Scottish Beaver Trial

Frequently asked questions

Why reintroduce the beaver?
The beaver became extinct in Britain in the 16th century – primarily due to hunting for its pelt, meat and the medicinal properties of a secretion from its anal gland (‘castoreum’). It is a missing element in our native biodiversity. The beaver is what is known as a ‘keystone’ species1 in forest and riparian ecosystems and there are few species which have such significant and positive influences on ecosystem health and function. Their modification of their local environment brings enormous benefits to other species, including otters, water shrews, water voles, birds, invertebrates especially dragonflies, and breeding fish, creating more diverse habitats (there are 13 species of dragonfly in Knapdale and all will benefit from the beaver related habitat modification). In effect they are a natural way of creating and maintaining habitats. Their dams can hold water in periods of drought, can regulate flooding and improve water quality by holding silt behind dams and catching acidic and agricultural run-off. They coppice broad-leaved trees and bushes and diversify habitat structure. There is also the moral responsibility for their restoration: under the EU’s Habitats Directive, the government is obliged to consider reintroductions of extinct native species.

What is the purpose of the trial?
The purpose of the trial is to show that the reintroduction of beavers in Scotland is feasible and beneficial to nature conservation. It can also assess the ecology of the beaver in the current Scottish environment and assess the effects of beaver activities on the environment, including a range of land uses (primarily forestry and freshwater lochs) – and to compare these with the intensive research and management in mainland Europe.

What are the benefits to the local population?
Other than improving local biodiversity, the beaver may also provide good opportunities to develop eco-tourism to the benefit of rural economies as has happened on Mull with sea eagles. Beavers are fascinating animals to watch and relatively easily to see both evening and morning (beavers are not strictly nocturnal but they do avoid the brightest part of the day and invariably come out at predictable times and locations).

What has changed since the last licence application?
Since the last licence application, the Government signalled its intent to reintroduce the beaver in the 2007 Species Action Framework. This provides a strategic approach to species management in Scotland – the plan identifies certain (32) species requiring targeted management and action. Two reintroductions were included – the white tailed eagle and European beaver. The aim being to reintroduce at least one population of beavers in the wild in Scotland.

Why was the last application rejected and how are you addressing these hurdles?
The application was rejected for the following reasons:

- **Part of the trial area, Knapdale Woods, is a European Special Area of Conservation (SAC).** The plan outlined by Scottish Natural Heritage (SNH) highlighted ‘possible negative effects on the SAC’ such as the Western Atlantic Oak Woodland and lochs with aquatic vegetation, both of which are features of this site. A recent European Court judgement suggests that any intervention in a SAC where there is scientific doubt about the prospect of a negative environmental impact would be likely to infringe the European Habitats Directive

- **The exit strategy proposed by SNH involved the potential killing of any beavers found outwith the trial site or causing more damage than might initially have been considered.** Any beaver introduced

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1 ‘a species which affects the survival and abundance of many other species in the community in which it lives’.
to Scotland would be protected under European law which raises doubts about the legality and practicality of the exit strategy.

It is our view that these reasons were based on misinterpretation of somewhat arcane legislation and we are confident that both issues will be addressed satisfactorily in the new licence application, having taken advice from specialists and agencies and from the European Commission.

In the Government's response to the application, the development of the species framework was cited as the best way to look at:

- species protection
- reintroducing species
- controlling non-native species
- conflicts between the conservation interests of different species

and the Government indicated that the reintroduction of the beaver should be considered as part of this framework. The framework was produced following extensive consultation and the beaver is included as a priority species.

Why isn't SNH making the licence application?
SNH did apply to the Scottish Executive for a licence for a trial to reintroduce beavers to Scotland. Since then the Government and SNH have launched the Species Action Framework (January 2007) in which it has prioritised 32 species across the country. One key thrust of the SAF is that SNH is keen for others to lead on individual species action. SNH would hope to be consulted on it prior to a decision being made.

In the previous application, SNH's role in advising and leading on conservation projects was unclear and where a third party takes forward a project independent of SNH, SNH's role as an advisor and monitor is more defined.

What do you say to those who deny that the beaver was once found in Scotland/Argyll/Knapdale?
Fossil beavers are rare in Scotland, because the conditions for the preservation of bone are poor, except in limestone cave areas, and efforts to find fossils of this kind have been much less in the west of Scotland. However, radiocarbon dates of fossil skulls and wood gnawed by beavers span more than 2,500 to almost 8,000 years. The historical record shows that beavers were formerly commercially exploited in Scotland and may have survived around Loch Ness until at least the early 16th century, but intriguingly a Gaelic name for the beaver, losleathan or dobhran losleathan (broad-tail or broad-tailed otter), survived as an oral tradition until the late 18th/early 19th century in Lochaber, Argyll, which suggests that the beaver may have survived in the west of Scotland until much more recently.

As beavers were formerly extremely widespread in Europe in all habitats that could support them, from the Mediterranean to the Arctic, it would be very odd if for some reason they did not occupy habitats we know to have been suitable in the past, in a country where the natural vegetation is continuously forested except on mountaintops and bogs, and where subfossils and historic records prove their existence in the country generally. We also have no fossil evidence for other normal species of the north European fauna, such as grouse or hares, living in Argyll specifically, but nobody doubts they were there in the past.

Surely the beaver will cause a lot of damage?
Beavers do modify their habitats through coppicing, feeding and in some cases damming (beavers living on lochs or large rivers have little need of dams), but this has a positive effect on biodiversity and habitat creation and management, plus controlling sediment and acidic run off. They do fell trees to eat bark in the winter and to build their dams. Most trees will be coppiced and will regenerate. Coppicing has been a normal process through most of history for bankside trees and the actions of beavers will make the woodland more natural. They normally forage close to water with activity concentrated within 20 m of the water’s edge. Studies carried out by SNH conclude that beaver occupation in Scotland is likely to be benign. Any occasional localised problems could be overcome by simple action, such as overflow piping and electric fencing. Beavers rarely eat conifers, although the odd conifer might be gnawed by an immature animal that has not learned that conifers are unpalatable and that resin gums up their teeth. They do not live in water entirely surrounded by conifers.
What will its impact be on the woodland in Knapdale?
This will be an important part of the trial. It is important to note that tree species and beavers have coexisted for millennia. Beavers do not eradicate waterside woodland but feed selectively on available trees, invariably leading to useful coppicing and natural restructuring of the woodland habitat. Certainly they fell trees and some local flooding may affect riparian trees, and create valuable patches of more open woodland and valuable wetland woodland. The extent of the impact will depend on topography, hydrology, vegetation and population size.

Any drowned trees provide dead standing timber, important habitat for other wildlife such as woodpeckers, various beetles and fungi. In truly natural forests, it is not unusual for up to one-third of the standing timber to be dead wood.

How will the trial take into account the conservation status of Knapdale?

The trial site at Knapdale has been notified as a Site of Special Scientific Interest and is part of a wider Special Area of Conservation put forward for its oak woodland, freshwater loch, marsh fritillary butterfly and otter interests. The trial requires an "appropriate assessment" in terms of the European Habitats Directive. What this means is that a consideration of the effects of beavers at Knapdale on the Special Area of Conservation qualifying interests must be undertaken. The "appropriate assessment" conducted for the earlier licence application is currently being reviewed; however, at this stage there is nothing to suggest that there will be any change to the conclusion that there will be no adverse impact on the site integrity because of the trial reintroduction. To provide further reassurance, particularly regarding cumulative impacts, a monitoring programme will form an integral part of the trial against baselines established before the trial. The proposed trial would include adequate safeguards (assessed by SNH) for the natural heritage of the area.

What is the impact on fish?
Beavers are herbivores and pose no direct threat to fish stocks. Positive impacts include the creation of new feeding pools and regulation of water flow, but beavers do not dam fast flowing or large rivers. Normally dams are built on small burns and streams. Dams can increase the production of invertebrate food (invertebrate biomass typically 2–5 times that of unmodified streams), provide drought refuge sites for fish and holding areas for migrating salmonids. Changes to the fish population will vary according to the location of a dam, topography and local conditions. Beavers favour floodplain habitats as opposed to fast flowing high gradient streams suitable for spawning.

Won't dams impede movement of fish?
The impact of beavers on fish migration depends on the conditions on site. Most available reports consider dams to be insufficient to inhibit migration during periods of high flow, but some migration may be impeded in low flow conditions, with the impediment being removed when flow increases.

There is little evidence from Europe and North America to indicate significant detrimental impacts of beaver on salmonid fish. In Norway, beavers are not perceived as a problem on salmon rivers and the only, albeit limited, research work available indicates that salmon can successfully spawn upstream of beaver dams. Moreover, as trial animals will be monitored closely, any animals straying beyond the agreed boundaries of the trial site will be rapidly returned.

What is the European experience of beaver reintroductions?
Reintroductions and translocations of European beaver have now taken place in 24 European countries. They began in the 1920s, e.g. in Sweden, Norway, Latvia, Russia and the Ukraine and have continued in the 1980s and 1990s, e.g. in the Netherlands, Croatia, Bosnia and Herzegovina, Czech Republic, Denmark, Hungary, Romania and Slovakia and more recently in Spain. In some countries these releases have also been augmented by natural immigration. Reintroduction to a country has usually involved release of animals over a number of years to several sites. They all seem to have been successful in terms of breeding, population growth and range expansion, except for some in France and Switzerland. Over 150 reintroductions have now been undertaken across Europe, most without the detailed monitoring proposed in the current plan, but some have been thoroughly studied enabling scientists to predict with confidence the likely pattern of events post reintroduction. The European experience is that beaver reintroductions are relatively simple and nearly always successful.
How will you monitor water quality?
The appropriate pathogens will be sampled during the course of the quarantine period to ensure that the released animals are disease free. The previous licence application secured the partnership of the Public Health Department of Argyll and Bute Council who are conducting monitoring of the area as part of the regime of public health control and we are in the process of securing of a similar arrangement with the Council for the trial. Disease and water quality within the trial site must be and will be addressed in the licence application and will be guided by advice from appropriate authorities.

What is the impact on hydrology?
Ponds and dams can have marked benefits on local water quality. Dams are usually only built on small streams, usually less than 3 metres wide, and these can moderate the detrimental effect of irregular flow. The modifications can also raise the water table locally creating wetland areas to the benefit of biodiversity. The ponds can help to neutralise acidic run-off, act as sinks for pollutants and increase the self purification of a watercourse. They can form considerable sediment traps, reducing very strongly erosive runoff and particulate loads in downstream water. Dams are not necessarily permanent.

Do they pose a flooding threat?
In general terms, beavers can actually help to mitigate against flooding lower down in the river system by building dams and moderating water flow. The modifications made to the streams can raise the water table locally creating wetland areas to the benefit of biodiversity.

Won’t the beaver population grow out of control because there are no natural predators?
Beaver populations are regulated by the available habitat and food supply and steep topography limits their range. Re-colonisation is likely to be gradual.

A great deal of evidence shows that watershed divides are a strong barrier to spread, especially in places like Scotland where the headwaters are usually not suitable beaver habitat. It would be entirely feasible in Scotland to restrict beavers to those watersheds where their presence is considered desirable.

Should you not be tackling the problem of Mink at Knapdale?
We have noted local concern with mink and are currently investigating targeting mink as part of the project proposal. There is some evidence that mink predate on beaver kits so it is in the interests of the trial to deal with this issue.

What is the impact of Beavers on Otters?
Some people have suggested that otter populations would suffer from beavers being present but this is untrue. Knapdale is a special area for conservation particularly for its otters and as such, research compiled for the previous application shows no adverse issues and confirms that beavers and otters are not in direct competition.

What of damage to farmland and the wider countryside?
Research by SNH indicates that beaver damage both in countries where they have been persecuted and those where they have been restored is generally considered to be negligible. They are not regarded as pests in Europe and where localised problems have occurred, there are a number of well established methods in use including removal of dams, overflow piping, or fencing as one does for deer and rabbits. This is not considered to be an issue in Knapdale given the nature of the topography and habitats. Some countries with sustainable beaver populations permit seasonal hunting in specified regions.

Will there be compensation for damage?
It is not anticipated that the beavers will cause any significant economic damage to neighbouring landowners and managers during the trial and we will deploy a range of techniques including radio tagging to follow the animals’ movements. As with all projects, there will a small contingency fund in the project’s budget for unforeseen eventualities and the relevant insurance will be in place for the project.
How long is the trial and what is the programme?
A three-year trial will be proposed in the licence application, preceded by one-year of preparation and followed by a period of evaluation. Although consideration is being given to extending the trial to five years.

It is planned to gather the animals in Norway in Autumn 2008, followed by 6 months in quarantine and a release on site in the spring of 2009. A programme of monitoring and research will be developed, which will include careful coordination of work on the ground to ensure disturbance of the animals is kept to a minimum and to ensure that the qualifying interests of the SAC will not be adversely affected.

How will you monitor released animals?
Direct methods, such as observing the animals and their tracks and signs, and indirect methods, such as radio tagging.

What is the area of the trial and how do we know it is suitable?
The boundaries of the proposed site are effectively around the land managed by Forestry Commission Scotland (FCS) at Knapdale. The site includes habitat suitable for beaver, ranges in altitude from sea level to 276 m. There are a number of small/medium sized freshwater lochs (up to about 2 km long) with small interconnecting burns up to approximately 2 m in width. The forest consists predominantly of Sitka spruce but broadleaves, birch, willow, alder and hazel are mainly associated with the lochs. Oak, sycamore and aspen also occur but oak and sycamore are more common over the site. The core area of suitable habitat covers approximately 15 km² and there is around 15 km of suitable linear riparian habitat. This figure will increase as FCS continues to remove conifers from riparian areas.

The extent of suitable habitat has been shown to be more than adequate for three beaver families to be translocated to the site, and should be sufficient to allow for any expansion of the beaver population over the trial period. Beaver specialists from Norway who have seen the site have confirmed this.

What will you do with any animals that stray out of the trial area?
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 have a strong tendency to restrict their movements to riparian areas, it is expected that they will stay within the Knapdale catchment while the carrying capacity of the site allows; much research from Europe indicates that this would be the normal pattern. Considerable research was carried out by SNH into the suitability of the Knapdale site.

Once introduced, the beavers will be observed using direct methods, such as monitoring their tracks and dams, as well as indirect methods, such as the use of radio tagging (including kits). Should any animals leave the trial site, they would be captured and returned. The Royal Zoological Society of Scotland has particular expertise in this field. We will work with the community to identify and mitigate against potential issues

What is your exit strategy?
An exit strategy is an integral part of the project plan, although the considered opinion is that the project will be successful and that there will be no call on an exit strategy. An exit strategy might be implemented during the trial if major, insurmountable problems occur. The reasons for considering implementation of an exit strategy are as follows:
• Unsustainable and detrimental effects arise as a result of the reintroduction of beavers to the study area. This applies equally to forestry, agriculture, fishery or conservation interests.
• There is an unsupportable 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.

There are four options for the methods of implementing an exit strategy:
(1) Transfer to other reintroduction programmes or ecological research sites.
(2) Housing of animals in zoological collections.
(3) Capturing, neutering and returning animals to live their life span in the wild.
(4) Humane destruction of animals.
Has the impact of beavers on the Crinan Canal been taken into consideration?
In general terms the feeder lochs for the canal are not great beaver habitat. Water fluctuations can be considerable and the riparian woodland is predominantly coniferous. The lochs are in different catchments to the three main catchments in the “core” part of Knapdale identified as the main beaver reintroduction area, and flow NE rather than within the three main catchments. Nevertheless, it is still possible that beavers could move into the area of the feeder lochs, and there is also the issue of whether beavers could dam outflow of these lochs. It is therefore essential that the animals are well monitored and that we have a protocol established with British Waterways whereby if beavers do move into the feeder Loch/burn area and are judged a potential problem, they could be removed by project staff.

Much of the Canal’s bank system is stone-lined and would appear not to be very attractive to digging beavers. There is also a fair amount of human disturbance, plus dogs etc. However, there are sections that are not stone, and therefore in the unlikely event that beavers do move into the canal it is important that any potential problems are identified as quickly as possible with the project team working with British Waterways. Again, the monitoring and tracking of the animals, and where necessary their removal, is an essential part of dealing with this issue.

What facilities will there be for public viewing and will there be any access restrictions?
If initial access restrictions are required then these will be kept to a minimum. We wish to continue to encourage visitors to the reserve and aim to provide an opportunity to see beavers in the wild while at the same time, giving the animals the opportunity to settle in with little disturbance. We will discuss any restrictions closely with our reserve management partners, Forestry Commission Scotland, should the project receive the backing of the Scottish Government.

Subject to the occupation of suitable locations and measures to prevent disturbance, we plan to introduce public viewing facilities, plus interpretation facilities. In the fullness of time we could consider the use of webcams. Beaver-watching contributes to local economies in several European countries. Beavers used to people can be quite relaxed, and will often pay scant attention to people more than 15m away. There are habituated beavers in public parks around Trondheim which the local council has in its management plan open for ‘harvesting’ for reintroduction stock, if a specially relaxed group were thought desirable.

How do we know if restoration at Knapdale is successful?
The restoration of the beavers would be carried out in accordance with IUCN guidelines, with the aim of establishing a viable self-sustaining population of beavers. A scientific evaluation will consider the range of issues associated with the restoration including hydrology, impact on habitats and other species as well as the condition of the animals.

Detailed work is being undertaken success/failure criteria will be outlined in the licence for the Minister’s consideration. However, the criteria are likely to include:

Success
- Survival of the introduced animals
- Stable or increasing population achieved within the limits of the study site
- The reintroduction is integrated with habitat management/restoration
- An assessment on the positive impact of the economy of the area as a result of the presence of beavers

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

It should be stressed that this list is being worked on by the project staff and will be reviewed in light of consultation feedback.
If it is successful will you introduce animals elsewhere?
On the assumption that the trial is successful, it is our ultimate aim to see beavers reintroduced to other parts of Scotland. Part of the evaluation process will be to look at other areas suitable for restoration, possibly in partnership with others interested in restoring beavers.

Who is carrying out the scientific aspects of the trial?
This would involve all the partners and a range of specialists, but we anticipate SNH taking the lead in this area.

Where are the animals coming from and how many?
We plan to gather 15–20 animals (in family groups and pairs) from the Telemark region of Norway. The Scandinavian Beaver is considered to be the closest type to that once found in the UK and the Telemark terrain has many similarities with the west coast of Scotland.

Do you have population projections?
At this stage without knowing the exact composition of the family groups that would be released in Knapdale, it is difficult to predict the population growth. However, we know that breeding pairs produce two or three young each year and the average lifespan of a beaver is 7-8 years. Research conducted by Stephen Ruston et al in 2000 suggests that if 3 families were introduced (2 adults and 2 young) the population might increase to 26-28 animals by the end of five years, and that there is the carrying capacity for 18 beaver families within the trial site. The trial will monitor population expansion and projections will be undertaken which will be used to inform the trial report.

What territory does a beaver colony require?
Territory sizes for beaver relate to a number of variables including availability and type of food, hydrology, and age and composition of the family groups. Colony densities of 1.5, 0.5 and 0.1 colonies per km length have been estimated in good, quite good and mediocre habitat in Europe. Based on published information and the views of Norwegian specialist who have seen the site, the quality of the habitat at Knapdale is considered to be 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. An important part of the trial will be the monitoring and evaluation of the range of beavers at Knapdale.

How will the animals be transported to the site?
Shipment from Norway to a quarantine facility and then from there to the release site.

Who is involved in the project?
The project currently involves the Royal Zoological Society of Scotland, the Scottish Wildlife Trust, Mammals Trust UK, and Forestry Commission Scotland. We hope that SNH will be a project partner when the licence is granted. We also have the support of Norwegian institutions with many years’ expertise in beaver reintroduction and management.

Who grants the licence?
The Scottish Government.

How will the feedback from the consultation be used?
The feedback will influence project planning and a summary of the results and key issues will be submitted as part of the licence application – enabling the Scottish Government to gain a clear understanding of local views.

Do beavers transmit disease?
The beavers would be quarantined before being released into the wild. The risk to the public from these animals appears to be no greater than from any other wild mammal in Britain.
What about Giardia?

*Giardia lamblia* is a parasite that lives in the small intestine of many mammals, including humans and beavers; it is not particularly associated with beavers as a species. The low incidence levels in Norway where there are tens of thousands of beavers are similar to those currently in Scotland, demonstrating that beavers are unlikely to increase the risk (there was one Giardia outbreak in Norway in recent years, near Bergen where there are no beavers). The trial population will undergo a six-month quarantine to ensure that they are healthy and free from *G. lamblia*. We intend to work with the local public health department on monitoring pathogens.

How much will the project cost and where is the money coming from?

Project costings are based on the previous proposed trial that was in the region of £500,000. Detailed costings are currently being undertaken. A range of potential funders are being considered, including Mammals Trust UK, European funding, funding in kind, appeals and various grant-giving trusts and bodies.

Isn’t the money better spent on threatened habitats already resident in Scotland?

A very subjective question but in any case it is not necessarily the same money. What price rebuilding biodiversity? Given that the beaver is a keystone species and therefore brings wide benefits to a range of other species and habitats we would say that this is money well spent. In addition we would rather beavers carried out habitat modification and maintenance than bringing in technical man-made measures. The restoration of the beaver has been considered against other species requiring conservation action and has made it into the Government’s Species Framework, which identifies certain (32) species requiring targeted management and action and these include the reintroduction of the beaver.