

Post-release Monitoring Plan for Beavers in Glen Affric

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Forestry & Land Scotland, with the support of Trees for Life, has been exploring the potential to submit an application to NatureScot for a licence to release beavers to Loch Beinn a Mheadhoin in Glen Affric. The Beinn a Mheadhoin hydro dam is likely to be a significant barrier to beaver dispersal for some years, with beavers likely to remain in the high-quality habitat upstream of the dam. Nevertheless, a key part of this proposal is to develop a beaver Monitoring Plan with the local community so that any potential interactions between beavers and sensitive land use interests below the dam can be identified and planned for as early as possible.

This plan is based on input from people who came to three open workshops in Cannich Community Hall in April and May 2023. A draft monitoring plan was circulated after each workshop to invite comments from local people, provide a basis for discussion at the subsequent workshop and to work in a stepwise fashion towards this finalised document. Each workshop considered four questions:

1. What are the purposes of the monitoring?
2. What monitoring methods should be used?
3. How will the Monitoring Plan be carried out?
4. How will the monitoring results be shared and made publicly available?

1. Monitoring purposes

Defining precise purposes for the monitoring is the first step in deciding what methods and intensity of monitoring are appropriate. The groups at the workshop proposed the following purposes, with those highlighted in bold identified as key elements in making a licence application:

- A. Engage, inform and support the community and all affected stakeholders to reduce human-wildlife conflict;**
- B. Monitor and measure beaver dispersal, particularly to detect if beavers come downstream of the Beinn a Mheadhoin dam;**
- C. Monitor and map the presence of beaver activity, such as dams, lodges, browsing and felling;**
- D. How are beavers affecting the environment? Effects on biodiversity and habitat change;
- E. Build the evidence base over time;
- F. Understanding changes in local attitudes to beavers.

2. Monitoring methods

We need to identify monitoring methods that are capable of fulfilling the above purposes and design them in ways that will make them sustainable for the long term. Monitoring practices for beavers are well-established from experience elsewhere in Scotland and from reintroductions in other countries.

Field Sign Survey

The most efficient way to detect beaver presence and understand territory size is to check for field signs. Beavers leave distinctively chewed sticks, felled trees and food caches on the banks of streams and lochs. They also construct conspicuous lodges or, less visibly, dig burrows. Patrolling for these signs on foot or by canoe allows surveyors to map beaver presence, assess the density of the sign, develop a good picture of the territories being occupied and identify areas being investigated as potential new territories by young adults. Where surveys require access to privately owned land, this will need to be agreed with the landowner in question.

Wildlife Camera Traps

Motion-triggered camera traps are a great way to learn more about a beaver family group or understand how they're using or travelling in specific area. Camera placement is informed by where the field sign survey indicates different levels or types of activity. Individual beavers are difficult to tell apart but with time and experience, distinctive marks on the tail can be used to identify individual animals, helping to build an understanding of population size, family structure, whether juveniles have left the family group and even the health of different animals. We are fortunate that someone locally has extensive expertise in camera trapping and is willing to volunteer time and high-quality equipment for this monitoring.

eDNA

eDNA has emerged in recent years as a powerful way to identify the range of species present in the environment using soil or water samples. Water samples are collected from lochs and rivers and analysed in the lab to produce a list of all the different species with DNA present in the sample. As habitat change takes place over time, including change brought about by beaver activity, we can expect to see changes in the species leaving a DNA trace in the sample. Studies elsewhere have found that species diversity tends to increase in response to the way beavers affect the habitat around them. Trees for Life has worked with Prof Bernd Haenfling, a specialist in the field from UHI, to collect samples that can provide an eDNA baseline against which changes that might result from a future beaver release can be measured.

Microchip tags

Any beavers released to Glen Affric would have microchips implanted under the skin prior to their release. These act as tags that can be picked up with fixed loop antennae placed at strategic points in the landscape, or, in the event of a beaver dying, in a recovered carcass. Each microchip would be uniquely coded so that individual beavers can be distinguished. This technology does not allow for active satellite tracking (the tags needed for this are too unwieldy to be fitted to beavers), but they can be used to detect presence in a specific location. Note that only the animals that make up the original releases can be microchipped. Fitting a microchip to a beaver is a highly invasive process and any kits born after the original release will not be chipped.

Drone photography and LiDAR

These are two effective ways of detecting landscape changes caused by beavers over time. Aerial photography captured by drone from season to season or year to year has been used to monitor how the presence of beavers has affected habitats around a release site. A fresh drone survey would ideally be carried out ahead of or shortly after a beaver release, although existing aerial photography could also act as a baseline against which future change can be assessed. Drones can be programmed to fly to the same coordinates and by the same route at different intervals, thereby capturing images of the landscape from above, allowing change to be seen and measured over time.

LiDAR stands for Light Detection and Ranging. It provides a very highly detailed aerial view of terrain, using laser range finding capable of mapping variations in ground height to variations as fine grained as 5cm. This could provide a useful way to track how an area of land changes over time in response to beaver activity.

Measuring local attitudes to beavers

UHI have used the Glen Affric and Strathglass proposal as a case study for work they have completed for NatureScot on The Cultural Perceptions of Beavers. This was a very welcome study for Trees for Life because it provides an external and academic evaluation of the way we undertook the engagement and consultation. It also provides something of an information baseline on the current local attitudes to beavers so that change from this in the future can be identified.

Options for assessing future changes in people's attitudes to beavers include repeating selected aspects of the UHI study or adopt the polling approach used to evaluate the beaver translocation to Knapdale (see p12-13 [here](#)), or some combination of the two. Further discussion with community interests is needed to identify the best way forward.

Summary of draft proposed monitoring methods

Method	Main monitoring purposes
Field sign survey is the primary basis of monitoring beaver presence, dispersal and activity. Patrols will be carried out on foot and/or by boat to survey the extent and detail of field signs.	A, B, C, E
Wildlife camera trapping is used in locations informed by the field sign survey to deepen our understanding of beaver activity.	A, B, C, E
eDNA - a set of baseline samples has been collected. Further samples, collected in the years after a beaver release, can be analysed and compared with the baseline to detect any change in species composition in the water environment.	D, E
Microchip tags - any beavers released will be fitted with microchips that can be used to identify individual released beavers. This can be deployed to	B, C

detect if the beavers have passed a specific sensitive location, or used to check any bodies found post mortem.	
Drone photography and/or LiDAR survey of the release area would ideally be carried out ahead of, or shortly after, any beaver release, with follow-up photography or surveys carried out when resources allow.	D, E
Social attitudes surveys based on previous work, including by UHI and in Knapdale.	F

3. Practically carrying out the monitoring

Overseeing delivery

Trees for Life intends to recruit someone to the team who will focus on beaver work. Ensuring that the detail of the Monitoring Plan is planned, delivered and systematically recorded is a responsibility they will take on, although local volunteers would be most welcome to contribute. The Trees for Life team member will be a known point of contact for people interested in taking part in the monitoring, would deliver the training needed for that and take responsibility for volunteer health and safety.

The role will support NatureScot if beaver management or mitigation becomes necessary in the future, responding to concerns raised by people in the community and adding to the support available from the Beaver Management Framework if needed. Forestry & Land Scotland's monitoring of their ground will also seek to feed into and develop the picture of long-term change.

Locations

Locationally, the monitoring would focus on the beaver territories that emerge after a release, the areas of most suitable habitat nearby in which new territories are most likely to be established over time and locations below the Beinn a Mheadhoin dam where any beavers that might eventually disperse downstream would likely leave signs of feeding.

Frequency

How often monitoring is undertaken will vary with circumstances. Above the dam, *field sign surveys* might be carried out weekly in the period immediately following a release, reducing to perhaps fortnightly or monthly through the winter once territories have been established. This frequency might increase again in the spring to detect signs of new territories being established. Below the dam, checks for field signs would be made weekly throughout the first year and would always be at least as frequent as surveys above the dam.

Once installed, *camera traps* will provide an ongoing record of the activity in their field of view for as long as they are maintained. Where camera traps are located will change in response to the information gained from the field sign surveys, so this will be reviewed on a monthly basis or as necessary.

For *eDNA sampling*, we have samples from Loch Beinn a Mheadhoin in storage with UHI that will provide a pre-beaver baseline against which future change can be measured. We would take advice from UHI's specialists on how often to collect samples in future to check for any changes in the eDNA. The first new sampling is unlikely to take place until at least year two after a release to give any changes brought about by beaver presence to take effect.

Ideally, *drone photography and/or LiDAR* would be used to capture the condition of the landscape prior to a beaver release and then repeated at intervals after any release is carried out. For instance, years 1 and 5 might provide a good window for measuring detectable change in the landscape.

Using antennae receivers for *detecting microchips* fitted to beavers released into Loch Beinn a Mheadhoin is an option if field sign and camera trap monitoring suggests that there will be particular value in detecting beavers moving into a specific location. This could be useful if microchipped beavers disperse to areas which might be sensitive to their activities, most likely to be the case in certain areas downstream of the dam if they move there.

Resources

Once the Monitoring Plan is complete, Trees for Life will assess the resources required to deliver it in practice and seek the funding needed. We will recommend that Forestry & Land Scotland do not submit a licence application to release beavers until this funding has been secured. Trees for Life has recently confirmed that it has funding in place to appoint the team member outlined above.

4. Sharing the findings and transparency

The natural extension of developing the Monitoring Plan with local input is to openly share the results of the monitoring with the community. This could in turn help with monitoring purposes C and D by providing stakeholders with consistent information obtained by transparent methods, both to understand the physical practicalities of beaver presence and to inform any management or mitigation that may be needed. This points to using one or more ways of disseminating information about the results of beaver monitoring locally, such as publishing the results online, presenting them at information events or sending paper newsletters via postal drops.

Transparency is an important part of the process, though the workshop discussion also highlighted the potential risks that widely publishing detailed information on the locations of beavers in the landscape could bring. This could take the form of increased human disturbance of both the beavers themselves and of other sensitive wildlife such as the black-throated divers. Although beavers can be resilient to disturbance from human activity, further thought will be given to what information about the beaver presence can responsibly be published to avoid the risk of focusing human activity on sensitive areas for wildlife.