

An overview of nutrient pollution on the Somerset Levels and Moors

Evidence and framework for restoration

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Outline of Presentation



- Overview of the ecological problem
- Summary of phosphorus pollution evidence
- Link to climate change impacts
- Proposed way forward for restoration

Important features of the Ramsar wetland, SPA and SSSIs

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Breeding birds: national importance for breeding waders



Breeding birds

Wintering birds: most important inland site in the UK (by population)



Wintering birds (SPA)

Aquatic plants and invertebrates of the ditch system



Wetland plants and invertebrates

21% (largest area) of lowland wet grassland in England

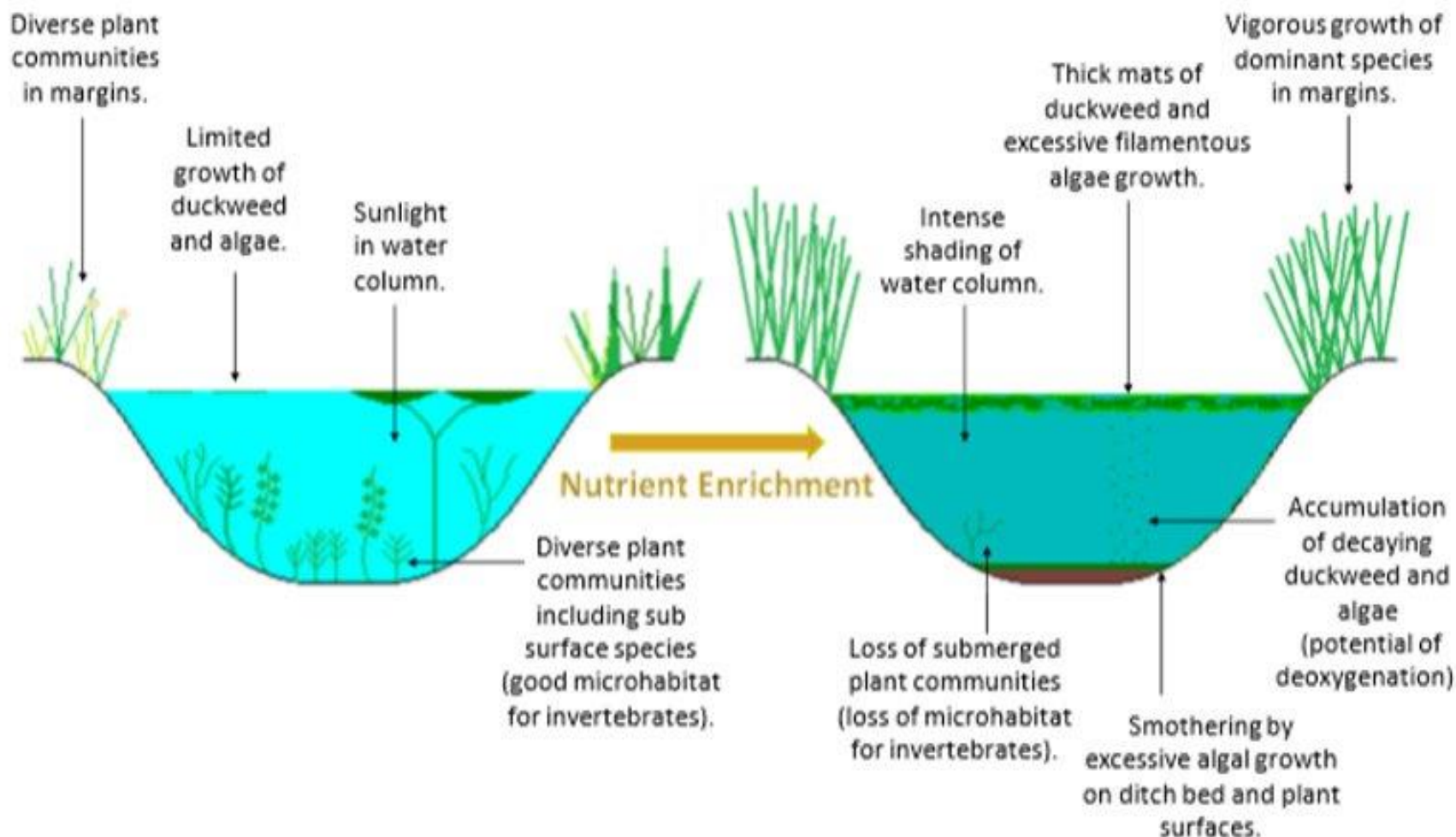


Grasslands

Blooms of algae and floating plants on the Somerset Levels and Moors



Consequences of nutrient enrichment on ditch ecology



Wider ecological impacts

Adverse effects on fish-eating birds



Greater risk of fish kills



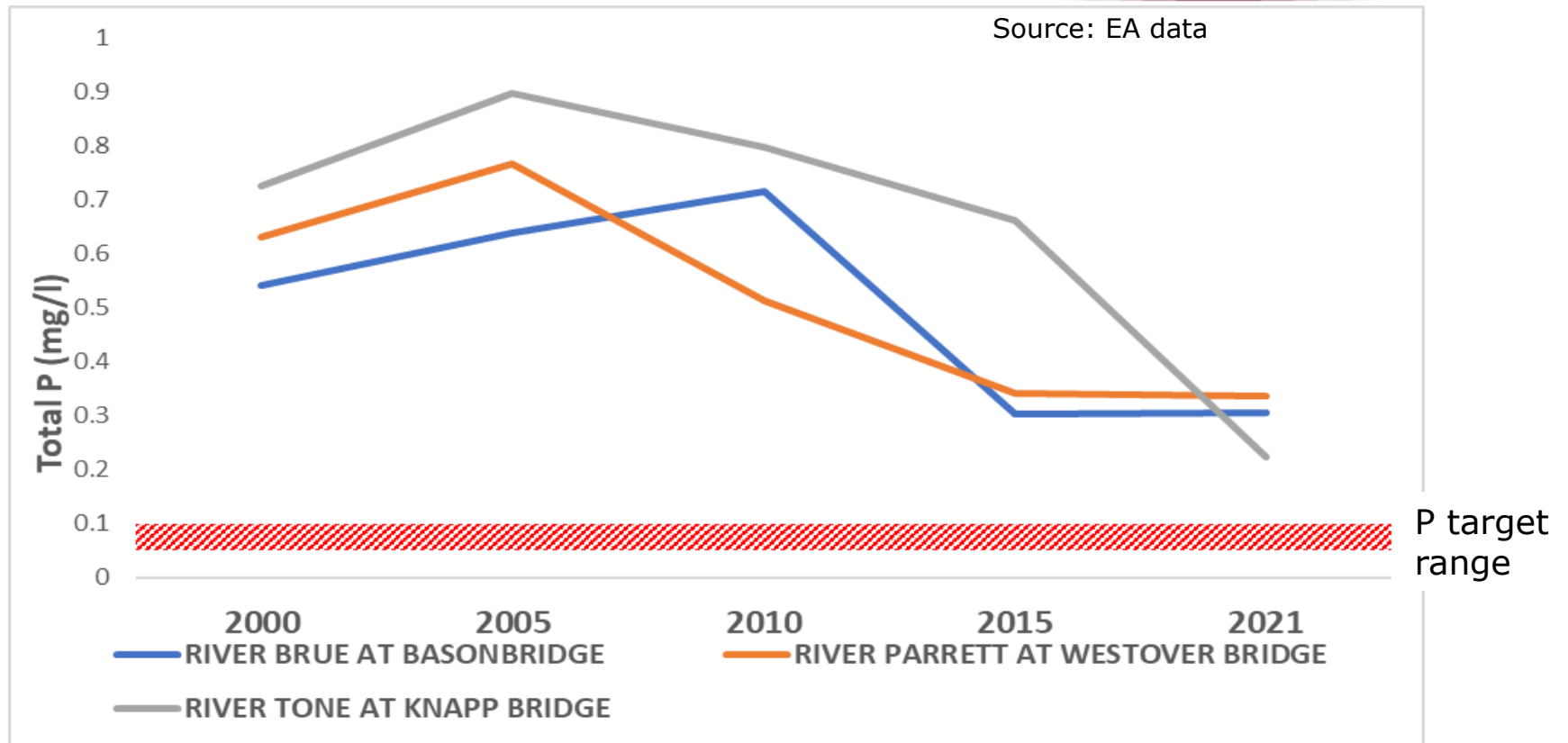
Rapid infilling of ditches with vigorous plant species



Methane production from Lemna choked ditches



Trends in Annual Mean Total Phosphorus in Somerset rivers feeding the SLMs

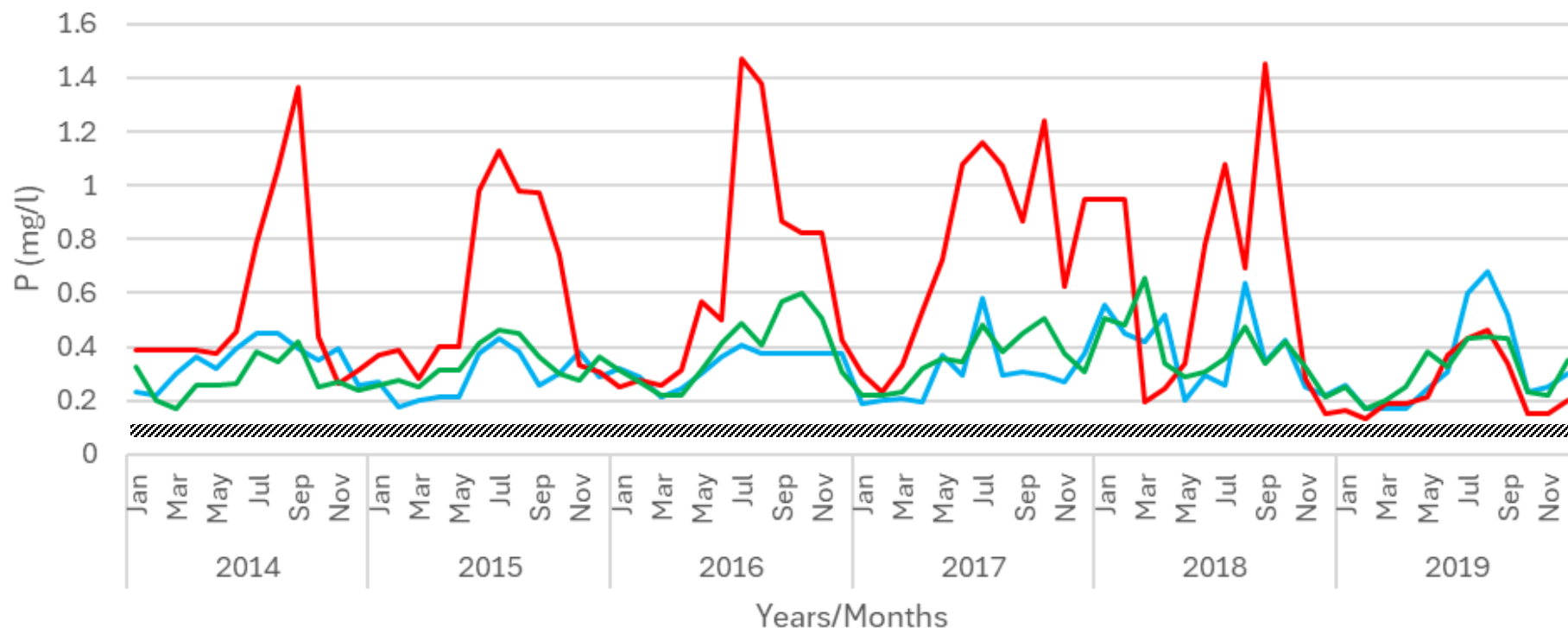


Data shows that Phosphorus levels in the rivers have decreased, but the duckweed and algae problem is getting worse

Month by month trends in Total Phosphorus in Somerset rivers feeding the SLMs



Trends of P in Somerset's Rivers

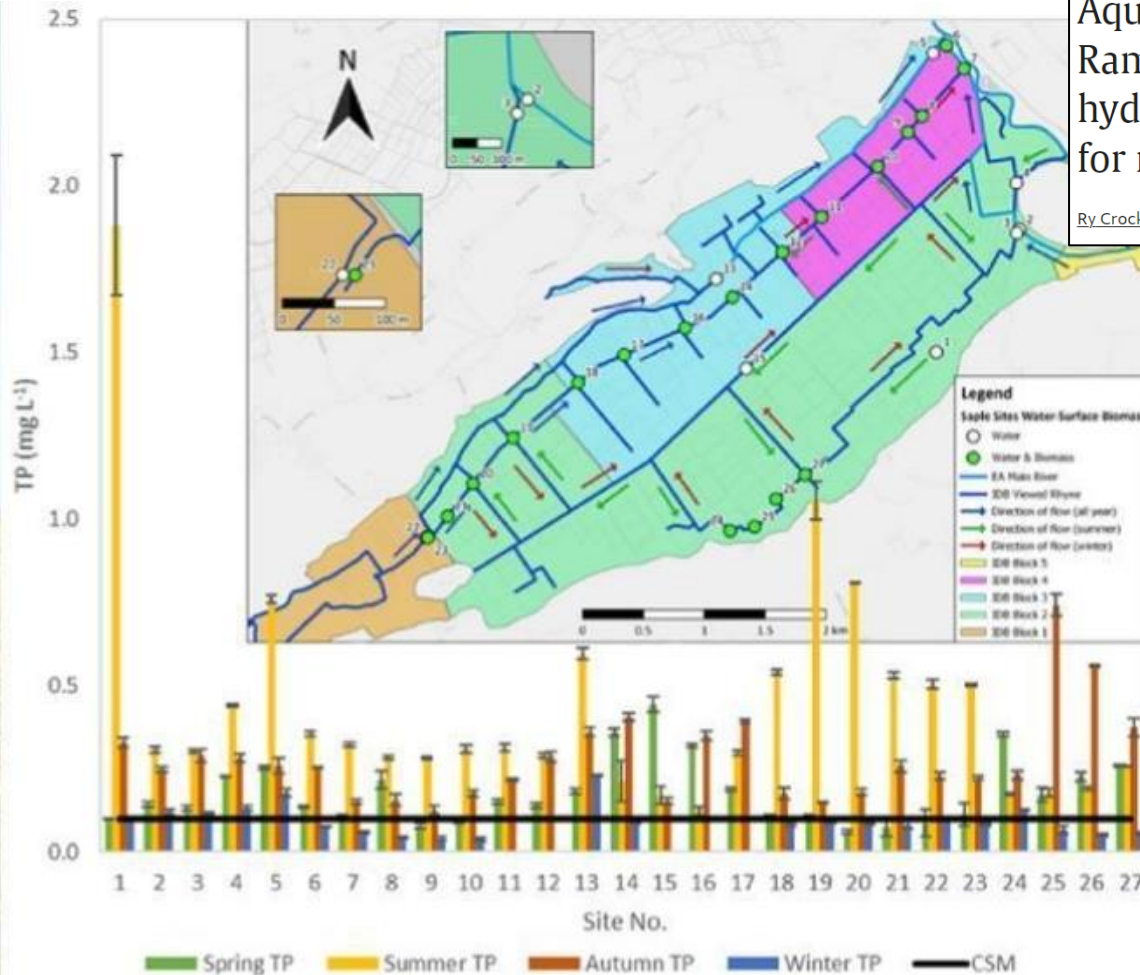


— River Brue (Basonbridge) — River Tone (Knapp Bridge)
— River Parrett (Westover Bridge) ▨ P target range (0.05 – 0.1)

Total Phosphorus levels in the ditch systems at West Sedgemoor SSSI

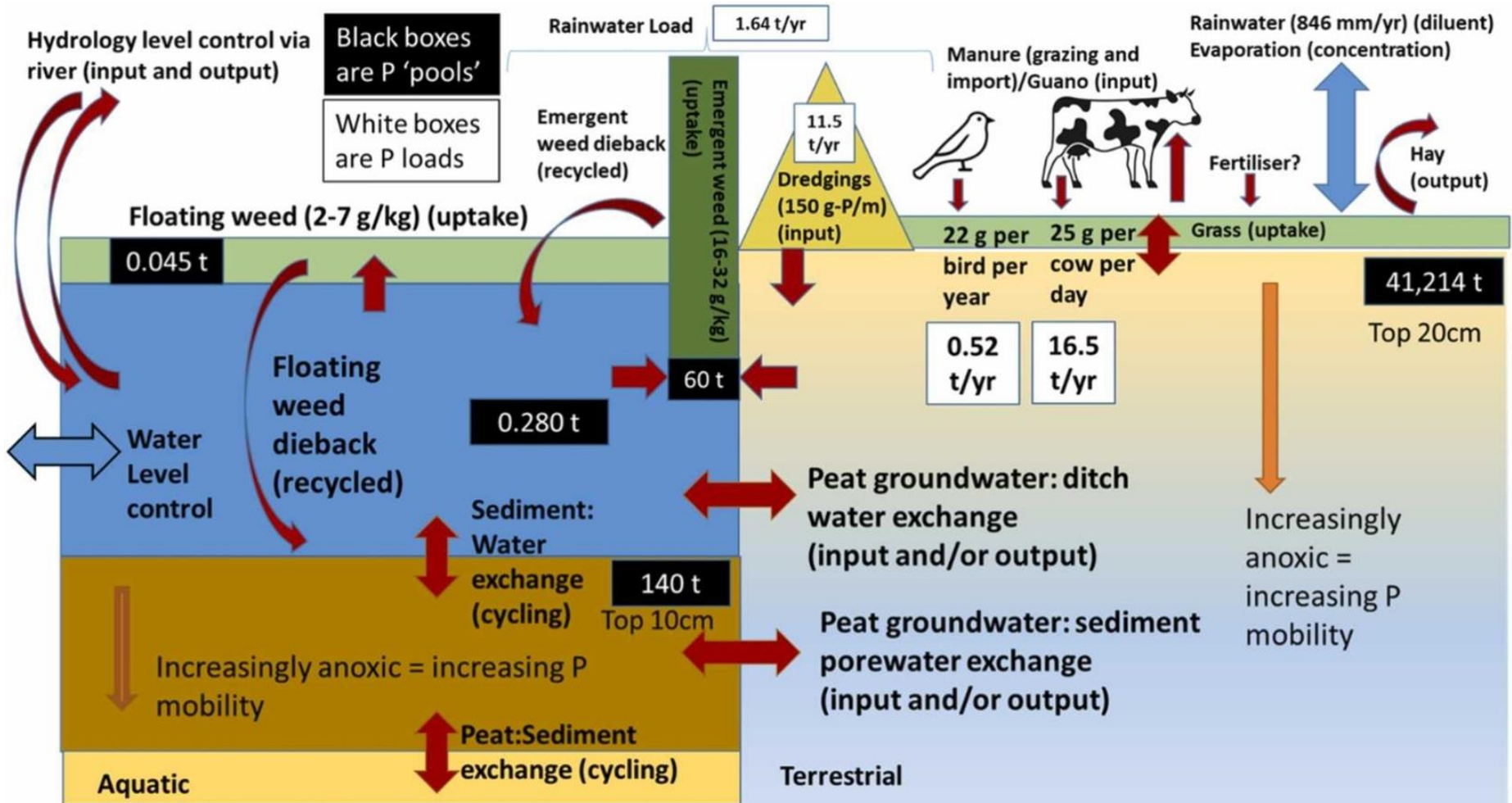
Aquatic phosphorus behaviour within a UK Ramsar wetland: Impacts of seasonality and hydrology on algal growth and implications for management

Ry Crocker, William H. Blake, Thomas H. Hutchinson, Sean Comber

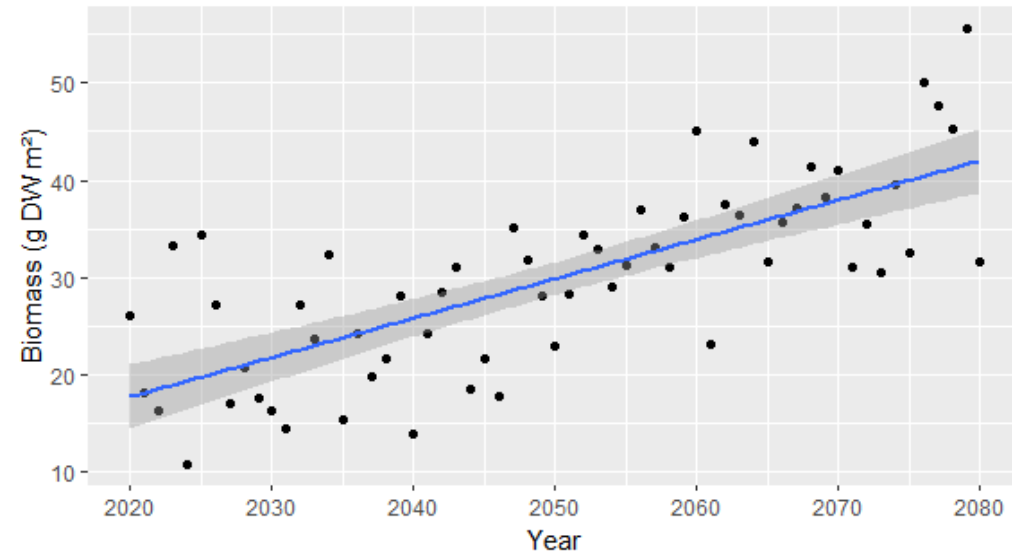


<https://www.sciencedirect.com/science/article/abs/pii/S0048969723032278>

Phosphorus inputs and reservoirs estimated to exist within West Sedgemoor



Effects of climate change on duckweed growth



Predicting *Lemna* growth based on climate change and eutrophication in temperate freshwater drainage ditches

Jared Feller · Mark Taylor · Paul Henry Lunt

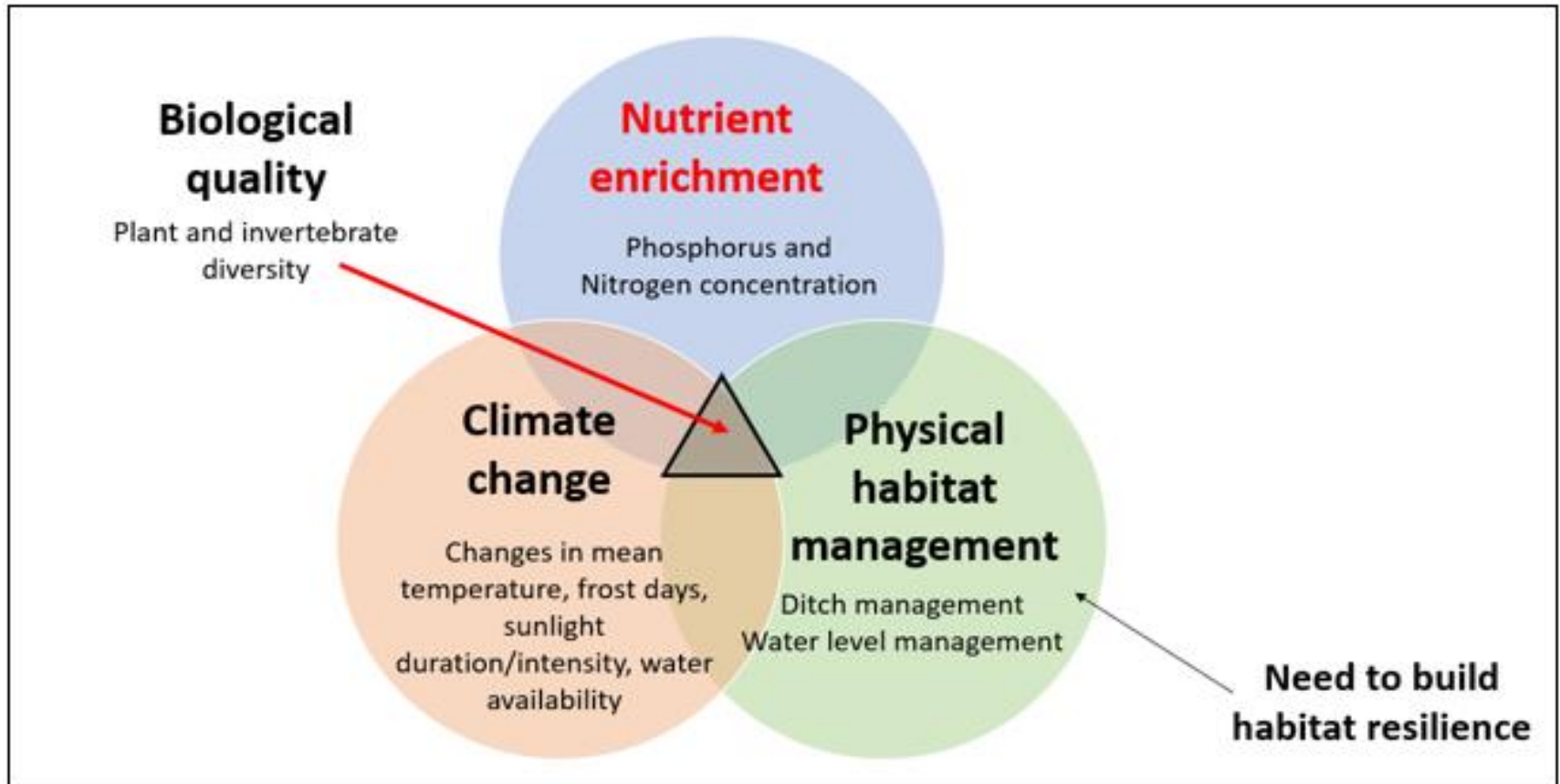
<https://link.springer.com/article/10.1007/s10750-024-05477-7>

Using the simulated data, the model predicted an **83% increase** in biomass from the 2020's to the 2070's if nutrients do not change.

To offset the impact of climate change on duckweed biomass, nutrient levels will need to **decrease by more than 50%** by 2080.



The need for a holistic approach



Interactions that determine the biological quality of ditches on the Somerset Levels and Moors – appropriate site management is critical to mitigating negative effects, as well as reducing the nutrient inputs

An integrated approach to restoration

Reduce inputs at source – nutrient load entering the system must be reduced

Reduce pollution pathways – slow the flow of water, reduce soil loss, increase nutrient interception

Manage the floodplain and designated sites more sustainably – increase ecological resilience and export of nutrients

Our overarching goal is a resilient, healthy, freshwater wetland ecosystem within the SLMs floodplain

Implement remediation actions where adequate evidence and mechanisms exist

Address information gaps and develop novel approaches (test and trial)



Wider benefits – importance of water for people and nature

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Soil conservation

Sustainable flood
and water level management

Farming resilient to
climate change

Peat restoration

Carbon sequestration

Improved drinking water resources

Enhanced and
resilient biodiversity

Enhanced recreational
opportunities



- Reduce nutrient inputs, driven by existing legal requirements and based on balance of evidence. Environmental Improvement Plan targets:
 - *Reduce phosphorus loadings from treated wastewater by **80% by 2038** against a 2020 baseline, with an interim target of **50%** by 31 January 2028.*
 - *Reduce nitrogen, phosphorus and sediment pollution from agriculture into the water environment by at least **40% by 2038**, compared to a 2018 baseline, with an interim target of **10%** by 31 January 2028, and **15%** in catchments containing protected sites in unfavourable condition due to nutrient pollution by 31 January 2028*
- Provide further support and advice to the farming community and consider new schemes (e.g. manure export schemes)
- Continue to develop our understanding of key sources of nutrients – their relative proportional contributions and pathways to the designated sites – to inform ongoing actions
- Trial new approaches to export nutrients from the designations (e.g. paludiculture, green harvesting)
- Trial modifications to drainage channel and water level management
- Trial new wetland habitat outside of the ditch network

Work happening now



- Ongoing research by academia (Universities of Plymouth and Lancaster) and Citizen Scientists (e.g. Dr Andrew Clegg)
- PR24 schemes and investigations led by Wessex Water (PR29 including Levelling Up and Regeneration Act requirements)
- New agri-environment scheme options and pilot projects (eg. FWAG / RSPB-led Paludiculture Exploration Fund)
- Landscape Recovery projects – Greater Sedgemoor Landscape Recovery Project (Round 2 – led by RSPB) and Adapting the Levels (Round 1 – led by Somerset Wildlife Trust)
- NE have produced a framework to guide the restoration of the Somerset Levels and Moors which will be shared to facilitate and structure discussion of the proposed Technical Advisory Group

Proposal for a SLMs Nutrient Technical Advisory Group



- The purpose of the proposed group is to:
 - review available evidence and data to help consolidate our current understanding on sources of nutrients, exposure pathways, remediation actions, identify key knowledge gaps
 - better co-ordinate ongoing relevant investigations and research
 - agree and implement key further investigations that are required
- We have in principle support from Wessex Water and the Somerset Catchment Partnership (SCP).
- The SCP has indicated that they are happy for the group to sit as a subgroup of the main SCP. Funding will need to be secured to enable SCP to provide secretariat services
- Academics with relevant expertise already engaged with research on the SLMs will be invited on to the group over the coming months, along with technical representatives from local partners
- Terms of Reference to be agreed with SCP

Thank you for listening

Questions?