestic and wild animals such as sheep, cows, dogs, deer, otter, small mammal species, etc. The area has a high annual rainfall and so any faecal material containing cysts would be quickly washed into the water.

9.2 Bites to Humans

Regarding the likelihood of bites, beavers are wild mammals and as with any wild animal there may conceivably be circumstances, such as when cornered or defending young, when they might attempt to bite people in close proximity. However like most other wild mammals their main defence will be avoidance. In addition beavers are usually active in the evening and at night and so direct contact with humans would be further reduced. The only report of such an occurrence SNH has seen was a press report in ‘The Scotsman’, in June 2001, from Finland where somebody followed a beaver in a river and was bitten. We have communicated with numerous European specialists over the years and have never heard of any other instances of beavers biting humans, apart from when they are being captured, and when handled in captivity. Therefore there seems to be a very low risk to the general public from any released beavers.

10. MANAGEMENT OF THE TRIAL BY SNH

An SNH Project Group, chaired at Director level, will oversee the management of the whole trial reintroduction project including financial management, internal/external reporting and other aspects of reintroduction not part of the Knapdale trial. The

project will be included in operational plans, budgets, financial and other corporate management systems. SNH has wide experience of managing long term projects, (e.g. Site Condition Monitoring, Natura, NNR Review, etc.), and of other reintroduction projects (e.g. white-tailed eagle and red kite).

At the local level there will be a dedicated Field Officer. Following recent discussions with Scottish Wildlife Trust (SWT) and Mammals Trust UK (MTUK), both organisations have expressed interest in funding/ managing the Field Officer post.

The Knapdale Beaver Management Group, chaired by the SNH Area Manager, will comprise SNH, FE, SWT, Argyll & Bute Council, and the major funder MTUK. This group will be responsible for the overall running of the Knapdale trial.

A Local Community Liaison Group, chaired by a community representative and serviced by SNH, will be set up if a licence is received by SNH. It will be made up from representatives of key community interests and private individuals. Its role will be for information exchange and liaison over the trial and also to provide the opportunity for local people to participate actively in the potential for socio-economic benefits in the local area, in particular in terms of tourism. The importance of good local communication is evident following our discussions with European colleagues. We intend to be open and inclusive, to invite local involvement and be able to respond to any problems in a fast and practical way.

If the licence application is approved SNH will wish to discuss with Scottish Executive officials at an early stage how the results from the trial and other information should be disseminated and discussed more widely so that there is an ongoing process of information provision and consideration of the results. The alternative is to leave consideration until the end of the trial.

11. INTERPRETATION AND EDUCATION

The primary purpose of the proposed Knapdale project is to undertake a scientific trial to determine the effects of beaver, and the ecology of beavers, in Scotland. However SNH and our Management Group partners recognise that, if it proceeds, there will be considerable public interest in the project resulting in an increase in visitors to FE's Knapdale site. At this stage it is difficult to be certain which parts of the trial area will be used by released beavers. Despite this uncertainty it is essential that interpretive information is provided to visitors at Knapdale. In this respect the current presence of an existing small, informal, information centre at Knapdale and the system of walks and cycle routes make this easier to achieve. However a balance will have to be made between encouraging visitors to learn about beavers and the trial, and limiting the disturbance of the beavers themselves so as not to compromise the aims of the scientific trial. The most sensitive period will be when the beavers are first released and settling into their new territories after being in quarantine. Once the beavers have settled it is likely that they will be able to tolerate a level of disturbance, based on experience from Europe.

Proposals for initial interpretation for the first two years have been discussed and agreed with FE. Once the beavers have established themselves it will then be possible to develop a fuller interpretative plan for the whole trial period. Throughout

the trial period the interpretive material will be reviewed to allow the progress of the trial and new information on the beaver families to be reported to the public. The scale of the interpretation will partly be influenced by the local community, both organisations and individuals, as they decide to what extent they wish to develop the potential socio-economic benefits of the trial.

In the event of the trial proving to be a success, and a decision being made to maintain the beavers at Knapdale after the trial, then there could be considerable potential in developing the beaver viewing and related wildlife tourism facilities in the Knapdale area which would have socio-economic benefits for the local area and Argyll in general. Successful examples elsewhere of wildlife tourism include sea eagles on Mull and ospreys at Loch of the Lowes and Loch Garten. A visitor survey at the North Kessock Tourist Information Centre in 2000, for example, found that the red kites reintroduced to the area attract extra visitor spending totalling £116,000 per year to the local economy. A visitor survey at the Symond's Yat Rock Peregrine Project estimated that the viewing scheme attracted extra visitor spending of £551,000 to the Forest of Dean area in 1999. These types of projects have all brought considerable benefits to local communities. However such plans will be dependent on the outcome of the trial.

Interest has already been expressed by the local primary school in being involved with the project, and this will be taken forward if the trial proceeds. There is likely to be great interest in the project from schools generally and material will be produced for them including the likelihood of a beaver website to provide information. The British Embassy in Oslo has already made an initial approach to SNH offering assistance in arranging joint Norwegian-Scottish educational projects, such as school exchanges, which would be related to the beaver trial.

Part of the role of the proposed Field Officer will be interpretation and education in the local area, and this element is likely to increase as, or if, the trial progresses.

12. EXTERNAL FUNDING

12.1 Background

Since it is now three years since the original Business Case was presented, it will be necessary to update the figures, and ensure the latest business case guidelines are addressed, prior to the project commencing on the ground. SNH will therefore do this as a separate exercise if and when a licence is received. Since it is not possible to predict when such a licence will be issued, this approach seems to be the best way to ensure the financial details will be absolutely up to date.

12.2 Likelihood of support

This is a high profile and novel project that will generate a high level of media interest, along with a range of opportunities for PR activity. SNH will identify companies which may provide cash support for the project (companies that may use the characteristics of the beaver to promote their products and services). Examples include financial services utilising the marketing opportunities associated with 'home-builders' or the industrious nature of the beavers, and the use of the phrases 'beaver away' or 'busy as a beaver'.

It is acknowledged that the shortfall cost (approximating to £12,900 per annum of the trial, see 2002 Business Case) remains a risk to the progression of the project once and if a licence has been issued. However SNH remains confident that, assuming the licence application is approved, the remaining funds can be secured from the corporate sector through in-kind and cash support. Furthermore, during a meeting in December 2004, both MTUK and SWT offered their considerable expertise in further fund-raising.

All future proposals will adopt the key principles outlined in the 'Sponsorship Guidelines' issued by Scottish Procurement Directorate (July 2003) and the SNH procedural guidance on 'Joint Working with the Commercial Sector' (draft).

**SCOTTISH
NATURAL
HERITAGE**



APPENDIX 2

**Application to Scottish Executive by Scottish Natural Heritage for a
licence under section 16(4) of the Wildlife and Countryside Act
1981, as amended, to release European beaver, *Castor fiber*, for a
trial re-introduction in Knapdale, Argyll:**

**PROPOSED TRIAL RE-INTRODUCTION OF BEAVER TO KNAPDALE:
REPORT ON LOCAL CONSULTATION**

(published 30/3/01)

PROPOSED TRIAL RE-INTRODUCTION OF BEAVER TO KNAPDALE: REPORT ON LOCAL CONSULTATION

Background

As part of Directive 92/43/EEC Conservation of Natural Habitats and of Wild Flora and Fauna (the Habitats Directive) Article 22 makes provision for member states to consider the re-introduction of species in Annex IV, including European beaver. Article 22 states that it should take place 'only after proper consultation of the public concerned'. Scottish Natural Heritage (SNH) carried out a national consultation in 1998 on the desirability of re-introducing beavers to Scotland. The results were predominantly in favour of re-introduction. However, a number of concerns were raised by various land and water use interests. The Main Board of SNH decided not to proceed with a full re-introduction of beaver to Scotland, but instead proposed a time-limited trial in a specific area to explore some of the questions that had been raised.

Interest from the Forestry Commission (FC) in providing a site for the trial led to discussions between the 2 bodies in 2000 to identify the most appropriate site. This resulted in the selection of part of Knapdale Forest, Mid Argyll, as the proposed trial site. This was subsequently approved by both SNH Main Board and the FC Commissioners.

SNH and the Forestry Commission agreed that a local consultation exercise should be carried out prior to the submission of the project proposals to the Scottish Executive. Accordingly, the proposal by SNH and FC to carry out the project in Knapdale was made known locally and consultations were carried out throughout October and November 2000 in the local area.

Methods of Local Consultation

SNH stated in the original press release that the trial would only proceed with local support and referred to a local consultation process which would run to 30 November (later extended to 12 December). To help inform the local community about beavers, the proposed project and to encourage a response a display was prepared, a leaflet published, response form distributed and various presentations made.

The 4 private land owners whose land would be surrounded by the Forest Enterprise owned trial area were contacted at the beginning of October to inform them of the proposal and discuss any immediate concerns.

Early in the consultation, an 'information day' was arranged for the 13 October at the Cairnbaan Inn (nearest suitable facility to the proposed site in Knapdale) for:

- Individual land and water owners/managers adjacent to the trial area;
- Community Councils; and,
- Representatives of local, area and national bodies/organisations whose interests might be affected.

About 35-40 people attended and a wide range of questions were asked and views expressed. Several of the attendees had reservations about the proposals, but there were some, too, who were reassured by the information provided. At the meeting, people or organisations with queries were encouraged to contact local staff at the Lochgilphead office for more information or for individual meetings. They were also asked to make their views known by filling in a response form or otherwise contacting SNH.

On the next day, Saturday 14 October, an 'open day' was held, also at the Cairnbaan Inn, for any members of the public to attend. The open day consisted of a static display, short video and beaver items to examine. SNH and FE staff were available to answer questions and discuss the project. In all some 200 people attended the open day with the majority interested in discussing the project. The vast majority of attendees were local people from Mid Argyll, and the immediate area. Again, people were encouraged to fill in a response form and submit it to the local SNH office. The event was attended by 'The Argyllshire Advertiser' and an article appeared in the next edition of the paper further publicising the local consultation.

Response forms were made available at the open day, and then they were also distributed, along with leaflets, at the shops and post offices in the Knapdale area so that local people had the opportunity of responding.

Consultation Process

1. Public

SNH received a steady return of response forms from the public, sometimes seeking further information. These were dealt with on a personal basis as soon as possible. Some detailed letters were received which necessitated detailed replies and, in some cases, led to ongoing correspondence. Others made phone calls which were logged.

Representatives of North Knapdale Community Council, the council which includes the whole of the trial area, attended the information day and SNH offered to provide a presentation at one of their meetings. They were only able to arrange for SNH to address a meeting on the 28 November, at Tayvallich, close to the end of the consultation period. As a consequence, SNH extended the consultation by a further week to receive any responses after that date.

At that meeting, SNH gave a presentation on the proposed trial and addressed the issues that had arisen over the consultation period. In addition, the Community Council had agreed that 2 people known to be opposed to the proposal, should also give short presentations. 38 people attended the meeting. It was a good natured meeting, but many of the contributions from the floor were hostile to the proposals. However, immediately after the meeting several people who had not spoken publicly approached SNH staff to say they supported the proposal. Further response forms were issued and the attendees were encouraged to send their views to SNH, with a commitment being made to accept views even if they arrived after the 30 November deadline.

The last responses following the Tayvallich meeting were received on 7 December and as no more had been received in the post on Monday 11 December the consultation was ended. However as 2¹, with apologies for late arrival, were received on 12 December these were also incorporated in the results.

Although respondents were invited to provide their name and address this was not a prerequisite. In fact only 3 anonymous responses (1 in favour and 2 against) were received and from the comments it was possible to determine their geographical location. No indication was given on the response forms by SNH that they would be made public and they are, therefore, regarded as being submitted in confidence. By contrast it was considered that the views of bodies/organisations could be attributed as these were not being made in a personal capacity.

2. Bodies/organisations

There were some bodies/organisations that SNH felt it needed to consult and work with if the project was to proceed.

Discussions were held with Argyll and Bute Council's Public Protection Department and with West of Scotland Water over any potential public health concerns.

SNH sought views from the Mid Argyll Branch of the National Farmers' Union for Scotland on the proposals, and SNH discussed the trial with the Lochgilphead and District Angling Club which has a lease from FE over most of the lochs in the trial area.

In terms of any possible economic tourism potential, SNH sought the views of the Argyll and the Islands Enterprise and Argyll, the Islands, Stirling, Loch Lomond and the Trossachs Tourist Board.

Results of Local Consultation

Responses were received from a wide variety of backgrounds in Mid Argyll including;

- Land owners/managers adjacent to the trial
- Land owners/managers in the general area of the trial
- Local residents

An analysis of the responses was carried out by SNH staff who, where there was doubt, erred on the side of objection. The responses were analysed with a view to determining the extent of support or opposition to the proposals from local people, with separate analyses being undertaken of the views of people in Knapdale – the immediate vicinity of the trial - and the views of those in Mid Argyll - a wider area. The following guidelines were used in the analysis of the responses:

- SNH or FE/FC staff and their families were ineligible to respond;
- If 2, or more, names were on a response form or letter then they were counted as 2, or more, responses;
- In terms of judging "local" consultation only those from Mid Argyll were considered;

¹ Note: both of these were objections.

- “Mid Argyll” is defined by the local plan area;
- “Knapdale” is defined by addresses, i.e. Tayvallich, Achnamara, Crinan, Bellanoch and Cairnbaan.

A careful examination was made of the reasons provided by people in support of their views, and an effort made to answer questions where these were asked.

No responses were received from people in Argyll outside Mid Argyll, and only 4 responses were received from people outside Argyll.

Table: 1 Results of All Responses Received

Geographical area	Number of responses	% of total responses
For		
Mid Argyll	38	60.3
Out with Argyll	3	4.8
Against		
Mid Argyll	14	22.2
Out with Argyll	1	1.6
*Others		
Mid Argyll	7	11.1
Total	63	

(*”Others” covers responses in which the respondent’s view – whether in favour or against the proposed re-introduction - could not be determined.)

The total response was 65% in favour and 24% against. However, for the purposes of the local consultation only Mid Argyll responses are of relevance.

Mid Argyll Responses

Table 2 Results of Mid Argyll Responses Received

Category	Number of responses	% of total
For	38	64.4
Against	14	23.7
Others	7	11.9
Total	59	

When only the Mid Argyll results are considered, this shows a large majority of respondents, nearly two-thirds, in favour of the project and less than a quarter against.

Knapdale Responses

A further analysis was undertaken to see if there was any difference in the views of the Knapdale respondents, compared to the Mid Argyll views as a whole.

Table 3 Results of Knapdale Responses Received

Category	Number of responses	% of total
For	26	65
Against	11	27.5
Others	3	7.5
Total	40	

The percentage of people in favour of the proposal is the same but there is an increase of a few percentage points in people against. However, this analysis demonstrates a general consistency of view of the Knapdale respondents to those of Mid Argyll.

Analysis of Responses

For the 38 Mid Argyll respondents who were in favour of the proposed trial re-introduction there were not any general themes that occurred in the responses, and respondents did not provide any lengthy detail over the reasons for their support. The key reasons when any were provided were:

- Restoring part of the lost wildlife of Scotland;
- Increasing biodiversity,
- Benefits for tourism; and
- The benefits of a well managed trial.

The 14 Mid Argyll respondents objecting to the proposed trial gave reasons, in some cases very detailed ones, for their objection. The main reasons can be summarised below:

- Objected to re-introductions per se
- Too expensive and/or money better spent elsewhere
- Potential negative impact on existing species and habitats
- No tourism potential or would cause more problems than benefits
- Would cause similar problems to introductions e.g. mink
- Damage to salmon fishing interests
- Risk of disease transmission

Responses from Organisations/Bodies

In addition to the consultation of local people with interests in and adjacent to the trial area SNH also consulted a range of local organisations/bodies and regional/national bodies which have a remit/locus involving the trial area or the work of the trial. Their responses can be summarised below:

Table 4 Views of Organisations/Bodies with a Local Interest

Body	View
Argyll and Bute Council	Extremely supportive
West of Scotland Water	Content if suitable monitoring
Argyll and the Islands Enterprise	Supportive
British Waterways	Supportive
Mid Argyll National Farmers Union Scotland	Content if straying animals trapped
Lochgilphead and District Angling Club	Content
North Knapdale Community Council	Unable to provide a community view
Scottish Environment Protection Agency	Content

Argyll and Bute Council

The Council, through its leader and local councillors, was extremely supportive of the proposed trial since first hearing of it, and issued a press release to this effect. The Council see it as a potential boost to the economy of Mid Argyll, and to Argyll as a whole. Discussion has taken place with Public protection staff over a monitoring programme to assess the significance of any risk posed by beavers.

West of Scotland Water

Discussions have been held with West of Scotland Water over water supply issues, though there are no public supplies in the trial area. West of Scotland Water is content for the trial to take place providing there is a suitable monitoring programme.

Argyll and the Islands

Argyll and the Islands Enterprise support the proposed trial as it can be beneficial to Argyll with economic benefits from wildlife tourism.

British Waterways

The management of the Crinan Canal are content with the project proposals.

Mid Argyll Branch of National Farmers' Union for Scotland

Although the National Farmers' Union for Scotland voiced concern at a national level, the local branch are more neutral on the issues. The branch is content with the proposed trial if straying animals are returned to the trial area.

Lochgilphead and District Angling Club

There has been a lot of correspondence and communication with the secretary of the club who reported no major concerns from his members. SNH also gave a presentation and answered queries at their AGM.

North Knapdale Community Council

The Community Council had hoped to provide a response to SNH on the consultation. However, following the range of views they decided that they could not provide a single response reflecting the community's view.

Scottish Environment Protection Agency

Discussions have taken place with Scottish Environment Protection Agency who have indicated they are content with the trial.

Responses from Adjacent Landowners/Managers

The responses from individual adjacent land and water owners/managers have been included in the Mid Argyll (and Knapdale) figures. Their responses have also been classed as in confidence.

Two owners/managers were supportive, 4 were content for the trail to go ahead and 4 owners objected. For 2 of the objectors, their concerns are ones that would be addressed by the trial and accompanying monitoring programme. The other 2 objectors have concerns over the impact of beavers on the salmon fishing interests of the river Add, in particular on the spawning grounds.

Next Steps

A decision will be made by SNH's Main Board in May 2001, based on the results of the local consultation, whether to proceed with the proposed trial re-introduction of European beavers to Knapdale.

Under the Wildlife and Countryside Act 1981 (as amended) it is illegal to release into the wild any animal which is not ordinarily resident in Great Britain. Any trial re-introduction of European beaver to Knapdale, therefore, will have to be approved and licensed by the Scottish Executive. Subject to final Main Board approval an application will be submitted to the Scottish Executive in late spring 2001.

Scottish Natural Heritage
30 March 2001

Update re. NFUS position, November 2001

From the national consultation in 1998 it was known that the NFUS were at that time opposed to the re-introduction of beavers. During the local consultation the Chairmen (there was a change of Chairman during the process) of the local Mid Argyll Branch were consulted and both indicated a neutral stance, being content for the trial to proceed as long as straying beavers were to be returned to the trial site. At the same time the NFUS national staff stated that the NFUS remained opposed to the trial. The views of the local Branch were reported in the local consultation report; these have been queried by the NFUS. A meeting between the NFUS and SNH in Mid Argyll had originally been planned for 29 March 2001 but this had had to be postponed following the foot and mouth disease outbreak. This was re-scheduled for 5 November. A number of the members discussed the situation after the meeting and then informed SNH that the Branch were opposed to the trial going ahead but that if it did proceed then they would wish to discuss compensation and containment issues.

The outcome of the SNH-NFUS meeting was reported verbally to the November SNH Main Board meeting. The Board then made the decision to approve the submission of the licence application by SNH to Scottish Executive.



SCOTTISH EXECUTIVE

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13 September 2005

Dear John

Mike Foulis has written to Ian Jardine today to set out the basis for Scottish Ministers' decision not to approve the application from SNH to proceed with a trial re-introduction of the European beaver to Scotland. I thought it would be helpful to you, SNH staff, your partners and other supporters of this project, as well as the public, to provide some further thoughts on how we can build upon the effort you have made in progressing this project.

I want to emphasise my appreciation of the effort which SNH, its Board Members and staff have devoted to developing this proposal in such a constructive manner. I do realise that it has taken a number of years to research, investigate and prepare for this application. Others will now be able to consider whether they want to build upon the foundations you have laid.

In my role as Deputy Minister for the Environment and Rural Development, I share with you the responsibility for addressing the needs of and threats to Scotland's habitats and wildlife. This requires both of us to have a clear focus for the work we choose to undertake in order to achieve the best value from available resources. I was therefore very encouraged to see that the SNH Board has agreed to develop a species conservation framework for Scotland and I share your wish to see priorities clearly set out and effectively managed. I have asked my officials to work closely with those in SNH who are taking forward this important work. There are already some excellent examples of our joint work on species conservation, such as our efforts to safeguard the capercaillie population in Scotland, and the Uist Wader Partnership.

I must emphasise that the door is not closed to future reintroductions and I would expect part of the new strategic approach to include evaluation of possible species re-introduction, as well as work on perceived threats, including those from the introduction of invasive non-native species.



INVESTOR IN PEOPLE

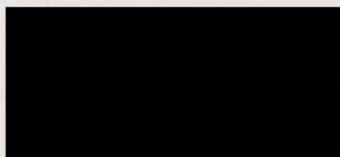


I would expect a rigorous appraisal to be made both by SNH and by the Executive of any future reintroduction proposals. Such assessments would need to scrutinise the legal, ecological and management aspects of any proposal, and where appropriate, would need to be accompanied by a well constructed business case. The biodiversity benefits which species expansion or re-introductions can bring to Scotland should be fully explored drawing upon the experience of European Union Member States and wider international knowledge.

As I see it, your proposed framework offers the real prospect of providing a strategic approach for the long-term benefit of Scotland which will help us to meet our obligations to halt biodiversity loss by 2010. In particular, it should help us to address priorities and ensure that the Executive, SNH and other partners make the best use of available resources for the benefit of Scotland and its species. I have asked my officials to keep me informed of the progress of your work on the framework.

It is right and important that SNH is placing on the policy agenda the issue of species that might benefit Scotland or are at risk. In light of the public and media interest in the SNH proposal for a trial re-introduction of the European beaver to Scotland, I am releasing this letter by means of a Press Release and through the Executive's Publications Scheme.

Rhona Brankin



RHONA BRANKIN



SCOTTISH EXECUTIVE

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1 September 2005

I am writing to inform you that Scottish Ministers have decided not to grant SNH's application for a licence under Section 16 (4)(c) of the Wildlife & Countryside Act 1981 for a trial re-introduction of the European beaver.

In reaching this decision, Ministers took full account of all the material supplied by SNH in support of this application, in particular:

The application from SNH dated 7 January 2002 to release the European beaver, *Castor fiber*, for a trial re-introduction in Knapdale, Argyll.

Annex 2 of the 7 January 2002 application – Trial re-introduction of European beaver to Taynish and Knapdale Woods cSAC –“Appropriate Assessment” dated 12 December 2001.

Annex 3 of the 7 January 2002 application – Business Case for a trial re-introduction.

Letter dated 8 February 2005 from Chief Executive of SNH to Head of the SEERAD Environment Group

Appendix 1 of the 8 February 2005 letter – response to the Minister's letter of 20 December 2002

Appendix 2 of the 8 February 2005 letter –report on local consultation published 30 March 2001 SNH letter.



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On the basis of the Executive's assessment across a wide range of policy issues, the conclusion is the licence should not be granted. The principal considerations which led to that decision are set out below.

Implications of Article 6 of the Habitats Directive

In his letter of 20 December 2002 to your Chairman, the then Deputy Minister for the Environment and Rural Development asked SNH to review the impact which this proposal would be likely to have upon the Taynish and Knapdale Woods Special Area of Conservation (SAC). The Minister also sought further information on whether a trial of this type was compliant with Article 6 of the Habitats Directive and I recognise that the supplementary information provided in your letter of 8 February 2005 aimed to address these issues.

The SNH analysis and appropriate assessment contained within Annex 2 of SNH's letter of 7 January 2002 made clear that the impact of the trial would be "certain not trivial" in relation to the Habitats Directive interests of Atlantic oakwoods and "certain" for aquatic plants. Together, these indicated there would be a number of negative effects upon the SAC but led SNH to conclude that a trial of this type would not be in breach of the Directive. This is not a view we share.

We have subsequently discussed with you the relevance of the recent judgment by the European Court of Justice (EC v Government of the Netherlands – the *Waddenzee* case) where the Court ruled that the test for considering the effects on the integrity of a European site requires there to be no reasonable scientific doubt as to the absence of adverse effects. Ministers fully accept that this ECJ judgement represents a new development. However, viewing the application in light of this judgement, and given that the appropriate assessment identifies the certainty of impact on the features for which the SAC was designated, it appears to us that there is a significant risk that a decision by Scottish Ministers to grant a licence for re-introduction of beavers to this site, could be held to be unlawful in terms of Article 6.

Consideration of Article 12 of the Habitats Directive

The release of the European beaver in Scotland would grant the species full legal protection under the Wildlife & Countryside Act 1981 in accordance with the relevant provisions of the Habitats Directive. This means that options to remove, and certainly to kill, any beaver that is either outwith the trial site or is causing more damage than might initially have been considered, as suggested in Appendix 1 of the SNH letter of 8 February 2005, are limited.

For those Member States with significant beaver populations – Austria, Sweden, Finland, Estonia, Latvia, Lithuania, and Poland - legal provisions have been made through their Accession Treaties to allow those States to remove the level of protection which the European beaver enjoyed in these countries. These measures are now reflected in the consolidated version of the Habitats Directive, which indicates willingness by the European Commission to amend the protected status of the species to reflect their high and healthy populations in certain Member States. But these circumstances do not apply in Scotland, nor has it been demonstrated in the SNH application or supplementary material how the provisions of Article 12 can be satisfied in the event that beavers re-introduced to Scotland had to be killed because of problems they posed in and around the trial site.

In short, we have identified no provision within current UK legislation or European Directives that would allow the exit strategy outlined by SNH to be undertaken in a lawful manner.



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SNH logo

Impact upon salmon interests

It is important that the lessons of any trial can be applied across Scotland. While SNH recognises that the trial site at Knapdale does not contain a river in which Atlantic salmon are present, the justifications for selecting this site, set out in your application of 7 January 2002, was the need for natural containment which could not be met on a typical salmon river. However, this means that the site selection would leave open some important questions about the transferability of the trial results to the rest of the country as a whole, particularly given the importance of salmon fisheries for the Scottish economy. While the Norwegian salmon/beaver study quoted in the additional information supplied is informative, it is not a detailed investigation and in our view further trials in Scottish salmon streams would be necessary before any wider reintroduction programme could be sensibly considered.

The additional information relating to Salmon does not give consideration to the issue of the salmon parasite *Gyrodactylus salaris* (Gs). The UK is currently free of Gs and the Executive would need to be convinced that this parasite would not be introduced into Scottish river systems as a consequence of any reintroduction of beavers. A stringent quarantine process would need to be in place to ensure that the beavers would be free of the Gs parasite before they left Norway.

The Economics and Financing of the Trial

On balance, Ministers were doubtful whether the benefits of this proposal would exceed the likely costs and also questioned the relative priority of this initiative as compared with other species measures. The Deputy Minister has written separately today to your Chairman, indicating her support for your plans to develop a species conservation framework, which has the potential to help both SNH and the Executive to direct future effort to achieve the greatest beneficial effect.

CONCLUSION

After consulting with a wide range of policy interests within the Executive and recognising and appreciating the considerable effort which SNH have made in bringing forward an ambitious project, we have nevertheless concluded that your application to re-introduce the European beaver to Scotland on a trial basis at the site proposed should be refused.

Since there has been significant public interest in this proposal, this letter is being released by means of a Press Release and through the Executive's Publications Scheme.



MIKE FOULIS



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SNH 10/01/02
1/1/02