Advice and recommendations for beaver reintroduction, management and licensing in England (NEER 019)

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Executive Summary

In August 2020, the UK government announced that beavers on the River Otter in Devon could remain and expand their range naturally. This milestone was reached after the successful conclusion of a five year trial reintroduction of wild-living beavers on the River Otter. A decision is now needed on the future of beavers more widely in England.

Based on a review of research and experience in the UK, Europe and North America, Natural England provides this advice to help inform the government's decision on the future of wild-living beavers in England, and to meet the ambition set in the 25 Year Environment Plan to reintroduce this species.

Future releases

It is Natural England's advice that future beaver releases in England should focus on maximising the benefits that beavers can bring and minimising risks or negative impacts to land use, infrastructure, other environmental features or livelihoods. Any further releases need to comply with Defra's Code for Reintroductions and Other Conservation Translocations in England[1], which is based on international guidelines[2].

Three options ('Approaches') to future releases are considered:

1. No further releases of beavers into the wild, except to augment the River Otter population in order to increase genetic diversity.
2. Beavers reintroduced at a measured pace to locations where it is possible to maximise their environmental, social and economic benefits and minimise risk of conflict with local communities and business interests.
3. Beavers reintroduced at a faster pace potentially anywhere in England where the criteria of the Defra Code for Reintroductions and Other Conservation Translocations in England can be met.

Natural England recommends Approach 2. This will allow the positive changes resulting from the presence of beavers to be realised and allow habitats and species to adapt to the presence of beavers. A measured pace will give people time to get used to living alongside beavers and maximise the chances of success by providing the opportunity to address evidence gaps, together with building knowledge and capability to manage negative impacts.

Keeping beavers in fenced enclosures

Beavers are also kept in fenced enclosures across England, principally to assess their impact on flood alleviation and on restoration of natural habitats, and to increase biodiversity, for educational or research purposes and as part of rewilding projects. A clear policy is required for future proposals for releases of beaver into fenced enclosures. It is recommended that they are only permitted where a proposal has a clear objective and measurable benefit. This might include piloting a future wild-release proposal. The justification for future releases into enclosures will decrease as more beavers are released

[1] Defra (in prep) Code for Reintroductions and Other Conservation Translocations in England. Department for Environment, Food and Rural Affairs, London UK.
[2] IUCN 'Guidelines for Reintroductions and other Conservation Translocations' (IUCN, 2013)

into the wild, especially taking into account the high proportion of enclosure projects that experience escapes.

Natural England recommends that criteria for licensing new enclosures and renewals should be tightened in order to limit the number of enclosures and discourage enclosures in locations where a release into the wild would be unacceptable.

Promoting coexistence and managing conflicts

A management framework for beaver reintroduction will need to be flexible and adaptive and include education and communication, maximising gains and minimising risks, ensuring welfare of the population and managing impacts.

Reintroduction projects should be delivered by partnerships. A Project Plan covering the first 5-10 years of the reintroduction should be developed in collaboration with key stakeholders. This will be required as supporting evidence for the release licence application and will need to identify sources of funding, roles and responsibilities, a monitoring programme and feasibility study. The Project Plan should aim to maximise potential benefits and minimise potential conflicts. A Steering Group should be established for each project, together with a local Beaver Project Officer.

A National Beaver Management Forum will be established to maintain standards, oversee and steer strategic, national and regional decisions on beaver management and ensure join-up between involved parties. The appointment of a National Beaver Officer is recommended to oversee the beaver projects, provide training and support for the local Beaver Project Officers, drive standards and ensure consistency.

A range of best practice management options, supported by education and engagement, need to be available to individuals, organisations and public bodies who may be affected by beaver activity. Solutions will follow an agreed decision-making process, ranging from telephone advice through to habitat management and, if justified, to translocation or lethal control. Depending on the beaver's future legal status, an efficient, fit for purpose licensing system will also be required.

The new Environmental Land Management Scheme (ELMS) may provide an opportunity to integrate beavers into land management practice.

Funding for management during the establishment phase should be provided locally and identified in each Project Plan. After that, three levels of centrally funded support are proposed:

1. 'Minimal' – provision of a licensing framework and associated guidance (*via* the National Beaver Forum) only.
2. 'Medium' – provision of a licensing framework, national support *via* the National Beaver Forum and National Beaver Officer, plus partial central funding of management advice and practical delivery of management, including volunteers.
3. 'Higher' – full central funding for licensing, advice and some management activities (e.g. habitat mitigation, volunteers); partial central funding for all remaining management activities (e.g. education and engagement, translocation).

Where central funding is not provided, alternative sources of funding will need to be identified by the Project.

Natural England recommends 'Medium' funding. This offers a balance between setting high standards and encouraging private initiatives. It addresses the full range of support although not all aspects would be fully funded.

All options will need to ensure the adequate funding and resourcing of authorities and organisations that are required to prepare for and undertake management related to the activities of beavers. Funding for the protection of important infrastructure and assets that could be impacted by beaver activity will also need to be addressed.

Status of unauthorised populations

In addition to the River Otter population, there are several unauthorised beaver populations in England that originated from escapes or illegal releases. The origin and disease status of these populations are unknown and populations are in most cases increasing, including on at least three river catchments. The future of these populations needs to be considered. It is neither practical nor necessarily desirable to remove these populations but, as they are currently unmanaged, it is anticipated that their activities are likely to come into conflict with landowners and river users in the future. This could undermine public support for future releases.

Natural England recommends an assessment is made of the existing populations and how best to manage them in order to maximise benefit and minimise conflict. Support based around the establishment of local management partnerships should be made available to landowners and river users to help facilitate the future management of these populations. A firm position is needed to discourage further unauthorised releases, with measures in place to ensure such beavers are removed as quickly as possible and appropriate enforcement action taken.

Legal status of beavers

Legal protection for beavers in England is currently limited and provides only minimal protection to beaver welfare. In Scotland, beavers have been fully protected since 2019.

Now that the beaver is accepted as a returned native species, it is important to determine the appropriate legal status to safeguard its welfare and future conservation status and, if the species is protected, to develop a licensing framework for management activities. This paper considers three options ranging from little to full protection. Other in-between options are possible and should be explored further.

Natural England recommends a protection that will allow beaver populations to thrive and expand in locations and habitats where their presence is most beneficial, and to ensure welfare of individuals when management is necessary. Under this regime it will be important to allow actions to manage problems caused by beavers in order to facilitate coexistence between people and beavers.

Contents

1. Introduction

The Eurasian beaver (*Castor fiber*) disappeared from Great Britain over 400 years ago, with only a few remnant populations subsisting throughout Europe. Since then there have been reintroductions and/or reinforcement of remnant populations in 27 European countries. The beaver was formally reintroduced to Scotland in 2016 following the conclusion of the Scottish Beaver Trial in 2014. In England, a five year trial reintroduction of wild-living beavers on the River Otter in Devon ended in spring 2020; in August 2020 the UK government announced that the beavers in the River Otter "…*will now be allowed to remain there permanently and continue to expand their range naturally, finding new areas to settle as they need*". The conclusion of the River Otter Beaver Trial provides a trigger for government to make a decision on the future of beavers throughout England.

The Eurasian beaver is protected in Europe by the Convention on the Conservation of European Wildlife and Natural Habitats 1979 (the Bern Convention) and is listed in Annex IV(a) of the Habitats Directive ('Annex IV(a) species'). Member states also have a duty to study the feasibility of reintroducing formerly native species. Since 2019 the beaver has been fully protected in Scotland; legal protection in England is currently limited to welfare and trapping legislation.

The 25 Year Environment Plan (Defra, 2018) raised the prospect of reintroducing the beaver to England for its positive effects on ecosystem functions and biodiversity gains of benefit to wildlife and people. There is considerable interest in beaver reintroduction due to the potential for increasing natural capital and associated ecosystem services. These include: wetland restoration, natural flood management benefits and the resulting contribution to the climate emergency, biodiversity crisis, sustainability and catchment resilience through restoration of natural processes. As a result, the number of applications to release beavers into fenced enclosures in England has significantly increased in the last three years (at the time of writing there are 25 projects, two with more than one enclosure), as has interest in proposals to release beavers into the wild.

As a result of escapes and unauthorised releases, beavers are also living in the wild six river catchments in England. Currently there are estimated to be at least 60 'wild' beaver territories (including those on the River Otter) in England (as many as 400 individual beavers) (Heydon *et al.* 2021). In Wales, there are at least three beaver enclosures plus a few unauthorised free-living beaver populations. To date there has been no formal reintroduction in Wales, although a project to reintroduce beavers is currently being considered by Natural Resources Wales.

Beavers are described as a 'keystone species', capable of engineering major changes to wetland ecosystems and riparian habitats. The impacts of their activities on the habitats and species around them can be highly beneficial to biodiversity and the environment generally but their activities can also lead to negative impacts that need to be managed. It is recognised that although a positive impact ('benefit') from beavers can accrue at the same location as a negative impact ('cost'), this is not always the case; for example, the 'benefit' of flood reduction downstream may be as a result of a 'cost' upstream of floodplain inundation. Consequently, the people who benefit from beaver reintroduction may not always be the same as those who bear the costs. In addition, benefits may be reduced either because the habitat is sub-optimal or because extensive management of beavers is required to mitigate for costs elsewhere.

Reintroductions should focus on maximising the benefits beavers can bring and minimising risk or negative impacts to land use, infrastructure or other environmental features. For all scenarios, a key objective should focus on developing and promoting an adaptive approach to management, where required, and learning to live with beavers. It is accepted that a robust management framework for beavers is essential. Defra therefore commissioned Natural England, with support and input from the Environment Agency, to provide advice about beaver reintroduction, management and licensing.

Based on research and experience in the UK, Europe and North America, and including feedback from stakeholders and national experts, this paper identifies and considers a range of approaches and options to help inform government's decision on the future of wild-living beavers in England. The detail for delivery of these options will be addressed at a later stage.

Approaches to the pace of beaver reintroduction in England are considered (section 2.2), together with the future role of beaver enclosures (section 3). Options for the future of the unauthorised free-living populations are also discussed (section 4.7). The minimum and essential requirements for living with beavers are explored, including their future legal status (section 5.3), a licensing regime (section 5.2) and the need for advice, guidance and governance which can then be incorporated into a management framework (section 4). The delivery of management options is presented on a sliding scale from minimum central government intervention to a high level of support, together with an assessment of the application of different management regimes in the short (5-10 years) and medium (10 + years) term (section 4.6).

Natural England highlights its recommended management options based on the outcome of the Evidence Review (Howe (Ed.) 2020), a balance between minimum standards required for a successful reintroduction and a pragmatic approach taking into account the resources required going forward. This would include funding and resourcing required for projects, organisational remits of statutory bodies and flood management authorities.

This paper aims to provide sufficient information for government to make decisions on the next steps for beavers in England. It is supported by three associated documents:

- *Natural England's assessment of the River Otter Beaver Trial and advice on the future of the beaver population* (Howe and Crutchley 2020);
- *A review of the evidence on the interactions of beavers with the natural and human environment in relation to England*. Natural England, York. (Howe (Ed.) 2020)
- *Beaver reintroduction in England 2000-2021* (Heydon *et al*. 2021).

2. Reintroduction Approaches

2.1 Ambitions for a national reintroduction programme

The reintroduction of a formerly native species such as the beaver is an ambition of the 25 Year Environment Plan. Another ambition within the Plan is the creation of the Nature Recovery Network to help build resilience to climate change, provide opportunities for species and ecosystem recovery, and facilitate the reintroduction of formerly native species.

Beaver reintroduction could contribute to the successful establishment of the Nature Recovery Network and delivery of Local Nature Recovery Strategies. Beavers may support these through:

- Creating and enhancing habitats – through their engineering activities which increase riverine and wetland habitat diversity, thereby increasing biodiversity.

- Delivering nature-based solutions – where a more functional ecosystem is potentially able to hold water for longer in the catchment, thereby potentially reducing flood risk, recharging groundwater and neutralising/holding water-based pollutants.

- Connecting people with nature – through the generation of support by national and local communities by linking nature recovery with a charismatic species.

Reintroduction of the beaver could also contribute to the objectives of other existing policies, such as: the Countryside Stewardship option 'making space for water', River Basin Management Plans and the National Flood and Coastal Risk Strategy for England. Natural England has a duty to have regard for River Basin Management Plans, and to consider the impact that proposals to re-introduce beavers may have on them. In order to comply with the Water Framework Directive (WFD), Natural England will request information from licence applicants to inform its assessment.

Now that the beaver has been restored as a native English mammal, it is important to ensure the population thrives and its future is secure. To help inform conservation actions, Natural England is developing a view on a realistic ambition for beavers in England based on ecological potential. Natural England has developed a methodology for important species and habitats called 'Favourable Conservation Status (FCS) Definition'[3]. This FCS Definition takes account of the potential natural range and distribution of the species, the size of the population and the extent and quality of the habitat needed to support the species into the future. It provides an ecological view of what 'good' looks like for a species. It is Natural England's ambition that the beaver population in England should, over a period of time, achieve the status set out in the FCS Definition.

A strategy setting out how to achieve the conservation status set out in the FCS Definition for beavers and a timeline for doing so is under development. The status of beavers as a 'returning species' needs to be taken into account in setting milestones for achieving FCS, as does the expectation that, for beavers to become accepted in the modern English environment, they will need to be managed in some circumstances as much as people will need to adjust to their presence. While the beaver will hopefully become a relatively common and widespread species in the coming years, achieving the full potential set out in the FCS Definition will be a longer-term goal.

Research and experience from other beaver introduction projects (see Howe (Ed.) 2020) should be applied to help identify the most appropriate locations for beaver reintroduction in order to maximise benefits and minimise negative impacts.

It is recognised that beaver activities can bring challenges, and a key objective is to develop and implement an adaptive approach to mitigation and management in order to maximise

[3] The FCS Definition for Eurasian beaver in England is published at: http://nepubprod.appspot.com/publication/5400422937526272

benefits and minimise conflict appropriately and using best practice. Initial wild release locations should seek to minimise risk and maximise benefits and focus on locations where the level of management required is likely to be relatively low.

2.2 Reintroductions

Any reintroduction will have to comply with Defra's Code for Reintroductions and Other Conservation Translocations in England (Defra Reintroduction Code; Defra, in prep.). This is Defra's interpretation for England of the IUCN Guidelines for Reintroductions and other Conservation Translocations (IUCN, 2013). For the purposes of this paper, reference to compliance with the Defra Reintroduction Code equates to compliance with the IUCN Guidelines.

Reintroduction of Eurasian beavers in England can be approached in different ways. The 'Approaches' outlined below have been developed based on analysis of the outcomes of the River Otter Beaver Trial (Brazier *et al*. 2020), on the experience in Scotland (Gaywood *et al.* 2015) and on Natural England's Evidence Review (Howe (Ed.) 2020). The details of the management mechanisms as well as the responsibilities and funding streams will be worked out in greater detail once a decision is made on future reintroductions.

The Approaches presented below consider future licensed reintroductions into the wild. The issue and future of unlicensed wild-living beavers in England will also need to be taken into account and is addressed later (see sections 2.3 and 4.7).

2.2.1 Approach 1: No further reintroductions of beavers into the wild

Beavers will be allowed to spread naturally from the River Otter catchment. Augmentation of the River Otter population with unrelated beavers would be permitted in order to enhance the genetic diversity of the population, as recommended in Natural England's assessment of the trial (Howe and Crutchley 2020), but there will be no additional reintroductions elsewhere.

Challenges

Incomplete strategic approach: This Approach is likely to be challenged on the grounds of it being an incomplete consideration of a strategic approach for reintroduction of a species, as set out in the Defra Reintroduction Code and under the Bern Convention (1979). It may also be perceived as hindering the potential environmental benefits that beavers could bring across England.

Wasted effort on other proposals: There are a number of proposals for wild releases in other parts of the country which are well advanced, and work undertaken so far could be seen as wasted.

Risks

Evidence gaps: The River Otter situation alone will not provide the full range of opportunities for filling known evidence gaps or identifying the full range of potential benefits and risks that will increase learning and development.

Delivering conservation objectives: This Approach would be considered to be insufficient to deliver the beaver restoration/use of the nature-based solution commitment in the 25 Year Environment Plan. It would also take a very long time to achieve FCS under this approach.

Unlicensed releases: This Approach will be perceived by some as lacking ambition and may result in further unauthorised releases of beavers of unknown origin, possibly into locations where conflicts could be high, and without management and local support in place.

Opportunities

Further understanding of conflicts: This Approach would allow further understanding of conflicts in the establishment phase for this location and therefore allow more time to:

- Assess and embed management techniques;
- Fill some of the evidence gaps identified in the River Otter Beaver Trial Science and Evidence Report (Brazier *et al*. 2020);
- Establish and secure long-term funding mechanisms;
- Produce, test and implement a management framework;
- Engage with stakeholders on observed and perceived conflicts, and find solutions.

Moderate new resource required: As only the River Otter and adjacent catchments would be involved - about which much is already understood - resources required to support the existing reintroduction project are likely to be largely in relation to on-going management, and readily identifiable.

Further study of the River Otter population: It would allow implementation of the recommendations made in Natural England's assessment of the River Otter Beaver Trial and provide information on the long-term possibility of establishing a thriving beaver population. Natural dispersal into adjacent catchments combined with reinforcement of the existing population will allow the population to become more resilient. It would also allow benefits observed so far on the River Otter to increase, together with monitoring of impacts on a wider range of habitats, such as those in adjacent catchments, which could be used to inform future reintroductions, should they be allowed.

What's needed for implementation?

The beaver population on the River Otter is already established, although further augmentation of the population with beavers from elsewhere will be required in order to increase genetic diversity.

The existing beaver management approach of the River Otter Beaver Trial, and Devon Wildlife Trust's Beaver Management Strategy Framework (2020) would need to be consolidated with the recommendations made in Natural England's assessment of the trial and advice on the future of the beaver population. The management approach would also need to be explored and refined to encompass the roles of statutory organisations and those working in the water environment, along with any associated funding requirements.

The population is expected to spread into adjacent catchments so engagement with those parties who may be affected by this will need to be undertaken, ideally well before it occurs. Support and guidance for those affected will also need to be in place.

The management options described in section 4 below are likely to be initially at the lower end of the scale of funding.

2.2.2 Approach 2: Beavers reintroduced at a measured pace to maximise benefits and minimise risk

Additional reintroduction projects would only be considered in areas where there will be significant environmental, social and economic benefits and a low expectation of negative impacts on landowners, local communities, river users and business interests.

This Approach would potentially encourage releases into areas where modelling and/or detailed surveys suggest that beavers would provide significant benefit with a low risk of negative impacts; this may include locations where fenced enclosure projects can be opened up and beavers allowed to disperse.

This would be a moderate-paced reintroduction that seeks to build and sustain public support for beavers, to allow learning and to address evidence gaps so negative outcomes are minimised. The pace will be governed by a combination of criteria based on risk and opportunity, local knowledge and modelling. For example, initial releases may focus on locations where there is relatively little low-lying, prime agricultural land and low risk of flooding, and/or avoid locations where negative impacts on protected sites, infrastructure and other environmental features are likely. Consideration will also be given to potential impacts on protected species and high value trees, costs/benefits to the local economy, level of support locally, and opportunities to fill evidence gaps.

Natural England currently estimates that, reflecting the moderate pace, releases into 5-15 catchments could be considered over the next 5-10 years. These figures will need defining more precisely and would be subject to regular review, but this pace of release would aid planning, allow time to learn from experiences and help manage resource for assessing applications. It may also help to manage expectations of applicants.

Challenges

Definition of criteria: Criteria for prioritising reintroductions under this Approach will need defining in detail so that all parties understand what will be expected of them. Additional work would be required ahead of any new reintroductions in order to determine whether or not proposed release sites meet the criteria.

Provision of resources for advisory bodies (in particular Natural England and the Environment Agency): Resources and capacity of organisations providing advice, managing processes, undertaking mitigation linked to operational activities, and monitoring outcomes will need to be supported. Without sufficient resource for these activities, public and/or landowner support for beavers could be lost, resulting in an increase in people taking potentially unlawful action themselves.

Risks

Too precautionary: This Approach may be seen as too precautionary in view of the 25 Year Environment Plan commitment and not in the spirit of encouraging beaver reintroduction or providing sufficient opportunities to apply and embed a wide range of management options.

Evidence gaps not addressed sufficiently: Although this Approach will address more evidence gaps than Approach 1, it may not initially provide sufficient new information on beaver impacts to resolve some of the uncertainties identified in Natural England's Evidence Review. However, this risk could be reduced if 'contributing to evidence' is included in the assessment criteria.

Opportunities

Maximising positive impacts: Beavers will be introduced into areas where positive impacts from their presence are expected and negative impacts are anticipated to be low.

Opportunity for new reintroductions already being developed: This Approach could provide an opportunity and future for ongoing projects (both currently licensed enclosures and wild reintroduction proposals) in which there has already been significant investment to progress to a wild reintroduction.

Building knowledge and experience: This Approach allows learning and adaptation as beavers are reintroduced. Starting in areas where there is confidence of significant benefits and low risk of negative impacts, as learning and experience increase, this could allow consideration of further reintroductions into areas of potentially greater risk.

Addressing evidence gaps: It will be possible to address more evidence gaps than Approach 1 as beavers are reintroduced into new habitats and areas, but with a 'safety net' of understanding and anticipation of potential impacts.

Enhancing acceptability: As well as the increased environmental benefits that a measured, targeted reintroduction will bring, it may help to improve the acceptance of beavers in the wild by those who perceive them negatively, as they learn to live with beavers in locations where benefits will be maximised.

What's needed for implementation?

This would be a more challenging approach to implement in the short term than Approach 1. The principles of the management of beavers will remain the same (see section 4), however the resources needed for implementation, including the establishment of management groups and partnerships, will be higher. Advisory and statutory bodies, such as Natural England and the Environment Agency, will need additional resource to deliver advice and guidance for applicants (including assessment of applications), together with the provision of advice and management/mitigation of impacts following reintroduction. Applicants are also likely to be required to undertake additional groundwork in order to meet the reintroduction criteria.

Modelling of habitat suitability undertaken by the University of Exeter (Graham *et al.* 2020), combined with other mapping exercises and field-based feasibility work to ground-truth could help to identify catchments in England which could be ideal candidates for wild reintroductions under this Approach. This would help to inform reintroduction applications, although applicants would be expected to undertake their own mapping and evidence gathering.

Clear guidance will be required for both applicants and Natural England's Wildlife Licensing Service.

2.2.3 Approach 3: Beavers reintroduced at a faster pace

Reintroductions could be considered anywhere in England provided that the proposal meets the requirements of the Defra Reintroduction Code. Consideration of social and economic benefit and conflict with local community and business interests will be limited to the requirements set in the Defra Reintroduction Code.

This could be viewed as a 'higher risk' version of Approach 2 and would aim to allow a greater number of reintroductions at the outset, so allowing beavers to colonise a wider range of habitats and land-use in different regions of England more quickly.

This would be a faster-paced reintroduction with a greater likelihood than Approach 2 of several reintroductions being undertaken simultaneously across a variety of catchments.

Challenges

Managing potential of greater risk of negative impacts: By proceeding quickly, there is unlikely to be sufficient time to learn from experience or address evidence gaps, so increasing the risk of unmitigated negative impacts. In turn, this could impact the resources of the Environment Agency and other local flood and water management authorities who may need to provide additional management and mitigation at a faster pace.

Reception: Although this approach is likely to be welcomed by the conservation communities, it may not be well received by those who have raised concerns regarding possible negative impacts such as the risk of flood damage to land, crops and trees and, in some circumstances, on the migration of salmon and trout.

Provision of resources for statutory bodies: Significant resources are required for Natural England and the Environment Agency to deliver their advisory, regulatory and operational roles to support a rise in reintroductions. For example, as additional criteria would not need to be met under this Approach, an influx of licence applications may result. It is also likely that licensing decisions may be challenged by other parties (e.g. through requests for information through the Environmental Information Regulations). Sufficient appropriately trained staff would therefore need to be available in Natural England's Wildlife Licensing Service to assess and determine these applications and deal with information requests within published timelines. The Environment Agency would also need to be adequately resourced to enable provision of advice to Natural England for consultations in relation to these applications.

Sourcing beavers: All beavers for reintroduction projects must have been born in the UK and be health-checked for a range of parasites, pathogens and disease prior to release. It is also important to ensure that there is sufficient genetic diversity within a reintroduced population. Transportation of beavers from donor locations (e.g. Tayside, fenced enclosures or unauthorised populations of beavers) and health checks may only be undertaken by suitably qualified and experienced people. If a number of reintroductions are happening simultaneously, not only must the availability of suitable beavers be ensured but also that of qualified people to trap, keep and examine them.

Risks

Too rapid: This approach gives less time for people to get used to living alongside a species that has been absent for hundreds of years, and it may be seen as being 'too much too soon' by those with concerns about beaver reintroductions or those who are undecided.

Insufficient time to apply learning: Where multiple reintroductions are being undertaken simultaneously, there is less time to learn from monitoring and mistakes which could be used to inform future reintroduction projects.

Cumulative effects of reintroductions: Under this Approach, it is likely that more beaver releases will happen in a shorter period of time than under Approach 2. As the cumulative effects of multiple beaver reintroductions are not fully understood, unexpected negative impacts that prove difficult to manage may occur while England is still gaining competence in this area.

Insufficient resource to meet demand for licences: Resources and capacity of public bodies and organisations providing advice, managing processes and monitoring outcomes may become overwhelmed and insufficient to meet demand. This could result in a loss of public and/or landowner support for beavers and an increase in people taking action themselves, potentially using unlawful methods.

Public opposition: If the number of locations with beaver populations increases rapidly and is associated with an increase in negative impacts due to beaver activity, a loss of public acceptability is likely to result and, in turn, the viability of beaver reintroduction.

Uncertainty of funding: With potentially more releases in a shorter space of time, competition for sources of funding is likely to increase. If funding cannot be guaranteed, commitments to management may not be delivered and negative impacts not addressed, so decreasing the acceptability of beaver reintroductions and potentially increasing the demand for resource from public bodies brought in to resolve issues.

Diversion of funds: A high demand on funding bodies from beaver reintroduction projects may divert funds from other reintroduction/species recovery projects.

Opportunities

Increased pace of reintroduction: The pace at which beaver can be reintroduced to England will increase and allow more people and organisations to be involved in beaver reintroduction projects and for positive impacts to be realised sooner.

Evidence gaps addressed: Owing to a greater number and diversity of reintroduction projects, assuming that an appropriate monitoring programme was in place and delivered, it should be possible to address a wide range of evidence gaps.

Delivering conservation objectives: The objectives of the 25 Year Environment Plan and the FCS of beavers in England will be met more quickly.

What's needed for implementation?

This would be the most challenging Approach to implement. The principles of beaver management will remain the same (see section 4), however the total resources needed for implementation and potentially mitigation, will be higher. Projects leading the reintroduction

will need to undertake the groundwork and secure the necessary funding. Projects would only be able to go forward if their funding and resourcing has been identified and secured.

Statutory bodies such as Natural England and the Environment Agency will need to be adequately resourced to meet the demands of what could be a significant influx of applications to reintroduce beavers.

Modelling undertaken by the University of Exeter, combined with other mapping exercises and with field-based feasibility work to ground-truth could help to identify catchments in England which could be candidates for wild reintroductions, although, as for Approach 2, applicants will need to undertake their own mapping and groundwork.

Natural England recommendation: Reintroduction approaches

Natural England recommends adoption of Approach 2. England has not yet seen significant or unmanageable conflicts with beaver activity, and the measured pace of this Approach will allow the positive impacts of beavers to develop and habitats and species to adjust to the presence of beavers, so enhancing confidence that the reintroduction of beavers will deliver benefits. It will also give people time to get used to living alongside the species. Importantly, the Approach also provides opportunities to address evidence gaps and build knowledge, experience and capability at a measured pace which will minimise the risk of conflict in future, so helping to embed management solutions in different catchments and encouraging acceptance of beavers in the English environment. The pace of reintroduction can be adapted as we learn from experience, including increasing pace if additional releases are successfully managed.

2.3 Unlicensed beavers in the wild

At the time of writing, it is estimated that there are around 60 beaver territories (including c.15 on the River Otter) resulting from escapes or unauthorised releases of beavers in England. Of these, breeding populations are known to exist in at least three, possibly five, river catchments (see Heydon *et al*. 2021 for more details on the history and distribution of these populations). The practicalities of completely removing these ‘unauthorised’ beavers (e.g. difficulties of trapping, access to land, public opposition) in order to provide a ‘clean slate’ on which to base future reintroductions mean that this is unlikely to be a realistic or desirable option. The Approaches outlined above therefore cannot be considered in isolation and must take into account that at least some, if not all, of these ‘unauthorised’ populations will establish permanent populations.

Integrating the future management of these populations into a licensed reintroduction policy based on one of the Approaches outlined above is therefore essential. Options for their future management are discussed in section 4 below.

3. Existing Enclosures: Renewals and Exit Strategy

Beaver enclosures licensed to date mostly aim to assess the impact of beavers on flood alleviation and restoration of natural habitats, and also to increase biodiversity, undertake research and/or to become part of rewilding projects. Enclosures range in size from less than two to over 200 hectares, most being less than 20 hectares. Applicants are expected to provide an impact assessment of important ecological features, designated sites (including the historic environment), as well as clearly identifying the objectives and aims of the project. They also need to describe the type of enclosure they intend to install, including likely vulnerable points and proposed reinforcement. The number of beavers to be released, disease risk assessment, a contingency plan should beaver escape, an exit strategy and monitoring programme also form part of the information required prior to an application being assessed. The assessment of the suitability of an application to release beavers into an enclosure is different to the assessment that would be made for a wild release, for which significant additional information and evidence of expected impacts would be required.

At the time of writing, 25 enclosures exist across England; 17 of which are licensed. All licensed enclosures will have been subject to a detailed assessment by Natural England Wildlife Licensing Service, in line with current guidance. Since December 2017 all beaver enclosures have been licensed; most licences have been granted for five years and will therefore start to be due for renewal in 2022. Currently nearly all enclosure projects issued with or applying for a licence have expressed an interest in the enclosure becoming the focus of a wild-release project in the future.

If the number of reintroductions of beavers into the wild is allowed to increase in England, it is likely there will be less need for enclosures in future, except in specific circumstances, such as to inform wild release or trial specific management techniques. For those enclosures already licensed, it is recommended to allow them to remain until expiry of the licence. Conflict management and responsibilities are clearly established on all granted licences and an exit strategy is in place in line with current guidance, therefore there are no benefits in terminating them early.

3.1 Renewal of licensed enclosures

Applications to renew licences will need to be considered on a case by case basis against pre-established criteria (see Annex A) in the context of the reintroduction policy. The following scenarios are anticipated:

i. The objectives of the project have been partially met but more time is required to fully measure the benefits at the site; the project would like to consider a wild release in line with the reintroduction policy. *Renewal will be considered to give more time to the project to meet the requirements for a wild release.* This option could become a criterion for new projects to help build local support prior to a wild reintroduction.

ii. The objectives of the project have been met. The project wishes to consider a wild release in line with the reintroduction policy. *Renewal will be considered to give more time to the project to meet the requirements for a wild release*.

iii. The objectives of the project have been partially met but more time is required to fully measure the benefits at the site; the project would not like to consider a wild release. *Renewal can be considered if the project can demonstrate the need to keep beavers for specific research, a management trial or to improve the condition of an environmental feature; otherwise the project should be terminated*.

iv. The objectives of the project have been met. The project wishes to continue to fulfil those objectives. *Renewal can be considered if the project can demonstrate the need to keep beavers to fulfil that objective*.

v. The objectives of the project have been partially met but the site is located in an area where beaver reintroduction will not meet release criteria. *The project should be terminated unless the need to keep beavers in an enclosure for specific research or a management trial can be demonstrated.*

vi. The objectives of the project have been met; the project either does not want or does not need to continue. *The project should be terminated.*

vii. The objectives of the project have not been met. *The project should be terminated*.

Where projects are terminated, the exit strategy will be implemented. A compliance strategy will need to be developed to ensure the beavers are safely trapped and released at an approved location and the fencing is removed appropriately.

Enclosures should not be considered as a shortcut for wild releases. Proposals to progress from an enclosure to a wild release would need to meet the requirements of the reintroduction policy.

The development of a national policy for beaver reintroduction should help inform the future of beavers in enclosures. The status of enclosures should be monitored and reviewed regularly. Although, outside of zoos and wildlife parks, no other native species is ordinarily kept in enclosures in England, unlike established species, the potential impacts of beavers on their environment can be significant and are not yet fully understood for England. It is therefore accepted that enclosures can be used to aid this understanding. Enclosures should also be considered where beavers may have a localised benefit but their release into the wild would result in unacceptable negative impacts.

Now beavers are recognised as a native species, it is expected that there will be less need for their release into enclosures.

3.1.1 Challenges

Negative publicity: Terminating licensed enclosures could result in negative publicity as local communities may want to keep ‘their beavers’. Any future policy on enclosures should therefore be clearly justified and carefully introduced.

Provision for beavers: At the end of an enclosure project that is not continuing to a wild release, appropriate provision must be made for beavers where the exit strategy is being implemented. Ideally, they should be used for other projects but, depending on the Approach for reintroductions adopted, it may not be possible to re-home them all.

3.1.2 Risks

Security: Despite robust fencing, beavers have escaped from enclosures on multiple occasions and it has been difficult and, in some instances, impossible to trap them. The more enclosures, the more likelihood of escapes in areas where beaver activities could result in negative impacts without a clear management framework being in place. Creating additional enclosures in England therefore must be justified with clear objectives in place.

Non-compliance with licence conditions: There are already unacceptable levels of non-compliance by licensees (e.g. reporting escapes), and once beavers become more widely accepted as being part of British wildlife, there may be a tendency within projects to relax monitoring of enclosures. This could increase the risk of escapes and welfare concerns as well as unmitigated negative impacts.

Salmon and migratory trout: Concerns have been raised about beaver fencing blocking free passage for salmon and migratory trout. The current specification for beaver fencing required to prevent the escape of beavers does not allow free passage for all age ranges of these species. Sites are now assessed on a case by case basis to ensure that the location of beaver enclosures on rivers supporting populations of these fish do not compromise their migration.

Maintenance: In order to prevent escapes, enclosures require continuous high maintenance, especially across rivers.

3.1.3 Opportunities

Trialling beaver presence and management: In order to aid the success of further beaver reintroductions in England, efforts and resources must be directed towards ensuring sustainable, authorised wild reintroductions. Enclosures allow the trialling of beaver presence in a given location, provide information on the likely impacts, and aid the development of novel management techniques. All of which can help garner public support and minimise risks on release into the wild.

What's needed for implementation?

A clear policy from Defra on enclosures is needed to facilitate consideration of applications to renew or install new beaver enclosures.

Detailed guidance will need to be produced for applicants to ensure they know what information they need to provide when requesting a renewal of their licence for an enclosure or for a release into the wild from an enclosure. Guidance will also be required for Natural England Wildlife Licensing Service, and for Environment Agency area staff who provide advice to Natural England, to ensure consistency in decision-making for renewals.

With regard to terminated projects, a robust compliance strategy will be required to ensure the removal of the enclosure and the relocation of beavers to suitable alternative accommodation.

3.2 Unlicensed Enclosures

As noted above, since December 2017 a licence to release beavers into an enclosed piece of land has been required in all circumstances except for releases into secure enclosures containing artificial environments, such as in a zoo. Where beavers were released into an unlicensed enclosure before December 2017, a licence will be required if additional beavers are to be released into the enclosure or if the enclosure is to be extended.

Should the owners of an unlicensed enclosure wish to consider a release of their beavers into the wild, they will be subject to the same criteria and conditions as those with licensed enclosures.

3.3 New Enclosures

If the decision is made to allow beavers in addition to those in the River Otter to establish in the wild in England (Approach 2 or 3 above), it is expected that applications for enclosures would be mostly precursors for wild reintroduction. In this situation it is unlikely that new enclosures would be permitted in areas where a wild reintroduction would be unlikely to meet reintroduction criteria.

Many of the considerations provided in the above section on renewal of enclosed beaver projects will be relevant for a new proposal for an enclosure. Criteria and detailed guidance for successful applications will need to be readily available to help limit applications to those projects likely to meet the criteria; an indication of what this would entail is given in Annex A.

In general, the creation of new enclosures or the renewal of existing ones will need to demonstrate greater benefits to the environment than previously, such as future catchment benefits, and either trial a specific management technique or undertake other priority research (identified in the Evidence Review) to inform future wild releases.

Natural England recommendation: Enclosures

A tightening of the criteria for applications for new beaver enclosures and renewals is recommended in order to ensure that enclosure projects have a specific objective which will support future releases of beavers, such as monitoring specific impacts of beavers or trialling new management techniques. Proposals for enclosures in locations considered to be unacceptable to a future beaver release into the wild should be actively discouraged, unless there is a demonstrable benefit that outweighs the risks, such as research that could not be carried out elsewhere. A clear policy on the future of enclosures is required in order to limit the number of new enclosures and, depending on the reintroduction Approach adopted, to gradually encourage existing enclosed populations to become wild where they meet the criteria for a wild release.

4. Management Framework and Governance

Whichever reintroduction Approach is chosen, some management of beavers and their activities in England will be essential. Looking across other countries, there are many ways

management can be approached. The sections below describe what practical management measures and governance could be implemented for beaver reintroduction in England.

It is important to remember that the type and scale of management will change over time and may vary between locations. Generally, and as observed on the River Otter, the initial phase of the reintroduction (the 'establishment' phase[4]) will require a low level of management as most impacts from beaver activity tend to need addressing later when the beaver population expands in the 'growth' phase. Any management framework will have to consider the short, medium and long-term needs of the beaver population.

4.1 Existing management approaches

The management options discussed in this report have been informed by the various approaches to mitigation and management that have been used for the River Otter, Scotland and elsewhere in Europe and North America. Annex B summarises the management solutions used in these locations which include: education and communication, management advice relating to dams, burrows, lodges and tree protection, fertility control, translocation, lethal control, management zones, mitigation and compensation, and beaver as a game species. All these solutions have been used in isolation or in combination to manage beavers and their activities across the world. Many management methods are now well established, although variations on how they are applied exist, often linked to the interpretation of legislation that applies in a particular country (see Annex B).

The majority of management frameworks, including the one developed for the River Otter Beaver Trial, follow a flowchart of stages with guidance of what is appropriate and when. General principles are:

- education and communication,
- seeking to maximise gains and reduce risk,
- ensuring welfare of a population, and
- management of impacts.

Decisions follow a clear hierarchy of intervention which reflects the level of the beavers' impact against the potential effect of the intervention on the beavers. Techniques will be implemented in accordance with this hierarchy and, if all options are exhausted, translocation or, as a last resort, lethal control is considered.

In Scandinavia and North America, beavers never entirely disappeared in the period when they were extinct or rare in most European countries. This means that these countries retained a traditional form of beaver management that is fully integrated in the culture of wildlife management. This includes hunting beavers during an 'open season' for meat and fur which, in turn, keeps the beaver population low enough to reduce conflicts with people. Trapping is also permitted to remove beavers perceived to be causing problems and is regarded as a standard form of management. Other countries where beaver populations have been reinforced through legal protection and reintroduction, such as Poland, are considering changing their approach and allowing beavers to be managed as a game

[4] Three distinct phases to beaver reintroduction are commonly referred to: the establishment phase (low population growth), the growth or building phase (rapid population growth and expansion into suitable habitat) and the regulation or maintenance phase (population decline and stabilisation).

species in order to allow the population to be maintained at levels low enough to minimise conflicts.

In Germany, guidance to manage negative impacts is produced by the state nature conservation agency that also employs beaver managers across counties, supported by a network of trained and supervised volunteers. Lethal control is only used if there is evidence that beavers are causing (or might cause) severe damage and no reasonable non-lethal preventative measures are available. A 'traffic light' system identifies zones where the scale of management required is likely to be greater or lesser, based on assets, natural features, etc. There is funding available for mitigation measures, incentive payments for land managers, and limited compensation for losses to farming and fishing businesses (which must be evidenced) but not for private residential land. The state also owns and manages land for nature conservation purposes which includes significant lengths of river corridors, so enabling the state to develop, protect, sustain and enhance habitat and apply integrated solutions to deliver multiple benefits. The possibility of leasing or selling vulnerable land to the state is also available as a solution for some landowners.

In Scotland, NatureScot (formerly Scottish Natural Heritage) provide free expert mitigation advice, including a telephone helpline, funded by the Scottish Government. Dams that are associated with beaver breeding places are protected and licences issued to remove them where they cause damage. Farmers with 'Prime Agricultural Land' (PAL) may obtain a two year licence to shoot an unlimited number of beavers whose activities are causing problems on their land. There is no compensation or land purchase scheme. Limited funding is available for some mitigation works.

4.2 Future management options for England

The management options adopted should enable the delivery of tailored, site-specific solutions to the negative impacts of beaver activities. A combination of the mitigation and management solutions employed throughout Europe and North America can be implemented in England, subject to the legislative framework. These measures must follow an agreed decision-making process and be pragmatic, flexible and include adaptive management methods. It is important that decisions can be made quickly and for any licensing or permitting processes (if required) to be as straightforward as possible and minimise delay. The main management options for England are described below, further detail on techniques, including pros, cons and applications is provided in Annex C (Table C1).

4.2.1 Education and Engagement

Education and engagement should be at the forefront of beaver reintroduction. This is a unique opportunity for England to create an inclusive and innovative approach to species reintroduction, including restoration of wetland ecosystems, natural flood prevention and public engagement with the natural world. A collaborative approach between government bodies and Non Governmental Organisations (NGOs) would offer the best platform for education, advice and guidance.

Education and engagement with the public will help encourage acceptance of beavers. Information platforms such as gov.uk and NGO websites should contain targeted information

for understanding and dealing with specific issues. Social media should also be used to increase accessibility of the information to all sectors of the community. Educational packages aimed at pupils and students could be integrated into the school curriculum so helping to connect future generations with the natural environment.

Although education and engagement are essential prior to a project being implemented, it should also continue throughout the life of a project and beyond. In the longer term, assuming beavers become more widespread and considered part of the fauna of Britain, it is likely that the focus will shift from local education and engagement in the area where beavers have been reintroduced to a more national approach. Initially, however, although it is expected that advice and guidance will be nationally agreed, engagement with local landowners, river users and the local community should be established at the project level, where there is also a role for NGOs and charities in promoting the benefits of beavers and assisting landowners and river users with dealing with any issues. The Devon Wildlife Trust provided an excellent benchmark on local education and engagement activities during the River Otter Beaver Trial.

4.2.2 Habitat Mitigation

Potential solutions include: the use of riverine buffer strips, protection of valuable trees, removal and manipulation of dams, lodges and burrows, reactive and planned protection of earth embankments from burrowing, and infilling of collapsed burrows.

4.2.3 Translocation

Translocation is the capture and removal of beavers from a location where their activities are demonstrably damaging to an alternative location where they will not cause conflict, where a beaver population needs reinforcing and/or enhancement of its genetic diversity, or where additional reintroductions are planned. If appropriate, translocation can also be used to move beavers beyond barriers to their dispersal.

Translocation is often expensive, can be difficult to implement and carries risks to the animals involved, for example through stress from trapping, transportation, captive holding for heath-checks and release into a new area. Where possible, translocation should involve the capture and release of family groups of beavers (rather than individuals) in order to avoid leaving young animals alone and minimise the stress of separation. However, it is not always possible to capture all members of a group and this can result in welfare concerns for both the captured and remaining beavers. The use of translocation therefore needs to be carefully considered; it would not normally be used until other, site-specific mitigation methods have been tried and failed and/or demonstrated to be impractical. It should also be borne in mind that removal of territorial animals such as beavers may result in others moving in to take their place, so providing only a short-term solution. Criteria that will trigger the need for translocation and the conditions under which it should be undertaken will need to be clearly defined within the management decision-making process.

For reintroductions where a condition of the release licence is that the beavers must remain within a given catchment (as was the case for the River Otter 2015 licence), the cost of trapping and recovering beavers that have moved beyond the permitted catchment boundaries will be covered by the project.

Owing to the technical skills required (trapping, handling, plus possibly holding in captivity and health-checking beavers), only suitably trained and qualified personnel should be permitted to undertake translocations. Depending on the legal protection afforded to beavers in England, a licence may be required for trapping and translocation (a licence is currently required to possess and transport a wild-caught beaver[5] and to release a beaver into the wild[6], and traps must be approved under the Humane Trapping Standards Regulations 2019); this would only be issued to those people capable of carrying it out.

Translocation as a management technique may become limited over time as beavers become widespread and relocation opportunities decline, as has happened in Bavaria.

4.2.4 Lethal Control

Lethal control is a commonly used method of population management in countries where beavers have been established for a long time, such as in Germany (where lethal control was first undertaken 36 years after beaver reintroduction), and in Norway where beaver did not go extinct and hunting beaver has been common practice and a means of managing populations for many years. Lethal control has also been carried out to resolve conflicts in Scotland; data are not available for the level of lethal control prior to beaver becoming a European Protected Species in Scotland in May 2019, but from 1 May to 31 December 2019, 40 licences were granted for the lethal control of beavers in Tayside. These licences were issued almost exclusively to resolve conflict on Prime Agricultural Land, and during this period, 16 licences were used to kill a total of 87 beavers[7].

Lethal control in England is likely to be subject to some public opposition; many people regard the beaver as an attractive, iconic species (as exemplified by the public campaign to 'save the River Otter beavers' in 2014), and as the species will only have been recently reintroduced and will still be establishing populations, lethal control could also be seen as acting against the reintroduction. However, as reported in the socio-economic chapter of the Natural England Evidence Review (Howe (Ed.) 2020), increased awareness or direct experience of negative beaver impacts might moderate some opposition towards lethal control measures where they can be justified.

Having the possibility to carry out lethal control does not necessarily mean it will be used extensively, especially in the establishment phase. As with translocation, lethal control would not normally be recommended until other, site-specific mitigation methods have been tried and failed and/or demonstrated to be impractical. In addition, as for translocation, the removal of these territorial animals may result in others moving in to take their place, so providing only a short-term solution. However, having lethal control in the 'toolbox' of management techniques may provide some reassurance to landowners, river users and those working in the water environment that they will be able to deal with the impacts of beavers where this is justified. It may also address some of the concerns of those opposed to beaver reintroductions and help facilitate greater acceptance.

Depending on the legal protection afforded to beavers in England, if a licensing framework is required, lethal control will be one of a number of solutions to conflicts with beaver activities to be included. It would be the responsibility of landowners, those authorised by landowners

[5] Conservation of Habitats and Species Regulations (2017), Section 55.
[6] Wildlife and Countryside Act (1981), Section 16(4)(c).
[7] https://www.nature.scot/naturescot-beaver-licensing-summary-1st-may-31st-december-2019

or those responsible for infrastructure or other river works affected by beaver activity to undertake licensed lethal control. A process including technical and accreditation training to carry out lethal control will need to be established. One has already been developed by NatureScot that should be possible to adapt for England.

Any decision to allow lethal control to be authorised should include a robust assessment and audit trail. It will be important to have developed the right FCS strategy to rely on for a decision to use lethal control. This should cover the need to treat reintroductions of formerly native species differently, especially those that can have significant impacts on livelihoods.

4.2.5 Compensation (for lost revenues)/incentives to provide space for beavers

There is significant variation across European countries as to what, if any, financial assistance is available for people experiencing beaver activity that requires management (see Annex B). In England there is no precedent for compensation payments for damage caused by reintroduced or existing protected species. However, as a reintroduced species with potential to significantly impact on their local environment, there may be an expectation from landowners, property owners or those with commercial interests linked to the water environment that some practical assistance will be provided to help resolve conflicts with beavers. In some cases time and advice may be as important as financial aid.

In countries where financial assistance is available, it may take one or more of the following forms (see Annex B):

i. Compensation for losses is usually limited to farming, forestry and sometimes fisheries. Compensation comes from a range of regional and national authorities. Most European compensation schemes do not appear to include payments for protection to infrastructure. In some countries, compensation is available for farmers only if they can demonstrate they have taken appropriate avoidance measures.

ii. Contributions towards costs of remediation or mitigation measures. This may cover the costs of materials and/or labour.

iii. Land purchase schemes which could also include land exchanges.

iv. Reward payments e.g. agri-environment schemes.

4.2.6 Bespoke Environmental Land Management System (ELMS)

The future ELMS should provide a timely opportunity to integrate beaver reintroduction into land management practice. Species recovery is one of the key objectives of ELMS and it will include actions specific to habitat and species recovery and restoration. ELMS could provide incentive and payment for the ‘public good’ as well as solutions to deal with the negative impacts of beaver activities and, more importantly, ensure beaver reintroductions maximise benefits for the environment. Beavers, as ecosystem engineers, have the potential to contribute to several of the outcomes identified in ELMS such as: clean water, thriving biodiversity, and flood risk management. The approaches below provide a high level indication of what could be possible.

Tier 1 (and probably Tier 2) could incentivise field margins (including riparian buffers), water storage, tree planting, habitat creation and natural flood management. These could offer

solutions for some of the likely conflicts, e.g. flooding, and bank erosion caused by beaver burrows etc., thereby increasing acceptance of beavers and/or reducing the reliance on mitigation/management.

Tier 3 (landscape scale approach) would rely on a local consortium to include beavers as a means to achieve some of ELMS' objectives. This would also include the Local Nature Recovery Strategy led by Local Partnership Agreements.

More work is required to fully understand how beaver management can fit into the future ELMS.

4.3 Management Advice

Nationally consistent, clear and accessible advice on beaver management, detailing what management options are available, when they can be used and whether or not a licence or permit is required must be available to support people dealing with beaver activity that may require management. This would include the general public, landowners, river users and larger organisations that carry out activities on or close to water bodies. It is anticipated that gov.uk and conservation organisations with an interest in beavers would host basic management advice, including the decision-making process, on their respective websites. Some of this advice will complement licensing solutions and may therefore also be provided by Natural England. This basic advice is considered to form part of the licensing framework and would therefore be centrally funded (see Tables 1 and 2).

In addition to advice provided centrally, a dedicated telephone enquiry line and email 'chat' facility must be available. This enquiry service would provide initial advice and triage queries to help decide whether a site visit is necessary. This is an efficient way to explore solutions to problems, especially in the early phases of a reintroduction when people are learning to live with beavers. A similar approach is provided for bats by 'Batline' through its advice to householders where many solutions can be provided without a site visit. Links to the enquiry line should be provided through other bodies such as Natural England, the Environment Agency and Drainage Boards.

Accessible management advice is essential to balance the conservation benefits and the socio-economic impacts of beaver reintroduction, and will help alleviate concerns from landowners and river users experiencing or likely to experience beaver activity that would cause concern.

4.4 Governance

4.4.1 Legal framework and best practice guidance for management

As beaver are being allowed to remain in the wild in England, national, best practice guidance on beaver management needs to be provided, supported by a legal framework. Once the legal status of beavers in England has been confirmed by government (see section 5.1), Natural England, as the licensing authority, will need to ensure a fit for purpose licensing regime (if required) is in place to allow otherwise unlawful management activities to be carried out as swiftly as possible. Natural England will work with Defra and the

Environment Agency to ensure a clear process exists for all necessary permits and licences to deal with managing beaver impacts.

Every project will need to ensure it operates within the national guidance, complies with the terms of the legislation and obtains the necessary permits and licences.

The Environment Agency has a key role regarding impacts on the integrity of flood management infrastructure and advising on risks and opportunities related to river systems. There may also be other unexpected impacts from beaver releases that the Environment Agency would need to be aware of and manage as and where appropriate. The Environment Agency would also act as an adviser, ensuring that benefits and risks are considered in the decision-making processes both at the site and catchment level.

The Environment Agency is also a regulator, operator and adviser in the water environment and therefore will have a multi-faceted role related to beavers in managing and advising on the risks and opportunities of enclosed sites and wild beaver populations within river systems. The Environment Agency is a key consultee and advisor to Natural England for any licence applications for beaver releases.

A summary of what will be covered by the licensing regime is provided in Annex E and will be developed further once the decision on the future legal status of beaver in England has been made.

4.4.2 Organisation/partnership arrangements to lead the reintroduction project: provision of a ‘Project Plan’

Reintroductions, especially those involving high profile or high impact species such as beaver, are best delivered through a partnership. The partnership for a beaver reintroduction will be responsible for the production of a ‘Project Plan’, establishing funding streams, roles and responsibilities, and a planning and feasibility study of all aspects of the reintroduction - in line with the Defra Code. The Project Plan will be for a minimum of five to ten years. This should be long enough to include a period in which the need to manage beaver activities increases, and with that the potential for conflict, (e.g. minimum five years for the beaver population to establish – no apparent conflicts - plus five years to monitor and manage conflict) in order to test the management measures, but it is accepted that this cannot be guaranteed. The actual duration of the Project Plan can be adapted to the specificity of the project. The plan would include a clear and agreed exit strategy.

A critical component of the Plan will be the buy-in and co-operation of landowners and land managers and those working in or using the water environment. The project should be designed in liaison with key stakeholders to maximise potential benefits and minimise potential conflicts.

Getting the right partnership to plan, manage and deliver the project will be essential to its success and will aid identification of the resources necessary to implement the project. It will also ensure high standards are maintained throughout the duration of the project. More details on partnership can be found in the Defra Reintroduction Code.

4.4.3 National Beaver Management Forum

As per the IUCN Guidelines,

> "*in situations where multiple bodies, such as government agencies, non-government organisations, informal interest groups all have a legitimate interest in reintroduction, it is essential that mechanisms exist for all parties to play suitable and constructive roles. This may require establishment of special teams (…) that can guide, oversee and respond swiftly and effectively as management issues arise".*

A National Beaver Management Forum for England will help fulfil this role. In Scotland, the national management framework that was produced following the decision to allow beavers to remain in the wild was developed in consultation with the Scottish Beaver Forum.

A National Beaver Management Forum must be established to maintain standards, oversee and steer strategic, national and regional decisions on beaver management and ensure join-up between the parties making those decisions. This could be formally established as a sub-group of the proposed Species Reintroduction Forum. It would regularly review issues and conflicts and support the development of solutions, including those around unauthorised populations of beavers. It would also likely play a role in ensuring a clear approach is adopted when considering any new reintroduction. It should include a range of beaver experts and a representation of interested parties (including statutory bodies and relevant authorities) representing conservation, farming, fisheries and other interests.

In its advice to ministers, Scottish Natural Heritage (now NatureScot) recommended the development of a management strategy (where the Forum would have an important role to play) immediately after the ministerial decision. This recommendation should be considered for a management framework for England.

4.4.4 Project Steering Groups

Steering groups must be established to support individual projects and input into local and regional decisions. They will be mandatory for the duration of the 5-10 year Project Plan.

A steering group should include a broad range of stakeholders similar to the National Forum (some members can also be part of the National Forum) but with a strong local ownership. Local representations from Natural England and the Environment Agency are likely to be included as observers or technical advisers to the project (rather than official membership). The steering group will set the principles of the project towards maximising the benefits of beaver reintroduction and implementing the right level of support to landowners and river users to manage any negative impacts.

The role of the steering group is important because it provides the governance for the project and a platform for the decisions that need to be made for the duration of the project. These include:

- Advisory role for seeking and establishing resources and funding streams;
- Engaging with stakeholders and organisations involved in the project and in beaver reintroduction and management nationally (e.g. the Beaver Management Forum and water management authorities);
- Supporting farming, river businesses and local communities;
- Steering decisions (e.g. on the direction of the project and management) locally and contribute to decisions nationally;
- Overseeing adoption and execution of the Project Plan;

- Ensuring alignment with the Defra's Code for Reintroductions and Conservation Translocations in England.

A steering group will not necessarily be focussed only on a new reintroduction project. It can also be created to steer decisions on unauthorised populations, as was the case for the River Otter Beaver Trial originally and more recently on the rivers Tamar and Stour. In such situations the steering group would help provide a framework for the unauthorised beaver population, aiming to provide effective management and potentially legitimise it through the production of a management framework and appropriate licensing (see section 4.7).

4.4.5 Local Beaver Project Officer

Each project will need to appoint a local Beaver Project Officer who will provide one to one expert support and advice. The River Otter Beaver Trial has demonstrated the importance of this role in providing a local contact who establishes trusted relationships with landowners and the local community.

The local Beaver Project Officer would need to be supported by the Project Steering Group and would be responsible to lead delivery of the Project Plan and the nationally developed management framework and associated decision-making processes. He/she would provide a range of support to river users and landowners including: the dedicated telephone enquiry line and email 'chat' facility, site meetings to discuss beaver impacts and explore solutions, and also direct implementation of mitigation measures to support landowners (including holding relevant licences and permits). The role would also include leading on engagement and education, project monitoring, and coordinating and training volunteers. The Project Officer would need to liaise closely with other bodies involved in water management.

Although this role is likely to become more important should conflicts start to appear, ultimately it is likely to decrease in importance as landowners and river users learn to live alongside beavers and understand how to manage beavers and apply appropriate mitigation to resolve negative impacts. As beaver populations on a catchment expand, the role of the local Beaver Project Officer could move with them, so expanding the geographical remit of the role.

4.4.6 National Beaver Officer

A National Beaver Officer role should be created to set the standards and steer advice that will be provided by the local Beaver Project Officers. The National Beaver Officer would have an overview of all the beaver projects and would therefore be able to contribute to the National Beaver Forum by providing a link between the different projects. Funding and affiliation of this national role needs to be decided but it could be based in Natural England and undertaken in close liaison with the Environment Agency. Depending on the pace of reintroduction, more than one National Beaver Officer may be needed for England.

Consistency and impartiality of advice provided by the local Beaver Project Officers is essential; it is therefore recommended that they are trained and supported by the National Beaver Officer/s in close liaison with the Environment Agency. Both roles would provide a point of contact for anyone experiencing issues with beavers.

4.5 Research and monitoring programme

All reintroduction projects are required to undertake monitoring and evaluation linked to clear objectives. In order to help inform beaver reintroduction going forward, alongside all beaver reintroductions and management interventions a nationally prioritised and facilitated research and monitoring programme will need to be established and resourced. The objectives of the programme could be set up and monitored by the National Beaver Forum. The programme would need to co-ordinate the findings of reintroduction projects and prioritise evidence gaps already identified. This could include assessments of population size and distribution, and the impacts of beaver activities on flooding and associated flood and water assets such as banks and bankside structures and equipment (e.g. trash screens, culverts and telemetry infrastructure).

A research and monitoring programme would also provide an opportunity to undertake further research to improve understanding of the interaction between beavers and fish, in particular salmon and migratory trout, which is of particular concern given the current status of sea trout and salmon stocks in England. Given the evidence gaps identified around the interactions between beavers and fish populations, continued research and monitoring should be prioritised on a long-term basis to help inform future decisions about the impacts of beaver reintroduction and to inform sustainable management decisions.

4.6 Delivery of management and monitoring

Any new reintroduction project will need to establish and fund a Project Plan (see section 4.4.2) for the first five to ten years which will support landowners and those affected by beaver activities during the establishment phase and into the period when conflict is more likely to occur. It must also include sufficient funding for managing and monitoring beavers. It will need to meet criteria in line with Defra's Reintroduction Code for England and, when developed, the specific criteria for beaver reintroduction in England.

The governance and management measures for a successful beaver reintroduction have been described but there are a number of ways in which these can be applied. Table 1 below indicates which should be mandatory and which should be optional in respect of the Project Plan and level of central funding available following expiry of the Project Plan.

4.6.1 Volunteers

Involving volunteers in beaver reintroduction has been successful in Bavaria, Denmark and Devon. Natural England has considerable experience of supporting volunteers related to protecting mammals such as bats through their Volunteer Bat Roost Visitors, and for habitat management, scientific research and public outreach on National Nature Reserves (NNRs). Partner organisations in the environment sector also have large numbers of volunteers and mature systems for managing and supporting them. Therefore, the question is not whether volunteers should be involved in beaver reintroduction but to what extent.

There are many beaver-related activities volunteers can be involved in, including: education, monitoring, habitat management, and research. More details on what a volunteer model could look like is explored in Annex D.

4.6.2 Assumptions

All management options would be supported by an appropriate licensing framework depending on the level of protection afforded to beavers in England. Even if beavers are given no additional protection, licences will be required to release beavers into the wild and to possess and transport beavers; the type of cage trap used must also be licensed. Landowners, river users and operators having to mitigate or manage impacts of beaver activity will have access to licensing options on the basis that other solutions that do not require a licence (as per the management framework) have been considered and are either impractical or will not resolve the problem. The licensing solutions available will need to be accompanied by suitable guidance on gov.uk (see Annexes C and E for a snapshot of licensing solutions).

4.6.3 Provision of Central Funding following expiry of the Project Plan

Principles

Three delivery funding options are outlined below. The main difference between them is the relative amount of central funding available. The level of central funding available will be based on to what extent government wants to be able to retain control over how beaver reintroduction is managed in future, together with how essential government considers consistency, high standards and the likelihood of benefits being realised and risks minimised. For all funding options, national, best practice guidance and advice on beaver management would be provided and funded centrally, together with a robust licensing framework (as required according to legal status). By contrast, local Beaver Project Officers, although important, could be funded by alternative sources. Support for education and engagement provided by local staff from Natural England and the Environment Agency could be available in all options but adequate funding would be required for the provision of this support.

All new reintroduction projects will need to identify long-term sources of funding in their Project Plan. Landowners, river users and conservation organisations involved with the project will be encouraged to establish mechanisms to fund what would be required to manage the provision of advice and support, including practical management solutions where needed, with a view to these funding mechanisms becoming ‘business as usual’ and applicable long-term. Evidence for the viability of these funding mechanisms will be required in the Project Plan; this could be through grants and funding from a range of public and private organisations. Additional work is required to determine how a funded project will transition from the period under its established Project Plan (first 5-10 years) to the period that follows where more national support could be triggered as beavers become more established.

Adequate funding and resources will also be required for organisations carrying out operational, regulatory and advisory work in the water environment. This will apply to all options. A summary of each option and what it could provide is given in Tables 1 and 2 below.

Option 1 – Minimal central funding

This is based on the principle that people will get used to beavers and learn to manage conflicts with some initial support (from the Project Plan). This option is likely to be better

adapted to a slower pace of reintroduction as it would give time to riverine landowners and river users to understand the likely conflicts and learn how to manage them (with the initial support of the Project Plan).

In this option, once the initial 5-10 year Project Plan (funded by the project) has expired, the only management tools supported by central funding would be the licensing framework and, for actions not requiring a licence, national best practice management guidance. Although direct central funding for mitigation or management will not be available in this option, Defra could facilitate access to funding when objectives meet current environmental ambitions; this might include 'making space' solutions incentivised through the new Environmental Land Management System, and facilitating the involvement of volunteers.

Mitigation measures would be implemented at the landowners' expense or through alternative funding sources identified by the project, although organisations (such as public bodies) required to provide management and undertaking works in the water environment, e.g. infrastructure managers, will still require adequate funding under this option. This option would not provide any central funding for education and engagement which would therefore have to be fully provided or organised by the project. There are many ways local projects could attract funding, including tourism which both engages the public and can generate income from visitors.

With regard to volunteers, in this option Natural England would have minimal control over the engagement and scope of the volunteers' remit. This would require little or no central funding but it would be more difficult for Natural England to influence volunteer activities.

Option 2 – Medium central funding

Central funding would be available to partially fund certain aspects of management but would also expect projects to set up additional funding streams. In this option, only those governance/management measures deemed highly beneficial within projects would be funded, together with those ensuring high standards and consistency across the country. For example, a National Beaver Officer could be funded to support projects nationally and provide some level of advice to stakeholders and to local Beaver Project Officers funded by charities or conservation organisations. In this option some funding will be available to partially fund mitigation solutions within projects.

This option would be similar to Option 1 in respect of education and engagement where in the short-term the project should be the main source of funding. However, in the medium-term, when the Project Plan comes to an end, central funding would be available to ensure education and engagement remain an integral part of the support to local communities.

With regard to volunteers, Option 2 would provide funding to allow Natural England to have some involvement and ensure volunteers are adequately supported and trained in order to ensure actions are legal and standards remain high. This option would be similar to the Volunteer Bat Roost Visitor Scheme where day to day management, recruitment and training responsibility is held by a partner body.

This option has essentially the same objectives and deliverables as for Higher Central Funding (below) but only some will be fully centrally funded.

Option 3 – Higher central funding

This option is essentially based on the standards established and recommended following the end of the River Otter Beaver Trial.

For education and engagement, Option 3 would be similar to Options 1 and 2 in the short-term as the project should be the main source of funding. However, in the medium-term when the Project Plan comes to an end, central funding would be available to ensure education and engagement remain an integral part of the support to local communities.

For volunteers, Option 3 would see a higher level of funding, possibly similar to that for National Nature Reserve volunteers where Natural England is responsible for training and support and can fully determine what volunteers do and respond quickly to changes.

Significant central funding will be made available to provide mitigation solutions. It will be in addition to other sources of funding. Criteria that will trigger the availability of funding would need to be established; for example, the highest priority could be given to managing flood risk with potential to threaten livelihoods and lives.

This option would demonstrate a high ambition for a successful and sustainable reintroduction of beavers into England. In this option, at the end of the Project Plan, project partners would be assured that beaver populations would continue to be monitored and conflicts managed adequately. However, this option would require significant investment from central government.

Table 1 Funding of Management Options for beaver in England

Option 1 - Minimal central funding

This option is based on the principle that people will get used to beavers and learn to manage conflicts with some initial support. This option is likely to be better adapted to a slow reintroduction approach as it would give time to riverine landowners and river users to understand the likely conflicts and learn how to manage them.

Option 2 – Medium central funding

Central funding would be available to partially fund certain aspects of the management framework but would also expect projects to set up additional funding streams. In this option, only those governance/management measures deemed highly beneficial would be funded, together with those ensuring high standards and consistency across the country.

Option 3 – Higher central funding

This option is essentially based on the standards established and recommended following the end of the River Otter Beaver Trial and would require significant initial central funding to provide mitigation solutions.

Assumptions

All wild reintroduction projects would need to adhere to the Defra Reintroduction Code and Natural England's reintroduction criteria (in preparation).

Unauthorised wild populations have become founders of new authorised populations (see section 4.7).

For all wild reintroductions, all options would require the production of a Project Plan which would cover a set period of time, to include a period of conflicts (e.g. minimum five years for the beaver population to establish – no apparent conflicts - plus five years to monitor and manage conflict). This period of time can be adapted to the specificity of the project.

Options 2 and 3 appear similar but the level of central funding available will be greater in Option 3. Both options include provision for funding to both Natural England and the Environment Agency.

ST = short-term (5-10 years – equivalent to the Project Plan); MT = medium-term (10 years +)

Timescale		ST	MT	ST	MT		ST	MT	ST	MT	ST	MT	ST	MT		ST	MT	ST	MT		ST	MT	
Management measures (and whether they are mandatory/ optional for the project)		Licensing Framework and associated guidance		Organisation or partnership set-up to lead the reintroduction project		National beaver management forum	Steering Group		Beaver Officer		Management advice		Habitat mitigation		Translocation	Compensation (for lost revenues)/ incentives to provide space for beavers		Bespoke ELMS		Lethal control	Engagement and education package		Volunteers
		MANDATORY		MANDATORY	OPTIONAL	MANDATORY	MANDATORY	OPTIONAL	OPTIONAL	OPTIONAL	MANDATORY		MANDATORY		OPTIONAL	OPTIONAL		OPTIONAL		OPTIONAL	MANDATORY	OPTIONAL	OPTIONAL
Funding options	1																						
	2																						
	3																						

Central government funding provided		Other funding sources required		Partial central funding	

Table 2 Challenges, risks and opportunities for each funding option

Option	What will be centrally funded	Challenges	Risks	Opportunities
1	Licensing framework and national best practice management guidance; Some support through ELMS; National Beaver Management Forum.	**Reception:** This option is likely to be negatively received by all stakeholders and communities. It could be perceived that the government does not want to support and encourage beaver reintroduction which would be contradictory to ambitions set-up in the 25 Year Environmental Plan. It would also indicate that landowners, river users, public bodies and communities facing conflicts with beavers will be 'left alone' to deal with the problems.	**Failed reintroduction due to lack of national framework:** This would discourage any further reintroduction and could put the existing populations at risk. It could also lead to unregulated beaver population spread, an inability to adapt to expanding populations and an unacceptable level of conflict. **Limited control/lack of consistency:** This option means that Natural England and Defra will have limited influence on how the projects are carried out. This is likely to lead to inconsistent approaches nationally which could undermine effective management, the welfare of the beavers and ultimately beaver reintroduction.	**Partnership and private funding:** The River Otter Beaver Trial has shown that collaboration between partners is essential to a successful project. This option offers little central funding but encourages partnerships to implement reintroduction projects. This could be seen as an ambitious challenge for partnership. It will require more work to attract funding. **Conservation Objectives partially met:** It will contribute to the 25 Year Environment Plan, effective management, and partnership working.
2	Licensing framework and national best practice management guidance; National Beaver Management Forum; Beaver Officer (national role only); Management advice (*via* Beaver Officer only); Habitat mitigation (limited and only in the medium-term); Translocation (limited support); Compensation (limited and only in the medium-term); Some support through ELMS; Engagement and education (limited and only in the medium-term); Volunteers (limited support).	**Reception:** This option could be perceived as not being ambitious enough to meet the aspirations of the 25 Year Environment Plan and not offering sufficient support to landowners and river users. **Cost:** Although less than for option 3, this option would require long-term regular funding to be identified in order to support beaver projects.	**Reduced funding:** As for option 3, this option relies on central funding being available and any changes to funding priorities could impact on the success of the reintroduction. **Limited control/lack of consistency:** This option means that Natural England, Defra and the Environment Agency will not have full control over how the projects are carried out. This could lead to inconsistent approaches nationally which could undermine statutory duties and effective management, risk the welfare of populations and the success of reintroductions.	**Balance:** This option provides a level of support for beaver reintroduction matching the ambition of the 25 Year Environment Plan but also encouraging private initiatives. **Conservation Objectives partially met:** It will contribute to the 25 Year Environment Plan, effective management, and partnership working.
3	Licensing framework and national best practice management guidance; National Beaver Management Forum; Beaver Officer (national role and contribution to regional roles); Management advice; Habitat mitigation (well supported); Translocation (limited support); Compensation (limited and only in the medium-term); Bespoke ELMS; Engagement and education (limited and only in the medium-term); Volunteers (fully supported).	**Cost**: Putting together such a package would initially be costly and require significant funding and staff resources from central and regional government as well as from private organisations. The actual level of funding required would inevitably depend on the scale and number of permitted reintroductions. **Time**: It would also take time to establish and therefore could realistically only be accommodated in the short-term for a small number of reintroduction projects.	**Loss of funding**: The risks of adopting this option would also be linked to funding and to what would happen if central funding originally identified became unavailable or if budget revision decreased year on year compared to the initial predictions. **Unmitigated conflicts:** This could lead to increased conflicts for which adequate support and management advice could not be supported.	**Reception:** This option is widely advocated by all stakeholders and would be readily received, garnering support for individual projects and the national approach. **High level of control over national reintroduction:** With a lot of support provided by Defra, Natural England and the Environment Agency, this option would offer significant and consistent support to stakeholders, river users and landowners. **Conservation Objectives met:** It will contribute to the 25 Year Environment Plan, effective management, and partnership working.

Natural England recommendation: Funding

Natural England recommends Option 2 – 'Medium central funding' as it is considered to offer the best balance between setting high standards and encouraging private initiatives. It delivers the same range of support identified in Option 3 but not all aspects would be fully funded by central government. Although, initially, new reintroduction projects will have to find funding sources, this option will support a national approach to beaver reintroduction.

It must be recognised that all options will require the adequate funding and resourcing of authorities and organisations that are required to prepare for and undertake management related to the activities of beavers in the water environment. Funding for the protection of important infrastructure and assets (see Howe (Ed.), 2020) that could be impacted by beaver activity will also need to be explored.

4.7 Management of unauthorised beaver populations

In parallel to considering management options and governance for future wild releases, it is important to consider the management of the existing unauthorised populations across England. As these populations grow and disperse, the need for mitigation and management will increase in the same way as for new wild releases.

Although these unauthorised beavers are not currently considered to present significant risks due to their low numbers and existing locations, populations are increasing, and their impacts need to be continually assessed and the management of negative impacts in the future must be considered. Until a decision on the future legal status of beavers in England is made, most beaver management (including some lethal control) can be carried out legally without a licence. It is not known to what extent this has happened to date.

Integrating the future of these populations and their management into a reintroduction policy is essential. The most effective route is likely to be through the formation of local management groups; these have already been initiated by the East Kent Beaver Advisory Group on the River Stour and the Devon Wildlife Trust on the River Tamar.

Central funding can be used in various ways to support wild releases. In the case of unauthorised populations, providing central support through advice and possibly practical assistance to help resolve conflicts that may arise in future needs to be carefully considered against the risk of legitimising these populations. Providing funding to support individuals, statutory bodies and authorities experiencing issues with these beavers could encourage more unauthorised releases and so undermine the work done on authorised wild projects. Adequate funding is, however, essential for statutory bodies, water management authorities and those working in or advising on water management and related activities who may be directly impacted by these populations and/or be required to provide support or assistance to other parties.

4.7.1 Challenges

Lack of governance and responsibility: As these populations have been either accidentally or illegally released into the wild, there is no clear governance or responsibility

in place to manage beaver activities causing problems. Landowners or river users would either be left to manage these activities with very little support, or central funding will be used. Other parties, such as statutory bodies and water management authorities, will also require adequate funding to deal with any impacts.

Integration of management into future policy: Beaver reintroductions require significant investment in time and resources, not least the need to meet the Defra Reintroduction Code criteria. Unauthorised populations are not exceptions and they should not be seen as a way to circumvent good practice. It is therefore important to ensure that the management of unauthorised populations is fully integrated in any future national policy for beaver reintroduction.

4.7.2 Risks

Expanding unauthorised populations: Populations may rapidly expand, disperse and become more challenging to manage, with most negative impacts experienced in areas where an authorised release would not have been recommended due to a high likelihood that beaver activity would lead to conflict. This has been experienced on the River Tay in Scotland, where a population of escaped and/or illegally released beavers has expanded in a low-lying area of Prime Agricultural Land to a level that beaver activities have resulted in significant negative impacts on local landowners.

Additional illegal releases: The introduction of more unauthorised populations could undermine past and future efforts for a sustainable reintroduction of the beaver in England. Any reintroduction without prior engagement with local people and key stakeholders, and without provisions in place to provide advice and support to people experiencing conflicts with beaver activity, risks the repetition of the problems experienced in Tayside.

Central funding is used to manage unauthorised populations instead of authorised populations: As the need to manage conflicts with unauthorised populations increases, government funding might be diverted to support those landowners and river users experiencing problems and may be less available to support authorised reintroductions. This could lead to dissatisfaction and frustration from those engaged and investing in a licensed reintroduction.

Public reaction: As people learn to live with beavers, they will not necessarily make the distinction between beavers that have been reintroduced under licence and those that have not. The public could therefore become attached to an unauthorised population, potentially making some management decisions more controversial.

Undermining the Reintroduction Code: The Defra Reintroduction Code aims to encourage projects that have the best chance of success by being well planned, implemented, monitored and managed. By their nature, most unauthorised releases are unplanned and poorly executed, and risk providing an example of poor practice which can set back aspirations for future reintroduction projects, and in some cases undermine an existing reintroduction project.

Focus on negative impacts: The unauthorised release of beavers into a location that has a high risk of conflict with environmental or social-economic factors could negatively affect future authorised reintroductions by highlighting negative impacts rather than encouraging efforts towards maximising benefits.

Disease risk and fitness of the source beavers: The Defra Reintroduction Code requires that a disease risk assessment is carried out prior to a reintroduction and that animals are health-checked before release. For the River Otter, this was done retrospectively as the beavers were already present and, although tests for a number of important pathogens were carried out, it is acknowledged that some parasites or diseases may not have been considered. The presence of unauthorised populations significantly increases the risk of disease transmission as neither the source of the original beavers nor the status of their health before release is known. Unauthorised releases therefore have the potential to allow unhealthy beavers to live and reproduce which could lead to the spread of disease, a failing population and possibly a reduction in genetic diversity and robustness through inbreeding.

4.7.3 Solutions

The following options for the future of unauthorised populations can be considered:

i. Remove all unauthorised beavers.

ii. Remove all unauthorised beavers except where a management partnership is established that is capable of supporting landowners and river users experiencing negative impacts of beaver activity.

iii. Assess populations against reintroduction criteria (to be developed), as well as ongoing impacts (positive and negative) on the local area and research opportunities. Encourage the formation of a management partnership which would provide advice on management of populations (including removal if appropriate). Where beavers are living in areas where a wild release would be acceptable, they could remain as founders of a new population.

iv. Leave unauthorised beavers where they are with no management partnerships set up around them that could address potential conflicts.

Table 3 below explores the challenges, risks and potential solutions and opportunities for each of these options, together with what would be required for implementation.

Another potential solution for situations where an expanding beaver population would lead to unacceptable levels of conflict is surgical sterilisation. This was successfully carried out on a small population in Gloucestershire, however, it is expensive, and there are welfare risks to the beavers associated with the procedure, which involves trapping, transportation, anaesthesia and holding in a suitable captive facility for a short period. It is therefore unlikely to be a viable option in most situations and will not be considered further here. It is possible that, in future, contraception and/or chemical sterilisation could be available for beavers and may provide an additional management tool but this is not currently available.

Consultation and engagement with local residents and stakeholders by Defra should help inform the decision on unauthorised beavers. The same process could be used to determine interest among local groups and statutory bodies in forming local beaver groups to help the public and landowners to learn to live with beavers, such as through public engagement and the provision of advice and support to people who are affected by their activities. Such groups are likely to be critical to the successful mitigation and management of those beaver populations that remain.

As part of the sourcing criteria for any licensed reintroduction, either wild or in an enclosure, there should be a recommendation to check whether beavers could be sourced from an unauthorised population, ideally one located where conflicts could occur in the future.

Steps must be taken to discourage any further unauthorised releases. Any new report of unauthorised beavers from the date of an announcement on further beaver reintroduction in England should trigger immediate removal and enforcement. A robust compliance and enforcement plan (involving Natural England and the Police) will need to be in place and funded to address this.

Table 3 Options for the management of existing unauthorised beaver populations

	Option a. Remove all unauthorised beavers	**Option b. Remove all unauthorised beavers except where there is a partnership/management group capable of managing negative impacts of beaver activity.**	**Option c. Assess unauthorised populations against reintroduction criteria, plus other relevant considerations. Encourage partnerships to advise on management. Managed populations that meet criteria remain as founders of new populations.**	**Option d. Leave unauthorised beavers where they are. No partnership/management group.**
Challenges	• Practicalities of removal • Cost • Controversy • Protected status of beavers • Funding	• Practicalities of removal, • Cost • Controversy • Protected status of beavers • Funding	• Practicalities of removal (if required) • Cost • Controversy • Protected status of beavers • Funding	• Legitimisation of unauthorised populations. • Would undermine authorised wild populations and further licensed reintroductions. • No clear governance or responsibilities to monitor or manage impacts.
Risks	• Negative public reaction to removal. • Landowners not giving access. • Impossible to locate and capture all individuals. • Criticism of misuse of funds that could be applied elsewhere. • Failure to remove – revert to Option d.	• Negative public reaction to removal. • Negative landowner reaction to beaver populations that remain. • Landowners not giving access. • Lack of management partnerships able and willing to take on the project. • Inability to locate and capture all individuals to be removed. • Does not directly select against unauthorised beavers in locations where conflicts are likely to be high. • Animals that remain will not have been health-checked. • Criticism of misuse of funds that could be applied elsewhere.	• Lack of resource for initial assessment of populations. • Some negative public reaction to management and/or removal. • Some negative landowner/river user reaction to populations that remain. • Landowners not giving access. • Criticism of use of funds to support management of unauthorised populations. • Animals that remain will not have been health-checked. • Lack of management partnerships able and willing to take on the project. • Removal/management fail – revert to Option d.	• Potential onus on Natural England, the Environment Agency and other statutory bodies to find solutions to conflicts. • No incentive for partnership to be set up. • Expanding unauthorised populations may become challenging to manage. • Higher likelihood of conflicts and negative impacts due to lack of management framework. • Nothing to deter further illegal releases. • Negative reaction from river users and landowners. • Possible spread of disease as disease status unknown.

	Option a. Remove all unauthorised beavers	Option b. Remove all unauthorised beavers except where there is a partnership/management group capable of managing negative impacts of beaver activity.	Option c. Assess unauthorised populations against reintroduction criteria, plus other relevant considerations. Encourage partnerships to advise on management. Managed populations that meet criteria remain as founders of new populations.	Option d. Leave unauthorised beavers where they are. No partnership/management group.
		• Failure to remove – revert to Option d.		• Undermining the Reintroduction Code. • Set-back aspirations for future reintroduction. • Focus on unauthorised population rather than adequately planned authorised reintroduction (including funding used to manage unauthorised populations rather than formal reintroduction).
Potential opportunities	• Would allow a 'blank page' start to implement a well-planned reintroduction programme of beavers in England. • Removed beavers could be used for other reintroduction projects (subject to health and genetic testing and demand).	• Would remove those beavers that would not be managed. • Removed beavers could be used for other reintroduction projects (subject to health and genetic testing and demand).	• Better understanding of where unauthorised populations are and their impacts. • Would retain beaver populations in locations where benefits are likely to outweigh negative impacts. • Would encourage the formation of management partnerships, building on existing approaches on Rivers Tamar (Devon) and Stour (Kent). • Pragmatic approach focussed on enhancing benefits while minimising negative impacts. • Removed beavers could be used for other reintroduction	• Faster spread of population could bring more benefits.

	Option a. Remove all unauthorised beavers	Option b. Remove all unauthorised beavers except where there is a partnership/management group capable of managing negative impacts of beaver activity.	Option c. Assess unauthorised populations against reintroduction criteria, plus other relevant considerations. Encourage partnerships to advise on management. Managed populations that meet criteria remain as founders of new populations.	Option d. Leave unauthorised beavers where they are. No partnership/management group.
			projects (subject to health and genetic testing and demand).	
Implementation	• Policy decision. • Assessment of numbers and locations of unauthorised populations. • Identify funding. • Identify who would carry out removal of beavers and what will happen to them. • Discourage further unauthorised releases.	• Policy decision. • Assessment of numbers and locations of unauthorised populations. • Identify funding. • Identify who would carry out removal of beavers and what will happen to them. • Identify management partnerships associated with unauthorised populations. • Support mechanism for managers of the retained populations. • Discourage further unauthorised releases.	• Policy decision. • Assessment of numbers and locations of unauthorised populations and likelihood of conflicts. • Identify funding to support assessment and advice. • Identify clear criteria to determine which populations are to be retained and/or removed. • Identify who would carry out removal of beavers and what will happen to them. • Support mechanism for those managing the founder populations. • Discourage further unauthorised releases.	• Policy decision. • Discourage further unauthorised releases. • Decision on whether people/public bodies etc. subject to negative impacts should receive support/assistance from government.

4.7.4 Conclusion on the future management of unauthorised beavers in the wild

Although it is not possible to provide an analysis on how unauthorised beavers are spreading in England due to the scarcity of the data available, it is now established that at least three and possibly five populations are breeding and expanding (this figure does not include the River Otter population, which can now be regarded as 'authorised') (Heydon *et al*. 2021).

It is important that these populations are fully integrated in the policy for beaver reintroduction going forward and do not undermine authorised wild reintroductions.

Further survey and monitoring should be funded and carried out to ensure a clear picture of the status of unauthorised populations nationally. Understanding where these populations are as well as the number of beaver present would help inform the policy on their future and assist with prediction and management of future impacts.

Local enthusiasm and partnership are required to support landowners living with unauthorised populations in addition to the adoption of a clear, pragmatic management policy.

Natural England recommendation: Future of unauthorised beaver populations

A decision is required on the future status of unauthorised beaver populations, informed by an assessment of the existing populations and how best to manage them. Defra would need to adopt and publish a clear policy on the future of unauthorised populations, indicating that they must be subject to a management approach based on minimising conflict and maximising benefit - Option c. Natural England recommends that support based around the establishment of local management partnerships is made available to landowners and river users to help facilitate the management of unauthorised beaver populations. This should be delivered either prior to or alongside any new releases.

Once a national approach to unauthorised beavers has been established, it is strongly recommended that there is a firm, published position on any further unauthorised releases, ensuring that these beavers are captured and removed as quickly as possible and appropriate enforcement action taken.

5. Principles of licensing

5.1 Legal status

In England, beavers are currently only protected under welfare and trapping legislation. In addition, it is an offence to release a beaver and to sell, control, possess or transport a wild-caught beaver (dead or alive) or part(s) of one without a licence. In Scotland, since 2019 beavers have been a European Protected Species (EPS), receiving full protection under the Conservation of Habitats and Species Regulations 2017.

With the reintroduction of beavers into England, a decision is now needed on their future legal status. Table 4 (below) summarises three possible options for future legal protection for beavers. These options indicate the range of legal frameworks that could be established, from virtually no protection to full protection, but it should be borne in mind that options (in between) are also possible.

Table 4 Options for the future legal status of beavers in England

	Status quo maintained	Beavers are given partial protection	Beavers are given strict protection (equivalent to EPS)
Summary of option	Beavers may be killed, and dams and lodges destroyed at any time of year. Limited welfare provisions apply (primarily relating to trapping). Exploitation (e.g. sale and possession) is prohibited, except under licence. Release is controlled.	Beavers would be protected from killing during the breeding season (approx. March to August). Methods of managing problems are controlled (under licence) to avoid adverse welfare consequences. Exploitation is prohibited, except under licence.	Beavers would be given comprehensive and strict legal protection throughout the year. This would protect individual beavers and key habitat used for breeding and resting. Exploitation is prohibited, except under licence.
Legal status or potential legal measures to deliver objective	Limited controls apply to welfare (delivered by the Animal Welfare Act 2006 and the Humane Trapping Standard Regulations 2019) and to exploitation (controlled by the Conservation of Habitats and Species Regulations 2017). The beaver is listed as a protected species (Annex III) by the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention 1979). It is also listed as a strictly protected species (Annex IV(a)) under the Habitats Directive. It was not listed along with other Annex IV(a) species as an EPS in England (*via* inclusion on Schedule 2 of the Conservation of Habitat and Species Regulations 2017) because the species was extinct in Britain. *This is the current legal status of beavers in Wales, as well as England*	Protected by Animal Welfare Act 2006 and the Humane Trapping Standard Regulations 2019. Aim to protect populations of beaver and minimise adverse welfare consequences from management by protecting animals and breeding sites during breeding season (*via* a close season) and controlling methods of killing (could be delivered under the Wildlife and Countryside Act 1981). This approach could deliver the protection appropriate for a species listed on Annex III of the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention 1979).	Protected by Animal Welfare Act 2006 and the Humane Trapping Standard Regulations 2019. Aim to provide comprehensive, strict protection for the beaver and key structures (lodges and dams) at all times (could be delivered by adding the beaver to Schedule 2 of the Conservation of Habitat and Species Regulations 2017). This is the level of protection envisaged by the Habitats Directive for species listed on Annex IV(a). *This is the status of beavers in Scotland (since 1 May 2019) and across most of the EU member states.*
Offences	There are very limited controls: It is an offence to sell, control, possess and transport beavers taken	There are controls that would apply in specified circumstances:	There would be comprehensive controls:

	Status quo maintained	Beavers are given partial protection	Beavers are given strict protection (equivalent to EPS)
	from the wild except under licence from Natural England. It also an offence to release a beaver into the wild (whether it is wild caught or captive bred) except under licence.	In addition to the current offences, it will be an offence to kill or take beaver during their close season except under licence. It will also be an offence to damage or destroy their breeding sites during their close season except under licence. It will be an offence to kill or capture beaver using certain controlled methods.	In addition to the current offences, it will be an offence to deliberately disturb, capture, injure or kill beavers except under licence from Natural England. It will also be an offence to disturb, damage, destroy their breeding sites or resting places except under licence (*this would need defining more specifically and should include lodges, dams and burrows).* These offences would always apply.
Consenting controlled activities	Limited licensing necessary, except to authorise use of approved traps and release of beavers into the wild.	Licence required to undertake all control during the close season and controlled methods during the open season.	Some management will require a licence. The licensing regime would aim to encourage management measures outside vulnerable periods.
Ease of managing beaver problem	Minimal regulation of management activities (only use of traps controlled). No restriction on when or how beaver management can be carried out (except for Animal Welfare Act and Humane Trapping Standard Regulations provisions). No limits on level of control and no limits on who may control beavers. Landowners experiencing issues can manage beaver problem themselves (subject to the controls above).	Licences will be required during the close season to kill or take beavers and to damage/destroy their breeding sites. Methods of control regulated (ensuring use of appropriate traps and firearms) but otherwise management of beavers and removal of structures may be undertaken lawfully outside the close season. No limits on scale of management outside the close season. Landowners, river users and those operating in the water environment who experience issues can manage beaver problem themselves during the open season (subject to the controls above).	Obtaining the necessary licences for urgent management intervention could be perceived as unnecessarily lengthy. *However, strategic licences would provide a way forward to deliver a fast and efficient licensing response to management issues.* More responsibilities on Natural England to find solutions to solve problems. If problems reach unacceptable levels, Natural England will be responsible to find areas where beavers can be translocated into or sanction culling. A licensing system already exists for other EPS and could be replicated.

	Status quo maintained	Beavers are given partial protection	Beavers are given strict protection (equivalent to EPS)
			Would enable set quotas for killing/trapping to be set based on population estimates. Would ensure beaver numbers are protected and closely monitored.
Consequences for welfare	Limited welfare protection. Poor culling practice could lead to unnecessary suffering.	Would protect beavers from being taken/killed using prohibited (i.e. inhumane /indiscriminate inappropriate methods).	This would be the highest level of species protection so welfare protection could be assured.
Consequences for conservation	No mechanism to limit culling impacts on populations, which could lead to local extinction. No regulation power means that no reporting of number of beavers killed would be required. It will be therefore impossible to monitor the potential impacts of killing on the reintroduction. Difficult to monitor FCS. Risk of failure of reintroduction.	Prohibiting killing and destruction of breeding sites during breeding season will provide a level of protection for populations. Management in close season limited to essential and low risk activities. Would enable a record of any beavers taken/killed and this number can at least be regulated and monitored at certain times of year. Beaver habitat not protected - risk of habitat loss and fragmentation of established populations - FCS would be more difficult to achieve. Beavers not protected during the open season - the ecological benefits from beaver activity may not be realised should they be heavily controlled during the open season.	Alignment with Scotland (EPS status given in 2019). This would be the highest level of species protection so conservation of the species would be assured. In line with the ethos of reintroduction – and would send a positive message of protection towards a recently reintroduced species. Easy to monitor and meet FCS.

5.1.1 Favourable Conservation Status (FCS)

Time will be needed to adapt to the reintroduction of the Eurasian beaver to England. Despite efforts to minimise negative impacts of beaver activities, reintroductions will inevitably involve management interventions where beaver activity comes into conflict with human activities. Across its natural range in Europe, despite ongoing management, the Eurasian beaver population has trebled since 1998 and is currently estimated at 1.5 million, compared to 1,200 a century ago (Halley *et al*. 2020). The trajectory of the beaver population in its natural range is positive and is expected to remain so, and the evidence from Scotland to date suggests a similar pattern for reintroduced populations can be expected in the UK. The impacts of management activities on reintroducing this species need to be considered as part of any licensing regime, on the understanding that achieving FCS is likely to be a long-term aim.

Natural England recommendation: Legal Status

The management regime enabled by a future legal status for beaver must be dynamic, proportionate and specific to the beaver having recently been reintroduced in England. Natural England therefore recommends that the Eurasian beaver in England is afforded protection to allow beaver populations to thrive and expand in locations and habitats where their presence is most beneficial and to ensure welfare of individuals when management is necessary. It is also important that the application of the law allows controlled actions to manage issues involving beavers in a manner that facilitates thriving coexistence between people and beavers. Controlled actions could include management, translocation, or where there is no alternative, lethal control.

This recommendation will deliver a workable approach that satisfies our commitment to uphold the Bern Convention and will further demonstrate the UK's leadership in species conservation and animal welfare.

Natural England will closely work with Defra to design a strategic regulatory regime that protects a sustainable population and its habitat whilst also allowing appropriate management.

5.2 Licensing Regime

5.2.1 New reintroductions into the wild

As previously mentioned, in addition to meeting Defra's Reintroduction Code, all licence applications for new wild reintroductions will be assessed against a set of published criteria. These criteria may be adjusted depending on which 'Approach' to new reintroductions is adopted (see section 2.2), but they are likely to focus on:

- Ensuring projects will lead to maximum benefits;
- Ensuring projects will lead to minimal negative impacts;
- Ensuring projects are in areas of high habitat suitability (identified through modelling and/or local knowledge).

Applicants will need to demonstrate that their project aligns with the Approach chosen by ministers and can meet the predetermined criteria.

Applicants will need to submit their Project Plan with their licence application. The application package would also include all necessary steps to prepare for a new release including, where applicable, removal of existing fences and any infrastructure (e.g. grilles, culverts, footings) from enclosures.

The Project Plan will include the following (please note that this is not an exhaustive list - it will be refined once a decision has been made by ministers):

- Project goal: set out how the project aligns with Defra policy;
- Biological feasibility: founders (source, genetics), population modelling, disease screening;
- Habitat suitability at the release site and in the catchment;
- Social and economic feasibility, including details of consultations;
- Habitats Regulations Assessment (where relevant);
- Other legislative considerations and consents;
- Management plan: responsibilities, funding, duration;
- Monitoring plan with clear objectives.

5.2.2 Licensing new enclosures (including renewals)

An indication of the criteria that would need to be met for renewing licences for enclosures is provided in Annex A.

Any new application for enclosures or applications to renew a licensed (or unlicensed) enclosure will need to consider broad principles similar to those for a wild reintroduction. These applications will also need to consider:

- Duration (either permanent if in an area where beavers will not be encouraged or temporary if future wild release may be possible);
- Site security, escapes, plans for progeny or breeding control, animal welfare, etc.;
- Exit strategy.

5.2.3 Licensing management solutions

The level of management solutions that will need to be licensed will depend on the legal status of the beavers.

Prior to considering licensing solutions, non-licensable solutions must be explored. These would seek to maximise benefits and ensure the welfare of the species is at the forefront of any decision. The framework for management is summarised in Annex C, based on the following steps:

- Avoid the need to manage and/or mitigate;
- Mitigation/management through non-licensable solutions;
- Management through licensable solutions.

Based on the national guidance on mitigation and management, each Project Plan would also identify the thresholds at which management actions will be triggered, as well as setting

out responsibilities for provision of advice, education and guidance, together with who would be responsible for carrying out mitigation and management.

Annex E summarises future licensing regimes, depending on the legal status of beavers.

5.3 Other legislative considerations

5.3.1 Interaction with other licensing/permitting

Processes to address the interaction between permitting and licensing regimes required by other legislation will be required. For example, a Flood Risk Activity Permit or planning permission issued by the Environment Agency or Local Planning Authority respectively may cover the same site and issues but have different legal criteria for approval or refusal. The environmental context and interactions with other legislative frameworks, in addition to the direct permitting regimes described above, will continue to be explored.

Protected Sites

If the reintroduction will impact a protected site, the project would need to obtain the appropriate consent/assent from Natural England as part of the application package. For sites also designated under the Conservation of Habitats and Species Regulations (2017) ('the Habitat Regulations'), an Appropriate Assessment may also be required.

Under the Wildlife and Countryside Act (1981), Section 28I advice may apply in some circumstances where public bodies/utility companies (section 28G bodies) must give notice to Natural England before granting a permission or licence that will impact on a protected site.

Historic Environment

Consultation with Historic England and the relevant local government archaeologists will be required if a proposed reintroduction is likely to impact on designated historic sites, i.e. Registered Parks and Gardens, Scheduled Monuments, Registered Battlefields and Listed Buildings. If required, the appropriate consents will need to be obtained from Historic England.

Water Framework Directive (WFD)

River Basin Management Plans (RBMP) set out a summary of measures to improve water in rivers, lakes, estuaries, coastal waters and groundwater. They are produced for the 8 English river basin districts identified from the Water Environment (Water Framework Directive) Regulations (2017).

Natural England has a duty to have regard to these plans in the exercise of its functions and will continue to explore how beaver reintroduction (including release into an enclosure) interacts with this duty. Whilst provision of relevant information from applicants and its assessment for enclosure sites is possible, an adaptive approach to meeting the obligations of the Water Environment (Water Framework Directive) Regulations (2017) may need to be taken for wild release.

Annex A Criteria for renewal of beaver enclosure licences

This is not an exhaustive list and applicants will be required to provide details on the following, as appropriate:

- Have there been any negative impacts (e.g. on valuable trees, crops, infrastructure, sensitive habitats, flooding) from the beavers being introduced to the site? If so, can they be quantified and how have impacts been managed?
- Have there be any welfare concerns? A health check audit trail will be required.
- Have kits been removed from the enclosures to manage numbers? Applicants will need to identify the kits and where they were moved to.
- Have there been any problems with the fencing used at the site? If so, what happened and how was it managed?
- Have there been any escapes from the enclosure? If yes:
  - What efforts were made to implement the escape plan?
  - What was the result - i.e. were all escaped beavers recaptured or are there now free-living beavers in the area?
  - Was any damage caused?
  - What has been the reaction of local people to the escapes or any damage?
- What have been the benefits of beavers on the site or surrounding area? This will be a critical part of the renewal and will need refining. The project will have to demonstrate the benefits the beavers have had on the site and/or adjacent to it. For the renewal, applicants will be required to justify the need/benefit of renewing the licence through either:
  - Contribution to an evidence gap; or
  - Local benefit.
- What stakeholder engagement has been undertaken prior to and during the course of the licence? Any information on support or opposition to the project must be documented and provided.
- Any proposed changes (e.g. fence specification, larger areas, additional beavers to be released) will need clear justification.
- A clear plan for any progeny must be established, should they need to be removed from the enclosure.
- Responsibilities and a clear funding plan will need to be established prior to renewal.
- If the applicant wishes to consider the site for a wild release, the criteria for a wild release (to be developed) will need to be met; applicants will be encouraged to consider these criteria at least 12 months prior to expiry of their enclosure licence.
- Have there been any breaches of the licence or licence compliance issues?

Annex B Beaver populations and the use of management techniques in Europe and North America

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
River Otter Beaver Trial (ROBT) led by Devon Wildlife Trust (DWT), England.	Licensed five-year trial. Original beavers were the result of escapes from fenced enclosure or illegal releases. Additional releases under the licence. ≥15 territories 2021.	DWT provide free advice and are responsible for rectifying problems during the licence period.	Carried out by DWT where required to prevent flooding and aid passage of migratory fish. Some use of volunteers.	Used once to capture and return a beaver that had moved out of the catchment (in compliance with licence conditions).	Not required at present.	Tree protection and fencing carried out by DWT. High risk areas identified for potential pro-active advisory work with landowners and public engagement.	Licences required to release more beavers and to trap, possess and transport beavers for monitoring purposes.	Licence made licensees responsible for damage and flood prevention and any required reparations.
Scotland	Escapes and/or illegal releases on the River Tay from c. 2008. Licensed trial release at Knapdale in 2009. 114 beaver families on the Tay in 2017 (was 39 in 2012). Beavers may spread from these areas naturally but no	NatureScot provide free expert mitigation advice funded by Scottish Government (SG). Phone helpline. Scottish Beaver Mitigation Scheme was funded by SG (funding since withdrawn) - may pay for	Dams that protect breeding places are protected. Licences issued where they cause damage. Dams <2 weeks old or proven to not protect a breeding site are not protected.	Some beavers have been taken from the Tay to reinforce the Knapdale population and for projects in England. No official translocations within the Tay to date.	Farmers with 'Prime Agricultural Land' (PAL) may obtain a 2 year licence to shoot unlimited numbers of beavers causing problems on their land. Must be carried out by accredited individuals, normally in autumn &	'Simple' burrows (those with no end chamber) – considered unlikely to be used for breeding and are not protected. Trialling use of flow devices and fencing designed to exclude beavers from entire sub catchments. Trialling use of automated water	Beavers afforded European Protected Species (EPS) status. Licences granted for activities that affect breeding sites (including some dams) or for lethal control. Streamlined process for farmers with PAL. Lowest impact options must be tried first.	No compensation or land purchase scheme. Funding for some mitigation works.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
	further releases are planned, and beavers from further unauthorised releases have been removed.	mitigation equipment and installation, monitoring and trial of new solutions.			winter (avoiding breeding season when dependent kits) and aim to remove entire family groups. To date no lethal control for non-farming reasons.	level monitoring to provide early warning of possible new beaver dams adjacent to PAL.	Licences required to release more beavers and to trap, possess and transport beavers for monitoring purposes.	
Belgium	Illegal release of 101 beavers in Wallonia c. 1998-2000. Possibly also some spread from neighbouring states. 800-1000 beavers by 2009. Also an official release of 22 beavers in Flanders in 2003 as well as some colonisation from the Netherlands.	Non Governmental Organisations (NGOs) e.g. Natagora.	Licences issued for water managers to remove or damage dams or install flow devices. There is said to be some reluctance to do this with lethal control preferred by many land managers.	Some translocation of problem beavers under licence but it seems there are no longer suitable unoccupied sites.	Lethal control under licence theoretically possible but controversial. Pressure is increasing for problem beavers to be killed but there is also much resistance. The usual method is free-shooting but it is also possible for trained personnel to trap and despatch.	Protection of trees and crops through fencing but at land manager's expense.	Licences required from the Division for Nature and Forestry (DNF) to damage dams or move or kill problem animals. No beaver Special Areas of Conservation (SACs) created in Wallonia due to the beavers having been released illegally. Licence assessments take 3 months or 8 days in emergencies.	Compensation provided by authorities but only for farmers, foresters, horticulturists and fish farmers. Loss of crops only covered, not damage to machinery. Minimum claim of €125 up to a maximum of €12,500. In theory the fund should also cover provision of measures to prevent damage but rarely does.
Czech Republic	Mainly natural colonisation from neighbouring states	A 10-15 year management plan has been written and a manual for	Permissions are granted for the removal of beaver dams if they are	In Zone A (see' other measures' column for definition of 'Zones')	Few licences for lethal control are issued in practice but it	Zoning to determine the appropriate level of management	Protection varies in the different Zones. Licences are issued by the	Funds are available under the Environmental Operations Programme to

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
	including Bavaria and the River Elbe. First noted in 1977. One small introduction in Moravia. Population expanded to 2500-3000 by 2010.	dealing with beaver problems is to be produced. State nature conservation have experience of dealing with beaver problems.	causing significant damage and is only permitted in Zones B and C (see' other measures' column for definition of 'Zones') with permission of the Regional Nature Authority and the water manager.	translocation only used in exceptional circumstances. In Zones B & C beavers may be translocated if there is a suitable release site.	is permitted. In Zone A culling only in exceptional circumstances. In Zone B culling may be used if required and other non-lethal alternatives have been tried. In Zone C there is a zero tolerance attitude to beavers.	and protection of beavers: Zone A – low risk - highest level of protection. Zone B – beavers have a permanent presence but managed to prevent problems. Zone C – high risk areas – potential for high beaver carrying capacity together with potential for serious damage, especially to human welfare; beavers are excluded where possible.	Regional Nature Authority.	minimise and prevent damage to infrastructure caused by endangered and protected species. However, funds are infrequently used due to high costs, except to improve habitats and protected areas, and compensation for state-owned forests. Financial support is conditional on preventative measures being used first.
Finland	As of 2017 the estimated population of Eurasian beavers was 3,300-4,500. They are greatly outnumbered by North American beavers *Castor canadensis* (10,000-19,000).	No beaver management plan at present.	Removal of dams is permitted between 16 June and 15 September, depending on the area of Finland and landowner's permission. Any dam removal at other times of the year	Plans to reintroduce Eurasian beavers to some areas so translocation an option.	Hunting controlled with game quotas. Assistance provided by hunting volunteers. Hunting is for recreation as well as to deal with problem animals. Hunting American beavers is	Management plans are being developed in a bid to prevent range conflation between Eurasian and North American beavers, and this is likely to be the first step in the development of a national beaver management plan.	General hunting licence required plus landowner permission. For Eurasian beaver a special permit is also required and this is given only for 'problem' animals.	No government compensation scheme for beaver damage, although some landowners have insurance to cover losses.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
	Eurasian beavers were reintroduced from Norway in 1935 and the non-native N. American beavers two years later.		needs permission from the Finnish Wildlife Agency.		more straightforward than Eurasian beavers (in 2013 only about 5% of beavers killed were Eurasian).			
France	Beavers survived on the Lower Rhone valley into the early 20th century. There has since been natural expansion and reintroductions into much of the rest of the country as well as movement into France from neighbouring states. 14,000 beavers in 2011 and present in most major catchments.	State run National Office for Hunting and Wild Fauna (ONCFS) provides a beaver advisory service and undertakes management.	Dams which do not protect a breeding or resting place can be removed without licence. Otherwise licences can be issued to prevent damage outside of the breeding season. Fast track system for urgent cases.	Beavers were first translocated to help beavers expand northwards through the Rhone catchment as Lyon was acting as a barrier to dispersal. There have been a total of 26 reintroductions using only French sourced beavers.	Unknown	Beavers are managed on a catchment scale.	Similar 3-test process to UK EPS licensing. Situation is determined as 'Urgent to Act' or 'Not Urgent'. For 'Urgent', the scale and risk are identified and, if justified, fast-track advice and solution are provided, action authorised; no licence needs to be applied for. If 'Not Urgent', assess the need for advice/licence	No national compensation schemes but there are examples of individual councils assisting in certain cases. Regional differences in help available - Agri-environment schemes, creation of buffer strips and state funded land purchases have been used in some areas as well as aid with infrastructure works that may impact on beavers. Consideration being given to land exchanges – swapping beaver flooded land for productive land elsewhere.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
Germany - Bavaria	Relict population of beavers on the River Elbe plus reintroduction of beavers into Bavaria from 1966. Also, reintroductions elsewhere and some expansion from neighbouring states. Now 30,000 beavers in Germany including 20,000 in Bavaria.	Guidance produced by state nature conservation agency who also employ two beaver managers supported by network of trained & supervised volunteers (expenses paid). A long-term education programme designed for all sectors of society is delivered.	Landowners can remove dams under instruction from a consultant - natal and mature dams receive more protection.	When beavers were at low density and had a limited range, translocation was carried out frequently. Many of these beavers were used in reintroduction programmes abroad.	No culling until 2002 (36 years after initial reintroduction). Around 1,000 beavers are culled annually. Removal of beavers is done only if they are causing (or might cause) severe damage and no reasonable preventative measures are available.	Some areas are kept 'beaver free' as far as possible using a 'traffic light' system but not at a catchment scale as this is not practical.	Beavers are protected under the Habitats Directive. In 2008 the EC concluded that the Bavarian model may not be compliant with EU law due to the use of permanent derogations in some areas.	There is funding available for mitigation measures, encouragement of the leasing or selling of vulnerable land to the state nature conservation organisations as well as incentive payments for land managers. Help is available for applications for funding. Long term planning involving the use of buffer zones around fresh water bodies is employed to reduce future conflict. Limited compensation is available for farming and fishing businesses but not for private residential land. Evidence must be documented and checked by a beaver consultant before payments are made.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
Latvia	Reintroduction in 1930s. Population remained manageable throughout the Soviet era but the end of Communism led to widespread agricultural land abandonment. Drainage ditches became scrubbed over with willow, making ideal beaver habitat. Now c.100,000 beavers.	State Forestry Service regulate hunting and are responsible for beaver management. In reality they have little involvement outside of state-owned forests.	Non-lethal measures considered unrealistic due to cost.	Translocation is not considered a suitable option due to already high beaver numbers.	Treated as a game animal. Short open season 1 May to 31 July to encourage more animals to be shot. Apparently little enthusiasm for hunting beavers as not a trophy species, it involves little skill and there is little demand for pelts or beaver meat.	Regulated under Hunting Act – licence required to hunt.	Due to the high density of beavers, Latvia obtained a permanent exemption for protection under the Habitats Regulations so no EPS licences required.	Unknown
Luxembourg	No reintroductions but the species has colonised from neighbouring states, mainly Belgium, since c. 2000.	Management plan launched in 2018 by government.	Flow devices and dam removal.	Not currently but would be possible with appropriate approval.	Not currently but would be possible with appropriate approval.	5-20 m wide buffer strips. State funding available under five year agreement. State will lend tree guards and electric fences.	Fully protected and licences required in theory but little damage at this stage.	There is a Ministry of Environment scheme for compensation for damage caused by protected species. Only for farmers, foresters and fisheries. Not used for beaver yet. Also land purchase and land exchange schemes.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
Netherlands	Beavers released from 1988 in the National Park de Biesbosch, and in 1995 from Gelderse Poort. Estimated 3500 beavers by 2019 (1000 in 2011).	Mitigation advice provided by the state.	Dam building not considered a major issue as although the country is generally flat, water levels in dykes are generally stable and deep enough for dams to not be required.	Has been used and there are recommendations to move 'problem' beavers to link the two populations and increase genetic diversity.	Possible under licence although no beavers were shot in the first 20 years of their presence in the country. More recently, beavers shot to prevent damage to dykes and other infrastructure. Likely to increase as fewer sites become available for translocation.	Beaver no-go areas and high risk zones identified for protection. Microphones in dykes to pick up beaver sounds allowing beaver presence to be identified quickly. Beaver proofing of dykes which includes vegetation clearance to deter burrowing. Youth volunteers used for monitoring work.	Fully protected and licences required.	Riparian buffer zones used in some areas. Compensation available for farmers if they can demonstrate they have taken appropriate avoidance measures.
Norway	70,000 beavers in the late 1990s descended from a small population that survived in the Telemark region until legal protection was given in 1845.	No beaver management plan in place at present.	Natal dams are protected but licences can be obtained to remove or damage them. This is done by the land manager.	Permission required from municipal Nature Conservation body.	Game species – hunting carried out in the open season and licensed control during the breeding season to resolve problems. Open season 1 October until 30 April. Quota is set but beavers can tolerate 15-20% of their	Regulated through hunting permits	Licences are available to remove or damage natal dams.	No compensation as issues are normally solved by killing problem beavers. Problems are also perhaps low due to the small area of flat ground.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
					population being hunted so there is no risk of population decline as hunting beavers is not sufficiently prized. However, it is often popular with young people as it is cheap.			
Poland	Very low numbers by 1945 but increased protection, natural immigration from Lithuania and some introductions from Soviet Union boosted it from the 1970s onwards. C.18,000 – 23,000 beavers by 2002, with 10,000 concentrated in the NE region. A different source states	Said to be a reduction in complaints of damage since 2015 due to better understanding of beaver benefits and increased education in non-lethal solutions.	Since 2002 problem beaver dams can be destroyed with permits from regional government. Increased use of flow devices since about 2015 has contributed to decline in damage complaints.	As beavers are concentrated in the NE region, which is considered 'saturated', translocation to vacant areas is carried out where problems occur. Until 2000, 1100 beavers were moved, some to a number of other countries, including England.	Beavers may be killed to prevent damage. Killing carried out by Polish Hunting Association but they kill less than licensed as little enthusiasm for hunting beavers. Licences issued to shoot 19,000 between 2012 and 2015 but only 1,500 shot.	Unknown	Full protection of beavers and their resting and breeding sites. Consideration being given to managing beavers as game animals (e.g. Latvia) and officials are considering changing rules to allow people to eat beavers to encourage hunting.	Compensation available for agriculture, forestry and fisheries through Regional Directorate for Environmental Protection. Mostly claimed for flooded pasture and gnawed non-fruit trees.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
	100,000 beavers by 2016.							
Switzerland	Successful reintroductions 1950s - 1970s. 1600 beavers recorded in 2007-08 census.	A national beaver advisory service based on the Bavarian model.	Dams removed, flow devices used, as well as measures to prevent dams being rebuilt.	Unknown	Cantons may take measures to regulate beaver population where a threat to health, safety or public buildings.	Artificial burrows created in areas where collapse of natural burrows is a frequent problem (Note: the efficacy of this is uncertain). Tree and crop protection with fencing.	Beavers, their structures and habitats are protected. Licences may be issued.	Compensation for farmers and foresters paid by federal government and cantons (50% each). No federal funding for damage prevention but some cantons will pay up to 80% of material costs for damage prevention measures.
Canada - Ontario	North American beavers only. Unregulated killing for pelts nearly wiped out beavers in Ontario by the start of the 20th century. Controls on trapping have allowed the population to recover. Now common.	Ontario Ministry of Natural Resources and Forestry and NGOs (e.g. Animal Alliance). OMNCF are also responsible for rectifying any damage on Crown Land.	Not recommended unless beavers are first removed. Permitted when other options have been tried except in winter when considered cruel or if dam >3 years old. Concern about downstream flood damage when water released. Limited use of	Not recommended due to risk of territorial fights and perception of passing problems on to other landowners.	Registered trapline system for harvesting beavers for pelts. Advised that 30% of beavers on a trapline be killed each year. Farmers and municipalities may kill beavers in open season if they experience damage. Must use licensed trapper unless	Tree protection advice. Lodges may only be destroyed with permission.	Beavers have limited protection as fur bearing animals. Licensed trappers expected to abide by conditions of their licence, follow trapping rules and local bylaws on firearms. Permission from OMNRF required to kill in close season or to destroy lodges.	No compensation schemes.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
			flow devices, often with help from voluntary groups.		farmer. Trapping (including kill traps) is the norm but shooting permitted also.			
USA - California	North American beavers found throughout most of the state except for the most arid areas in the South East. Perception that they are non-native in some areas because introduced in the 1920s to curb soil erosion. From 1300 animals in 1942 there were 20,000 by 1950. Now considered native due to evidence they were only absent due to being trapped out by early European settlers. Now seen as a possible tool	The California Department of Fish and Wildlife (CDFW) are responsible for beaver management.	Dams sometimes removed by Wildlife Services.	Considered in a small number of cases but permits rarely issued by the CDFW.	Legal to kill beavers in 42 out of 58 counties. Need to apply for a permit from CDFW and provide proof of damage.	Volunteer groups help with mitigation and tree protection.	Department of Fish and Game issue Depredation permits. 900 beavers killed by Wildlife Services (part of US Department of Agriculture). In 2019 legal action stopped the killing of beavers along 11,000 miles of river and 4 million acres of land due to realisation of the benefits of beavers to biodiversity.	No compensation schemes.

Location	Beaver origin and numbers	Sources of advice & help	Dam destruction /modification	Translocation	Lethal control	Other measures	Legal matters. Licensing /authorisation /derogation requirements.	Compensation /agri-environment /land purchase
	for combating climate change by preventing droughts.							
USA - Massachusetts	North American beavers largely eradicated by European settlers and as a result of forestry clearance but now restored to most of their former range, partly through reintroductions from the 1930s. Apart from usual beaver conflicts, concern about disease – *Giardia*.	State advisory service.	Permits required to damage lodges or modify dams by breaching or use of flow devices.	Translocation is against state law.	Recreational hunting permitted in open season but also lethal control possible where damage to property or a health and safety risk. Funded by fishing and hunting licence fees.	Beaver free areas in locations where non-lethal measures are deemed impracticable. These are defined by a beaver expert and unregulated trapping is permitted on a continuous basis. Fencing 'exclosures' to protect trees. Fertility control trial.	Permits required to trap beavers in close season in emergency situations. In the open season they may be trapped by licensed trappers and are considered an economic resource.	No compensation schemes at present.

Annex C Management framework for a new reintroduction

Where beavers will be released into new catchments, the hierarchical options available to mitigate and manage beavers and their impacts are set out below.

1. **Avoid negative impacts**

- Selection of initial release sites where risk of negative impacts is likely to be minimal (informed by the results of conflict/opportunity modelling):
  - Identify which negative impacts need to be avoided and which can be addressed by other mechanisms (e.g. flood risk management).
  - Consider evidence gaps relating to impacts.
- Explore financial incentives for landowners, e.g. ELMS, conservation covenants:
  - Identify how this could maximise benefits.
  - Explore connections and input to Nature Recovery Areas.
  - Explore various options such as buffer strips, planting of suitable habitats, sacrificial land.
- Provision of education, advice, guidance and support:
  - Responsibilities for providing and funding this in the short, medium and long term.

2. **Mitigation and Management not requiring a licence**

- Identify the options for pre-emptive management at certain sites, and the triggers.
- Set out options to address issues once they have occurred, e.g. fencing to prevent further damage, flow devices, tree protection, proofing, dam management (including notching, removal of dams not associated with resting places), destruction of unused burrows.
  - Some of these actions might require a licence or permit in certain circumstances and/or depending on legal status.
- Identify who would be responsible for advising on and implementing these measures, and who would fund mitigation in the short, medium and long term.
  - Experience/training needed.
  - Explore financial incentives for landowners for mitigation, linked to ‘avoid’ (see above).
  - Provision of education, advice, guidance and support.

3. **Mitigation and Management of negative impacts that may require a licence** (depending on legal status)

- Destroy or modify dams/lodges/burrows.
- Translocate beavers.
- Lethal control.
- Fertility control?
- Identify who would be responsible for advising on and implementing these measures and who would fund actions in the short, medium and long term.
  - Experience/training needed.
  - Explore financial incentives for landowners for management, linked to ‘avoid’ (see above).
  - Provision of education, advice, guidance and support.

4. **Identify the thresholds for management actions**

- Define ‘significant’ damage for different landowners/river users or those affected, and under different scenarios.
- Set out how in the short, medium and long term the thresholds may change.
  - Use of a model of population establishment and growth from Natural England’s Evidence Review to inform timescales.
  - Consider FCS.

5. **Set out responsibilities for provision of advice, education and guidance** (relevant to avoid, mitigate and manage)

- What is required and categories of enquiries.
- How is it resourced/funded?
- Who leads, co-ordinates on the various aspects? Could include:
  - Natural England;
  - Environment Agency;
  - National Beaver Officer;
  - Contracted-out advice service;
  - Local Beaver Project Officers;
  - Re-introduction project group/catchment-based Management Groups;
  - Trained volunteers.

6. **Who** carries out the mitigation/management?
7. **How** could it be funded?
8. **Monitoring of conflicts and management**, support, advice – who, when and what. Adaptive management approach.

Table C1 Management options for free-living beaver populations

Management action/technique	Beaver activity to be addressed	Can it be pre-emptive and/or reactive?	Advantages	Disadvantages	Effectiveness over time
Individual tree protection - fencing	Feeding and tree damage.	Both	Can protect and retain key trees.	Resource intensive if used on a large scale. Occasional maintenance required. Aesthetic issues.	Medium term
Individual tree protection – textured paint (paint containing a grit that deters beavers from gnawing).	Feeding and tree damage.	Both	Easy and quick to apply. Relatively inexpensive.	Resource intensive if used on a large scale. Requires reapplication so may not be suitable long- term. Repeated use of certain paints may be detrimental to young trees.	Short/medium term
Fencing – exclusion.	Beaver activity causing demonstrable negative impact.	Both	Permanent exclusion of beavers. Well-established designs to prevent access to beavers.	Costs of installation and maintenance – not feasible for large areas. A permit is likely to be required for fencing across a watercourse. Care is needed when installing fencing across rivers or near to culverts in order to prevent blocking due to accumulation of debris. Also need to consider movement of fish. Beavers can dig under fencing across watercourses.	Long term
Fencing - electric	Beaver activity causing demonstrable direct negative impact on land.	Both	Low cost and quick to install.	Temporary measure. Welfare considerations for certain designs. Beavers have breached electric fences.	Short/medium term

Management action/technique	Beaver activity to be addressed	Can it be pre-emptive and/or reactive?	Advantages	Disadvantages	Effectiveness over time
Dam management – removal	Dam building and water level changes e.g. raised water levels likely to increase risk of flooding.	Reactive	Low to medium cost depending on size of dam and frequency of management. Depending on dam size, hand tools may be used (especially if dam is new). Quickly solves problems caused by dam building.	Requires ongoing monitoring with repeat removal often necessary (depending on the purpose of the dam). Results in a (temporary) increase in debris moving downstream. May require licensing if adjacent to a lodge or burrow. May stimulate rebuilding of the dam and therefore increased tree felling.	Short/Medium/Long term depending on reason for dam.
Dam management – manipulation, e.g. notching (removing a small part of the dam that allows water to flow through or over it, so maintaining a lower water level)	Dam building and water level changes e.g. raised water levels likely to increase risk of flooding.	Reactive	Retains dam. Low to medium cost depending on size of dam and frequency of management. Depending on dam size, hand tools may be used. Can aid fish passage.	Labour intensive - ongoing monitoring and repeat notching may be required. May require licensing if adjacent to a lodge or burrow. Less documented evidence of regular use in Europe but documented as commonly used in North America and Scandinavia.	Medium term
Dam management – flow management devices	Dam building and water level changes e.g. raised water levels likely to increase risk of flooding.	Reactive	Allows the dam to remain while maintaining a lowered water level. Low/medium cost and various designs available.	A permit may be required from the local flood authority. Flood Risk Activity Permit from the Environment Agency if main river; Land Drainage consent	Long term

Management action/technique	Beaver activity to be addressed	Can it be pre-emptive and/or reactive?	Advantages	Disadvantages	Effectiveness over time
			Can be designed to allow fish passage.	if Local Authority. May require maintenance. Expertise required for installation and maintenance. Potential high failure rate if not correctly installed. Works only at a specific point. It does not prevent the construction of subsidiary dams elsewhere.	
Canal and burrow management - bank protection e.g. chain link/welded wire fabric/sheet metal piling.	Canal and burrowing impacts e.g. bank and bankside erosion.	Both – mainly pre-emptive	Long term protection from burrowing. Effectively protects key sites, infrastructure.	Very high cost to install depending on extent and situation. Water management authorities would need adequate funding. May not be viable along extensive lengths of river. May damage bankside ecology.	Long term
Canal and burrow management - e.g. infilling	Canal and burrowing impacts e.g. bank and bankside erosion.	Reactive	Can quickly prevent any issues from burrowing activity. Low/Medium/High cost depending on extent.	Temporary solution, unless the infill is physically protected e.g. by laying chain-link netting on ground.	Short/Medium term
Culvert protection - guards /fences /extensions	Dam building blocking culverts.	Both	Permanent structure. Highly effective and various designs available.	High cost depending on extent plus additional maintenance. Permits likely to be required for installation. Expertise required for installation.	Long term

Management action/technique	Beaver activity to be addressed	Can it be pre-emptive and/or reactive?	Advantages	Disadvantages	Effectiveness over time
Habitat alteration - e.g. removing trees and shrubs close to water courses.	Feeding and dam building	Both	Removing trees and shrubs can encourage beavers to move or not become established at particular locations. Planting additional trees can also help to reduce burrowing. Non-invasive technique.	Potential negative effects on ecosystem and/or bank stability. Resource intensive particularly for fast-growing shrubs and plants.	Medium term
Scare devices - visual, audio - e.g. strobe lights, sirens etc.	Beaver activity causing demonstrable negative impact.	Reactive	Localised means of deterring beavers. Non-invasive, relatively inexpensive technique. Maintenance required.	Beavers likely to become habituated to devices. If beavers become EPS, disturbance near to lodges and burrows may need licensing. May cause unacceptable disturbance to people and/or other wildlife.	Short term
Scare devices - dogs	Beaver activity causing demonstrable negative impact.	Pre-emptive	Free running dogs are likely to deter beavers from a localised area.	Welfare issues - dogs should not be used to disturb beavers, particularly in established lodges. If beavers become EPS disturbance by dogs could be an offence. Likely that disturbance would need to be regularly repeated especially if the habitat is otherwise suitable.	Short/Medium term
Chemical repellents	Feeding and tree damage.	Both	Non-invasive technique if using natural repellents.	Approval required for the use of chemical repellents against beavers under the	Short term

Management action/technique	Beaver activity to be addressed	Can it be pre-emptive and/or reactive?	Advantages	Disadvantages	Effectiveness over time
				Control of Pesticides Regulations 1986. Limited effectiveness for many repellents. Frequent reapplication usually required. Potential negative environmental or non-target impact.	
Financial incentives /compensation	Beaver activity causing demonstrable negative impact.	Potentially both	Allows beaver activity to continue and maximises environmental benefits of reintroduction. Potential to link with ELMS.	Potential high costs depending on extent. Administration of compensation scheme required.	Long term
Beaver removal – trapping and translocation	Beaver activity causing demonstrable negative impact.	Reactive	Removes ongoing issues where beaver activity is having a demonstrable negative impact. Potential source of beavers for other projects. Well-developed trapping protocols available.	Licensing required including specific criteria and high level of expertise to undertake (currently limited in Britain). For welfare reasons, it may be necessary to remove family groups rather than single beavers which is not always possible. It may be more difficult to re-home larger numbers of animals. Resource intensive and repeat monitoring required to ensure success. Requires suitable release sites and/or holding facilities to be available.	Medium/Long term depending on population levels. Would be short term if the site is reoccupied.

Management action/technique	Beaver activity to be addressed	Can it be pre-emptive and/or reactive?	Advantages	Disadvantages	Effectiveness over time
				Potential for reoccurrence of problems if new individuals reoccupy area.	
Beaver removal - culling	Beaver activity causing demonstrable negative impact.	Reactive	Avoid all conflict for persistent issues or if beaver free areas maintained. Well-developed trapping and dispatch protocols available.	High level of expertise required to undertake. Licensing may be required. Potential public opposition. Potential for reoccurrence of problems if new individuals reoccupy area. Impacts of removal of individuals on their family group is not known. May involve trapping and then shooting. Free-shooting should be done on land to avoid risk of ricochet from water.	Medium/Long term depending on beaver populations. Would be short term if the site is reoccupied
Fertility control (surgical neutering)	All beaver activity.	Mainly in response to a problem.	More publicly acceptable means of population management than lethal control. Reduces breeding but retains family group to prevent dispersal of new individuals into a territory.	Licensing required including specific criteria and veterinary expertise to undertake. Not a commonly used technique. Expensive and labour intensive. Will not remove 'problem' beavers.	Long term

Annex D Volunteers

Background

Natural England has long term experience of supporting volunteers on a variety of projects including habitat management and work with European Protected Species. Natural England`s volunteer network forms an integral part of the organisation's public outreach and contribution to scientific research. Non-Governmental Organisations (NGOs), such as the Wildlife Trusts and the National Trust, also have widespread volunteer networks that could be utilised if reintroductions occur on land owned by the NGO; for example, Devon Wildlife Trust successfully involved a number of their volunteers in the River Otter Beaver Trial.

Issues to consider:

Scale and implementation

The scale of beaver reintroduction in England, its pace and whether multiple catchments are involved simultaneously is not yet finalised. The degree to which Natural England will be involved and the funding available is also yet to be determined. All this will influence the volunteer resources required and how they are organised and managed.

Depending on the location/s of beaver reintroduction, Natural England could seek to expand the geographical remit of existing National Nature Reserve (NNR) volunteers but, given that the beaver reintroduction will have its own identity and may require volunteers with bespoke training, setting up a dedicated volunteer group may be preferable.

It would need to be determined what organisation or independent group would take ownership of volunteers. Natural England could also liaise with other organisations and bid for volunteers for certain aspects of the project. The level of involvement Natural England could have with volunteers and the main implications are identified in the table below.

Table D1 Potential volunteer models

Model	Level of NE control	Benefits	Issues	Equivalent example
Existing Natural England volunteers	Full control	Natural England can fully determine volunteer activities and respond quickly to changes. Communication is simplified.	Natural England has full liability and costs. Staff resource is required to train, manage and support all volunteers.	NNR volunteers
Natural England ownership of volunteers – but volunteers managed by a partner body	Legal control	Day to day management, recruitment and training responsibility is held by a partner body.	Natural England has full liability and some costs. It employs some staff resource to support volunteers and maintain records.	Volunteer Bat Roost Visitors
Volunteers from different organisations working together under one project	Split control	Volunteer numbers increased and a wider network of volunteers is formed.	Responsibility is split so good working arrangements, agreements over policy and good coordination are essential.	Foresters, Forest Fens and Whixall mosses

Model	Level of NE control	Benefits	Issues	Equivalent example
Management of all volunteers by a related third party organisation	Minimal control	Managing body could have financial autonomy and apply for funds independently.	Volunteers could be managed by a bespoke body set up specifically to manage them.	'Friends of...' type group
Management of all volunteers by an unrelated third party organisation	Little control other than a legal means, e.g. contract	Lower cost, no liability and no staff resource required to directly manage volunteers.	Little ownership and Natural England is remote from local communities from which volunteers are drawn.	Wildlife Trust volunteers operating on Natural England site

The way beaver reintroduction is organised will have implications on the number of volunteers required and when. A programme based on the geographical location of projects by catchment would enable recruitment of local volunteers within that area. The number of volunteers would be defined by need and local population demographics.

Costs and resources

Resources required for volunteers are normally financially less than staff; for example, travel and subsistence costs tend to be low as volunteers generally come from the local area. The cost of volunteer Personal Protective Equipment (PPE), tools, first aid kits, etc. can be kept low by bulk ordering and sharing between groups, if applicable.

Training tends to be the major expense, especially where volunteers need more specialist skills, such as in the use of powered equipment. This can be offset to some extent where volunteers join staff training which has already been set up. Training can also be delivered by staff or using online resources.

Costs in terms of staff management time per volunteer will be highly variable and depend on the model that is used. Experienced volunteers may require almost no time whereas new volunteers may require significant staff input. Volunteering is a good platform for encouraging inclusivity and diversity within an organisation. The recruitment and support of volunteers can take time and requires staff with well-developed people skills. Having sufficient budget and dedicated staff time to support volunteers is therefore essential.

Activities

Not all activities associated with beaver reintroduction will be suitable for volunteers and some will require the support of staff. Activities such as trapping, dealing with sick or injured animals, or operations that require heavy machinery (e.g. the installation of flow devices and grilles) are unlikely to be suitable for most volunteers. Table D2 below summarises the main activities that volunteers should be able to assist with.

Table D2 Summary of activities potentially suitable for volunteers

Activity type	Specific activity	Issues and benefits	Suitability for volunteers
Education	Visits to and from educational institutions and interest groups.	Volunteers can be excellent advocates for wildlife and can engage successfully with all ages. This tends to be an isolated role and requires reasonably in-depth knowledge.	Medium
Monitoring	For example: Population dynamics of flora and fauna; Beaver populations, health and behaviour; Dams and water levels e.g. in drainage ditches; Habitat changes; Assessment for new beaver locations e.g. baseline surveys; Beaver impact; Mitigation measures; Photography and filming.	Monitoring is a key area where volunteers could get involved. The range of activities is large. Many will require specialist knowledge and training built up over time but those that require only basic training would make early participation possible. Training can be delivered in groups to reduce costs.	High
Practical work – habitat management	Removal of dams; Unblocking culverts; Bank works; Installing tree guards; Applying textured paint to trees.	This type of practical habitat management work can be suitable for volunteer working parties. Working in or near to waterbodies carries potentially high health and safety risks and therefore specific training, staff supervision, risk assessments and PPE will be required. These activities would not be suitable for volunteers with certain health conditions. Some of the activities would be required at short notice rather than as planned tasks, such as removal of dams causing immediate flood risk or property damage.	Medium
Research	Surveys undertaken by trained or expert volunteers.	Where expertise is high, minimal supervision is required. Training and supervision will be required for less qualified volunteers.	Medium
Outreach to groups and individuals	Engagement with participants, potential participants or those likely to be impacted by a reintroduction (e.g. landowners and interest groups such as anglers).	Soft follow-up visits and initial gauging-interest visits would need to be undertaken by experienced individuals during the early years of the projects. There is some scope in the later stages of the projects to involve volunteers however they would have to be experienced and work closely under staff supervision.	Low
Visitor management	Guided tours for the general public/schools.	Wildlife themed guided walks are extremely popular and can generate income. Knowledgeable volunteers are well placed to deliver these.	High

Activity type	Specific activity	Issues and benefits	Suitability for volunteers
		Appropriate insurance and landowner permissions would be required	
Expert advice	Individuals or panels of experts providing their time for free.	This can be extremely useful in terms of providing both a strategic steer to an initiative or bespoke advice on a particular aspect. Staff time is required to set up and manage this but it can pay huge dividends.	Low
Mass participation in data collection	Citizen science projects have the potential to engage large numbers of people on set tasks to acquire information on habitats and species.	The numbers and locations of beavers is likely to mean that for the foreseeable future the citizen science approach is likely to be of less value than more targeted monitoring with smaller numbers of volunteers.	Low
Patrols	Walking areas where beavers are active.	'Eyes and ears' volunteering is common practice on NNRs and National Trails and performs a valuable function to spot problems early. For beavers this could be dams causing flooding, tree or bank damage and blocked footpaths. Little training and support is required, but health and safety procedures to cover lone working are usually needed. The distances patrolled would need to be determined and landowners' permission secured to enable access.	High
Events	Holding an event or providing a stall at public events.	This type of activity is suitable for volunteers and can generate low levels of income and engage with the local community. A minimum number of volunteers need to be available at the same time.	Medium
Communications	Providing information to the general public in the form of newsletters, blogs and use of social media.	IT literate volunteers can provide a useful resource in promoting initiatives through regular communications. This type of activity needs to be closely monitored by staff to ensure any content being posted is appropriate.	Medium
Resolving problems	Providing advice and support to landowners and river users experiencing negative impacts of beaver activity.	This type of role is undertaken by Volunteer Bat Roost Visitors. However, it is a well-established role backed up by the Bat Conservation Trust and protected species legislation. There may be a role for volunteers with an appropriate background, and it has been successfully applied in Bavaria for less complex cases. In the initial phases of a beaver reintroduction project there would be risks.	Low

Volunteer training

Training of volunteers is essential to ensure legal health and safety requirements are met and that volunteers understand what is being asked of them. The level and type of training will depend on to what role volunteers are assigned. Whatever the level of training, the staff resource to deliver this must be adequately supported and funded, together with time to monitor the effectiveness of training, including provision for feedback once the volunteers are undertaking the activities. As a minimum, training delivered to volunteers should include: an induction, health and safety requirements (including risk assessments) and training specific to the activities to be undertaken.

With beaver reintroduction there is potential for volunteers to become highly trained and experienced and help with the delivery of the project.

Level of community connectedness

Volunteers provide a key avenue for any project to engage with the local community or communities in which they operate. With the beaver reintroduction there is the potential for multiple communities to be engaged, so increasing the potential for knowledge-sharing amongst communities.

Staff resource

Staff resources are required to manage volunteers and ensure they are supported in their role through regular communication. In addition to providing training and appropriate equipment, staff time is needed to undertake administrative tasks for volunteers such as: registration, recording hours, and providing IT support and expenses.

Risks associated with volunteers

One of the main risks associated with volunteers is where relationships between staff and volunteers break down, resulting in volunteers not feeling valued and supported. This can be due to poor communication and/or a lack of support from staff, possibly because of insufficient resource in terms of staff time and funding. This can result in volunteer resignations, bad publicity and staff time being lost sorting out issues.

These risks can be minimised by having regular open communication between staff and volunteers to ensure any issues are flagged early and resolved. The organisation/s responsible for the volunteers will need to ensure sufficient staff resource is provided, that they abide by the volunteer promise and are clear about the volunteer role specifications.

Conclusions and recommendations

Volunteers can be a valuable resource, bringing to a project expertise, enthusiasm, physical labour, and connections to the community and/or academic institutions. It is clear that volunteers could play a vital role in beaver reintroduction projects in England, including a wide variety of activities, while also inspiring and connecting communities to beavers. The direct financial costs should not be high, however the staff resource required to support volunteers should not be underestimated.

Volunteers cannot be guaranteed and therefore it is recommended that the level of interest in volunteering is gauged in the planning stage of any beaver reintroduction. This can be through local community consultation and discussions with interest groups. It should then be possible to determine what might be feasible in terms of volunteer involvement.

Annex E Summary of future licensing regimes

Species licensing

The future legal status of Eurasian beavers in England is yet to be determined. A range of options is outlined in Table 4 but other 'in between' options should also be explored. The implications for licensing of each of the options considered are summarised below.

1. Current protection unchanged:

Beavers are protected under the Animal Welfare Act 2006 and the Wildlife and Countryside Act 1981 (as amended) where they are listed on Schedule 6ZA (incorporating the Humane Trapping Standard Regulations 2019) - animals which may not be killed or taken by trapping or snaring.

Licences for trapping and release are required under the Wildlife & Countryside Act (1981).

A licence is also required under the Conservation of Habitats and Species Regulations (2017) (the Habitats Regulations) to sell or exchange, possess or control and transport beavers (dead or alive, whole or parts of) taken from the wild.

2. Partial protection:

In addition to the current protection, 'open' and 'closed' seasons would be identified. The closed season (March – August) would reflect the breeding season when dependent kits may be present.

In the open season, the following management activities would be permitted without a licence:

- Destruction, damage or disturbance of beaver structures such as dams, lodges and burrows;
- Lethal control (without trapping).

In the closed season, these activities would require a licence.

At all times, licences for trapping and release would be required under the Wildlife and Countryside Act 1981 (as amended) and licences to sell or exchange, possess or control and transport beavers taken from the wild would be required under the Habitats Regulations.

3. Full Protection – European Protected Species:

Beavers would be added to Schedule 2 of the Habitats Regulations and fully protected throughout the year. Under Regulation 55 of the Habitats Regulations licences may be granted for the following purposes:

- scientific or educational purposes;
- ringing or marking, or examining any ring or mark on, wild animals;
- conserving wild animals or wild plants or introducing them to particular areas;
- protecting any zoological or botanical collection;

- preserving public health or public safety or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment;
- preventing the spread of disease; or
- preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber or any other form of property or to fisheries.

Principles of licensing:

If beavers are afforded either partial or full (EPS) protection, the following principles of licensing will be applied:

- Set out the likely scenarios that **do not** need licensing (as identified in the Management Framework);
- Provide guidance on when a licence is required;
- Deal with licence applications in accordance with Defra's policy on wildlife management, applying a step-wise approach for managing human-wildlife conflicts, and identifying key licensing principles, including providing definitions of terms as required.

Delivery of Licensing:

The type of licence granted (see below) will depend on the situation but, where appropriate, strategic licences (see Class and Organisational licences below) will be granted to address more commonly occurring situations in order to minimise regulatory burden.

Individual licence:

An Individual licence would be required for higher risk, normally one-off activities. Examples for beavers include: licences to release, licences for the purpose of development, and most lethal control licences.

Class licence:

Class licences would be available to appropriately skilled and experienced individuals and may permit low, medium or high risk activities. Individuals applying for the licence have to register and provide evidence (including references) of their skills and experience. For beavers, activities that may be permitted under a Class licence include: capture, use of cage traps, transport, ringing and marking, and destruction of beaver structures. Licences are normally issued for at least one year, and licensees are required to make an annual report to Natural England of actions taken under their licence.

Organisational licence:

An Organisational licence would be available to individual organisations that need to carry out relatively low risk actions. For beavers, it is likely that Organisational licences would be granted to bodies such as the Environment Agency, Highways Authority or Drainage Board in order to allow them to undertake activities such as dam removal or notching, or the installation of flow devices. An Organisational licence will permit a range of activities and it is the responsibility of the organisation to ensure that people acting under the licence on their behalf are suitably qualified and trained. As for Class licences, Organisational licences are normally issued for at least one year and an annual report of action taken is required.

Project licence:

This type of licence is available for specific projects. The licence may permit a range of activities for a variety of purposes. For beavers, project licences are likely to be issued for monitoring and research. The licence would allow individuals and/or organisations and their skilled individuals working on the project to undertake specified activities; it may also reflect the different phases of the project.

Integration with other legislative frameworks

Processes to address the interaction between permitting and licensing regimes required by legislation other than that described above for species will be needed. Circumstances where more than one permission may be required for an activity will need to be identified, together with the regulatory process required to address this.

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