

BACE Meeting 2018 – Minutes

Delegates

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Kevin Austin	The Environment Agency
Mhari Barnes	National Farmers Union
Cath Bashforth	The Forestry Commission
Richard Brazier	University of Exeter
Henri Brocklebank	Sussex Wildlife Trust
Ellie Brodie	The Wildlife Trusts
Peter Burgess	Devon Wildlife Trust
Charlie Burrell	Knepp Castle Estate
Peter Cooper	Derek Gow Consultancy
Kevin Cox	RSPB
Tom Dearnley	The Forestry Commission
Alistair Driver	Rewilding Britain
Mark Elliott	Devon Wildlife Trust
Nick Fox	Countryside Alliance
Martin Gaywood (Teleconference only)	Scottish Natural Heritage
Neil Gibson	Dorset Wildlife Trust
Derek Gow	Derek Gow Consultancy
Penny Green	Knepp Castle Estate
John Gurnell	Queen Mary University of London
Paul Haddaway	Kent Wildlife Trust
Matt Heydon	Natural England
Rachael Hill	The Environment Agency
Jo Hodgkins	National Trust
Emma Hutchins	Wildfowl & Wetlands Trust
Chris Jones	Woodland Valley Farm
Tor Lawrence	Sussex Wildlife Trust
Alicia Leow-Dyke	Wildlife Trusts Wales
Mark Lloyd	The Angling Trust
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Ann Maidment	Country Landowners Association
Cheryl Marriott	Cornwall Wildlife Trust
Rob Needham	University of Southampton
Andrew Pollard	Dorset Wildlife Trust
Christopher Price	Country Landowners Association
Archie Ruggles-Brise	Spains Hall Estate
Chloe Sadler	Kent Wildlife Trust

Jane Sears	RSPB
Tom Shelley	Cornwall Wildlife Trust
Julian Smith	Balcombe House
Fran Southgate	Sussex Wildlife Trust
Jonathan Spencer	The Forestry Commission
Ginny Swaile	Natural England
Mike Swan	Game & Wildlife Conservation Trust
Mike Townsend	Woodland Trust
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Martin Varley	Cheshire Wildlife Trust
Ian Waller	National Farmers Union
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Rebecca Wilson	The Forestry Commission

Session 1

Presentation 1 – Beavers in England: Matt Heydon (*Natural England*), Kevin Austin (*Environment Agency*), and Ginny Swaile (*Natural England*)

The purpose of this talk was to go over the current distribution, legal status and reintroduction policy of beaver populations in England, and to outline the options for the future in terms of both the Environment Agency's potential role and what is required to develop an effective national strategy.

Over 27 beaver records are known to currently exist in England and Wales, comprising of licensed free-living (1), unlicensed escaped/illegally-released free-living (12), licensed enclosures (3) and unlicensed enclosures (11), in addition to 13 fenced and free-living projects in development, although not all of the latter are guaranteed to take place. Notably, most unlicensed free-living records are in closed proximity to enclosed beavers.

Internationally, beavers are protected under Appendix III of the Bern Convention and Annex IV of the Habitats Directive. The latter affords strict protection, whereas the Bern Convention keeps the species protected from unnecessary control or exploitation. In England, there is no protective legislation from killing, taking, and disturbance or for breeding/resting places, but the species does fall under general welfare provisions as set by the Animal Welfare Act. Possession and transport of beavers from the wild and release into the wild are unlawful, and require licenses.

Shooting is allowed to control beavers, but is strongly advised to follow best practice guidelines. Netting and live trapping is also permitted but required to be compliant with the Agreement on International Humane Trapping Standards. Destruction of lodges, burrows and dams is also permitted and there is no closed season, but

general welfare provisions still apply. Where beavers are having a significant negative impact, be it on biodiversity, environmental, economic or social interests, 'species control agreements' or 'species control orders' can be applied as set out in Schedule 9 of the Wildlife & Countryside Act. Section 98 of the Prevention of Damage by Pests Act can also be used to compel necessitate control by landowners where beavers are having damaging impacts on land uses such as forestry or farming.

All beaver release projects require a license, and in 2017 this was extended to cover releases into fenced enclosures. This was due to the frequency of escapes and the subsequent inadequacy of the response, and the rationale of fenced projects seeking to create novel environmental impacts. Releases into enclosures are permitted so long as it is secure, no adverse impacts on other environmental ecology or land uses are predicted, a management plan for individual animals is prepared that covers recruitment, welfare and territoriality (previous escapes were often the result of animals pushed out because of this aspect), and an exit strategy is in place.

Releases into the wider countryside are permitted as part of a trial to investigate wider issues into having the beaver reinstated in England. Applications would have to contribute to understanding of beavers in England, be time limited, and have both a plan for what happens to the animals at the trial's conclusion and an exit strategy. All license applications would be considered on a case-by-case basis. Any free-release applications submitted before Natural England's decision on beavers in England at the conclusion of the River Otter Beaver Trial in 2020 would need to provide significant evidence that the proposed catchment was contained.

The key considerations for source populations of release animals would be genetic suitability for replacing the British beaver population, genetic diversity, and disease. The key concern in the latter category is *Echinococcus multilocularis* (EM), a parasite absent from the UK that can be carried by beavers and is potentially fatal to humans. It has been detected in 2 beavers that have been imported to the UK from Europe that were subsequently destroyed (2010 and 2017). The sample detected in the 2010 animal was only discovered 4 years after import. Enclosures are not fox-proof (a key host) or secure against escape, and multiple tests can only give ~90% detection rate. The 2012 voluntary code encouraging safe sources has proven ineffective. In the future, Natural England expects either wild or captive-bred source animals to come from EM-free countries (the UK, Ireland, Finland, Malta) or Norway.

In regards to taking a strategic forward approach to beavers in England, Natural England sees that beavers should be established in the right places to fully realise their ecological potential. As they will not be welcomed everywhere, careful thinking is required as to where there would be a beneficial impact and where conflict would be likely to occur. Steering future project locations towards the former would be beneficial to both the animals from a welfare point of view (avoiding the informal culling seen in Tayside) and for the proponents to know where the most successful sites would be. A lack of strategic approach would reduce clarity for those wishing to undertake releases, with little framework for evidence gaps or situations that require

testing. This would likely result in proposals that would not add to the evidence base or prove unsuccessful. The number of illegal releases and the subsequent conflict would also be more likely in the absence of a strategy.

The key aims of a strategy will be to prepare and inform future policy decisions based on sound evidence. It would also set beaver reintroductions within a wider context of building more resilient landscapes, as set out in the 25 year environment plan, with the species potentially acting as a flagship project within a range of ecosystem restoration methods. By collating existing evidence and data, a strategy would identify likely conflicts and test solutions.

None of this would be undertaken by Natural England on their own. It would include regulatory authorities (inc EA, Forestry Commission, Animal and Plant Health Agency, Defra), NGOs, practitioners, academics, landowners, user groups and the general public. NE, FC, EA and Defra meet every couple of years to discuss beavers, and very recently met with colleagues from Scottish Natural Heritage and Natural Resources Wales at Tayside to see and learn from the former's experience. Key to beaver reintroduction is landowner buy-in and cooperation, and many more have been coming forward willing to take part in such projects. The Tayside experience however demonstrates however it isn't always the case, and developing management techniques to mitigate and avert conflict is crucial.

A large degree of necessary evidence on the impact of beavers is already known. This includes their ecology, behaviour and impact on natural systems as learned from Europe, Scotland and the River Otter Beaver Trial, potential conflicts and some management techniques, and modelling what impact beavers are likely to have on an area.

One of the key priorities for on-going and future research are beaver impacts on freshwater and migratory fish, as well as people utilising fish as a resource. Many rivers very different in their structure to how they were when beavers and fish previously co-habited, and many species (especially salmonids) are under many other external pressures. Modified water bodies may also create unwanted problems once put under further changes from beavers, and conflict management will be an on-going learning process. However there is also plenty of scope in further studying the role beavers can contribute towards natural capital and ecosystem services.

The key decision timeline is set to begin at the conclusion of the River Otter Beaver Trial in 2020 with the associated report and recommendations. In the same year, Natural England will review the evidence with input from other evidence such as the Scottish experience, BACE and smaller beaver trials in England, and advice from statutory bodies on subjects such as biodiversity, flooding and agriculture. At an undetermined point this would result in a recommendation from NE. If that was to approve beavers in England, this would result in a reintroduction strategy, management strategy and protected status, designed in coercion with a public and

stakeholder consultation. A ministerial decision would have the final say as to whether this could go ahead.

The Environment Agency will support beaver reintroduction, provided that it is in the context of working with natural processes and the 25-year environmental plan, releases are fully assessed for benefits and risks with full local consultation and continued research, coherent legislation and strategy is developed, and consideration is given for reward of public good.

The EA would play a part by raising awareness and training staff, working closely with the relevant Defra group, identifying strategic opportunities to maximise ecosystem services, engage with partners and support research, and would act as a consultee and regulator for proposals, for example by examining whether raises concerns were justified.

Presentation 2 – The Return of an Ecosystem Engineer, the Beaver, to Scotland: Martin Gaywood (via teleconference, *Scottish Natural Heritage*) and Karen Taylor (absent, *Scottish Natural Heritage*).

The last records of beavers in Scotland originate from the 16th century. In 1992 the species was added to the EC (European Commission) Habitats Directive, with SNH first assessments of feasibility/desirability of reintroduction in 1995. The trial approach was proposed and Knapdale selected in 2000, and beavers were added to the ‘Species Action Framework’ in 2007. 2009 saw the commencement of the Scottish Beaver Trial and the Beaver-Salmonid Working Group established, followed by the Tayside Beaver Study Group in 2012. In 2015, SNH published the ‘Beavers in Scotland’ report.

Since 2015 SNH have remained active on the subject of beavers. There have been several key commission projects and other research, ongoing work by the Beaver-Salmonid Working Group. A literature database of 2,500+ reports has been collated including work from European and American colleagues, while support is provided for several PhDs and RZSS-lead studies.

Support of two field-based projects is ongoing, the official Scottish Beaver Trial at Knapdale, and the Tayside Beaver Study Group – an unofficial trial as not a release site, but an opportunity to learn about living alongside beavers.

The Beavers in Scotland Report 2015 was requested by the Scottish government and designed to support Scottish ministers on decision making for the future of beavers in Scotland. Additionally, beavers were included in the Species Action Framework Handbook 2016, and a paper in Mammal Review ‘Reintroducing the Eurasian beaver to Scotland’ was published in 2018. The interactions of beavers with the natural and human environment, legal issues, management and future scenarios were all covered in the 2015 report.

Beaver interactions in the natural environment are of an overall positive influence by creating new habitats and increasing habitat diversity at catchment scale, however potential adverse interactions could occur with Atlantic hazel woodland, areas where deer are abundant, aspen woodland and migratory salmonids. A total of 106,000 ha of woodland is available in mainland Scotland as potential core beaver habitat.

A management decision was made in November 2016 by Roseanna Cunningham MSP (Cabinet Secretary for Environment) that existing beaver populations can remain in Argyll and Tayside, are allowed to expand their range naturally, and will receive legal protection. However, populations should be actively managed where conflicts with other land uses occur, and it remains an offence to release beavers without a license. A decision was also made to prohibit other releases.

In regards to SNH's current position, a Strategic Environmental Assessment consultation and Health Risk Assessment is now complete. A Scottish Statutory Instrument is to be laid which would add beavers to Schedule 2 of 1994 Regulations for European Protected Species. A management framework is being developed with support from Scottish Beaver Forum, and is now almost complete. On-going evidence of range expansion is being collated, with the Tayside Area report published this year. Reinforcement of the population at Knapdale is also on going.

The framework has been designed to bring together a vision that will allow beavers to expand their range naturally, realise the ecological benefits they can bring, and accepting at times that they are managed to minimise impacts. Its five key elements are management guidance & policy, management action, monitoring and research, the benefits of beavers, and communication plan.

The Management Guidance and Policy was developed in consultation with Scottish Beaver Forum since early 2017 to include EPS licensing guidance (which activities require a license, how to apply, etc.), lethal control policy (accredited controller training), ecological and legal definitions (which beaver-built structures will be protected), translocation guidance (when and why translocation is acceptable), conservation status implications and FAQs.

Several different initiatives on management are in the pipeline. The provision of specialist advice on beaver ecology, impacts and management is available with the potential for a management manual in the future. It is planned to develop and implement a Scottish beaver mitigation scheme to support land managers and trial and demonstrate how impacts can be managed. A technical group is to be established that can develop and trial new mitigation techniques, and novel technology can be trialled to help track beaver activity and deduce rapidly when intervention is needed.

However, the general consensus is that when negative aspects are resolved, SNH will be able to concentrate on positive inputs such as natural flood management,

landscape scale restoration, riparian woodland enhancement and socio-cultural opportunities.

Research, surveys and monitoring that has been conducted since 2015 includes the Tay Survey 2017-18, continuing surveys at Knapdale to inform reinforcement and Natura qualifying interests, a predictive tool for dam presence with the University of Exeter, a PhD on beaver-deer interactions with the University of Stirling and James Hutton Institute, beaver-salmonid interactions PhD with the University of Southampton, GWCT and Salmon & Trout Association, and testing Geophysics methods with the University of Leeds to map beaver burrows.

For the immediate future, there should be focus on statutory requirements to develop management tools. Testing techniques (e.g. gates), and modelling for Natural Flood Management (NFM) Social-ecological factors should be included.

Session 1 Questions:

Leigh Lock (RSPB) asked: *It's likely there won't be a government decision on beavers in England till at least 2022. What would happen in the meantime to the different ideas and proposals?*

Ginny Swaile (NE): Take a strategic approach now so discussion is as empowered as can be. Need to make the decisions where the public will support it. There is a need to map the best places for beavers are now and move away from low-lying farmland areas similar to Tayside. A strategy should be for the present day.

Matt Heydon (NE): Suitable areas for beavers that are in contained catchments need to be identified before decisions are made on their future in England. The idea of them in farmland has created a lot of fear and hit-back. Are we able to get a picture of where the best places for beavers are? For example, not East Anglia.

Chris Jones (Woodland Valley Farm) asked: *Operating beaver projects currently appears to be a voluntary exercise. At what point will government agencies join in, set the agenda and run it?*

MH: It shouldn't be thought that Natural England aren't involved. The Forestry Commission already are, and NE are doing a lot of work currently on the species. However, English society as a whole hasn't made a decision on beavers and it has to be measured at this stage. Therefore NE are contributing and strategizing in the background, in order to ensure that we are at the same stage Scotland are now before beavers become widespread. It needs to be got right first with the public so more education is needed.

Kevin Austin (EA): Government agencies have to represent government. Therefore, is not advantageous to proponents for agencies to be seen representing one side.

There is already a degree of suspicion of statutory bodies in some. Therefore NGOs and individuals should demonstrate beaver projects and show support.

Archie Ruggles-Brise (Spains Hall Estate) asked: *How does the beaver timescale feed into new environmental land management schemes?*

GS: Ministerial decisions can't be pre-judged, but it is being considered. The current scheme is looking at how it would work. But it would require a ministerial decision before they could be integrated.

Peter Burgess (Devon Wildlife Trust): Payment from having beaver wetlands on land is crucial. DWT has put together a model based on this which needs more work.

Richard Brazier (University of Exeter): NFM funds are being drawn upon for Cumbrian feasibility study. But bare in mind funding isn't enough to give evidence that can stop the polarizing of opinions. There is a lack of coherent leadership. Government funding is needed.

Alistair Driver (Rewilding Britain) asked: *The Forestry Commission have took the lead on the Forest of Dean project. Where the right kind of flood management was appropriate, would the EA potentially be a lead partner on a beaver project?*

KA: No plans at the moment. But the EA wouldn't rule it out if it was the right opportunity.

Julian Smith (Balcombe House) asked: *In regards to the policy on protection, would it not be easier to persuade landowners if they were allowed to cull problem animals?*

MH: Statutory protection has a bad name – for example, crows are technically statutory protected. This means therefore you can set parameters. People tend to fixate on culling but in the vast majority of situations you can manage through mitigation. If the beavers in the River Otter turned up outside the designated trial catchment, farmers are able to manage them. These kind of issues need to be resolved prior to legal protection being granted.

Session 2

Presentation 3 - Quantifying environmental impacts of beaver and modelling impacts across intensively managed landscapes: Richard Brazier (University of Exeter), Alan Puttock (absent, University of Exeter), Hugh Graham (absent, University of Exeter) and Roger Auster (absent, University of Exeter).

There is increasing need nationally for nature-based solutions to flooding, which beavers could play a key role in. A nationwide online survey in 2017 found of a total 2,759 respondents that most occupations were largely supportive of beaver reintroduction, but the 'Fisheries & Agriculture/Farming & Agriculture' sectors were

more divided. This was also reflected in respondents who found out about the survey through farming or fishing organisations. Moving forwards, decisions will need to minimise the risk of further polarising views and escalating potential conflicts. Addressing potential conflicts now will reduce escalating them in the future.

Much of the University's research output on beavers comes from the Devon Wildlife Trust Enclosed Beaver Project site. A first order tributary draining from 20ha of intensively managed grassland, 2 beavers were introduced in 2011 and have since created 13 dams and ponds along a length of 180m of watercourse. They have altered the physical structure and water holding capacity, from 50m² in 2011 to 1,000m² since their introduction.

Beaver dams and ponds at the site have been shown to moderate channel response to rainfall following storm events (from 70+ rainfall-runoff events). A reduction of 30% total storm event flow and peak flow has been recorded below the beaver site, while lag times of peak rainfall to peak flow are much shorter above the dams than below (29%), with water taking an average of an hour to flow through the site. The base flow has also been enhanced at the driest times of the year.

The site acts as a filter for diffuse pollution from agriculture. However, there is more organic matter in the site, resulting in a greater loss of dissolved organic carbon than intensive grasslands – 7 tonnes of soil have been lost from 20 acres in 10 years. On average, each litre of water leaving the beaver site contained 3x less sediment, 0.7x less nitrogen, 5x less phosphate and 2x more dissolved carbon. The beaver ponds appear to be trapping and holding more sediment, nitrates and phosphates. 13 ponds held >100t sediment, 15t carbon and almost 1t nitrogen. Size is the greatest control over storage, position may help too. More than 70% sediment from upstream catchment was held, and beaver ponds could potentially hold >50% more not accounting for continued modification. Beaver dams could therefore play an important role in mitigating soil erosion and diffuse pollution.

Beavers continue to enhance the site for other wildlife. 26 species of water beetle were found in 2015 compared with 8 in 2011, and frogspawn clumps have increased from 10 in 2011 to 681 in 2017.

Other studies from Scotland and Europe show beavers having a significant effect on catchment hydrology with similar results to the Devon study. In particular, paleo-evidence shows beavers had a large influence over catchments in the pre-agricultural period. Over time, beaver wetlands can restore multiple stream incisions within a single-channel catchment, and research from Scotland demonstrates the capability of beavers to recreate primeval wetland landscapes.

Research is providing much insight of beavers wider environmental impacts, however we need more understanding of landscape-scale effects to better inform local management and national policy, and we need to understand the impacts beavers will have, where they will be and the potential risks and benefits. As the

largest impacts have been shown so far to be on habitat and hydrology, this has been the focus of their modelling.

The Beaver Vegetation Index Model has been developed to create a continuous description of beaver habitat. Comprised of 4 nationally available datasets (OS VectorMap Local, CEH linear Woody Features Framework, Copernicus Tree Cover Density, CEH Land Cover Map 2015), each data set is classified on an increasing positivity scale of 0-5 in terms of suitable beaver habitat.

The Beaver Dam Capacity Model collects and combines all relevant vegetation data via the BVI model and also includes slope, stream power, stream width and contributing hydrological area as inputs. This model has been tested and validated in the field. 82% of dams were built in reaches with capacity for >5 dams/km. 75% of dammed reaches were in reaches with capacity for >5 dams/km. No dams occurred in reaches with no capacity, and electivity index scores showed a preference for building dams in higher capacity reaches.

In conclusion, research into beaver reintroductions is showing multiple environmental benefits. Beaver habitat suitability can be modelled at large catchment sizes and therefore has a national application. It can be modelled at the same scales to very high resolutions, predicting where water quality and quantity benefits may accrue. Conflicts or opportunities arising from beaver dams could then also be modelled to aid management of water and land at field/farm/catchment scales, and decision-making at local or national policy scales. More monitoring at different land uses and scales is still needed, however.

Presentation 4 - The response of a brown trout population to Eurasian beaver habitat modifications in Northern Scotland: Rob Needham (*University of Southampton*), Martin Gaywood (*Scottish Natural Heritage*, absent) and Paul Kemp (*University of Southampton*, absent).

Rob's PhD sought to quantify the impact of beaver dams on fish migration from a UK perspective and work out if such barriers are permanent or seasonal/temporal, quantify the response of trout populations to beaver modified habitats, investigate potential increases in predators such as herons around beaver dams, and to gain a conceptual idea of what influences dam building and how it relates to land use and habitat type based on European data.

There are a number of potential positive impacts from beaver dams on fish, including enhanced habitat and productivity, habitat provision under low flows, enhanced water quality and refugia from predators, temperature and high flows. However, negative effects may constitute barriers to movement, reduced O₂ and habitat quality, reduced spawning habitat and altered flow regimes.

The possibility for dams to act as barriers to fish migration has been a particularly large concern. They hold the potential to impede both up and downstream migration, but there is uncertainty as to whether they are temporary or permanent barriers. Many studies have shown salmonids can navigate beaver dams when the

ideal water conditions are present seasonally – in early September a dam may prove difficult to navigate, but as parts are washed away by November it becomes navigable again.

It has been demonstrated that once beaver ponds are created, these can replace the original riffle habitat and subsequently favour lentic species of fish over the original lotic. This can be seen in aquatic invertebrates as well as fish.

Rob's study site is based within Inverness-shire and discharges directly into the Beaully Firth. The loch contains naturally occurring populations of brown trout, European eel and three-spined stickleback. The site's beaver activity consists of 5 dams and the subsequent creation of 5 pools, an increase in surface area and volume of water, and a new side channel around some of the dams. The side channel, created by natural overflow, allowed trout to pass dam 3 and subsequently allowed the highest passage success rate of all the dams, highlighting the importance of these channels for fish movement.

A combination of different tag types and dimensions were used in the study to accommodate for the varying lengths of fish sampled, ranging from Visible Implant Elastometers for the smallest trout (55-65mm) to Passive Integrated Transponders (PIT) for larger trout and eels. A total of 2,172 trout were caught of which 921 were PIT tagged.

While it initially appeared that trout abundance was higher in the control sections than the beaver modified ones across all 3 seasons (spring, summer, autumn) ($p < 0.492$), when the exceptionally large numbers of fry (<30 mm) and parr (<60 mm) in the control (particularly during the summer) were omitted from the analysis, trout abundance was significantly higher in the beaver modified habitat ($p < 0.001$). Trout density was only significant in regard to total numbers ($p < 0.006$), with little difference when fry and parr were omitted ($p < 0.747$).

Tail fork length was significantly larger in beaver habitats ($p < 0.001$), and while trout <50 mm and >251 mm in total body length were more common in the control habitats, all other length classes occurred more frequently in beaver habitats in all seasons and years. When accounting for individual seasons, occupation of beaver habitats was more frequent in beaver habitats in sizes >51 mm in Spring and Summer, and were particularly large in all classes between 51-250mm in Autumn.

PIT loop structures were positioned above and below beaver dams to record fish passage over the dams. Of the 4 dams observed, 1 and 3 had the more successful passage rates as they had side channels. While some results showed motivated directional movement, others showed very little movement, which highlights not all fish, detected may have necessarily been attempting to pass dams. Passage success may therefore be greater than reported or initially thought.

Focusing on passes at dam 2, it took significantly longer for trout tagged above the dam ($n = 8$) to pass than it did for those tagged in the Loch ($n = 14$). This suggests fish

tagged in the latter were more motivated to pass the dam than those tagged between dam 2 and 1. A greater fork length was found to improve the success of dam passage both up and downstream.

In Autumn 2016, 30 upstream passage events involving 14 individuals have occurred, an extremely low number when compared to the previous year. Following analysis, it's been suggested only 4 of these were genuine individual fish passage events. Due to the movement patterns recorded, 10 of them seem to be due to predation – a pair of otters was present on site during this season, mostly on the control site but with some evidence on the beaver ponds. Weather conditions were also far worse, with extremely low rainfall and temperatures often below freezing.

An initial summary can be made that trout appear to be more abundant in beaver modified habitats, where they are also larger and live in an environment supporting a wider variety of size ranges. Given the right environmental conditions (rainfall/discharge), trout can pass beaver dams with motivation appearing to play a crucial role in success. Although they may impact upstream migration, further work is needed to establish the extent of impact and consequences on fish movement from beaver reintroductions in the UK.

Presentation 5 – Lessons from the River Otter Beaver Trial (ROBT): Mark Elliott (Devon Wildlife Trust)

The ROBT is the first licensed trial release of beavers into the wild in England, running from 2015-2020 and covering the entire Otter catchment. There is a management strategy for the length of the trial to cover any potential conflicts, and Defra will have a say on what happens next at the trial's conclusion.

The trial began as a result of animals already living wild on the River Otter as a result of escapes or illegal releases. APHA estimated there were approximately 9 beavers in 2 family groups living on the river in 2015. Since then, field observations from ROBT staff indicate 3+ kits were born in 2015, followed by 7+ in 2016, 6+ in 2017 and 5+ in 2018. Only one mortality, an RTA in March 2018, has been confirmed, but there are almost certainly others that have gone unreported.

A best estimate is that there may be currently about 30 animals on the river, but this figure will become increasingly inaccurate. In order to have a regular update on territory size and family groups, an annual field sign survey is conducted. The number has gone from an estimated 2 to 8 family groups on the catchment between the 2015 and 2018 surveys, with movement widespread across the catchment and shifting areas of core activity. Initially activity was focused where there was no need to construct dams, but since 2016 more headwaters have been colonised. The movement of beavers has made it hard to manage public interest in the animals and plan tourism, events and business opportunities around them. This is most likely a result of low beaver density, and as territories become more established it will be easier to predict where they are going to be.

Awareness raising and myth busting has been a core part of the trial's work. While people have often attended such events with strong but valid opinions, and often lots of myths - learning and understanding the realities have helped ease concerns – most of which are regarding the impact on trees. 262 walks and talks were carried out in the first three years of the trial, and almost all of these were reactive events where DWT were invited by groups, individuals and organisations wanting to learn more.

Major impacts on trees have been limited, with only 2 landowners coming forward with concerns in 2017/18. Low-level woody feeding signs are widespread in the catchment, but otherwise locals rarely know the beavers are there until DWT tells them. The mobile behaviour of the beavers makes it harder to talk about excluding them from small areas without fencing.

While they can create the greatest benefits, dams can also cause the greatest conflicts. As beavers move into headwaters more dams have been recorded – 81 dams have been built on the catchment at 55 locations across 7 land-holdings, but they are temporary and dynamic structures. Only 26 of them are still in place at the time of the meeting. On the Otter's main tributary, the River Tale, a series of dams has been built since Autumn 2016, and although often quite large they have so far been washed out every winter since.

The beaver dams can be a key agent of habitat restoration, as shown by a particular channel on the catchment that was once deeper and slow flowing, but becoming shallow and meandering, as a result of dams appearing and washing away repeatedly. The dams have the potential to store water and slow the flow downstream, reducing flood risk to certain communities. This may be notable in small urban conurbations where flow has been made flood-prone from engineering. Equally however, there is still the potential for conflict if left unmanaged.

Flood modelling work has been used to explain flood risk and impacts of beaver dams. Modelling on dam capacity and conflict risk has also been undertaken. The Beaver Restoration Assessment Toolkit (BRAT) can model the capacity of water bodies to support beaver dams, and has been adapted and applied to the whole catchment.

Anglers have expressed concern about fish passage and habitat changes. Fish monitoring in the ROBT is on going, and a protocol is being developed for assessing dam passability, and to guide when to intervene to facilitate fish movement in key periods. One watercourse where a high beaver could become an obstacle for fish movement has been given space to develop. A major new wetland has formed behind it as a result, which provides more fish habitat, as this has in turned allowed the formation of side channels that enable passage.

Provided that a robust and funded management strategy is in place, stakeholders involved in the ROBT show clear acceptance that beavers can remain after the 2020 finish date of the trial. The ROBT steering group has set up a working group to draft a

beaver management strategy framework, designed for the River Otter catchment for the period after 2020 *if* the beavers are allowed to remain. The working group comprises over 12 organisations and individuals, including national bodies so that the plan can be adapted and adopted for other catchments elsewhere.

Beaver restoration and management should be considered at a catchment scale, and in three phases as the animals gradually colonise the catchment. A potential model for how this could play out is as follows:

An establishment phase in the first five years sees low-level populations (<15 family groups) moving throughout the catchment. Educational work is intensive, and landowner advisory support occurs at low levels but is very important. In the event of any major impacts, translocation to receptor sites is likely to be successful due to wide availability and new beavers can be introduced to increase genetic variability.

The building phase 6-15 years after the start of establishment sees a rapidly growing population of 15-50 family groups. All suitable parts of the catchment are colonised and beavers begin to move into sub-optimal habitats and building more dams, which improves wetland habitat but creates more conflict potential. Social focus turns to training and capacity building in management among statutory bodies and others involved closely with the species. Significant advisory work is now required when working with landowners to resolve conflicts, and any translocations are likely to result in new beavers colonising the area. Inter-catchment translocation important for managing genetic diversity.

The maintenance phase 15 years+ from the start of the trial results in a beaver population achieving stability and near to reaching carrying capacity at >50 family groups. The population is now healthy, widespread and resilient with conservation status assured. Multiple environmental benefits are being provided and wetlands restored. On-going educational work is required, but communities have greater experience with the species and dealing with conflicts. Management is streamlined to ensure low cost to taxpayer and focused on ensuring high welfare standards.

Before any catchment-scale beaver project can go ahead, core principles need to be established first. Beavers will require active management, and will be approached via a strict hierarchy of increasing impact: education, risk avoidance, mitigation, trapping and relocation, and only in the complete absence of no other suitable alternative, lethal control. Processes associated with beaver advice, management and mitigation must be rapid, efficient and easy to access.

A suite of practical management interventions is already available when there is a risk to key infrastructure from beaver activity. On the ROBT, these include flow devices ('beaver deceivers') through dams to allow reduce extent of flooding, and tree guards or sandy paint to protect individual trees. Wherever possible and practicable, financial support must be available for landowners who provide space for beaver generated wetlands that provide multiple ecosystem services.

Devon Wildlife Trust is now developing a series of policy recommendations. Some of the complex issues being discussed include whether it is feasible to have zero-tolerance and how they could work, and where funding for landowner support and management for each catchment should come from.

Session 2 Questions

Nick Fox (Countryside Alliance) asked: *In the wild beavers would disperse before the effects of dams holding back floodwater can be fully realised. How can these beneficial effects be realised outside of an enclosed situation?*

Richard Brazier: At one of their study sites which is unenclosed, there's even more water being stored than at the fenced sites and the beavers have not dispersed further.

Mark Elliott: The biodiversity increase even in a 1.8ha enclosure is highly significant, and is likely to be replicated over a wider area. The issue with enclosures is territorial behaviour which can cause conflicts with associated welfare implications, and the risk of escape.

Jonathan Spencer (Forestry Commission) asked: *If you have more dams in a channel, does that reduce the likelihood of them being washed away?*

RB: Yes, resilience does increase with more dams. The dams in the Devon Wildlife Trust enclosure site won't be washed out because of this.

Alistair Driver (Rewilding Britain) asked: *Anglers are concerned about beavers changing the way they fish. How do you tackle this?*

ME: There has been a conflict between anglers and beaver watchers on the River Otter. The former were not able to fish in the same pools as they used to due to too many beaver watchers taking up space, but this the only example they've seen.

Kevin Austin (Environment Agency) asked: *Are the conflict models going to be ready by the decision date in 2020?*

RB: Yes.

Session 3

Quick-fire Presentation 1 - Beavers in the Greathough Brook, Forest of Dean, Gloucestershire. A nature based solution?: Rebecca Wilson (*Forestry Commission*)

The Greathough Brook above Lydbrook in the Forest of Dean is part of what was once an industrial landscape that has now being largely reclaimed by nature. However, links to this past still remain, such as the steep-sided canalized culvert system of drainage. This in turn has lead to a high flood risk downstream in Lydbrook, most notably in November 2012 when a major flood event occurred.

A feasibility study was undertaken in 2014 to evaluate the possibility of reducing the flow entering the culvert by holding more water upstream. The culverts in Lydbrook are often narrower than the watercourse and in a poor state of repair, and flow greater than its 3.8m³/s capacity can be generated in 1 in 30, 1 in 50 and 1 in 100 year storm events.

The study found 1 in 100 year flood attenuation was not economically feasible. Woody debris dams were installed upstream to hold back water. Finally, the idea of using beavers as a nature-based solution was considered.

A 2km fence-line was installed over 6.5ha of the Greathough Brook. In 2017, a year prior to the beaver's arrival, baseline monitoring of flow was conducted by the University of Exeter, and of wildlife including birds, bats and amphibians by Ecosulis. Culverts entering the site were beaver-proofed, and beaver-proof fencing to the highest available standard was installed.

A licensed release of two Bavarian-origin beavers into the enclosure took place in July 2018. Both were health-screened to ensure they were disease free and the project team will be in proactive in the management of these animals to ensure they do not exceed the enclosure's carrying capacity.

Constant monitoring is taking place through trail cameras and field sign surveys. 7 dams have been built so far in the space of 3 months, and large trees actively felled. Although an artificial lodge was provided on arrival, the animals ignored this and have dug their own burrows.

Quick-fire Presentation 2 – Cornwall Beaver Project: Chris Jones (*Woodland Valley Farm*) and Cheryl Marriott (*Cornwall Wildlife Trust*).

Chris Jones owns Woodland Valley Farm, a 170 acre mixed farm above Ladock in Cornwall. For some time he has been interested in agro-ecology, and how farmers can alleviate flooding. Ladock has had increasing significant flood events, and when discussing upstream flood management solutions with officials, realised there was

no money for on-going human-induced management. Getting beavers to do it for free therefore seemed a tenable option.

A partnership was formed with Cornwall Wildlife Trust, and baseline monitoring of hydrology and wildlife were set up in 2015 with the University of Exeter. All necessary funding came through in 2017, and a pair of beavers was released into a 2ha enclosure in June of that year.

Construction of the first dams begun within only 2 nights of their arrival, and have since built 7 dams in the space of just over a year. Similar patterns of flow slowing have been observed to the Devon enclosed site, with notable differences to peak flows observed prior to their arrival.

Monitoring of amphibians, dragonflies, birds and small mammals is on-going. As new habitat is being created more species are being recorded at the site, many of which would be unlikely to find a niche here pre-beaver. These include water rail, shelduck, grass snake, green sandpiper, harvest mouse and polecat.

A few key trees have been protected with metal guards, but otherwise beavers have free range of the site. Funding is provided from crowdfunding (£20k) and beaver watching (£6k). For the latter, over 1,000 people have now visited the site, often from different land use interests. One notable quote from a visiting farmer was “I came thinking I couldn’t possibly have beavers on my land, I am leaving thinking I can’t possibly not”.

Quick-fire Presentation 3 – Martin Varley (*Cheshire Wildlife Trust*)

An initial scoping of the River Dane in Cheshire suggested there were over 150 places where beavers could live. Statutory bodies rejected this proposal.

Martin later put forward the case of a 20ha fenland site, where extensive funds were been put in place to remove scrub. Beavers could do this for free, and a visit by Derek Gow suggested that there was a bountiful supply of food for them on the site. However, the area was a SSSI and there was no way of proving the beavers wouldn’t be detrimental to the site’s specific targets.

A third, landscape-scale approach was then taken in co-operation with Shropshire Wildlife Trust’s Meres & Mosses project. A water environment grant has been put in for the scheme.

Earlier experiences highlight difficulties that can be faced when trying to reintroduce to or within areas that contain designated sites. Any future management strategy should therefore consider a framework on how this issue can be resolved.

Quick-fire Presentation 4 – Beavers at Knepp... coming soon?: Fran Southgate (*Sussex Wildlife Trust*)

Sussex Wildlife Trust have been working on natural flood management techniques, most notably building woody dams. Beavers would be a logical next step, and their introduction to the Knepp Estate is now being proposed.

The estate is 250ha in size, so scoping essential locations that would need to be fenced to allow containment has been undertaken. 6 key areas that required fencing have been identified. There is numerous suitable habitat for beavers across the estate, such as the Hammer Pond.

Baseline monitoring has been conducted of flow by the University of Exeter, and of ecology by Ecosulis. This has included comparative bat monitoring this year to 2009, turtle dove tagging/monitoring, dragonflies, herptofauna, snails, aquatic invertebrates and vegetation. There is also interest in seeing how the beavers will interact with free-ranging stock, particularly the Tamworth pigs.

The first key step is to complete and successfully attain a license application. Once confirmed, the next stages would be to develop a communications strategy, management plan and ordering of the appropriate fencing. Seeking external funding sources is also being considered.

Quick-fire Presentation 5 – Beavers at Spains Hall Estate: Archie Ruggles-Brise ***(Spains Hall Estate)***

The management of Spains Hall Estate in Essex oversees Grade 2/3 agricultural land which poses complex choices. There are ditches on site that were previously drained that suggest a former greater capacity to store water.

There is a need for 'slow-the-flow' initiatives to protect local communities in Finchingfield from flooding. The estate has been working in partnership with the Environment Agency, Essex Wildlife Trust and Essex & Suffolk Rivers Trust on a Natural Flood Management project, which has largely involved human-engineered methods such as installing leaky dams, bunds and allowing water back into old meadows. The final step is to release beavers into an enclosed area.

Although movements to bring beavers to Finchingfield only kicked off last year, within that time they have secured a license from Natural England and funding from the Regional Flood and Coastal Committee (RFCC) and Coca Cola. It is hoped that the beavers will be instated by early next year.

Time lapse cameras are planned to show the development of both human and beaver-engineered NFM, with each method taking place on a different tributary. This will both compare the methods, and show which accrues the greatest benefits in comparison. There is a growing wildlife photography business on the estate which the beavers would be undoubtedly beneficial for, and potentially showcase the financial value of these animals for ecotourism.

Session 4: Open Forum to discuss a forward strategy for beavers in England

Chaired by Charlie Burrell (*Knepp Castle Estate*) and Derek Gow (*Derek Gow Consultancy*)

Apologies were sent by Mike Swan (Game & Wildlife Conservation Trust) and Mark Lloyd (The Angling Trust), who had to withdraw their attendance due to external factors outside their control. Each provided a statement on behalf of their respective organisations for their contribution towards the forum. They are as follows:

Mike Swan: The GWCT position on reintroductions has remained the same over the last 25 plus years; namely that we welcome reintroduction where it properly meets the IUCN guidelines. This is crucially important, not least with our own involvement with the likes of grey partridges and black grouse. We are therefore happy to see beavers back in the UK, provided that there is proper public support for them. However, we are very concerned that there must be a simple system in place to allow mitigation and control when problems arise. This we feel is often lightly glossed over by reintroduction enthusiasts. I note recent newspaper headlines along the lines that beavers are only just back and we are already killing them. We hear very little response to this sort of misguided stuff from the pro beaver side, but why? A strong voice of support saying that we need to be able to kill beavers where they cause trouble would surely help bring the afflicted landowners on side with beaver conservation.

As it stands in Scotland, beavers are spreading fast in the Tay catchment, but landowners who have a problem have the right to carry out control as they see fit, at any time of the year. The beaver protagonists wish to curtail this, and talk of protecting lodges, and closed seasons. GWCT is very much of the view that legislation along these lines will force control “underground” to the detriment of beavers. As one Scottish arable farmer put it to me: “Beavers are much more of a threat to me than rabbits, and there is no closed season for them. Soil waterlogging from beaver activity in my drainage ditches threatens my whole 350 acres, but rabbits just eat the margins.”

Lately in various fora, I also seem to be the only voice raising issues around migratory fish. Despite the placatory noises about minor impacts, there is actually very little evidence for this. The oft quoted example of Norway and salmon ignores the fact that the salmon rivers there mostly are steep gradient, where beavers do not build. Here in the UK our salmon and sea trout live in mostly low gradient streams, and there is actually growing evidence of beaver impacts on migration in this sort of environment. In this regard we should also remember that beavers do not choose barren or upland environments if they can avoid them - the “accidental” releases in the rich environment of the Tay are thriving, while the deliberate experiment in much less productive Knapdale area is failing. I might add here that in

my opinion the proposal to top up the Knapdale beavers fails the IUCN guidelines – if the original introduction is not working, we need to work out why before adding more beavers.

And so to the several items on the agenda which presumably propose further reintroductions – Gloucestershire, Cornwall, Sussex, Cheshire, Essex. At the last proper statement on this, government said there would be no further licensed releases until the River Otter trial was complete in March 2020. Why is everyone in such a hurry to let more go? It seems to me and my colleagues at GWCT that beavers are here to stay anyway, and nothing stands in the way of them recolonising the whole country, so rushing to release them in new sites before we properly understand the outcome of the river otter trial is a mistake.

Mark Lloyd: Whilst we recognise that there are potential benefits from greater large woody debris, cooler water, sediment capture and habitat heterogeneity from beavers' activities, there are a number of serious concerns about the reintroduction of beavers which has happened as a result of unlawful releases of captive animals.

There are 26,000 man-made obstructions to fish migration on our rivers. We are concerned that beaver dams, in the context of enhanced low flows, might impede fish passage further. At a time when the vast majority of our salmon populations are probably at risk of failing to meet conservation targets, we think that reintroductions are highly risky. Nearly all freshwater fish (apart from bullhead) migrate up and downstream to complete their lifecycle. Salmon and trout are quite good at jumping, but other fish such as barbel and minnows are not. It must be accepted that whilst beavers may have some benefits for fish in some areas, there are serious risks for them in other areas in the context of a heavily-modified and degraded water environment.

Beaver dams could smother fish spawning areas with woody debris and/or sediment. Our rivers are not in a natural state and suffer from substantial excess sediment loading. Accumulations of sediment (often containing substantial concentrations of other pollutants) behind dams could build up, creating risks for the future.

Beaver dams could interfere with the fishing rights of our member clubs and fisheries, potentially causing river diversions, loss of riparian habitat with ecological and amenity value and other impacts on property.

Felled trees could add maintenance costs for the Environment Agency and fishery owners.

Given all of the above, anglers and landowners must have the right to manage beaver dams and to remove and lethally control (under licence) beavers. This right needs to be supported publicly by the supporters of beaver reintroduction to avoid landowners and anglers being publicly demonised for taking action to protect their property.

* * *

Chris Jones (Woodland Valley Farm): There has been a great deal of funding put into natural flood management. Could a certain proportion – say 10% - be allocated directly for beavers?

Rachael Hill (Environment Agency): The EA position will be released on this very soon, there is a shift in thinking towards NFM and they are engaging significantly with relevant stakeholders such as the Association of Drainage Authorities (ADA) and NFU. £30 million has so far been directed towards NFM, but what needs to change is how this money is allocated. The cost/benefits to nature are difficult to quantify, but the EA are looking into it. Local communities vulnerable to flooding can obtain NFM funding through a local levy, which can include beavers. This government money is allocated on a six-year basis, and discussions are happening. NFM/beavers is looked at in equal weight to artificial engineering.

Richard Brazier (University of Exeter): Templates for successful funding bids should be shared, such as the application for Spains Hall Estate.

Archie Ruggles-Brise (Spains Hall Estate): Such projects are reliant on individuals sticking their necks out. Can be difficult as bids are often more geared towards hard engineering, but land management funding is changing. A movement of acceptance is needed to make funding access for beavers easier, but things are moving quickly.

RH: Money is scarce and many communities requiring NFM are not getting the core funds they need. It's about getting the best value public money.

Jonathan Spencer (Forestry Commission): The question is how much money be coming from in a few years time.

Kevin Austin (Environment Agency): Money from the Agriculture Bill directed towards payment for public goods circa £3 billion, but more likely to be £1 billion.

Christopher Price (CLA): Would need to be proposed with a cost-benefit analysis and a firm grasp of what needs to be achieved.

Tony Whitbread (Sussex Wildlife Trust): What nature of evidence is required? You don't just need to prove cost-benefit. Need to get above a certain bar and water companies will react to evidence in upper catchment.

JS: Reduce money and cost-benefits will start showing. A lot of money goes into consultation and fencing, not beavers. Wider benefits measured will help economists and lead to simpler experiences in contained catchments, e.g. River

Otter with no fencing and free-living animals. Engage with environmental economists, and beaver catchment officers can help.

ARB: There's a difference between capital (fencing) and revenue (maintenance/monitoring). Funding for the latter is therefore difficult with what is required for NFM. Worry about how to manage afterwards, but a step change is needed for that financially otherwise you're driven down a high revenue route.

Derek Gow: Single farm payment could provide this. In Bavaria two staff (North and South) costs 1 million euro a year. There's a good case for doing this.

KA: At the moment farmers are paid for the loss of land from farming system in the environmental payments schemes. This justifies the environment as 'bad'. When subsidies move to pay for environmental goods, the 'good' of the environment needs to be exemplified.

Peter Burgess (Devon Wildlife Trust): Landowners currently wish to get water off their land as quickly as possible. Benefits of keeping some back need to be communicated.

Rebecca Wilson (Forestry Commission): Look at areas where most benefits from beavers will be gained. Landscape-scale payment pilots could even be trialled in areas where they might not be accepted, such as arable land.

DG: Good example of this can, again, be taken from Bavaria. Beavers can purify agricultural land, taking out sediments and particulates and returning life. But this needs courage to address landowner conflicts, as these animals will go into areas where they are not wanted.

Leigh Lock (RSPB): Looking at maps of beavers, leakage is obvious. Are we confident fenced areas are completely enclosed? What are the risks of escapees? The risks of places where escapees especially wouldn't be wanted need to be taken into account.

Matt Heydon (Natural England): Since licensing of beaver projects was instated, decent fencing and its on-going maintenance is required, as is a plan/will to catch beavers if there is an escape and a holding facility for them. There's always a risk of fence breach, but they want people to be responsible so these are incentives to stick to the license. There could be enclosures anywhere within reason, but they'll be decided on a case-by-case basis. An enclosure would be unlikely to be sanctioned in the Fens, for example.

DG: We have learnt a lot about fencing requirements and what does and doesn't work.

LL: The step change therefore is to decide where to have unfenced beavers.

PB: We need to guard against a proliferation of enclosures over free-release, and be honest and have a justified rationale about why we are putting beavers in fenced areas. They are difficult to maintain.

DG: Enclosures can be used to supply captive-bred animals that can be free-released.

Mhari Barnes (NFU): How many beavers have escaped and been recaptured from enclosures?

MH: None have escaped from licensed enclosures except Ham Fen, and Kent Wildlife Trust try hard to recapture. Things have moved on. People are now obliged by license to inform of escapes and be able to recapture.

PB: We need to learn to live with beavers, and fenced enclosures don't do this. People win and lose, how do we balance the economics? Need to tackle the big management issues.

MB: Plans must be catchment specific, as they differ regionally. For instance in the Fens it would be disastrous and burden for the EA to maintain.

Kevin Cox (RSPB): Fens are man-made landscapes, and have suffered from a loss of soil from intensive farming. We need to look at a change of psychology.

MB: Farmers happy to accommodate this, but there needs to be understood as a business model with potential loss of money. There must be a financial incentive to beavers.

KC: Agreed, people downstream also suffer so economics must even out. There is an issue of over-tidiness of the countryside, and a shift in the psychology of land management is needed - more Knepps, more joined-up landscapes. Some reward based methods needed, but some of it is just about learning to live with the animals. Social science is important.

DG: Social science at the beginning is critical. In Bavaria the animal became increasingly more common with little trouble until they started appearing in parks – then the negative reactions started.

Nick Fox (Countryside Alliance): A more robust approach to wildlife management is needed culturally, such as that seen in New Zealand. Issues like beavers is more often a social problem that can create polarisation into binary 'camps' such as what is currently seen with badgers and the Bovine Tb issue. Support often comes in large swathes from people who don't have to deal with impacts – farmers and anglers do. Beavers are relatively easy to manage, but there aren't enough people in Britain used to doing it. Involve children and bring together community responsibility for beaver management – you don't need big funds for it, just organisation.

Alicia Leow-Dyke (Wildlife Trusts Wales): The Netherlands is also flat and full of bunds, so learn from others and apply to flatter areas in England.

DG: Who is responsible for beaver management? Suggest Deer Initiative as model. Or statutory agencies? Would be difficult to operate with Freedom of Information.

CP: Support Deer Initiative idea. They are the closest thing we currently have to an operational model and they have expanded remit to boar already, and would work better than Wildlife Trust or government agency. These would be unlikely to be trusted by many farmers. It would also likely be too labour intensive for Natural England. Doesn't think the Bavarian model would work, as they have a different system of low-level government.

Cheryl Marriott (Cornwall Wildlife Trust): Not enough credit is given to the positive relationships of local Wildlife Trusts with farmers.

CP: Understood, but feels that for many farmers Wildlife Trusts can come with too much external 'baggage'.

CM: The marine strandings network is a good example where people are engaged and willing to respond to incidents. Another is badger vaccination programme. Citizens should be involved.

PB: Need to think about the purpose of BACE. Engage with animal rights movement and groups at other end, as things will become even more difficult when they clash with shooting groups. We are currently at a central position, so apply the River Otter model nationally - if it isn't broken don't fix it. Field Officers plus steering group with various stakeholders should be involved.

Ginny Swaile (Natural England): Do we need a new entity for beaver management? NE has framework and models for protected species workers. Can we have more class licenses for management? We need more Roisin's (Roisin Campbell-Palmer, Scottish Beaver Trial). There are lots of models out there and Deer Initiative feels more end of line. Mitigation required first.

PB: Currently not enough beaver activity to provide management advice workers on a wide scale. At stage where a lot of effort establishing them needed first.

KA: Advice needs to be consolidated and shared within communities. Local projects can give more direct advice. If there was one sudden big spread of beavers there should be one source of information – ideally an NGO.

Emma Hutchins (Wildfowl & Wetlands Trust): Expect projects need to be self-contained and have enough resources behind them. Moving forward there could be a license for beavers like there are with bats. Consideration needed that at this point people won't have to expect to pay for advice. In beaver problem areas, enclosures only likely to get licensed, but you need to have them free-living here to overcome

gaps in knowledge in agriculture and fish issues – we need to see beavers in situ, can this happen before 2020?

GS: Timescale wise, 2020 is just over a year away – that’s not much time to learn. Want a rapid reaction after that to inform government. Enough will be known by then. There is a risk to allow a project that could cause bad feeling. With people being the issue rather than beavers, there’s no need to rush when the decision will be made in less than 18 months.

PB: There is a risk of this being used as a opportunity to hold things back.

MH: Fish issue remains a challenge. We need more research on salmonids. Knowledge on management and mitigation is growing, NE are trying to draw as much together as they can – note wild boar where research came too late for British populations. It takes at least two years to set up partnerships and the like, and there will be a decision by then anyway.

Elly Andison (EA): If we’re using 2030 as a full establishment goal, we need a strategy and targets that sits with government now. Beaver initiative/catchment-based approach?

ARB: Similar issues seen in catchment partnerships/natural capital. Danger of being too beaver centric when it can be segued into other issues. Enough organizations already involved, some conversations needed elsewhere. It shouldn’t be treated overtly differently to other wild animals.

DG: Needs to borne in mind that unlike other animals, beavers physically change landscapes.

RB: Their socioeconomic research includes impact on farming, fisheries, tourism and aquaculture as part of the 2020 report, although this is River Otter specific.

NF: How many beavers are there in Britain?

DG: No one knows for certain. Estimated 450 in Tayside – perhaps a total close to 1,000 nationally.

JS: In Sweden beavers increased rapidly, they won’t wait for government decisions. Ultimately their management will become more like deer and boar with officers that deal with management issues. Similar transition between these animals with the Deer Initiative, who give advice and understand issues on all accounts. Run by board of several organisations.

KA: The EA are not currently engaging with animal welfare groups. This needs to happen early on.

DG: Pre-plan mitigation early on so people don’t automatically reach for the gun.

RH: What about evidence gap on burrowing? There doesn't seem to be enough mitigation awareness covering this.

PB: How realistic is it to have zero tolerance areas? There aren't any simple answers without huge engineering or observation work.

DG: They will burrow considerably into flood walls, but the issue is how close they are to the river. In canals in Bavaria, when the walls were moved back 20m the problem was resolved.

RH: The EA spends flood money retaining walls. Beavers should be established where the EA aren't putting funds into such practices.

ARB: Need to look at level of education to councils and the like, especially when surface water level management boards are involved. Presumably this is not going to be a problem for enclosed projects.

Fran Southgate (Sussex Wildlife Trust): Good catchment advisers are already available. They are trying to increase the skills of people in NFM that is happening anyway, at some point this will come together with beavers.

Martin Varley (Cheshire Wildlife Trust): What about designated sites?

GS: Discussion should be framed around individual projects. An internal search found there was little conflict with rewilding on designated sites in principal if there are no concerns.

Mark Elliott (Devon Wildlife Trust): There was a consultation on River Otter trial on public perception, this will be repeated in 2019 – could that be used in a national consultation?

Sarah Webster (Defra): It will depend on what politicians in office by the 2020 decision date want to do.

MH: There needs to be a wider stakeholder response. Only 7% in Britain is designated as SSSI. We need to concentrate on making poor – good rather than good – better. It's where our biggest gain would be.

RW: Agree there isn't a need for many more enclosures, but the Forest of Dean project is inundated with people wanting to visit. There is a feeling fencing standards have been 'making up as they go along' so would be good to have some clearer specifications.

Julian Smith (Balcombe House): Is there a chance of beavers not being protected?

MH: This is not possible, international obligations can't be abandoned. Mustn't be afraid of protection, and it needs to be sensible. Need to avoid a similar path to wild boar.

Charlie Burrell: Discussion should take into account what documents are required. River Otter specific does not cover East England for instance.