



Devon
Wildlife Trust

What role could beavers play in a new future for the Culm?

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Photos by Nick Upton, Roger Auster, Alan Puttock, Sam Moore and David White



Talk overview:

- Brief introduction to beaver biology and ecology
- Overview of beavers in Great Britain, Europe and Devon
- Beavers and natural processes
- Utilising tools to identify opportunities
- A vision for change and support required



Eurasian Beaver

Castor fiber

Although short-sighted it is believed beavers can see colour. They also have a third, clear eyelid, (nictating membrane) which allows them to see underwater.

Vital for finding food, identifying family members and detecting danger, a beaver's sense of smell is it's most important and one of its strongest senses.



Beavers teeth are reinforced with iron which gives them their distinctive orange colour and allows them to gnaw through wood.

An excellent sense of hearing both on land and underwater allows them to identify predators and family. The inner ear is full of dense fluffy hairs which trap air and prevent water from getting in.

Beavers have 2 layers of fur. A short dense underfur which acts as an insulator and an outer layer of longer guard hairs which repel water.

With a lung capacity roughly 3 times that of an adult human beavers can remain underwater for up to 15 minutes at a time.



Beaver fossils and other archaeological remains have been discovered at 104 different sites across Britain.

Up to **1.5 feet (0.5m)**



Large, flat and scaly tail mainly used as a rudder when swimming. Also used to slap the water's surface to deter predators and notify other beavers of danger.



Up to **5 feet (1.5m)**



Hand-like forepaws allow beavers to easily grasp food and materials. But unlike us it is the outer digit of the hand which is opposable (imagine your thumb and pinky swapped places).



Large webbed hind feet (up to 7 inches) which are mainly used to propel beavers through water up to speeds of 5mph.

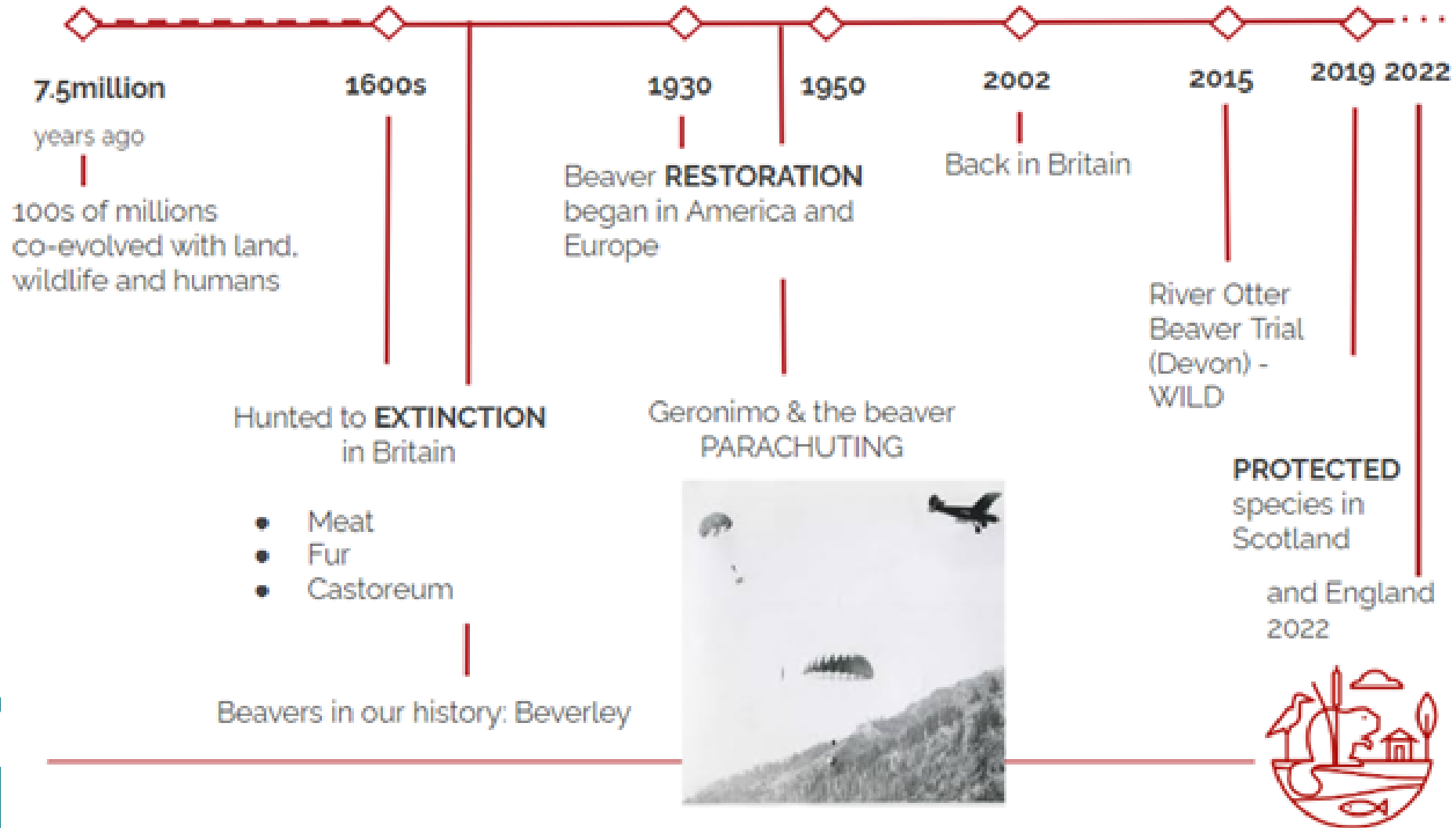


Out of 4,660 known species of rodent, the beaver is second only to the Capybara from South America in size.



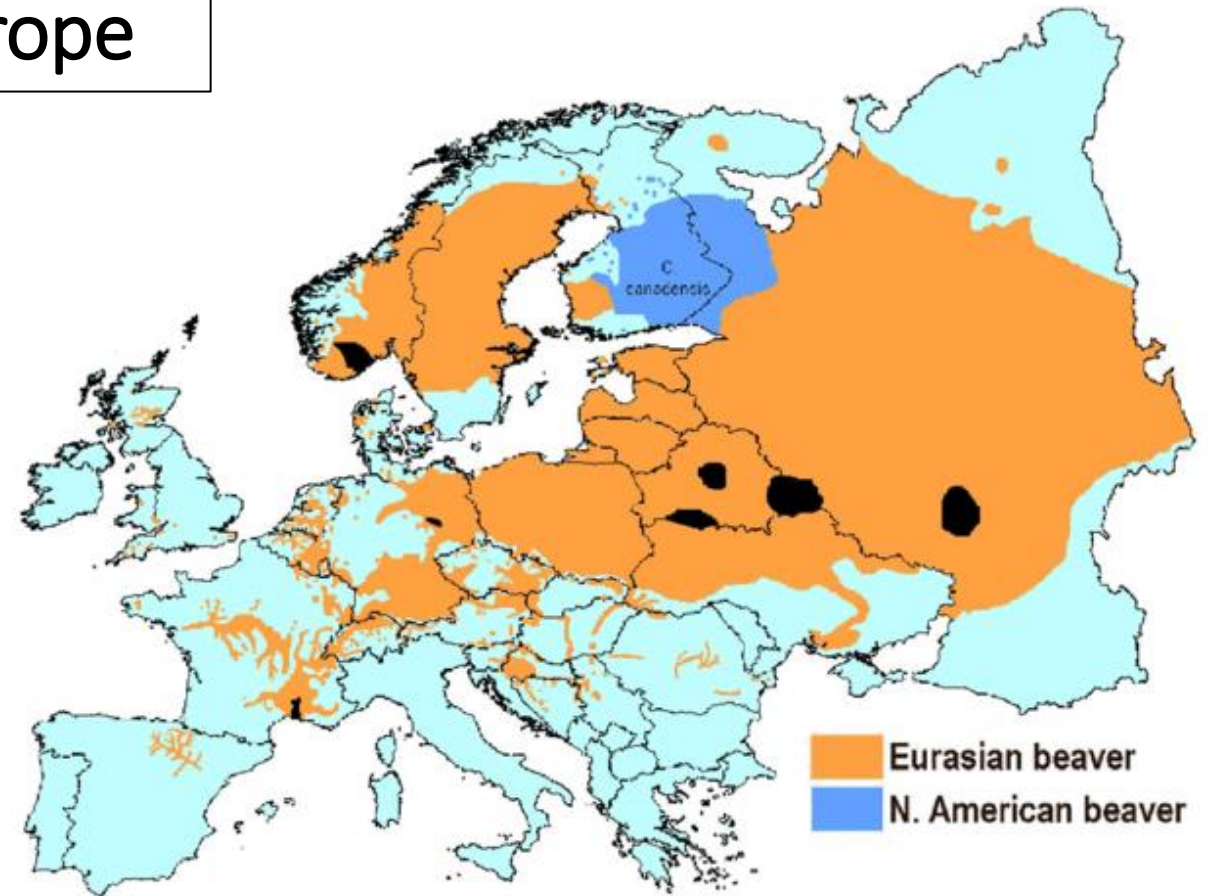
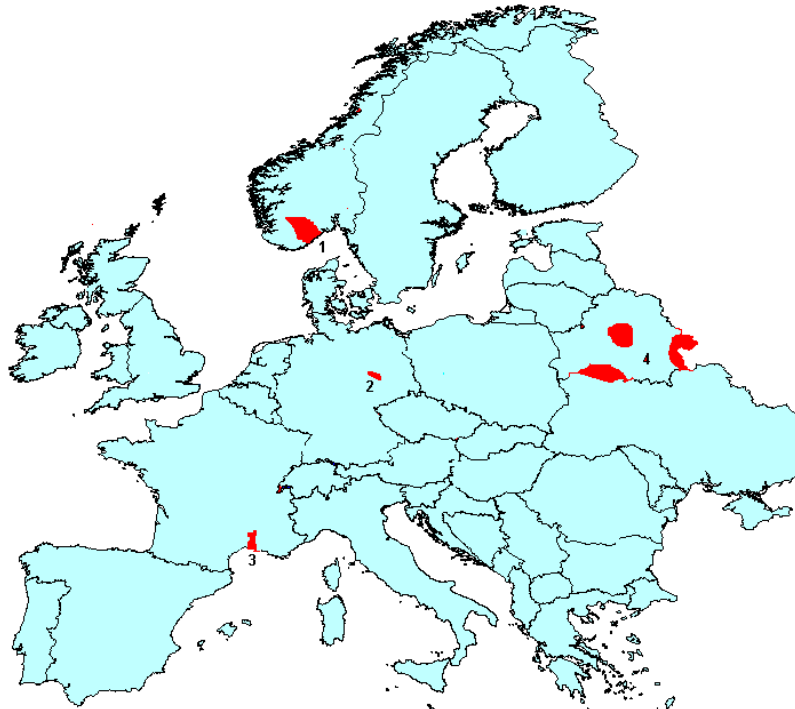
27 European countries have reintroduced beavers since the 1920's. The European population is estimated at 1.5 million individuals but Britain only has an estimated 2,000.

Beaver History



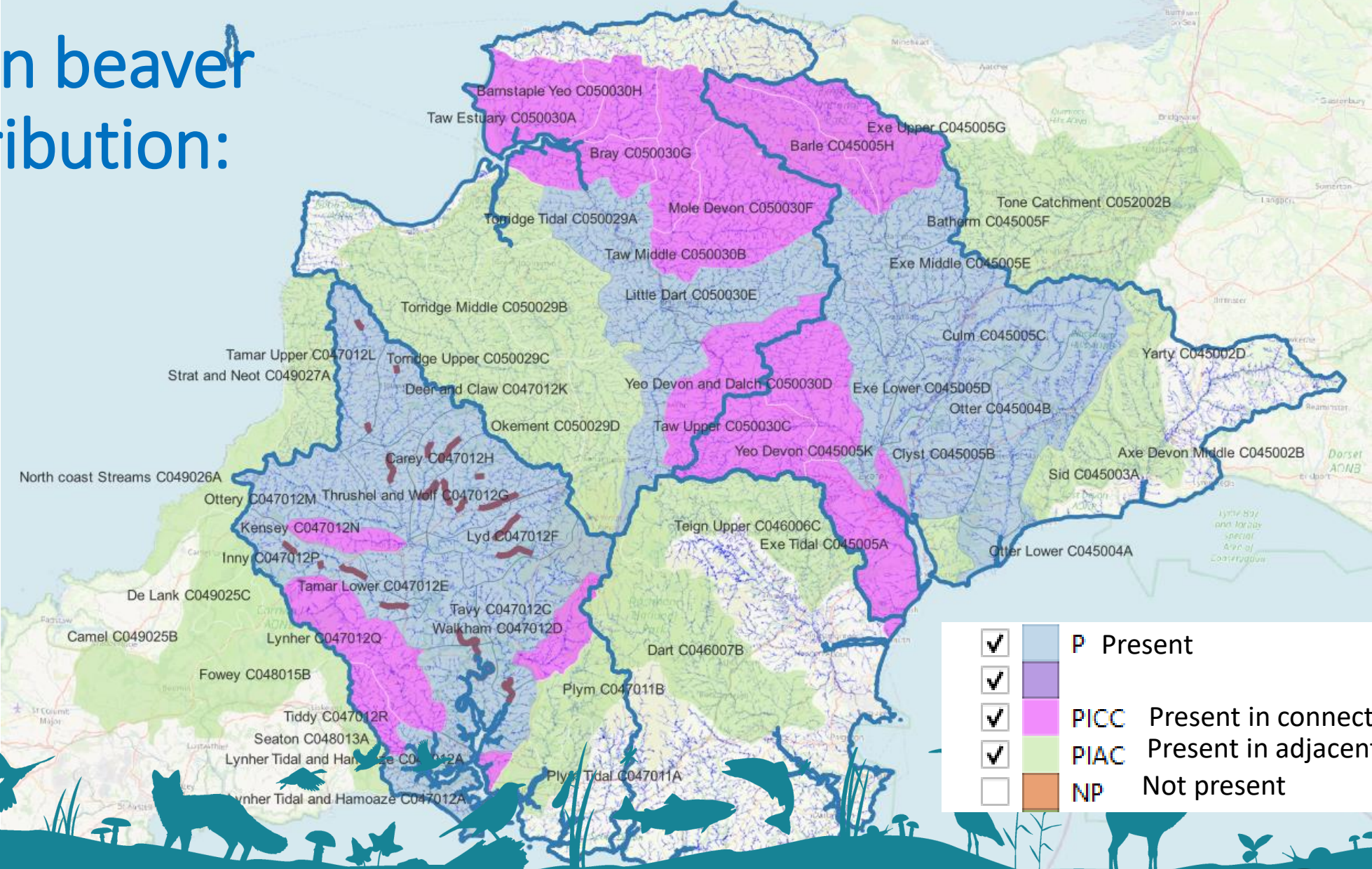
Beaver reintroductions across Europe

A century ago population numbers across Europe were est. at 1200 beavers.



Through re-introduction and natural spread now est. at around 1.5 million (2020).

Devon beaver distribution:



✓	Light Blue	P Present
✓	Purple	PICC Present in connected catchment
✓	Pink	PIAC Present in adjacent catchment
✓	Brown	NP Not present

How beavers benefit nature and society



More opportunities for **ecotourism and recreation**⁵



100 tonnes of carbon stored per hectare of beaver pond⁶



Complex wetland habitats support a range of plant and animal species³



Lower nitrates and suspended sediments in water downstream^{2,7}



30% reduction in flood peak flows lowers downstream flood risk¹



> 1 million litres of water storage, increased downstream water supply^{1,4}



Reduced flood risk



Improved water quality



Increased biodiversity



Resilience to drought



Carbon storage



Recreation and ecotourism

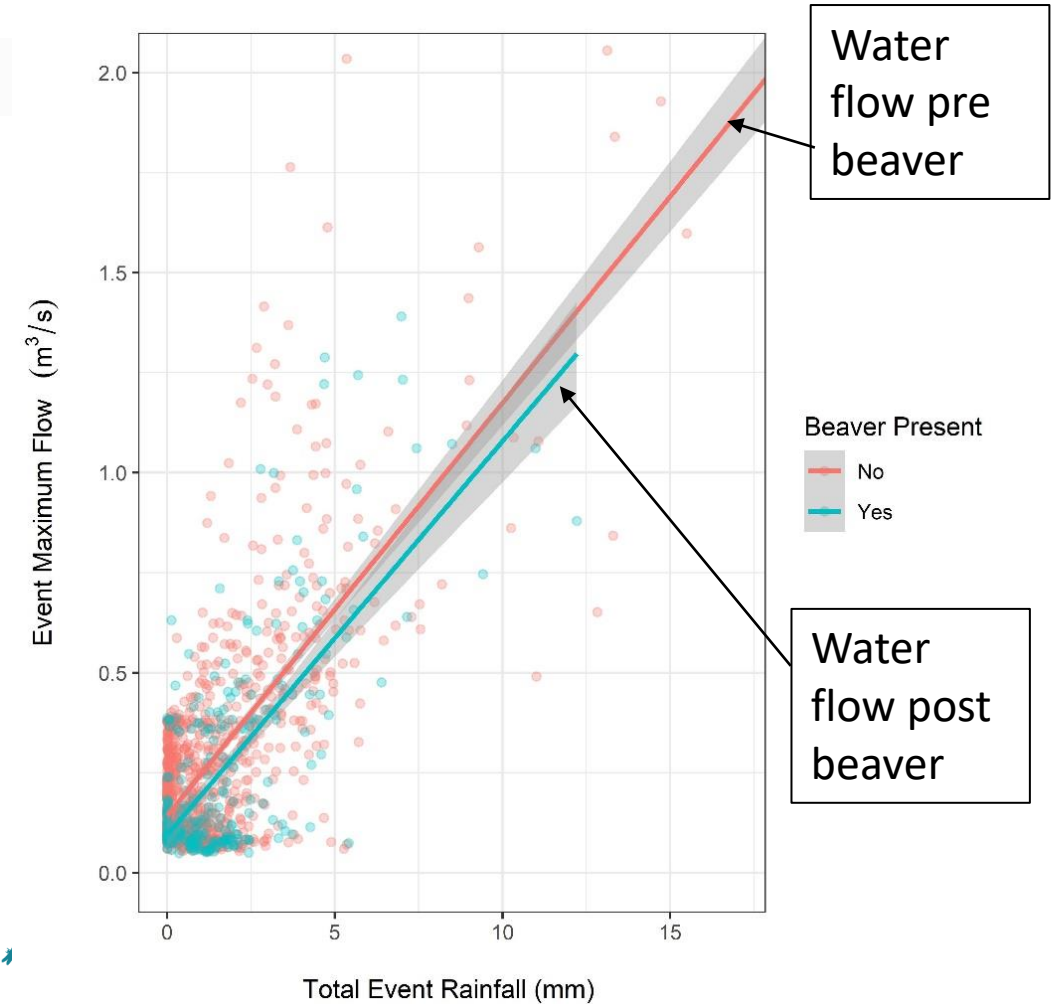
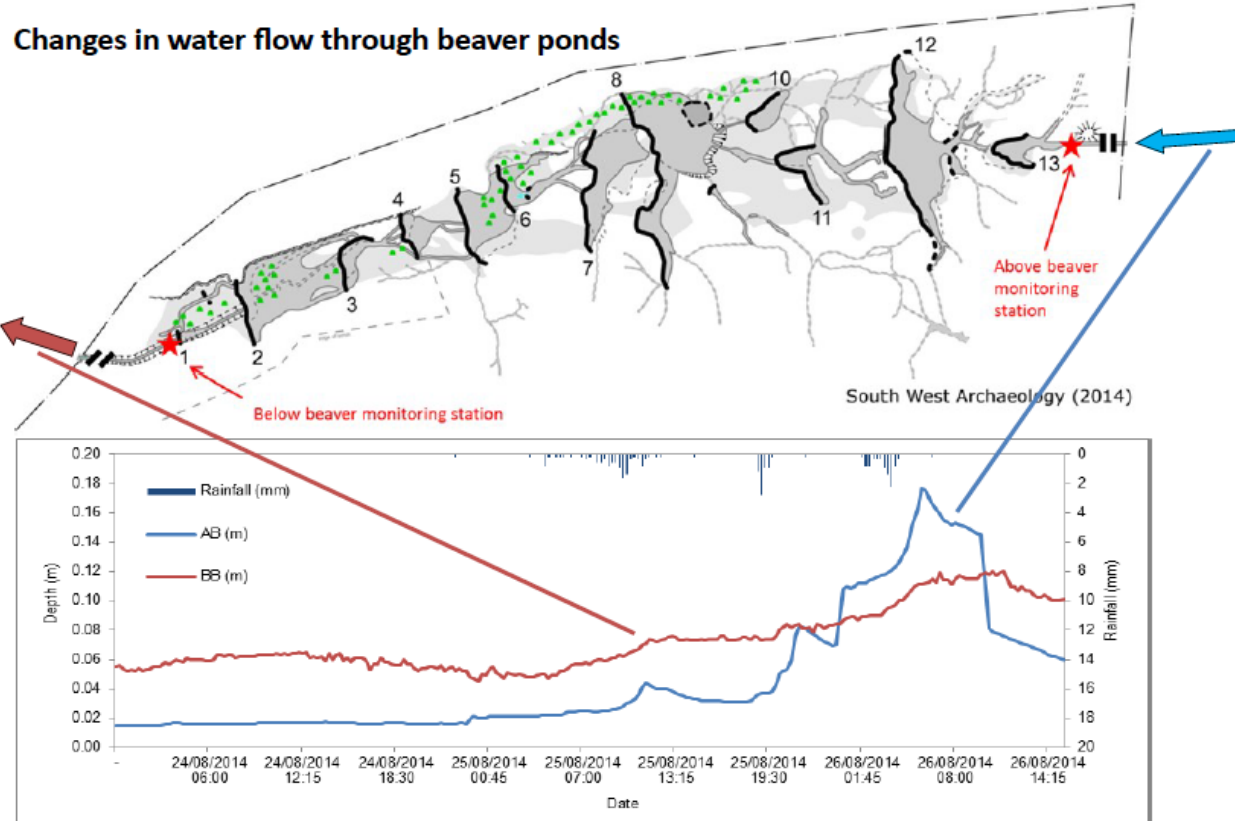
Photo: Alan Puttock



Alan Puttock, University of Exeter

Reductions in flood peak flows

Changes in water flow through beaver ponds



Elliott, M., Blythe, C., Brazier, R., Burgess, P., King, S., Puttock, A., Turner, C., (2016) Beavers – Nature’s Water Engineers. Devon Wildlife Trust

[Beavers – Nature’s Water Engineers.pdf \(devonwildlifetrust.org\)](#)

Protecting **wildlife** for the Future

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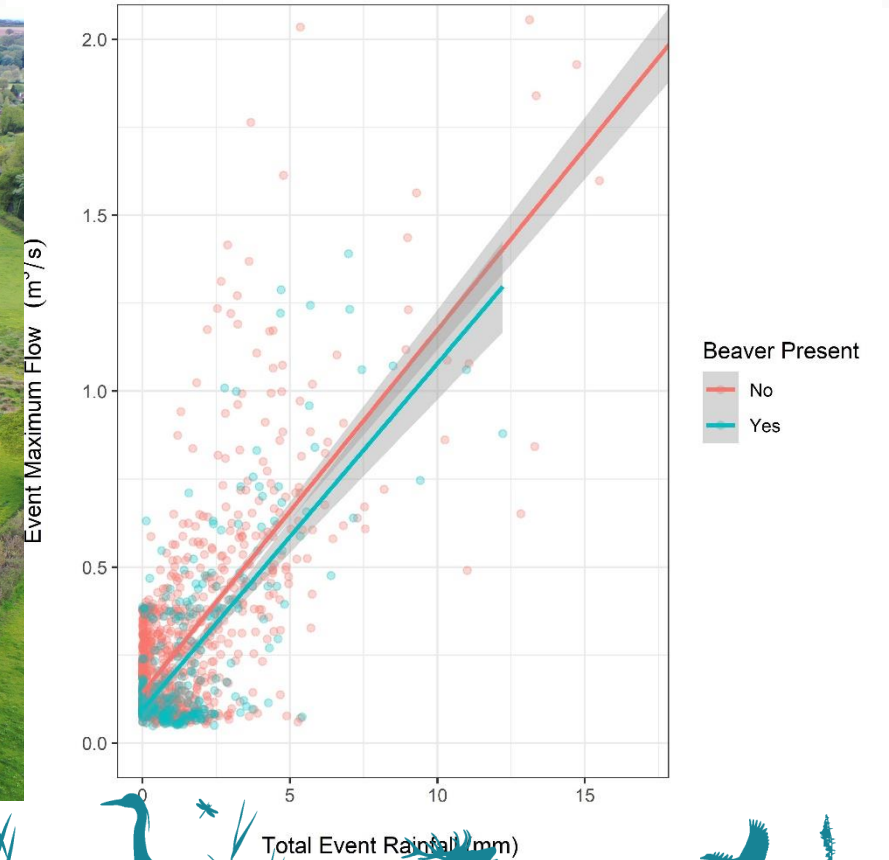
Puttock, A, Graham, HA, Ashe, J, Luscombe, DJ, Brazier, RE. Beaver dams attenuate flow: A multi-site study. *Hydrological Processes*. 2021; 35:e14017.

<https://doi.org/10.1002/hyp.14017>

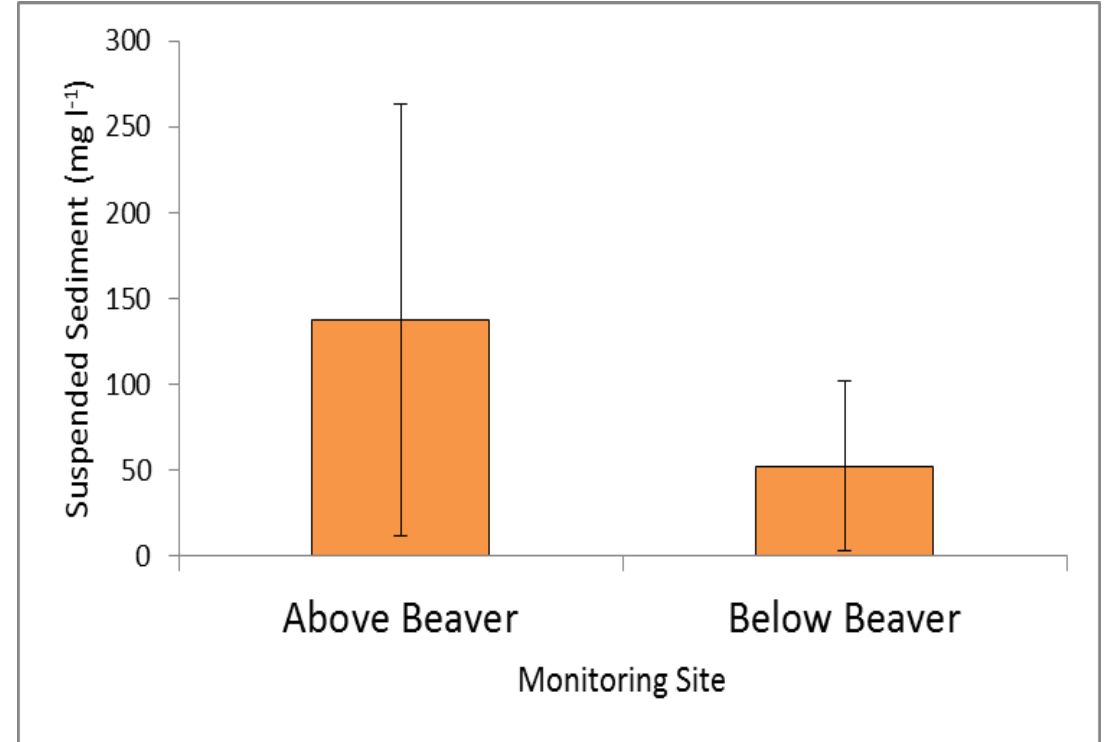


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A sequence of dams built upstream of a village with properties at risk of flooding has caused a significant reduction of peak flows as a result of the beaver dams.



Enhanced water quality



The graph shows the amount of sediment entering the beaver site on the left and amount leaving the site on the right.

Puttock, A., Graham, H. A., Carless, D., and Brazier, R. E. (2018) Sediment and nutrient storage in a beaver engineered wetland. *Earth Surf. Process. Landforms* 43: 2358–2370. <https://doi.org/10.1002/esp.4398>.

Protecting Wildlife for the Future

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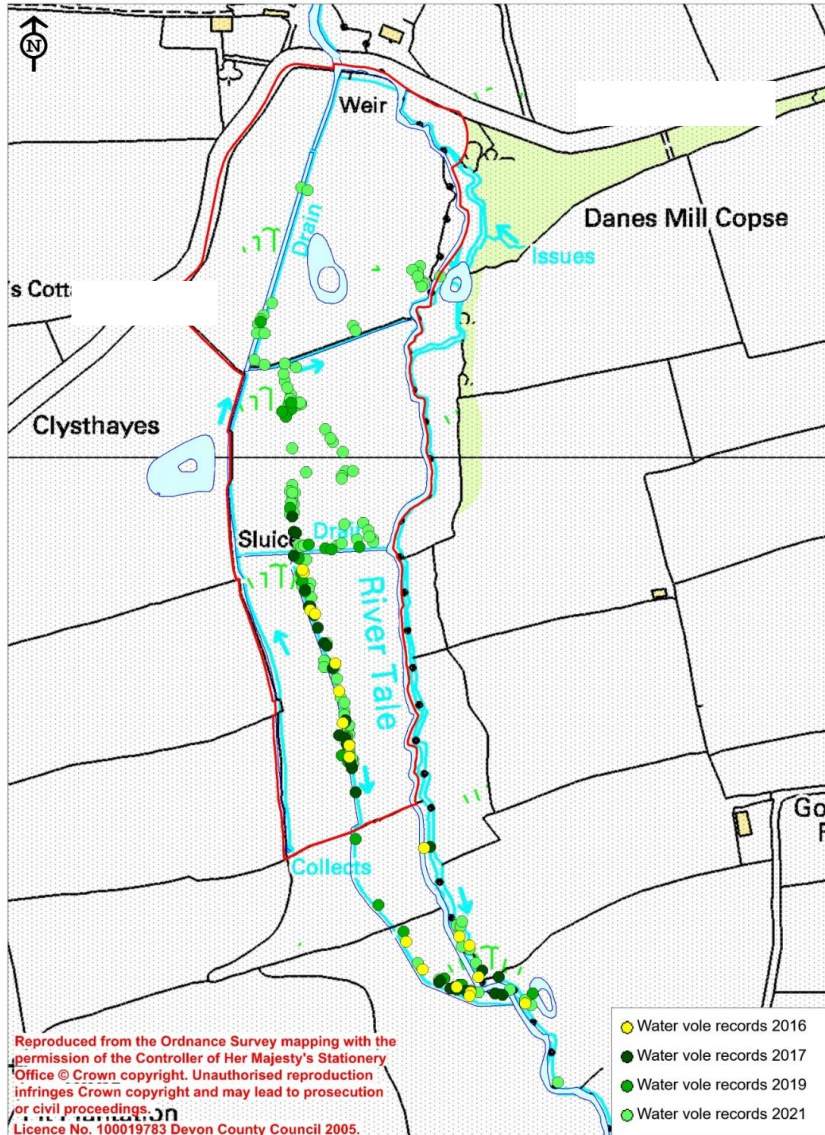
Improved biodiversity and species abundance



Elliott, M. and Puttock, A. 2022. Devon Beavers: Ecological Changes in the Enclosed Beaver Project. Devon Wildlife Trust.

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Benefits to endangered species: water vole



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In response to canal building at a site on the River Tale numbers of water vole territories have significantly increased.

Mammal society publication

2023: <https://www.mammal.org.uk/science-research/mammal-communications/browse-papers/volume-9/positive-coexistence-of-water-voles-and-beaver-water-vole-expansion-in-a-beaver-engineered-land/>

© DWT



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Beavers create dynamic river systems

In deeper larger rivers beavers will not build dams and in high-energy streams dams will not always be permanent structures. In these systems beavers can have different benefits:

- Changes to riverside vegetation structure through bankside coppicing
- Dynamic changes in the river creating new pool and raised riffle habitats
- Partial dam breakdown deflecting flow and increasing river sinuosity



Beaver benefits re-cap:



Reduced flood risk



Improved water quality



Increased biodiversity



Resilience to drought



Carbon storage



Recreation and ecotourism



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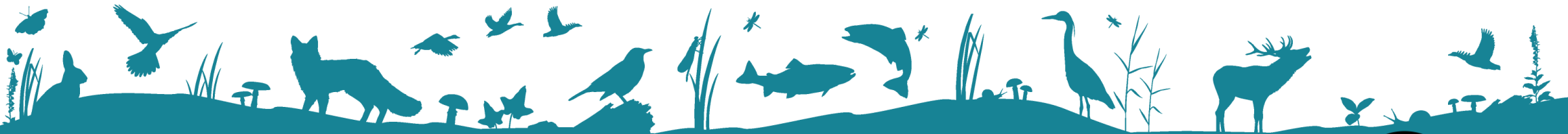
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Eco-engineering, impacts and management





A summary of potential beaver-human conflicts

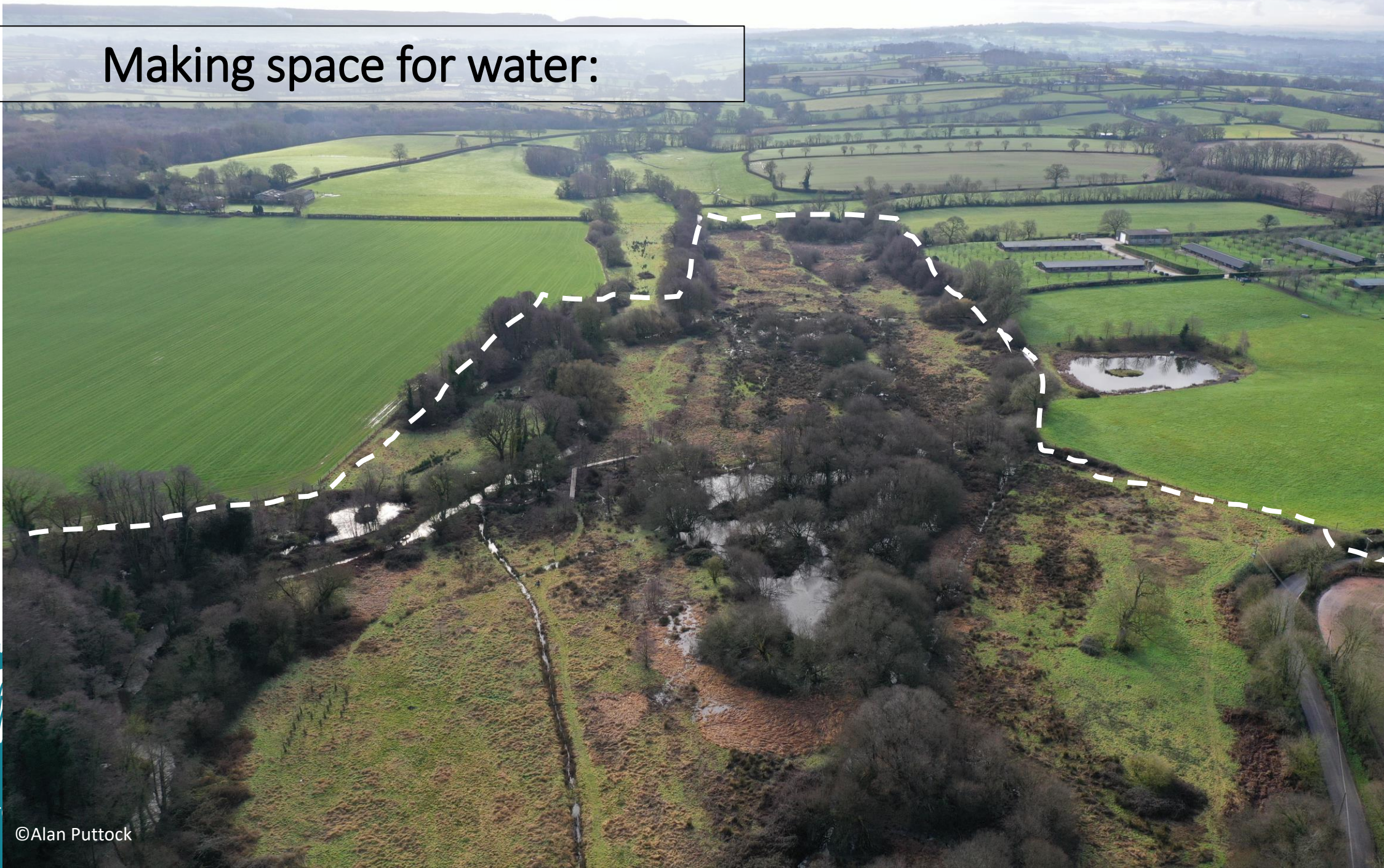
**Impact or loss
on areas of low
lying cropped
land**

**Impacts to
infrastructure**

**Feeding on
notable and
important trees
and crops**

**Impact or loss
of grazing
pasture or
other farmland**

Making space for water:



2. Making space for beaver



© Alan Puttock



The future for beavers in England

- Legal protection came into force on 1st October 2022
- Beavers are now formally recognised as a 'native' species as opposed to previous classification
- Something we are pushing for is clarity on:
 - A.) Status of other wild populations (e.g. Tamar, Taw, Avon, Stour)
 - B.) Financial support for landowners and beaver derived benefits
 - C.) A clear 'national approach' to the reintroduction of beavers into new areas and the reinforcement of existing populations



In summary.....

Thank you for listening....



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- Beavers are a native keystone species
- Reintroduced to GB in last 20 years
- Now legally protected
- Can deliver multiple benefits for nature and people
- Can have challenges/impacts
- Well established management techniques
- Key is making space for nature within our landscapes



More information:

Beaver Management website: www.beavermanagement.org

Devon Beaver Project website: www.devonwildlifetrust.org/beavers

Government website: www.gov.uk/government/publications/beavers-protection-and-management/protection-and-management-of-beavers-in-england



<https://www.youtube.com/watch?v=ZCDNpVh0CRo>

A new opportunity for individuals and organisations to deliver positive change for nature and society by supporting the expansion of beaver wetlands in South West England.



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University of Exeter

