# Lakes – Opportunities for Restoration and Contribution to Nature Recovery

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# Aims

Introduce you to the meres of Cheshire, Shropshire and Staffordshire

Bust some myths about these water bodies and what this means for other lakes too

Discuss current condition and trends in England

What we can do to further improve lake condition

The mechanisms and funding we have to do it

# The Meres and Pools of Cheshire, Shropshire and Staffordshire

Depressions left behind as the ice retreated ca. 14 000 years ago

More than 60 meres in this area

<u>Variable</u>

<1 -75 ha

<1-27 m deep

Low-high alkalinity

Clear or peat-stained water

Hydrologically isolated or connected to stream systems

Many are at least partially groundwater fed

Retention Time 0.03 - 9.6 years

# Meres, Mosses and Wetlands

Peat has accumulated through time in these depressions

Some have become entirely infilled

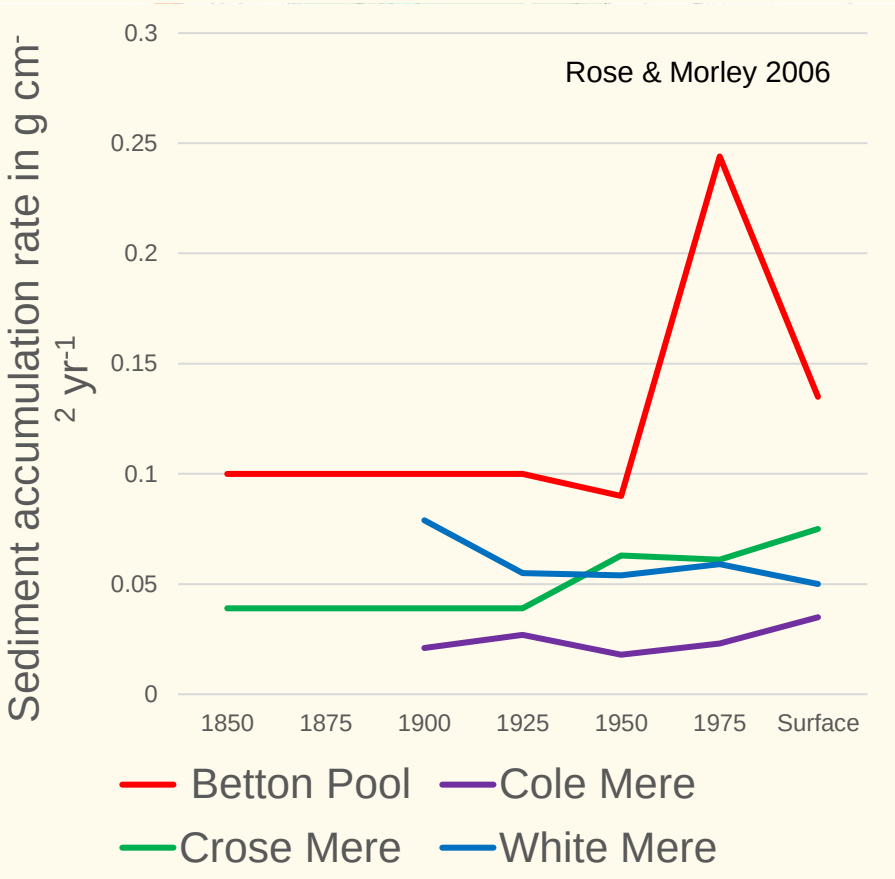
Some steeper sided basins have developed floating mats across them.

Approximately 200 mosses in the area

Many of the meres are surrounded by wetlands or would be if the wetlands were not drained

1850 sediment accumulation rates less than 0.1 g $cm^{-2}$ $yr^{-1}$

The mere will not imminently become mosses



# SSSI mere condition

~ 30 SSSIs with meres or pools

At notification (2nd half of 20th C) many were in poor condition with high nutrient levels and few aquatic plants

Many had been stocked with fish, particularly carp

Many of the wetlands had also been drained to some extent

The ambition is to restore these lakes beyond the condition at notification for the benefit of nature

# What do you aim for?

Initially reports suggested that as many of these lakes were naturally eutrophic there was little to be done

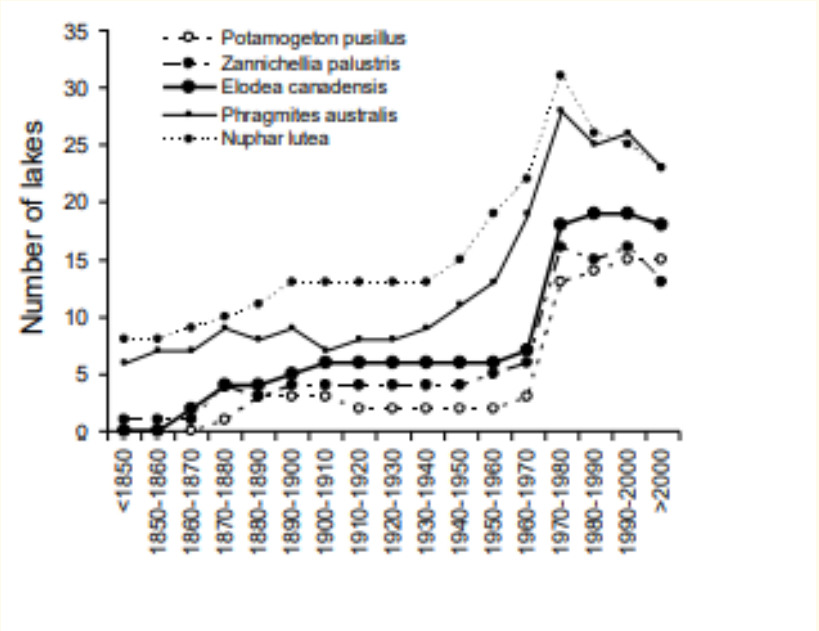
Increasingly historical records and macrofossils showed a different picture

If you looked back to ~1850 a whole range of aquatic plants were found in these lakes

We don't aim to turn back the clock to a set date

Aim to do the best we can for nature, alleviating as many of the pressures on the site as we can

Aiming for as close to natural conditions as we can




Madgwick, 2009

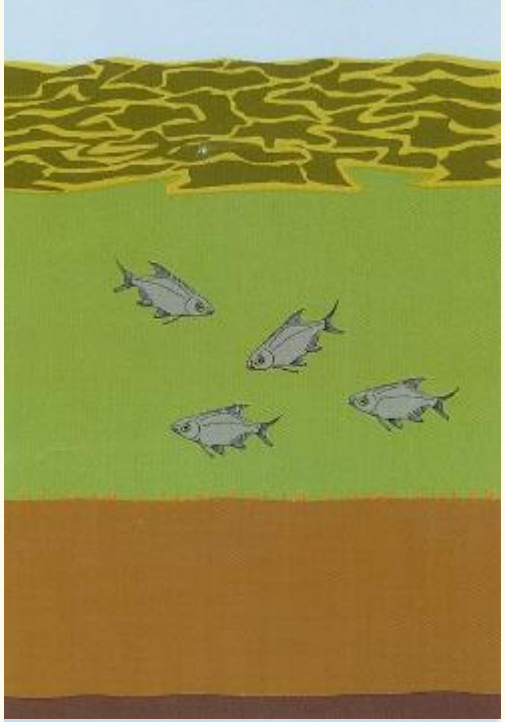
# What does a natural eutrophic lake look like?

Plant-dominated

Clear water

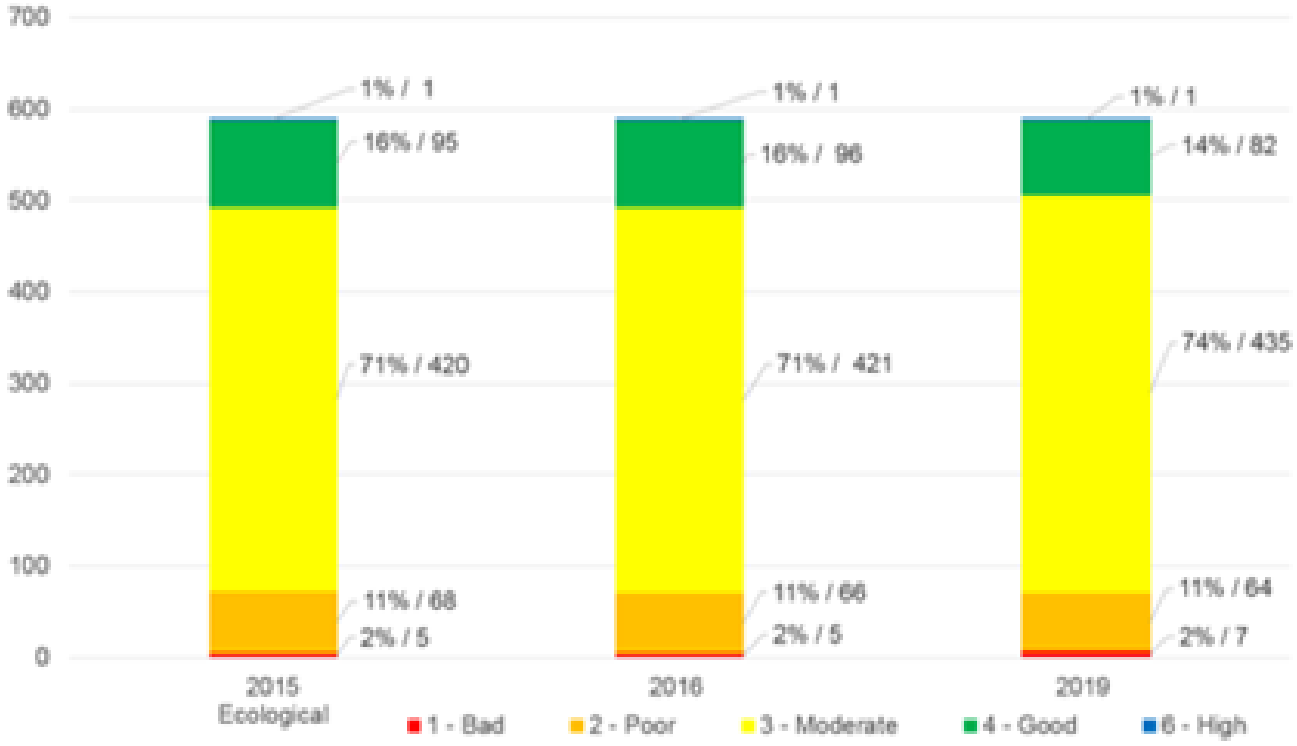
Invertebrates

Fish assemblage has a high abundance of piscivores

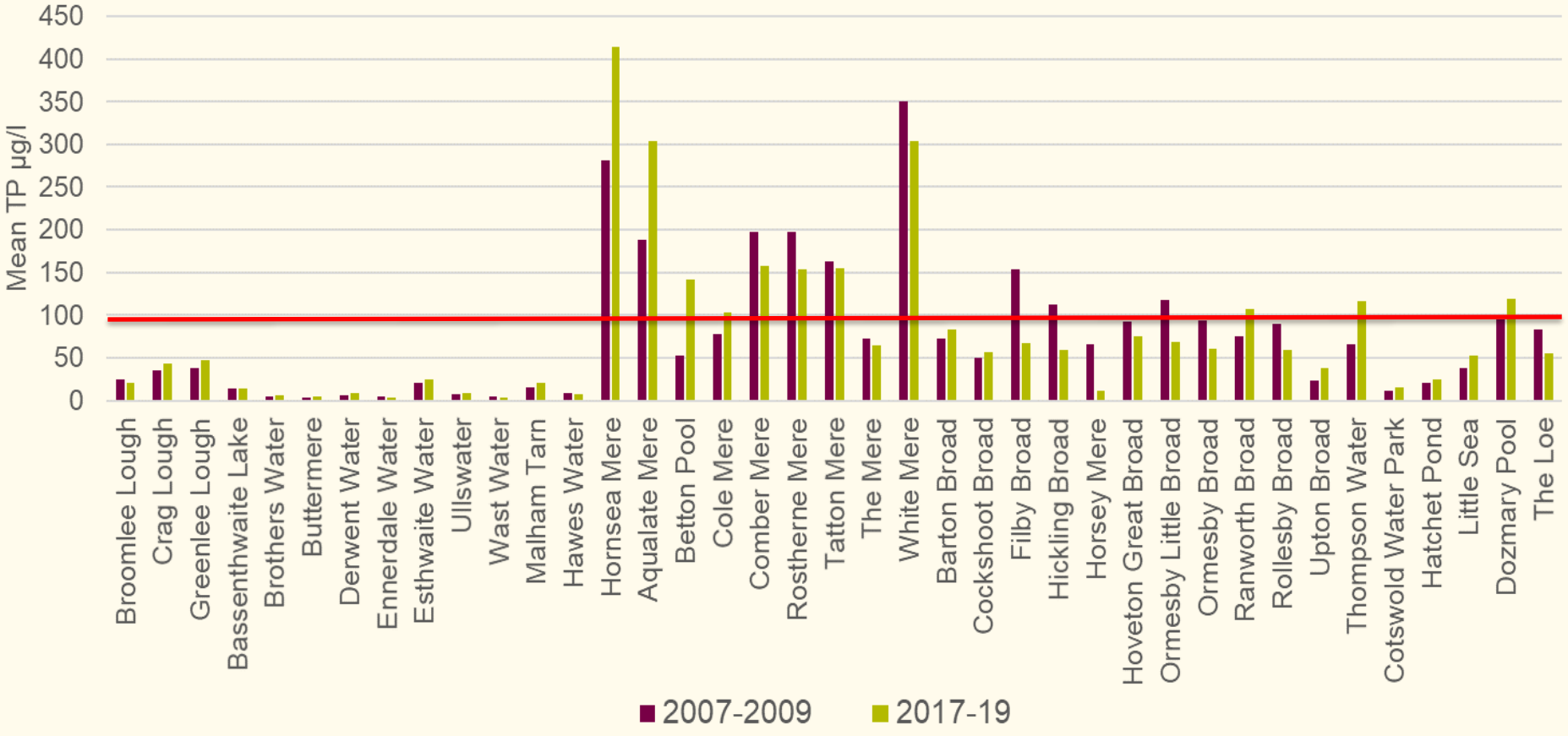


# What is the current condition of lakes in England?

**Lakes: ecological status or potential** (%/no water bodies)



# How has this changed over time?



# What needs to be done for lakes to recover?

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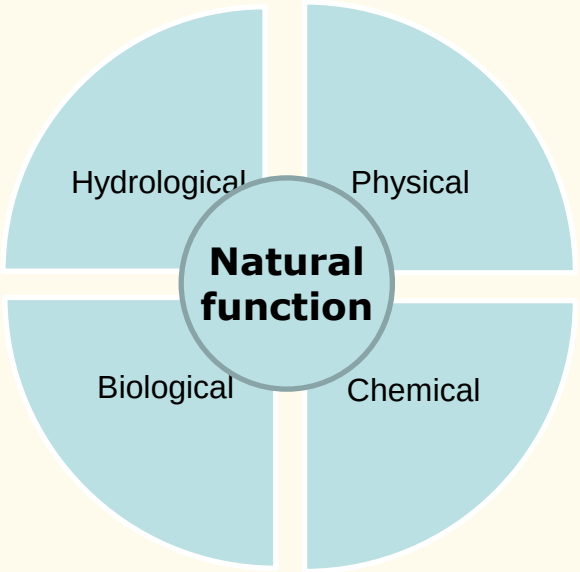
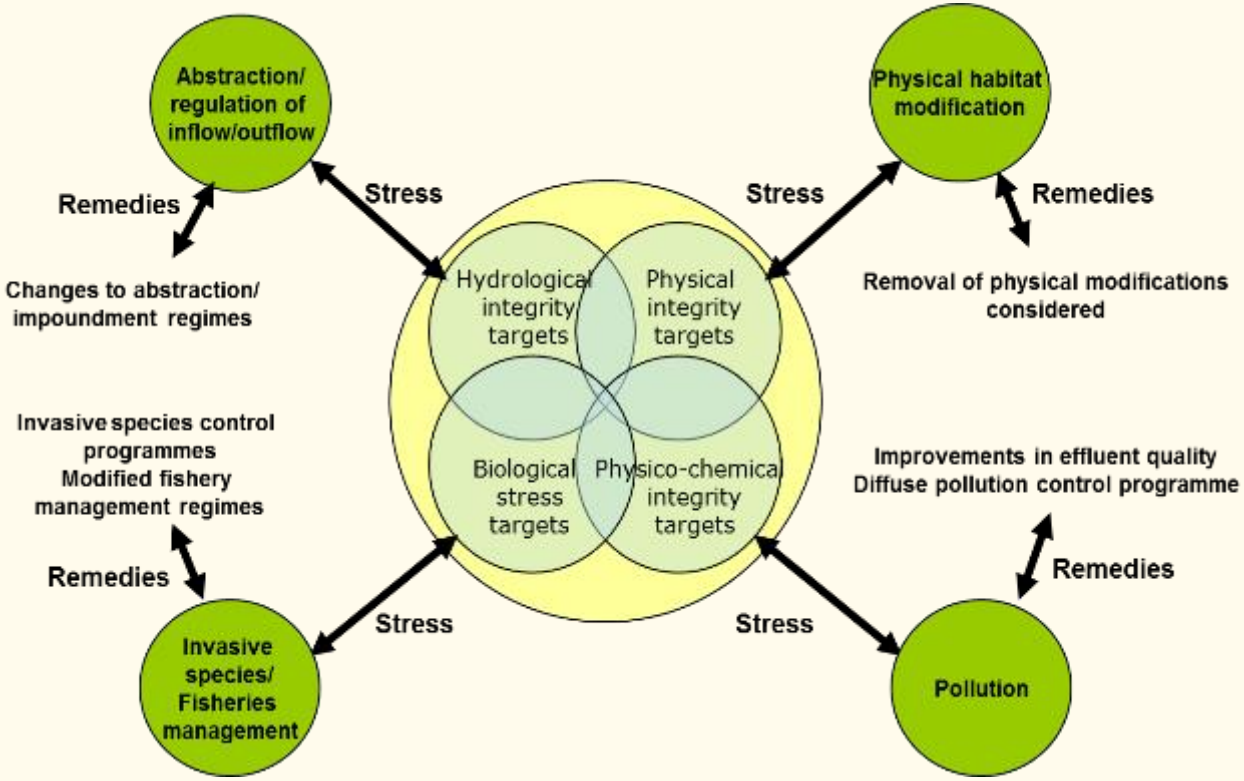
Fundamentally about restoring natural lake functioning : the chemical, physical, hydrological and biological components of naturalness



# Natural function component 1- Chemical: Examples of impacts & restoration measures

- **Priority: Address both point and diffuse pollution by dealing with polluting discharges and/or changing land management practices**

- **Consider removing anthropogenically enriched sediments**

# Natural function component 2 - Physical: Examples of impacts & restoration measures

- **Establish/restore riparian zones of semi-natural wetland/terrestrial vegetation**
- **Restore natural lake shorelines** and **littoral margins**
- **Remove structures where these do not result in the complete loss of the water body (allow changes toward more natural hydrology).**


***Highly modified lake shoreline***


***Shoreline restoration work***


**Natural *phragmities australis* lakeshore habitat**

# Natural function component 3- Hydrological: Examples of impacts & restoration measures

- **Restore natural water-level fluctuations or manage water-level regimes to reflect natural water level fluctuations.**
- **Remove artificial drainage from the riparian zone, wider floodplain or catchment**
- **Restore natural inflows & outflows**

***Lobelia dortmanna*** **exposed by rapid excess drawdown**

**Wier modifying lake levels and natural function**

**Restoring *toward* natural function - Simple low cost restoration measure in lake inflow**

# Natural function component 4- Biological: Examples of impacts & restoration measures

- **Control non-native invasive species & spread**
- **Reduce the intensity of or halt fish stocking (other than when addressing fish kill incidents).**
- **Restore natural biological assemblages e.g. through biomanipulation.**

*Demonstration bio-manipulation @ Betley mere*

# Mechanisms available

We have many of the same mechanisms we've had before,
BUT some are new

- Water Company Price Review programme
- Current agri-environment schemes - Countryside Stewardship mid and higher tier (2022 & 2023)
- eNGO and Local Authorities 'self' funding
- NE Grant In Aid; 'EA Water Environment Improvement Funding (WEIF)
- Others- eg HLF and Highways Agency;
- Potentially Biodiversity Net Gain,
- Environmental Land Management' schemes (2022 onwards)

# ‘ELMS’ – proposals under Local Nature Recovery & potential Landscape Recovery

## Proposed Local Nature Revery Options:

**Establish, manage and restore riparian habitats** - specifically applicable to lakes, about creating good semi-natural habitat that is not drained

**Create lakes** – where lakes are created these should be made to maximise biodiversity benefits

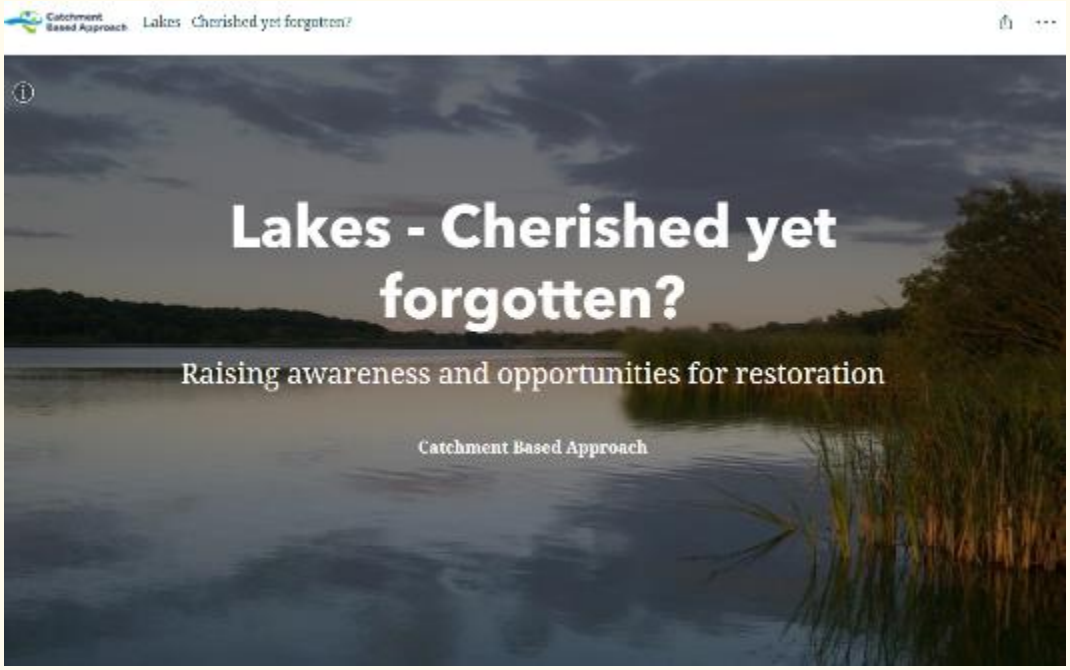
**Manage lakes** – could include managing edge vegetation for benefit of lake plant communities; mimicking natural management of water levels; and also potentially provide income foregone for not managing the lake in ways that would be damaging - such as by stocking carp or wildfowl

**Restore lakes** - this would be action that would be undertaken in the lake itself to restore it, such as sediment removal, biomanipulation, or restoring natural hydrological regimes

**Many other options** may be used to enhance or protect the catchment for benefit of lakes

# Delivery at local level

- *Initial* work to raise the profile of lakes and encourage interested groups to think about what they could do to restore lakes in their locale– Catchment (and LNRS) partnerships
- eg lakes story map + Factsheets (& Biodiversity Data hub)
- Including advice and access to data to help understand pressures and act to restore




# Conclusion

- **Water quality in lakes is improving although we still need to do more**
- **There are also other actions we can take to improve lake condition which can begin now.**
- **We are at a point of great opportunity for nature recovery in terms of support and existing and new ways of funding coming soon. Lakes should be a part of the thinking and new initiatives, and not be forgotten.**
- **If we act now to recover and restore lakes there is much to be achieved within the 25 year plan timeframe.**
- **To do so, we need to 'ramp up' awareness of the threats to lakes, and interest and engagement in restoring them.**

# Thank you

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