**Eurasian beaver**

*Castor fiber*



Eurasian beaver © Rob Munro

Beavers are regarded as keystone species: by modifying their forest and riparian habitats through coppicing, feeding and in some cases damming, beavers can have a positive effect on biodiversity. The Eurasian beaver (*Castor fiber*) became extinct in Britain in the 16th century, primarily due to hunting for its pelt and meat and the medicinal properties of castoreum, a secretion produced from glands near the anus.

The Eurasian beaver meets criterion 1b of the Species Action Framework as a species for conservation action.  It is listed on Annex IV (and Annex II) of the EC Habitats Directive.  The Directive requires European Union Member States to study the desirability of reintroducing such species where they have become extinct.

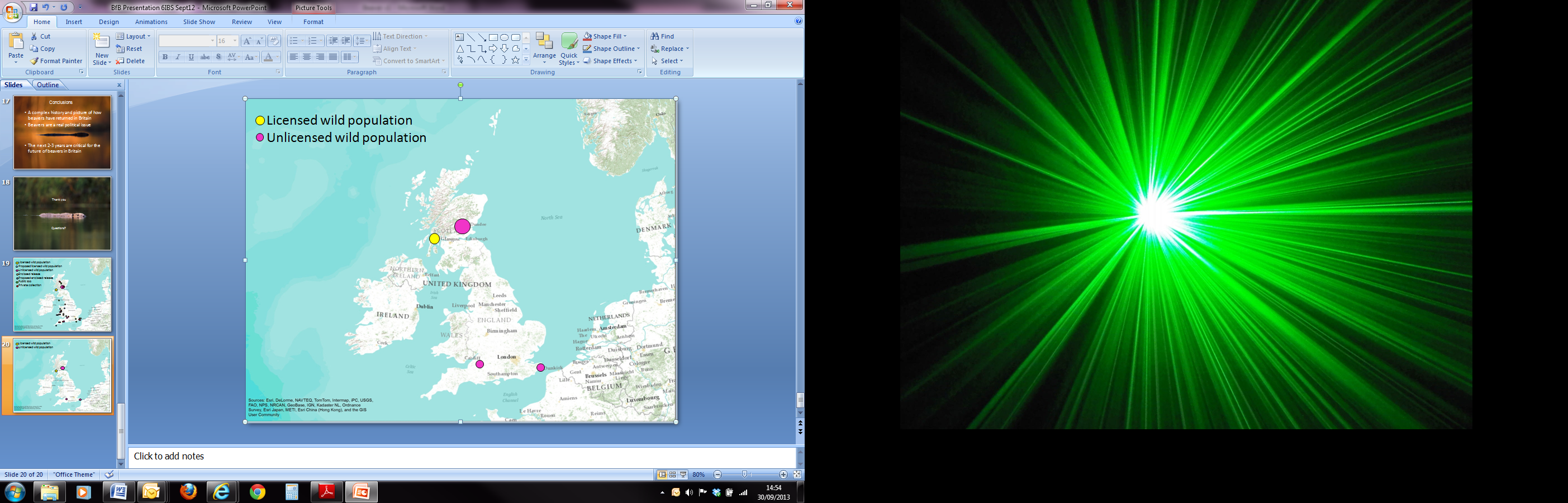
# Description

The Eurasian beaver is a large rodent, weighing between 16–20kg (exceptionally up to 29kg), and measuring 60–100cm in body length, with tail lengths of 30-40cm. Beavers are well adapted for a semi-aquatic lifestyle, with a sleek waterproof coat, large flattened muscular tail and webbed hind feet to provide propulsion underwater. The long claws on its front paws are adapted for digging.

Distribution

The Eurasian beaver occurs from Western Europe eastwards to the Chinese-Mongolian border region. They generally prefer freshwater habitats surrounded by woodland, but may occur in agricultural land or even suburban and urban areas[[1]](#footnote-1),[[2]](#footnote-2).

Beavers were once widespread through Europe and northern Asia, but by the beginning of the twentieth century over-hunting eliminated them throughout most of their original range (including the UK), leaving just eight remnant populations totalling approximately 1,200 individuals2. Protection (beginning with a hunting ban implemented in Norway in 1845), natural spread and reintroductions have resulted in a rapid recovery in numbers and range, particularly in Europe, and by 2002 it had reached at least 593,0002. To date, over 19 countries across Europe have reintroduced beavers.



In Britain a number of populations occur as authorised enclosed releases, but there some may also be the result of illegal introductions[[3]](#footnote-3); in Scotland they have been recorded in the wild at over 40 sites, with the largest established population occurring in the River Tay catchment[[4]](#footnote-4).

Ecology

Beavers can live up to 25 years in captivity, but on average only 10-12 years in the wild.  They are highly territorial and live in family groups of monogamous parents, young kits, and the yearlings born the previous spring. They are nocturnal, being most active at dawn and dusk, and do not hibernate.

Beavers build burrows in banks as nesting places, but also construct large lodges of piled logs and mud.  They may also build dams to flood areas they wish to access for feeding or to protect the underwater entrances to lodges or burrows. This ecosystem engineering can have a positive effect for biodiversity, with the resulting ponds benefitting many species including otters, water shrews, water voles, birds, invertebrates (especially dragonflies) and breeding fish. Dams also 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.

Mating takes place between January and February, with kits born from April to June. Kits are usually weaned after two to three weeks and soon emerge from the lodge to feed with their parents. Offspring will remain with their parents until they are around two years old when they become sexually mature and leave to find territories and partners of their own. A breeding pair can produce between two and four kits per year.

Beavers are completely herbivorous, feeding on aquatic plants, grasses and shrubs during the summer months with woody plants making a large part of their diet in winter. They will often store food in underwater caches attached to their home lodge so that they can easily access it if the water freezes over.

Threats

The beaver's historic decline was caused by over-hunting for fur, meat and castoreum (a secretion from scent glands near the anus), combined with loss of wetland habitats. Following protection and some reintroductions populations in Europe are expanding rapidly, and there are currently no major threats, although road kill is an important source of mortality for some populations1.

Management

* **The Scottish Beaver Trial**

The Scottish Beaver Trial is a partnership project between the Royal Zoological Society of Scotland, the Scottish Wildlife Trust and host Forestry Commission Scotland to undertake a time-limited, five-year trial reintroduction of Eurasian beavers to Knapdale, Mid-Argyll. The trial will run until 2014, after which the Scottish government will decide whether or not to allow beaver reintroductions in Scotland. Scottish Natural Heritage co-ordinates the independent scientific monitoring of the trial, reporting progress to the Scottish Government and monitoring how the conditions of the licence are being addressed on the ground. The Scottish Beaver Trial has five main aims:

* To study the ecology and biology of the Eurasian beaver in the Scottish environment.
* To assess the effects of beaver activities on the natural and socio-economic environment.
* To generate information during the proposed trial release that will inform a potential further release of beavers at other sites with different habitat characteristics.
* To determine the extent and impact of any increased tourism generated through the presence of beavers.
* To explore the environmental education opportunities that may arise from the trial itself and the scope for a wider programme should the trial be successful.
* **Beaver- Salmonid Working Group**

A key concern of beaver reintroductions is the potentially negative impact it might have on fish and angling. Scottish Natural Heritage commissioned the University of Southampton to undertake a review of the literature and a survey of expert opinion. The ‘Beaver-Salmonid Working Group’ has been set up in Scotland to examine the issues further, and will report to Scottish Government in 2015. The BSWG reports to the Scottish Government appointed ‘National Species Reintroduction Forum’.

## **The National Species Reintroduction Forum**

This Forum had its first meeting in May 2009. It is chaired by Scottish Natural Heritage and has a membership representing a range of stakeholders from land use, conservation and science sectors. The overall role of the Forum is to contribute to broad scale, strategic issues relating to species reintroductions in Scotland.

* **Tayside Beaver Study Group**

There are already beavers living in the Tay River catchment, following accidental/illegal releases in the past. The Tayside Beaver Study Group has been set up by the Scottish Government to monitor these populations alongside the Knapdale Trial. Data collected will contribute to the formal decision making process regarding the beaver’s future in Scotland in 2015.

* **Scottish Wildlife Trust policy on beaver reintroduction - an overview:**
  + SWT has a vision for the widespread return of the once native Eurasian beaver to Scotland. Beavers are a missing element in our native biodiversity, lost from Scotland due to human persecution and anthropogenic habitat loss and we believe that there is a moral imperative to restore this species.
  + SWT also believes that there is an ecological imperative to reintroduce the Eurasian beaver to Scotland as it is a ‘keystone species’ which produces positive environmental and biodiversity effects which would have significant benefits for our depleted wetland wildlife.
  + SWT believe that the reintroduction of the Eurasian beaver would (in the long term) be a valuable tool for restoring wetland habitats, reducing management intervention requirements and increasing the robustness of ecosystems in the face of threats such as climate change.

Future action

If the current Scottish Beaver Trial is found to be a success, further licences for future reintroductions may be considered by the Scottish Government. For reintroductions to be successful, areas of suitable habitat needs to be identified, along with landowners and communities willing to support or tolerate the restoration of beaver populations.

Characteristics of prime beaver habitat include:

* Easy access to grasses, non-woody herbaceous plants and riparian tree species, especially poplars and willows.
* Water at least 60cm deep when at its lowest near lodges and burrow sites.
* River channel gradients typical of lowland rivers with ‘soft’ or fine bed and bank materials, low-moderate flows, presence of aquatic, semi-aquatic vegetation, bankside trees and bushes.
* Within wetlands and/or a river system with the potential for the beaver population to grow and expand across neighbouring areas.

*It should be noted however that beaver populations can establish in sub-optimal habitats provided that sufficient wild forage is available and burrows or lodges can be constructed.*

Wider context

Beavers are considered a keystone species and can create wet woodland habitats that are essential to many other species. There are few native species which have such significant influences on ecosystem function and health. This ecosystem engineering service (widely seen as the main argument for beaver re-introduction) has various benefits:

* Hydrology - Damming slows river flow and creates pools and wet woodland habitat. This provides important habitat for a range of invertebrates (in particular dragonflies), fish, otters and birds such as kingfisher, heron and some ducks.
* Trees – through tree felling, beavers effectively coppice and open create open glades. This is good for many plants and invertebrates such as butterflies and dragonflies.

The beaver is a charismatic species which can serve to raise wider biodiversity issues such as riparian woodland management, aspen restoration, wetland biodiversity and dead wood habitat.

Quick facts

* Beavers are the world's second-largest rodents after the capybara.
* Unusually for mammals, female beavers are the same size or slightly larger than males of the same age.
* Beavers have sharp incisor teeth which, as with all rodents, continue to grow throughout their lifetimes.
* Beavers can stay underwater for up to 15 minutes.
* Their ears and noses have valves that they can close before submerging themselves under water.
* They have a set of transparent eyelids that can function a bit like goggles underwater.
* Beavers use their tail as a support when standing, a rudder when swimming and a warning device for other beavers when slapped on the water. Fat is stored in the tail to provide a beaver with energy during winter.
* Beavers have a pair of large scent glands, located near the anus, which produce castoreum oil that they deposit on scent mounds.
* Castoreum is used in high class perfumery for “refined leathery nuances.” In food, castoreum is used to flavor confectionary, drinks, and desserts such as puddings. Today, it has been replaced by chemically synthesized castoreum. In the past castoreum was used in medicines for for its pain relieving properties.
* Another pair of glands near the anus secrete an oil that is used in grooming. A specialized toenail on each hind foot acts as a comb to spread the oil over the fur and give it a waterproof coating.
* The release of beavers at Knapdale was the first time a species of mammal was reintroduced legally, anywhere in Britain in the wild.

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Beaver activity results in increased habitat heterogeneity, higher invertebrate populations and provision of refuges which can have a positive effect on fish stocks. However, their dams can have a negative influence for some fish species by impacting migratory routes.

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