

ENVIRONMENT DAY 2023

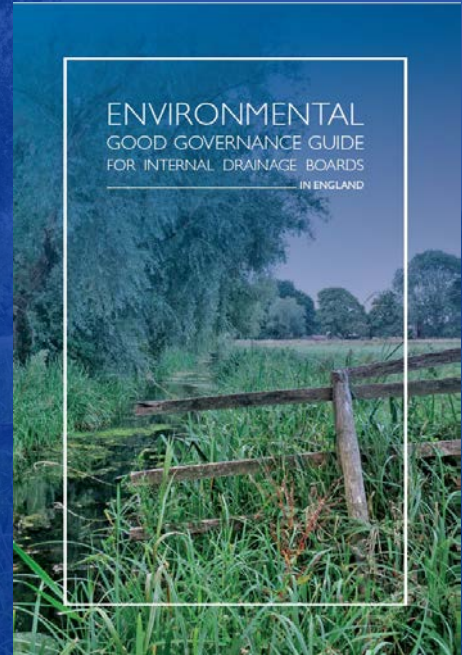
FOR INTERNAL DRAINAGE BOARDS



Representing Drainage
Water Level & Flood Risk
Management Authorities

ENVIRONMENTAL GOOD GOVERNANCE GUIDE FOR INTERNAL DRAINAGE BOARDS IN ENGLAND

Sofi Lloyd | Technical Officer - ADA



Background



Department
for Environment
Food & Rural Affairs



Representing Drainage
Water Level & Flood Risk
Management Authorities

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Interpretation

What

Why

How?



Representing Drainage
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Management Authorities

Interpretation

“...have regard for...”

“...consider...”

“...take into account...”

**Prove
it!**



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How to use the Guide



Reference style



Representing Drainage
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How to use the Guide - Chapters

3. Publishing Environmental Information

4. Planning & Development

5. Flood Risk Management & the Environment

6. Catchment Scale Approaches

7. Habitats Species & Biodiversity

8. Protected & Priority Species Guidance



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How to use the Guide - Chapters

9. Problem Species

10. The Marine Environment

11. Managing Water Quality, Pollution & Water Resources

12. Waste Management

13. Environmental Permits

14. Climate & Carbon



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How to use the Guide – Duty Index

DUTY INDEX

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How to use the Guide – Information Status



DUTY

MUST do



BEST
PRACTICE

SHOULD do



GOING
FURTHER

COULD do



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How to use the Guide – Signposting



KEY RESOURCES



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Toolbox – Chapter 2



How to Deliver Good Environmental Governance



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Toolbox

Biodiversity Action Plan

Best Practice Operations Manual

Partnership Working

Biosecurity Policy



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Toolbox

Mitigation Hierarchy

Working with Contractors

Engaging Environmental Expertise

Environmental Training



Using the Guide



Target Audience



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| Next Steps



**Environmental Legislation and
Regulation is changing!**



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Thank-you.

Questions?



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Water Level & Flood Risk
Management Authorities

Biodiversity Net Gain vs Biodiversity Enhancement?

General Biodiversity Objective?



Middle Level Biodiversity

Biodiversity Net Gain

- Biodiversity gain of 10% to be a condition of planning permission in England
- “Gains” to be registered and maintained for 30 years
- Expected to come into force Nov 2023



Middle Level Biodiversity

Biodiversity Metric

- Used to calculate biodiversity value before and after development
- Uses extent and quality of habitat as a proxy to calculate biodiversity value
- Prioritises on-site gains, but off site gain and “credits” can be used to reach full 10%
- Net gain rules – fish can’t live in trees!



Middle Level Biodiversity

Biodiversity Net Gain & IDBs

- Net gain plans will accompany other details sent to the IDB for consenting
- Review net gain plans & check flood risk compatibility
- Make suggestions!



Middle Level Biodiversity

General Biodiversity Objective

102 General duty to conserve and enhance biodiversity

- (1) Section 40 of the Natural Environment and Rural Communities Act 2006 (duty to **conserve** biodiversity) is amended in accordance with subsections (2) to (7).
- (2) In the heading, after "conserve" insert "**and enhance**".
- (3) For subsections (A1) and (1) substitute—
 - (A1) For the purposes of this section "**the general biodiversity objective**" is the conservation and enhancement of biodiversity in England through the exercise of functions in relation to England.
 - (1) A public authority which has any functions exercisable in relation to England must from time to time **consider** what action the authority can properly take, consistently with the proper exercise of its functions, to further the general biodiversity objective.
 - (1A) After that **consideration** the authority must (**unless it concludes there is no new action it can properly take**)—
 - (a) **determine** such policies and specific objectives as it considers appropriate for taking action to further the general biodiversity objective, and
 - (b) **take such action** as it considers appropriate, in the light of those policies and objectives, to further that objective.



Middle Level Biodiversity

Conservation & Enhancement

- Conserve - keep what we have
 - = Biodiversity Action Plans
 - = Best Practice Operations Manual
 - = Protected species licencing
- Enhance – make things better
 - = Biodiversity Action Plans
 - = Enhancement budget – ringfenced & defined



Middle Level Biodiversity

Enhancement – IDB Operations

- Create more habitat (small ponds, extend ditches, berms, “fry bites”)
- Create better habitat (diverse seed mixes, coir rolls)
- Increase structural diversity (rotational cutting frequencies for weed, reed and grass)
- Don’t discount “poor” or difficult areas – enhance them



Middle Level Biodiversity

Enhancement – IDB Operations

- Look to Local Nature Recovery Strategies (**LNRS**)
- Map good areas & features & identify less favourable areas
- Expand the good areas, join them up or create stepping stones between them



Middle Level Biodiversity

Enhancement – Use BNG opportunities

- Define enhancement projects which can be progressed with funding
- Approach your LNRS delivery lead, planning authority with enhancement proposals – other stakeholders are already doing this!
- Identify stacked benefits (reedbed creation = increased system capacity, carbon sequestration, climate change resilience, improved water quality **PLUS** biodiversity benefits).



Middle Level Biodiversity

Enhancement - Consenting

- Make BNG mandatory for development which requires IDB consent i.e. culverting.
- Use biodiversity metric trading rules to ensure no loss of extent or quality of habitat type and to gain 10% over pre-development
- Create an IDB biodiversity credit system - if applicant cannot deliver 10% gain, fund IDB enhancements elsewhere in the district



Middle Level Biodiversity

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Thank-you.

Time for discussion...



Middle Level Biodiversity

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Local Nature Recovery Strategies

Charlotte Phillips – Nature Partnership Manager
Emily Todd – Policy Officer

Local Nature Recovery Strategies



Why do we need nature recovery?

- 15% of species in Great Britain are threatened with extinction
- 133 already extinct
- 30% of Britain's birds are threatened with extinction
- According to the RSPB 40 million birds have disappeared from our skies since 1970
- UK it is estimated that we have lost 92% of our seagrass beds in the last century.



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Local Nature Recovery Strategies



25 Year Environment Plan



Nature Recovery Network:

“Develop a Nature Recovery Network to **protect and restore wildlife**, and provide opportunities to re-introduce species that we have lost from our countryside.”

Local Nature Recovery Strategies



Environment Act 2021



Environment Act 2021

2021 CHAPTER 30

Introduced **Local Nature Recovery Strategies**

- Strengthened duty to conserve and enhance biodiversity (NERC Act 2006)
- Underpins the Nature Recovery Network

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Local Nature Recovery Strategies



The vision



wildlifetrusts.org

Local Nature Recovery Strategies



What are LNRSs?

- New system of spatial strategies for nature recovery
- Nation wide (approx. 50 LNRS areas)
- Coordinated, practical and focussed action for nature
- Locally led, collaborative, transparent and evidence based
- Brings together existing initiatives, plans and policies (BNG, Tree planting, peatland restoration).

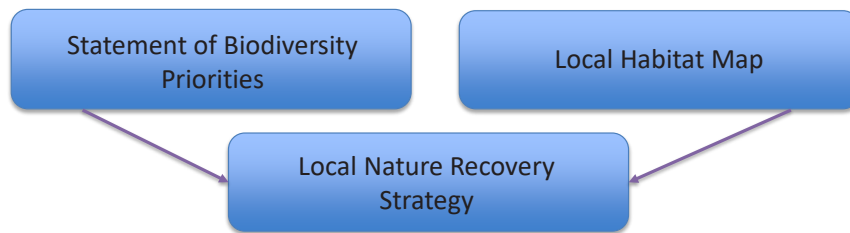


Cherry Blossom © GLNP

Local Nature Recovery Strategies



LNRS Production



Statement of Biodiversity Priorities

- Agreed priorities for nature's recovery – from stakeholder engagement

Local Habitat Map

- Map the most valuable existing areas for nature
- Map opportunities for habitat creation or enhancement

Local Nature Recovery Strategies



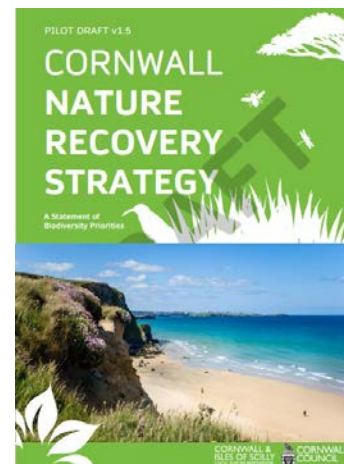
Statement of Biodiversity Priorities

Description of the strategy area and its biodiversity

Description of opportunities for recovering biodiversity

Priorities for recovering biodiversity

Measures relating to those priorities



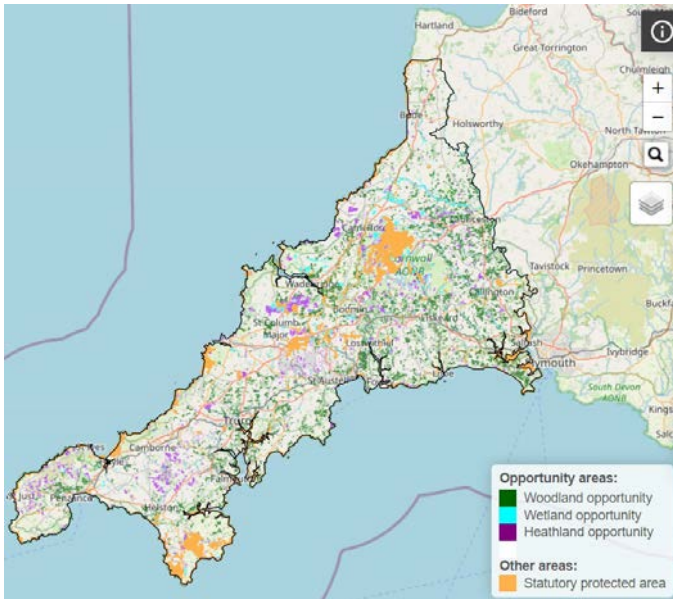
Cornwall LNRS Pilot: Draft LNRS

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Local Nature Recovery Strategies



Local Habitat Map

- National conservation sites
- Nature reserves
- Other areas of importance for biodiversity
- Opportunity areas for nature recovery and wider environmental benefits

Cornwall LNRS Pilot: Interactive Local Habitat Map @ lagas.co.uk

Local Nature Recovery Strategies



Lincolnshire Wolds © GLNP

Delivery & Funding

- Biodiversity Net Gain
 - » 15% increase in units for engagement with LNRS
- Environmental Land Management Schemes
 - » Financial incentive for Nature Recovery/Sustainable Farming Practices
- England Peat / Tree Action Plans
 - » Nature for Climate Fund
- Green Investment
 - » Carbon and Biodiversity markets

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Greater Lincolnshire's LNRS

First Steps



GL Local Nature Recovery Strategy: First Steps



GLNP
GREATER LINCOLNSHIRE
NATURE PARTNERSHIP



© Emily Todd

About Greater Lincolnshire

- Covers Humber to the wash (718,186 ha)
- 10 local authorities
- Approx. 1.1 M (2021)
- Arable lowland landscape
 - » One of the largest concentrations of food manufacturing, research, storage and distribution areas in Europe
 - » 30% England vegetables
 - » 18% England poultry

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GL Local Nature Recovery Strategy – First Steps **GLNP** GREATER LINCOLNSHIRE NATURE PARTNERSHIP

Working together to achieve more for nature



GL Local Nature Recovery Strategy – First Steps **GLNP** GREATER LINCOLNSHIRE NATURE PARTNERSHIP

What have we done so far?

GLNP Conference November 2022

Partnership Framework

Habitat and Biodiversity Opportunity Mapping

Stakeholder list



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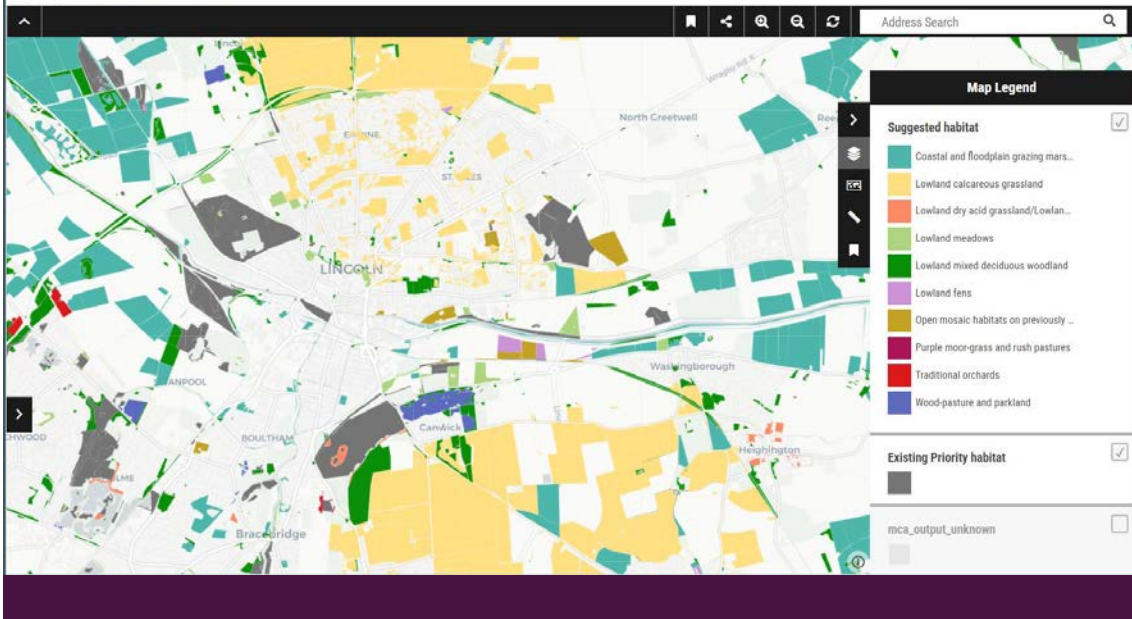
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GL Local Nature Recovery Strategy – First Steps



GLNP Habitat suggestions



GL Local Nature Recovery Strategy – First Steps



Challenges and Opportunities

Nature recovery in a farmed environment

Funding and the duty to deliver

A new approach – More, Bigger, Better and Joined

Locally led – local people choosing what is important



wildlifetrusts.org

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GL Local Nature Recovery Strategy – First Steps



Working Together © GLNP

How IDBs can contribute to the LNRS

Become a key stakeholder

Use the LNRS Local Habitat Map

Continue to promote and investigate sustainable water management practices

Integrate LNRS Biodiversity Priorities into IDB BAPs

GL Local Nature Recovery Strategy – First Steps



While we wait

- April 2023
- Spread awareness
- Build partnerships
- Data collection

Local Planning Authority © GLNP

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Greater Lincolnshire Nature Partnership



Newsletter, Twitter, LinkedIn and Facebook



Questions?

GB Floating Pennywort Strategy

Trevor Renals
Senior Technical Advisor, Invasive Species
February 2023



Floating Pennywort *Hydrocotyle ranunculoides*



Environment
Agency

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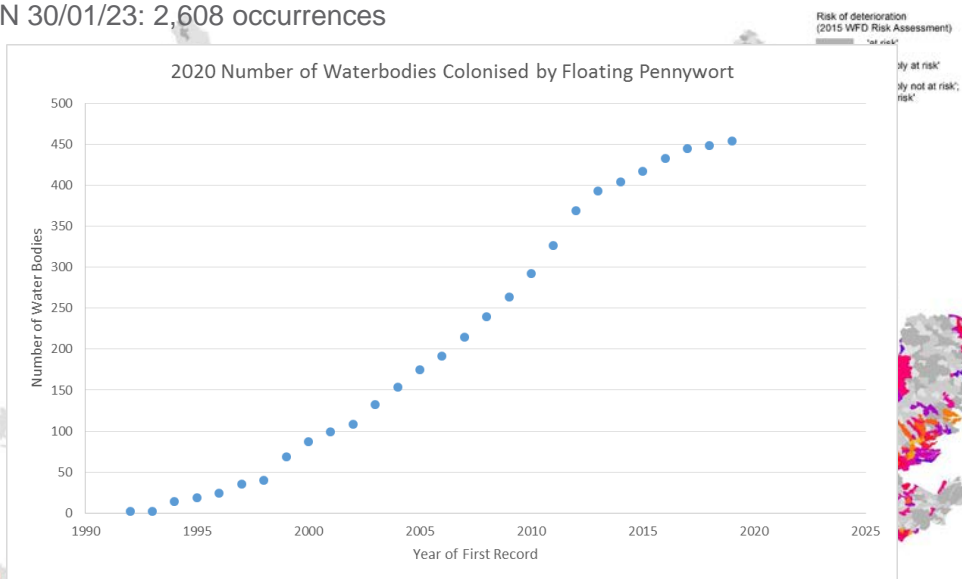


Invasion history



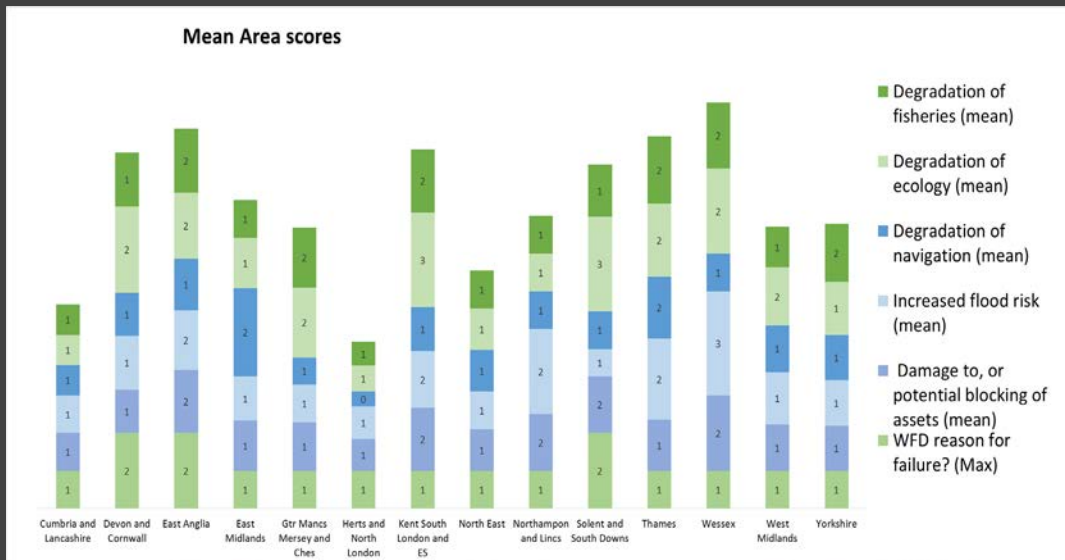
Floating Pennywort records to December 2017
NBN 30/01/23: 2,608 occurrences

Floating Pennywort: Year of first colonisation



Darker grey water bodies were classified as 'at risk' of deterioration as a result of Floating Pennywort (2015 WFD Risk Assessment)

Area perception of impact



Cost

- ➔ £650k annual EA cost (EA, 2017);
- ➔ Total annual cost to England £25 million, of which £1,800k is control costs (Defra 2010)

Unit cost

	Sum of EA cost to date in 2017	Sum of estimated total cost of EA management to date	Count of Severity of infestation	Sum of What length of the river was affected? (Km)	Mean overall amount per kilometer	Mean amount per kilometer in 2017
Abundant	310746.83	2000500	17	257.05	£ 7,782.53	£ 1,276.52
Dominant	950	25500	1	10	£ 2,550.00	£ 95.00
Frequent	186900	793000	18	134.25	£ 5,906.89	£ 1,529.32
Occasional	97163	390120	22	203.7	£ 1,915.17	£ 597.19
Rare	44330	123830	7	46.71	£ 2,651.04	£ 991.72
Grand Total	£ 640,089.83	£ 3,332,950.00	65	651.71		
				Average cost	£ 4,161.13	£ 897.95
				Average cost without dominant	£ 4,563.91	£ 1,098.69

Unit cost

- ➔ In summary, managing floating pennywort costs, on average £1100/km/year;
- ➔ There are plenty of 'health warnings' over this figure;
- ➔ Our current investment is failing to prevent further spread, and must therefore be considered an under-estimate.



Why is strategic management of floating pennywort so hard?

- ➔ It's nobodies job;
- ➔ There is no dedicated strategic budget;
- ➔ Multiple landowners/managers usually involved;
- ➔ Hard to eradicate



Why is strategic management of floating pennywort so hard?

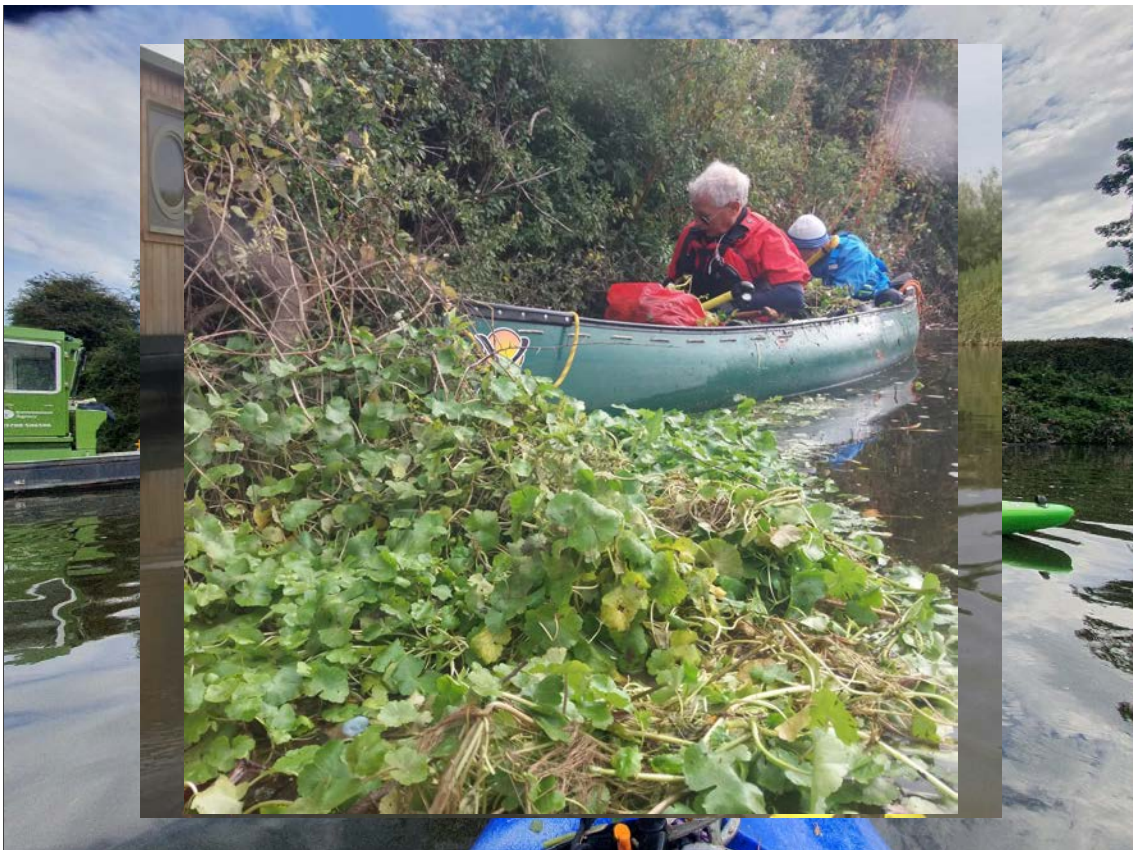
- ➔ It's nobodies job;
- ➔ There is no dedicated strategic budget;
- ➔ Multiple landowners/managers usually involved;
- ➔ Hard to eradicate

Strategic management of floating pennywort requires coordinated, effective and sustained intervention for the entire duration of the management programme



GB FP Strategy

- ➔ A volunteer-led strategy, working with a variety of environmental NGOs, government bodies and water companies;
- ➔ British Canoeing and Angling Trust main partners;
- ➔ Cost-neutral, but provides a route for effective use of funding;
- ➔ Thames Area pilot project underway and GB launch in May 2021.



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'the evidence for a link between mental health and engagement with, access to and interventions within nature is substantial'

Literature review by Dan Bloomfield, 2017

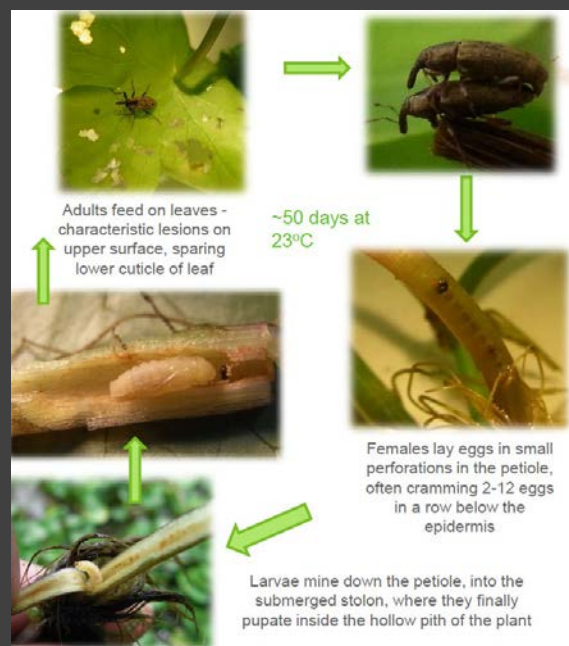
Integrated Weed Management of Floating Pennywort

- ➔ Large volumes of weed removed with weed boats and other large mechanical control methods;
- ➔ Small infestations (new infestations and regrowth from mechanical removal) removed using volunteers (the 'little and often' approach);
- ➔ Good biosecurity to prevent further spread
- ➔ Biological control



Biological control

- ➔ EA instigated/Defra funded research commenced in 2010;
- ➔ Released in 2021.

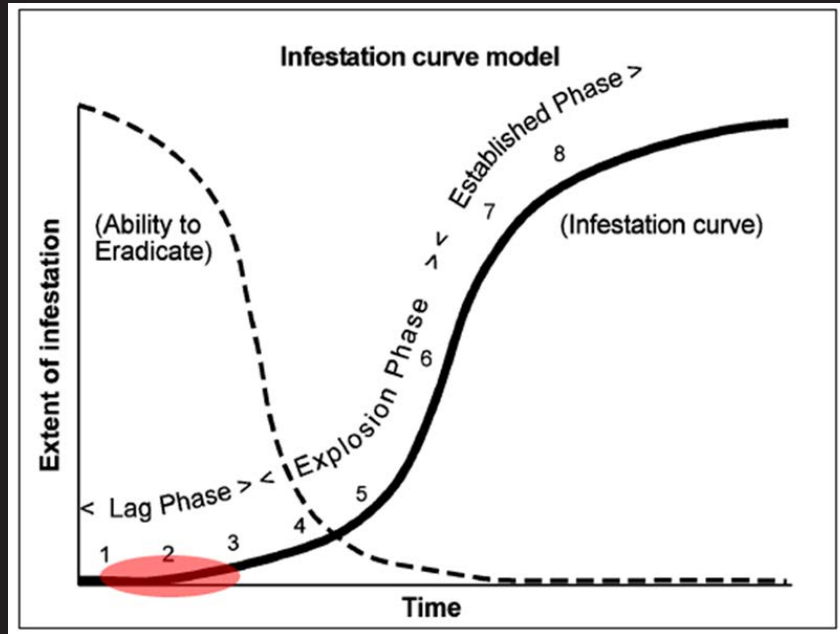


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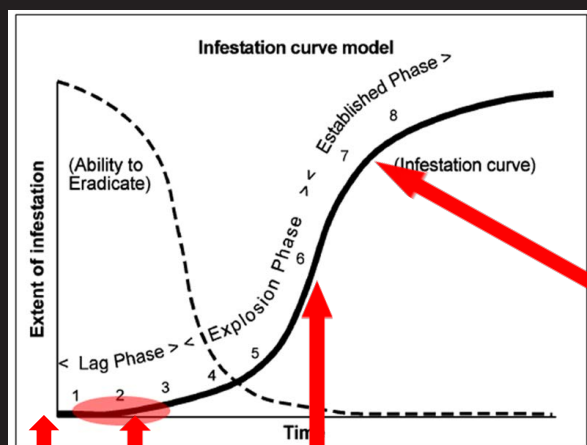
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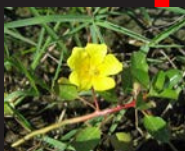
The invasion process



The invasion process



*Reynoutria
(Fallopia) japonica*



*Ludwigia
peploides*



*Ludwigia
grandiflora*



*Hydrocotyle
ranunculoides*

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Water Primrose Alert!

Water primrose is present at this site. This plant is highly invasive and it is an offence to spread it.

Do not:

- Remove any plant material from this site without permission;
- Access the site or let your dog go in the water;
- Enter any fenced or restricted areas, especially when removal operations are underway

Keep away from the water and margins.

Ensure you thoroughly clean footwear, clothing and equipment.

What is water primrose?

Water primrose, *Ludwigia grandiflora*, was introduced into the UK as an ornamental aquatic plant, and is invading ponds, lakes, wetlands and waterbodies. It is already causing serious damage to the environment elsewhere in Europe and Japan.

Water primrose forms dense mats which excludes native species, degrades amenity use and may increase flood risk. It is now banned from sale in the UK. If you find water primrose, report it at alert@nonnativespecies.org. More information on identifying water primrose is available at www.nonnativespecies.org

STOP THE SPREAD
INVASIVE AQUATIC SPECIES
CHECK-CLEAN-DRY

Carbon Accounting for IDBs

2 February 2023



Carbon Accounting for IDBs

- Why we've undertaken a carbon footprint
- Methodology
- Results
- Carbon Management Plan
- Conclusion

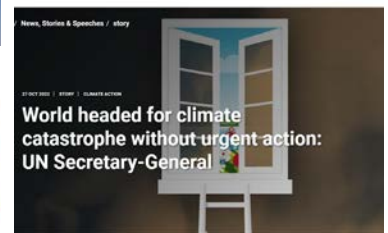
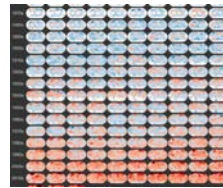
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Why – The Legislative Drivers

- 2008 Climate Change Act
 - set out a legal framework to cut GHGs to 80% below 1990 levels by 2050
 - Established the Committee on Climate Change
- 2018 IPCC Special Report on 1.5 C
- 2019 UK became the first G7 economy to legislate for **net zero by 2050**



Why – Local Drivers & How

Why

- Local Government Authorities and Environment Agency produced Carbon footprints
- Some Board members are councillors and climate emergencies have been declared by various boards, our most local - Borough Council King's Lynn & West Norfolk.

How

- December 2021 - Gained board approval to commence
- September 2022 - Completed carbon footprint

Considerations

- Consultant vs In house resource?
- Where to start?



Turning Point

Discussed with our local Local Authority how they actually went about creating their carbon footprint

- Baseline year
- Scopes
- Conversion factors

Confidence that it was in fact achievable in house

All now within ADA Carbon Accounting Guide

But remaining issue was Data savvy-ness



What we did

Data & Resources – Finance Team

Coverage - All 7 IDBs in WMA. Appendices for each board and a WMA consortium which the target is based on.

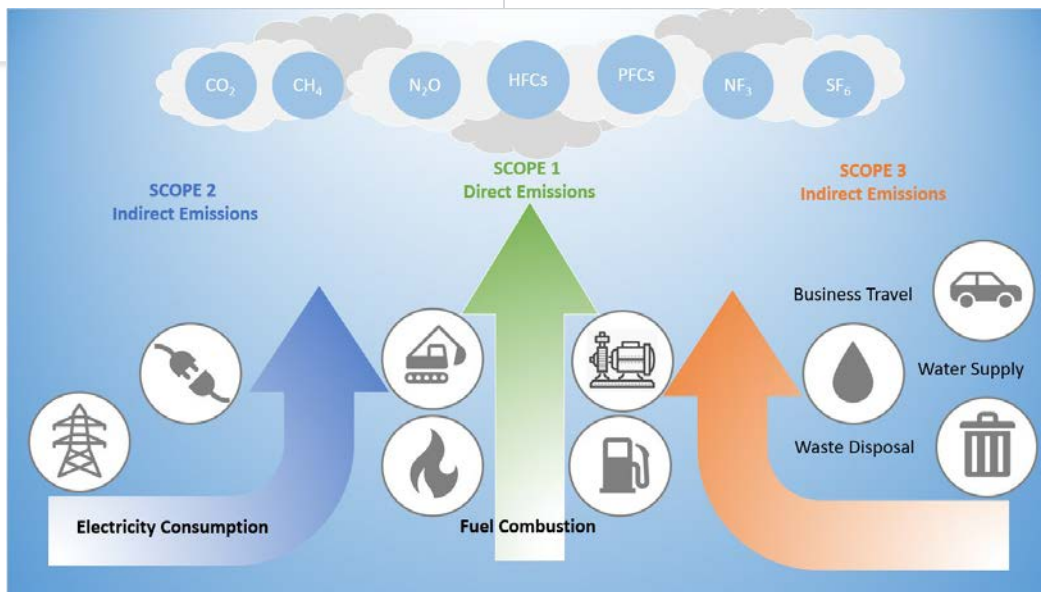
Duration - Past 3 financial years 2019/20, 2020/21, 2021/22

Target

Government's ask of small businesses (SMEs) :

- 50% reduction in greenhouse gas emissions before 2030. (Scope 1 and Scope 2)
- Achieve net zero emissions by 2050. (across Scope 1, 2 and 3)
- Disclose progress on a yearly basis.

Scopes



Scopes

What have we included in our Scope 3

Organisation boundary

- Recharge works
- Contractors plant
- FCERM Capital projects
- Commuting

Assumptions / limitations

- Electricity



All need to be documented in your report.

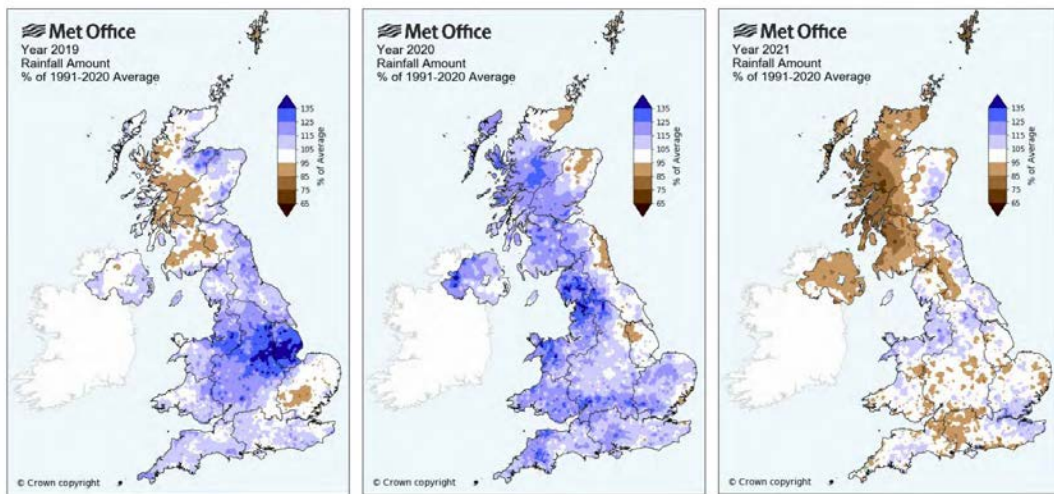
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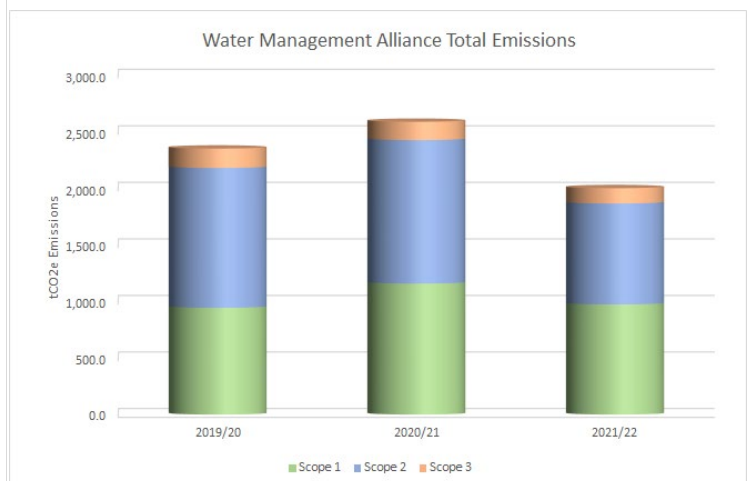
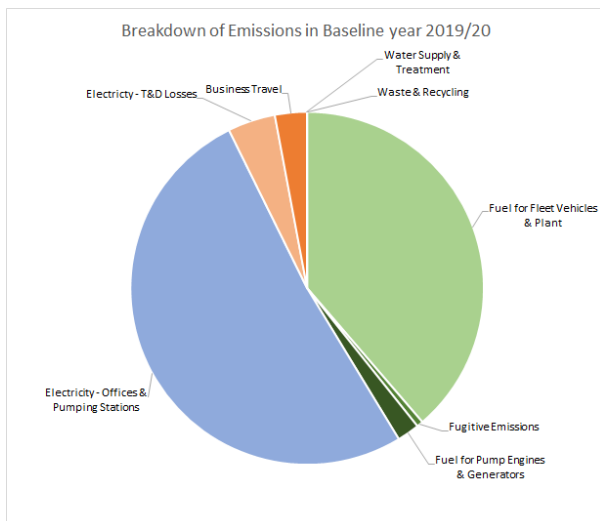


Baseline – 2019/20

APPENDIX 8: Maps showing actual rainfall as a % of the 1991 – 2020 Average (30 year averaging period) . Reference: Met Office, Exeter, UK

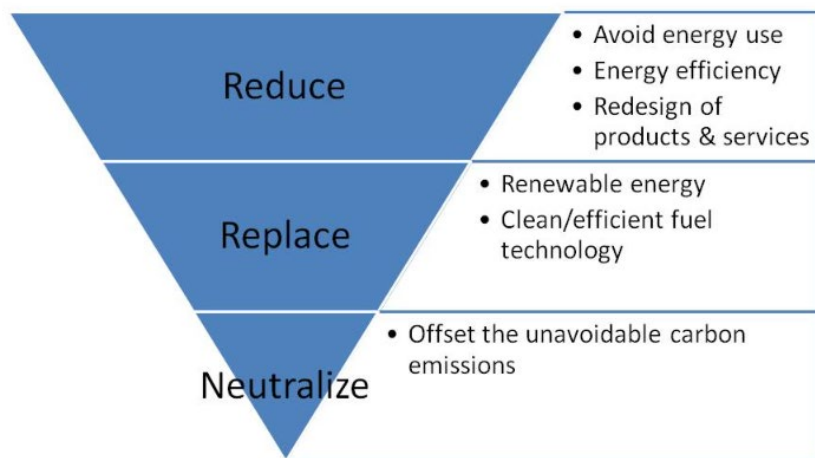


Results



Carbon Management Plan

Carbon hierarchy



Fuel Reduction – Scope 1

HVO Fuel



90% Carbon Reduction

Cost

Sustainability?

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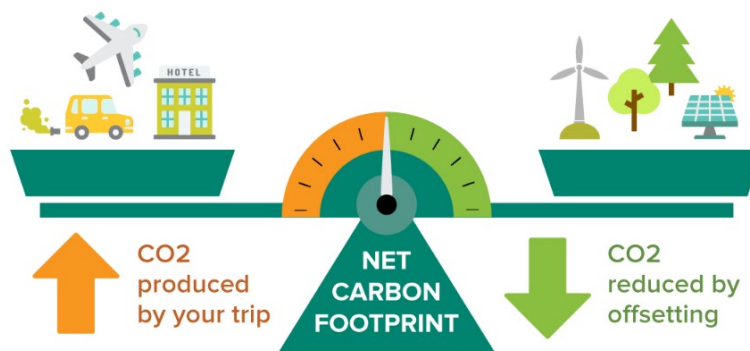
Electricity Reduction – Scope 2

Renewables / Green Tariffs
Solar



Carbon Offsetting

CARBON OFFSETS ALLOW YOU TO BALANCE OUT
YOUR EMISSIONS



sustainabletravel.org

SUSTAINABLE
TRAVEL INTERNATIONAL

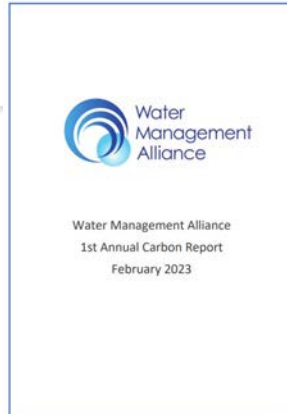
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Conclusion

- Daunting experience at the start
- It's been a positive experience 😊
- It's opened the carbon discussion
- All help push forward a carbon plan



- Questions
- Where is everyone on their journey?



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Useful links and sites

Borough Council of West Norfolk – Calculating your Carbon Footprint

[Calculating your carbon footprint | Calculating your carbon footprint | Borough Council of King's Lynn & West Norfolk \(west-norfolk.gov.uk\)](#)

The Climate Change Committee

[A legal duty to act - Climate Change Committee \(theccc.org.uk\)](#)

ADA's Carbon Accounting Guide for IDBs

[Climate and carbon - Association of Drainage Authorities \(ada.org.uk\)](#)



Beaver Management Regulation and Licensing in England



- Wild beaver populations in England
- Legislation protecting beavers
- Beaver management and mitigation
- Licensing regime



www.gov.uk/natural-england

Wild beaver populations in England



- Wild releases not currently permitted
- Escapes from enclosures and unlawful releases have resulted in 6 wild-living populations (estimated 400 beavers):
 - A. River Otter in Devon (authorised population due to the licensed ROBT)
 - B. River Stour in Kent
 - C. River Tamar in Devon
 - D. Rivers Avon and Frome in Somerset and Wiltshire
 - E. Little Dart River in Devon
 - F. River Wye in Herefordshire
- Beavers made a European Protected Species in October 2022 – all wild beavers in England are now protected by the Habs Regs.

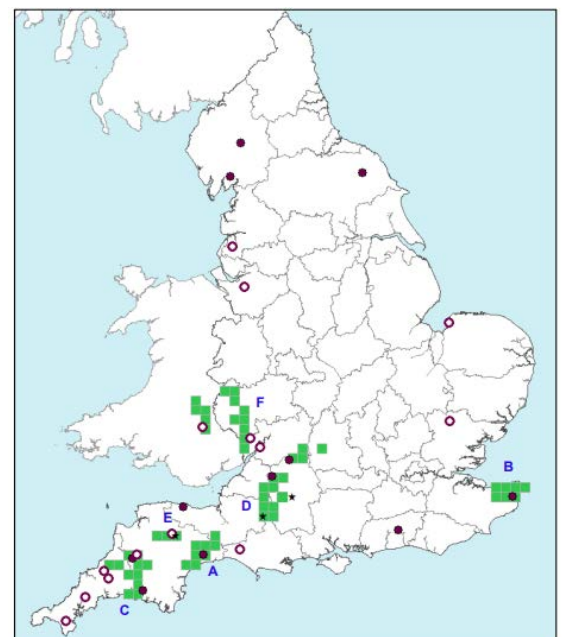


Figure 4 Distribution of wild-living beavers during the period 2015 – August 2021

Legislation protecting beavers



Offences under the Conservation of Habitats and Species Regulations 2017:

- To possess or be in control of a beaver / beaver parts (e.g. skulls, fur, castoreum etc)
- To transport a beaver / beaver parts
- To sell or exchange (or to offer for sale or exchange) a beaver / beaver parts
- Deliberately capture, injure or kill a beaver*
- Deliberately disturb a beaver*
- Damage or destroy a beaver breeding site or resting place (dams, burrows, or lodges)*

* New offences from 1 October 2022



Dam removal

Legislation protecting beavers



Offences under the Wildlife and Countryside Act 1981:

- Use any trap or snare to kill, take or restrain a beaver
- To release a beaver into the wild

Beavers moved from Part 1B (animals no longer normally present) of Schedule 9 to Part 1A (native animals)*

* Changes from 1 October 2022



Photo credit: Roisin Campbell-Palmer

Beavers can play a role in natural flood management



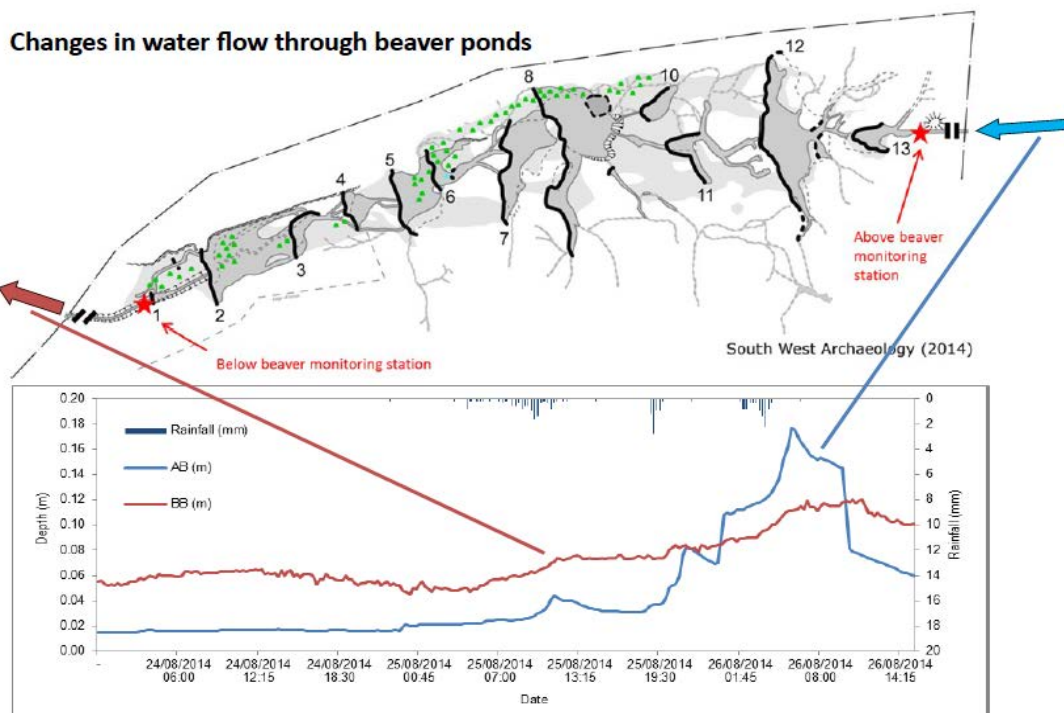
- Attenuate water flows:
 - Reduce risk of downstream flooding
 - Maintain water in times of drought
- Improve water quality

Case study example – River Otter Beaver Trial:

- Beavers established a territory in farmland upstream of a flood-prone village
- 52 properties in the village at risk of flooding with 4 flood events occurring since 2000
- Beavers created ponds which covered 1000m² – causing water to leave the site more slowly which has reduced the risk of downstream-flooding



Beaver-created ponds in farmland upstream of a flood-prone village



Why beaver management is required



Beavers can cause impacts by:

- **Burrowing** – burrowing into riverbanks can lead to increased erosion and bank collapse, could cause flood embankments to become undermined
- **Dam building** – can cause localised flooding and woody debris used in dams may become dislodged and damage downstream flood defence and water control assets
- **Felling trees**

Risk of damage is expected to be greatest in low-lying areas with heavily modified watercourses that have lots of flood defence infrastructure and no / minimal river buffer zones.



Collapsed burrow



Excavation in a farmers drainage ditch



Beaver dam

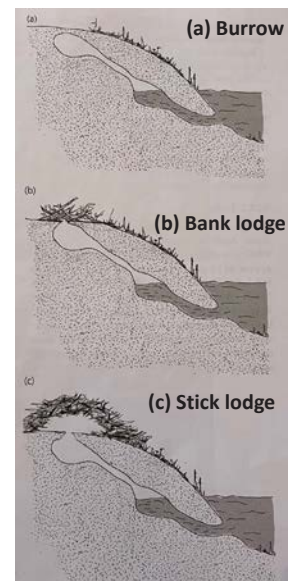


Tree felling

Why beaver management is required



- Burrow and lodge entrances are underwater making them difficult to detect (only visible if water level drops or the water is extremely clear)
- Monitor flood embankments (for potential burrowing activity)
- Monitor flood defence and water control assets



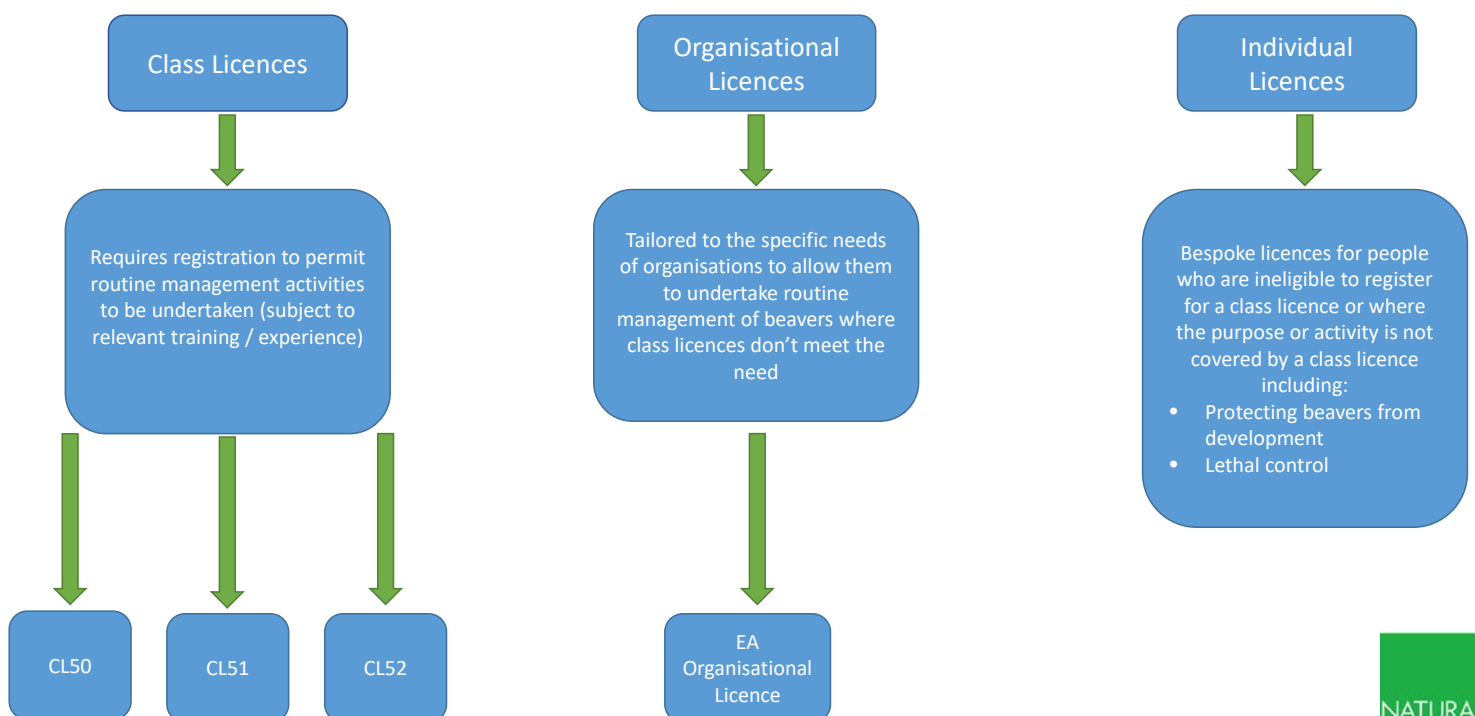
Illustrations from Rosell, F.N. and Campbell-Palmer, R. (2022) Beavers: ecology, behaviour, conservation, and management.

Activities not requiring a NE licence



- On-going normal land management activities like ploughing and cultivating
- Modifying or removing a dam less than two weeks old
- Modifying or removing a dam where there are no burrows or lodges associated with that dam
- Destroying a day rest
- Infilling a burrow which is so severely damaged that its continued use by beavers is not possible
- Infilling beaver canals
- Installing fencing to keep beavers out of vulnerable structures
- Installing tree guards or using textured tree paint
- Removal of trees that beavers have felled (but this may increase the chance of beavers felling more trees for food and building materials)
- Removing woody debris e.g. which has blocked a culvert – provided the woody debris is not acting as a beaver dam and protecting burrow / lodge entrances

Beaver management licences



Class Licence 51



Activities permitted:

- Modify or remove beaver dams, burrows and lodges
- Possess dead beavers or their body parts

Purposes for which the licence can be used:

- Prevent serious damage to livestock, animal feed, crops, growing timber, fisheries or any other property
- Preserve public health or safety
- Conserve wild animals or plants of conservation concern
- Allow you to carry out scientific or educational work

To register for this licence, you must be one of the following:

- A public body or authority employee
- A land or water manager
- A fishery manager
- An adviser or consultant to the above

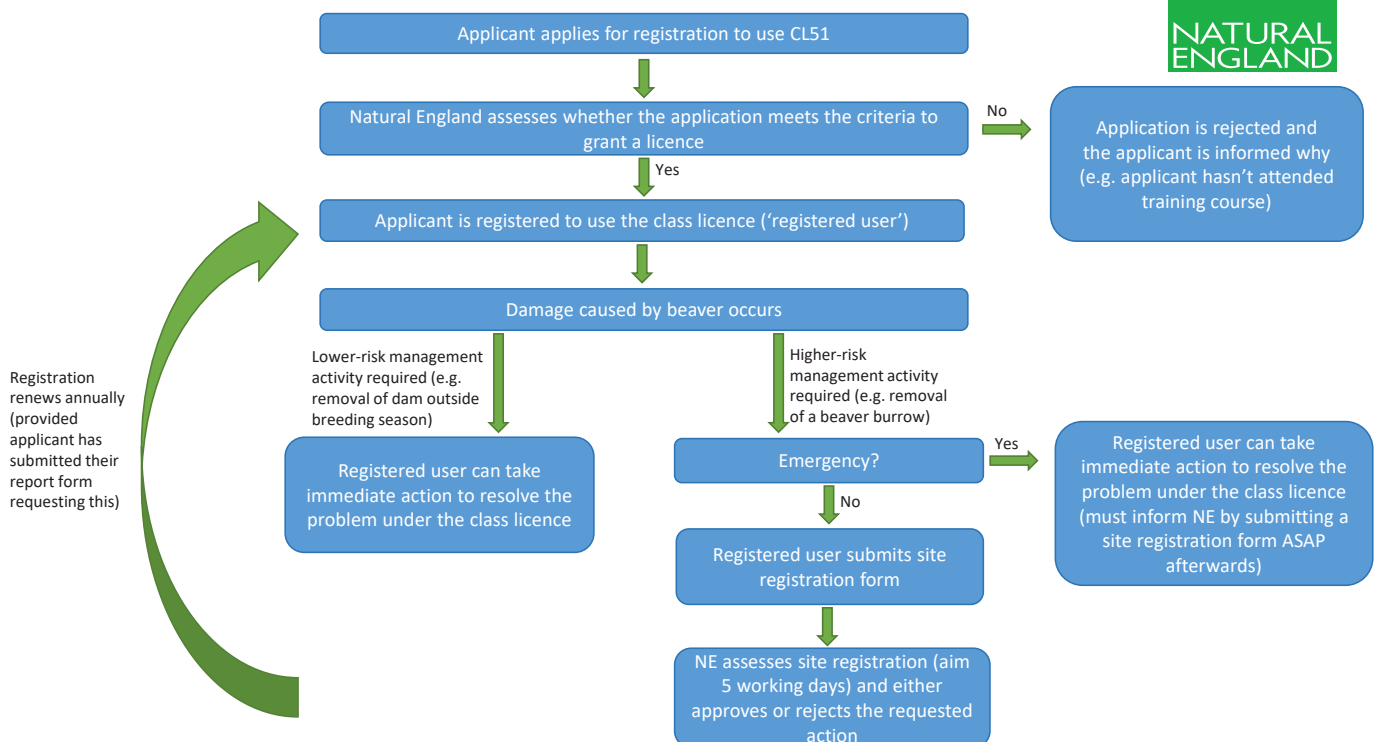
Training:

- You must attend a NE training course before you can register to use CL51
- Email beavers@naturalengland.org.uk to express interest in attending training / registering to use CL51



NE class licence training course

Class Licence 51 – Registration Process



Guidance available on Gov.uk



- [Beavers: how to manage them and when you need a licence - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/beavers-how-to-manage-them-and-when-you-need-a-licence)
- [Managing beaver activity and land without a licence - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/managing-beaver-activity-and-land-without-a-licence)
- [Beavers: protection and management - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/beavers-protection-and-management)

Conclusions

- Beavers can play a role in natural flood management, but we recognise issues can occur especially in lowland areas
- Management should begin at the bottom of the management hierarchy and there are a range of lower level interventions that can manage or mitigated risks
- NE (in collaboration with the EA) has designed a licensing regime which enables IDBs to respond to problems swiftly
- Email beavers@naturalengland.org.uk if you need to attend the CL51 training course (pre-requisite to registering to use CL51)



The New Eels Regs Process: Evidence-Led Regulation

How we got to Best Achievable Eel Protection
(BAEP) for the Land Drainage/Flood Pumping
Sector

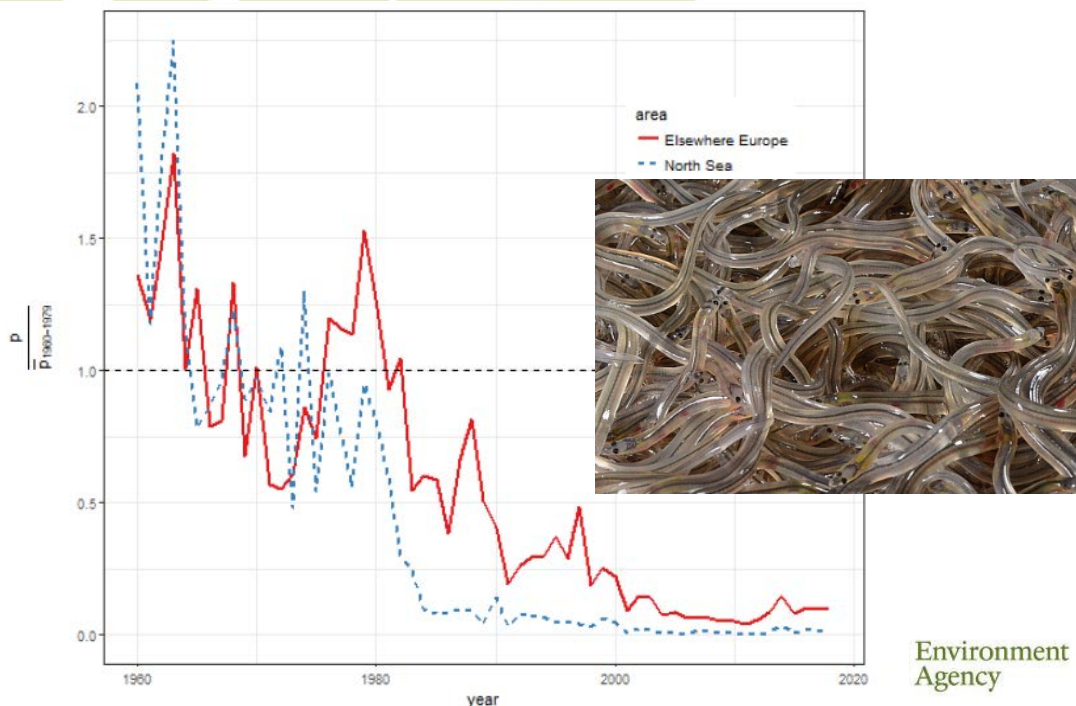
Andy Don
National Fisheries Services

A Presentation for ADA Environment Day

02.02.2023



What's it all about...?



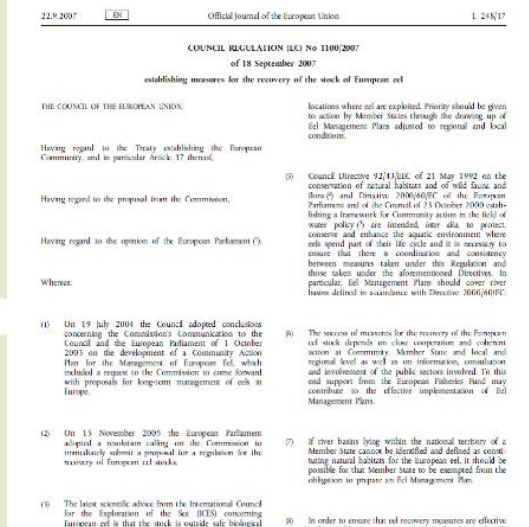
Environment
Agency

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FOR INTERNAL DRAINAGE BOARDS



The European Eel Regulation (EC 1100/2007)



COUNCIL OF THE EUROPEAN UNION
Brussels, 14 August 2007 (OR_en)

12031/07

Interinstitutional File: 2006/0201 (CNS)

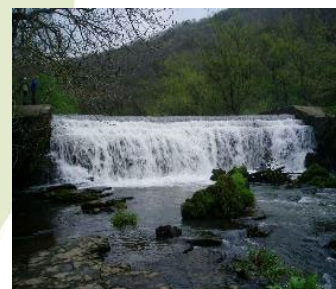
PECHE 241

LEGISLATIVE ACTS AND OTHER INSTRUMENTS
Subject: COUNCIL REGULATION establishing measures for the recovery of the stock of European eel



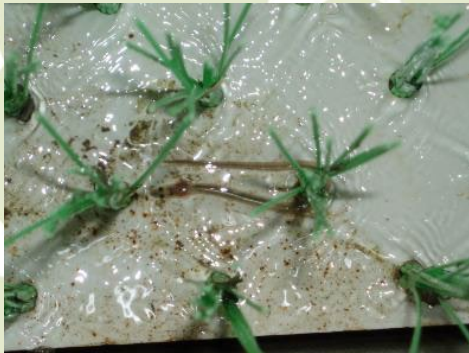
The main impacting factors on eel populations

- Exploitation,
- Access/migration barriers,
- Entrainment, Loss of habitat,
- Predation, Water quality/pollution,
- Pathogens & parasites,
- Climate change/oceanic factors



The Eels (England & Wales) Regulations 2009 Statutory Instrument

'The Eel(s) Regs.'



STATUTORY INSTRUMENTS	
2009 No. 3344	
FISHERIES, ENGLAND AND WALES	
RIVER, ENGLAND AND WALES	
The Eels (England and Wales) Regulations 2009	
<i>Made</i>	14th December 2009
<i>Laid before Parliament</i>	21st December 2009
<i>Laid before the National Assembly for Wales</i>	21st December 2009
<i>Coming into force</i>	15th January 2010
CONTENTS	
PART 1 General	
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2. Interpretation	3
PART 2 Records and restocking	
3. Eel catch returns	3
4. Records	4
5. Imports	4
6. Exports	4
7. Dates on consignees	4
8. Restocking	5
9. Interpretation	5
PART 3 Eel Licences	
10. Close season	6
11. Reduction of fishing effort	6
PART 4 Passage of eels	
12. Construction, alteration etc of obstruction	6



The Eels Regs

Part 1 Context and definitions

Parts 2 & 3 Regulation of commercial and recreational eel fishing. Plus 60% for restocking

Part 4 The passage of eels (includes eel passes and eel screens)

Part 5 Notices and Appeals

Part 6 Enforcement and Penalties

In terms of eel screens, the Regs are binary: an operator must either screen appropriately or be given a legal notice of exemption



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We had to:

- Design a process
- Train and support staff
- Get 'responsible persons' to understand The Regulations, the process and their obligations.....and act on them(!)

Scale of the challenge:

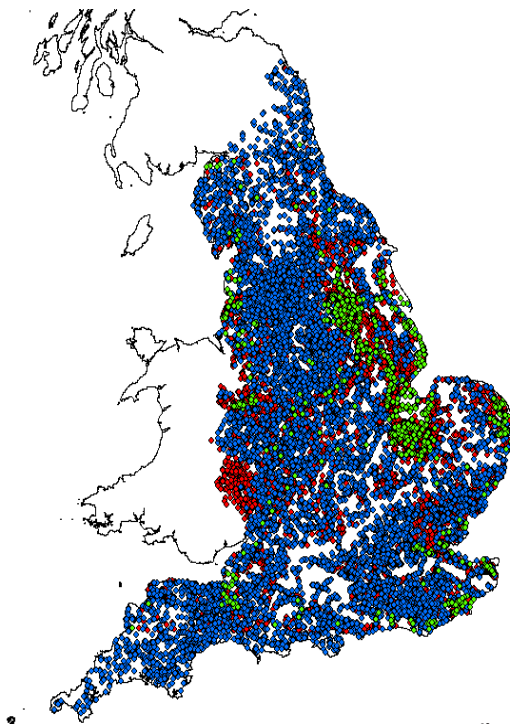
Qualifying sites range from this:



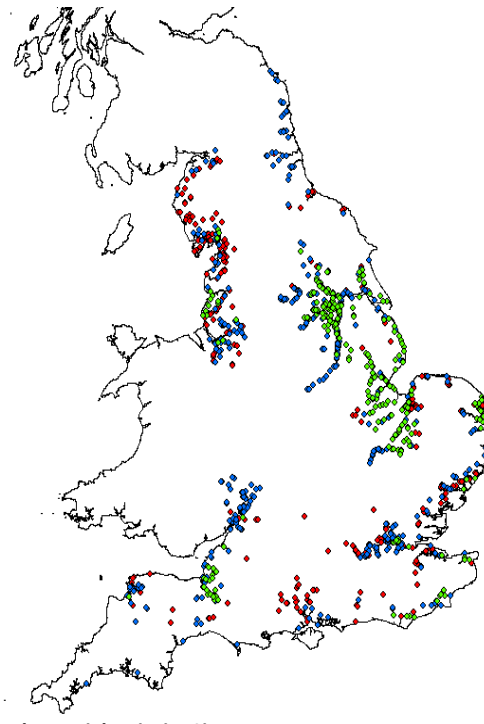
to this:



Needed to adopt a 'risk-based approach' to implementation



Legend:
Abstractions – Red
Obstructions – Blue
Pumping Stations – Green



Filtered Numbers, High Priority Sites:
Abstractions: 603; Obstructions: 640; Pump Stns: 292



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...We will work with operators to help them achieve compliance with eel passage and screening requirements through their scheduled programmes of work, including routine maintenance and refurbishment programmes and planned capital investment programmes...



Changes to the Eels Regulations Process (ChERP) project: Final Newsletter

This newsletter is to keep all our stakeholders up to date on how we are progressing with our work to make changes to the Eels Regulations process.

Project Update, January 2021

In our last ChERP newsletter we told you that our aim was to complete the remaining work on the project and seek final sign-off of our new regulatory approach, from Executive Directors, during the third quarter of this year. I'm pleased to report that, just before the Christmas break, Directors made a decision to accept the new regulatory process developed during the project. This is good news and it means that we can now move on to implement the new process.



New Eels Regulations Process (NERP)

- Starting point need not be BP in all cases
- New concept of Best Achievable Eel Protection (BAEP)
- CBA for new builds as well as legacy structures
- Still uses much of existing process (CBA etc)
- Will get to correct, approved solution quicker, cheaper
- Fundamentally based on better data and experience since Eels Regs enacted



How do you define Best Achievable Eel Protection?

1.0 Best Achievable Eel Protection (BAEP)

In terms of protecting eels at intakes, “Best Achievable Eel Protection” means the most effective and advanced stage in the development of a solution and its methods of operation by site type. There may be more than one BAEP solution for a site that can deliver or exceed the safe parameters stated in our latest guidance documents, and, BAEP and the evidence that drives its requirement is dynamic and will change with time.

1.1 Definitions:

“Achievable Eel Protection” means utilizing those techniques that have been developed on a scale that allows their implementation by a relevant Sector at a specific site. They should be accessible to the operator and be **technically and economically viable**.

“Best” means the most effective solution in achieving the highest level of eel protection compared to other considered options.

BAEP as a whole includes everything that has a bearing on the eel protection to be derived, eg:

The selection of a BAEP solution;

The design of the solution;

The implementation of the solution; and

How it is managed, operated and maintained.



What does a BAEP solution look like?

 Vertical Travelling Band Screen (Engineered Polymer)	 Vertical Travelling Band Screen (Stainless Steel)	 Coanda Effect Screen	 Open 'Archimedes' Hydrodynamic Screw Turbine	 True Archimedes Screw Turbine	 Traditional Water Wheel
 Horizontal Travelling Band Screen (Engineered Polymer)	 Passive Wedge Wire Panel	 Passive Wedge Wire Cylinder	 Venturi-Enhanced Turbine Technology	 True Archimedes Screw Pump	 Less damaging Vertical Canister or other Axial/Volute Pump
 Fish Recovery and Return Band Screen (Engineered Polymer)	 Fish Recovery and Return Drum Screen	 Fish Recovery and Return Launder/Ancillaries	 Less damaging Horizontal Canister Pump	 Less damaging Pipework, Siphon Valves, Control Structures, Ancillaries	 Less damaging Portable/Towable Pump
 Contra-Flow Self-Cleaning Screen	 Sub-Gravel Intake	 Low Velocity Side Entry Intake Head	 Appropriately dimensioned Bar Rack	 Appropriately configured Bypass	



Using evidence to lead this regulatory reform

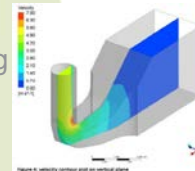
Relating to less damaging pump systems instead of eel screening
EA has used / is using:

Desktop

- The Dutch NEN 8775 Standard



- Computational Fluid Dynamics (CFD) Modelling



Practical

- Barotrauma Detection System (BDS)



- Live fish trials



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FOR INTERNAL DRAINAGE BOARDS





Dutch standard
NEN 8775
(en)

Fish safety - Method for the determination of the fish safety of pumps, Archimedean screws and cooled water turbines used in pumping stations and hydroelectric plants

Vissveiligheid - Methode voor de bepaling van de vissveiligheid van pompen, vijzelwiel en koelwater turbines die worden gebruikt in gemaal en waterkrachtcentrales

NEN 8775:2020 (en)

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Method for carrying out lab and field tests

Method for calculating blade strike probabilities and likelihood of mutilation for pumps/turbines

The full scale mortality P_{sc} can then be determined from the mortality on a model scale P_{sm} according to formula (26):

$$P_{sc}(z_{f,sc}, D_p, Q_p, N_{sc}) = f_s \cdot P_{sm}(z_{f,sm}, D_p, Q_p, N_{sm}) \quad (26)$$

where the scaling factor f_s for scaly fish is determined with formula (27):

$$f_s = \frac{\left[\frac{z_{f,sc}^2 + \ln\left(\frac{z_{f,sc}}{z_{f,sm}}\right) + 1}{z_{f,sc}^2 + \ln\left(\frac{z_{f,sm}}{z_{f,sc}}\right) + 1} \right]}{\left[\frac{z_{f,sm}^2 + \ln\left(\frac{z_{f,sm}}{z_{f,sc}}\right) + 1}{z_{f,sm}^2 + \ln\left(\frac{z_{f,sc}}{z_{f,sm}}\right) + 1} \right]} \quad (27)$$

[see for explanation Table 2 and formula (16) on page 47]

and that for eel with formula (28):

$$f_s = \frac{\left[\frac{z_{f,sc}}{z_{f,sm}} \right]}{\left[\frac{z_{f,sm}}{z_{f,sc}} \right]} \quad (28)$$

<https://www.nen.nl/en/nen-8775-2020-en-278917>

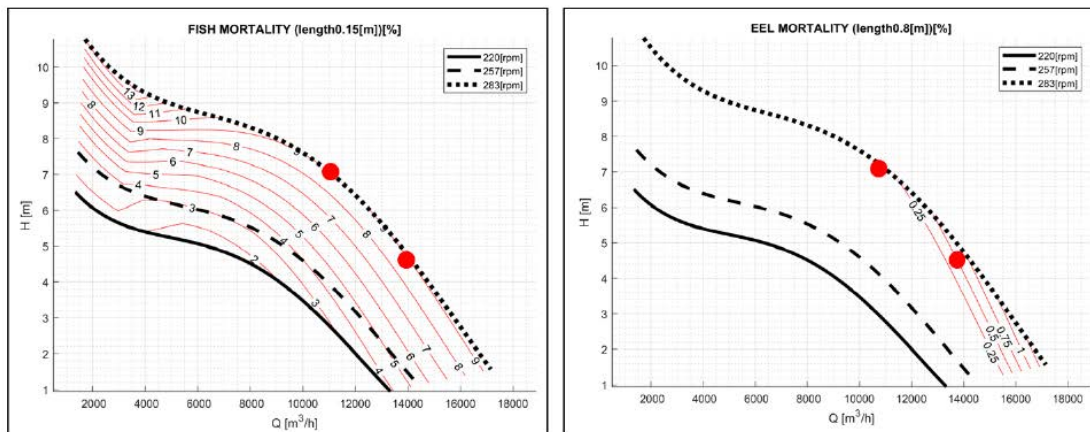


Figure 3 theoretical fish mortality rates for VPF1-1100.130 for Keadby for scaled fish (left) and eel (right) according standard NEN8775

Generally what's good for pumping operations: no cavitation, smooth stream lines, no or little turbulence, is a good proxy for how benign transit for fish/eels is through these systems – **we have a common goal**



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FOR INTERNAL DRAINAGE BOARDS

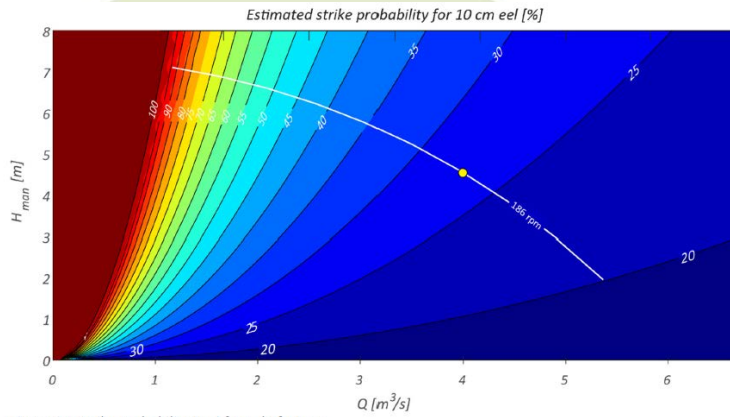


Figure 8a: Strike probability in % for eel of 10 cm

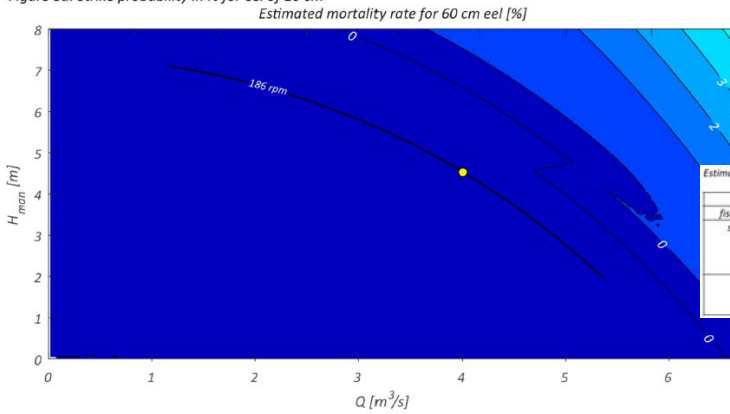


Figure 8b: Estimated mortality rate for 60 cm eel

Based on the pump performance curves it is possible, using the techniques described within the NEN 8775 Standard, to estimate blade strike probability and mortality rates

Duty points and duty exceedance points can be reviewed

Estimated mortality rates at a shaft speed of 186 rpm and three different flow rates

fish type	length [cm]	estimated mortal damage [%]		
		2 m³/s	4 m³/s	5 m³/s
scaly	10	2.8	1.8	1.6
	20	8.9	5.6	5.2
	30	15.8	10.3	9.4
	50	17.5	18.9	17.4
	80	0	0	0
eel	40	0	0	0
	60	0	0	0
	80	0	0	0

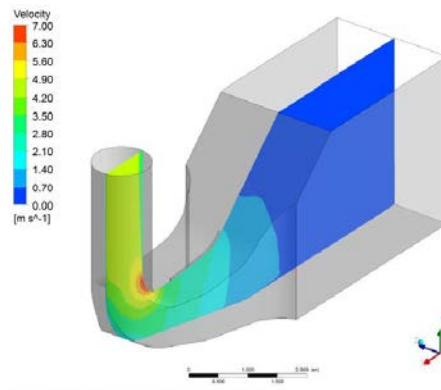
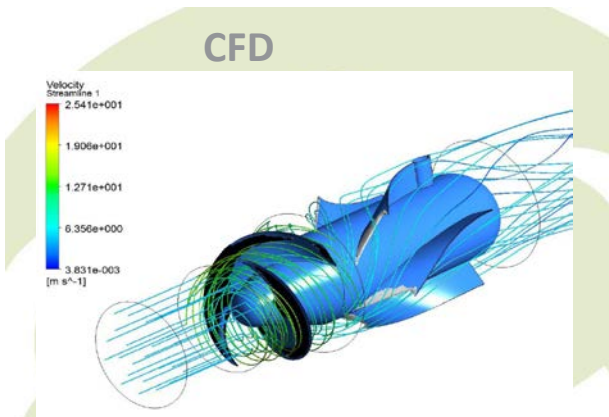


Figure 4: velocity contour plot on vertical plane

DEVELOPMENT OF THE FISH FRIENDLY PUMPS FOR KEADBY PUMPING STATION

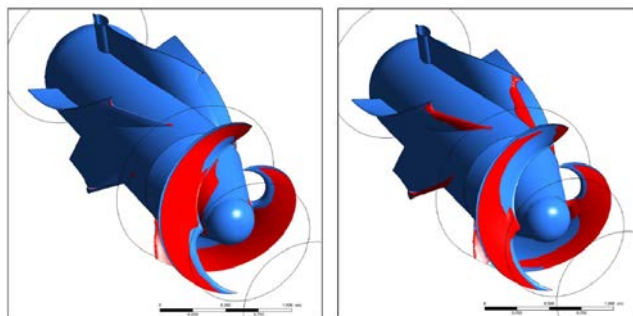


Figure 2: Iso vorticity surfaces (500 [1/s]) for duty point 1 (left) and duty point 2 (right)

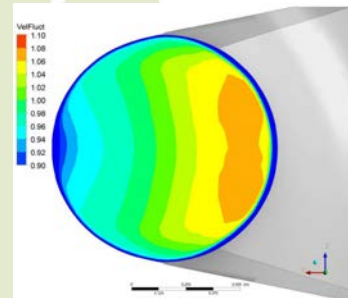


Figure 8: Percentage fluctuation velocity around average contour plot at impeller eye



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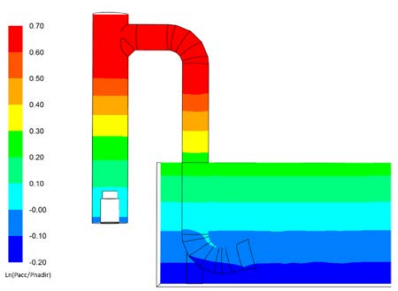


Figure 2.06 – Contour of LRP highlighting that the values are below 1.8

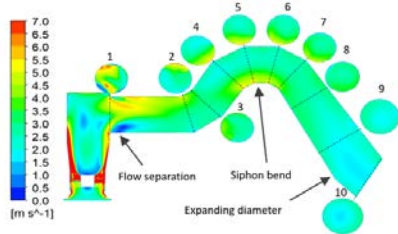
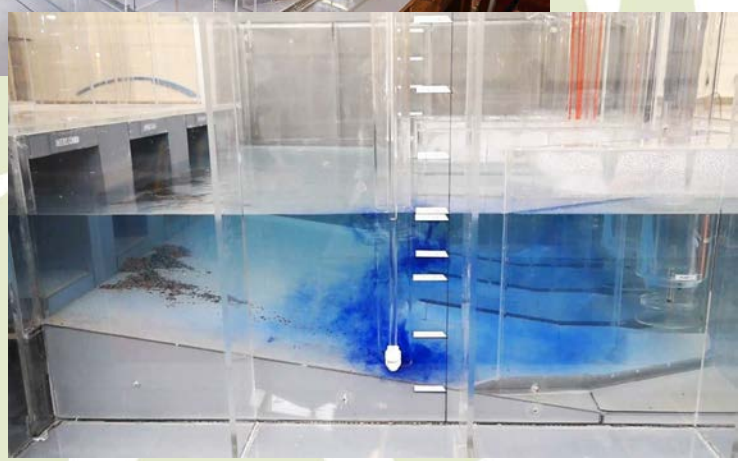


Figure 5 Velocity distribution for a cut-plane and streamwise cross-sections



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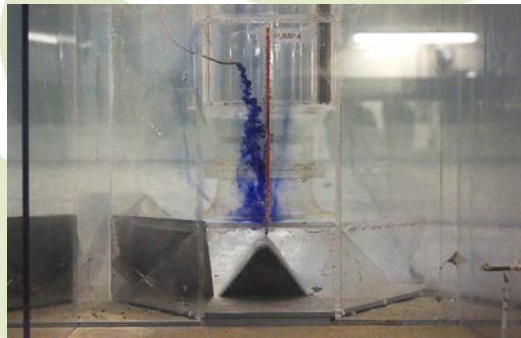
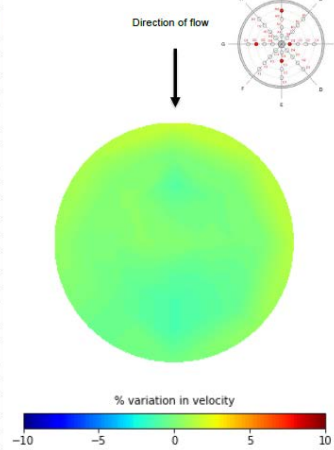


Table 4.04 - Measured velocity variation about the mean for Pump 03
 Pump flow rate = 660l/s. Operative Pumps = P2, P3, P4. Sump WL = -1.30 mAOD

Pitot Ref	Mean Velocity (m/s)	Velocity (m/s)	% Variation
A1	5.35	5.35	1.78
A2	5.25	5.25	0.01
A3	5.20	5.20	-0.94
A4	5.24	5.24	-0.22
B1	5.33	5.33	1.43
B2	5.26	5.26	0.13
B3	5.24	5.24	-0.22
B4	5.24	5.24	-0.22
C1	5.33	5.33	1.43
C2	5.25	5.25	0.01
C3	5.25	5.25	-0.11
C4	5.25	5.25	0.01
D1	5.28	5.28	0.61
D2	5.22	5.22	-0.58
D3	5.21	5.21	-0.70
D4	5.22	5.22	-0.58
E1	5.24	5.24	-0.22
E2	5.19	5.19	-1.18
E3	5.19	5.19	-1.18
E4	5.21	5.21	-0.70
F1	5.23	5.23	-0.34
F2	5.23	5.23	-0.34
F3	5.22	5.22	-0.58
F4	5.24	5.24	-0.22
G1	5.28	5.28	0.61
G2	5.25	5.25	0.01
G3	5.25	5.25	0.01
G4	5.27	5.27	0.37
H1	5.31	5.31	1.20
H2	5.26	5.26	0.25
H3	5.27	5.27	0.37
H4	5.26	5.26	0.13



Keadby PS, EA asset on tidal R Trent



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Keadby Terminal Assisted Outfall Scheme (pumping station)

Drains 37,000 Hectares via the 'Three Rivers' system into the Tidal River Trent
Circa £43m

(It really isn't like CenterParcs)

<p>Keadby PS upgrade</p>	<p>Lincs and Northants</p>	<p>H</p>	<p>ERAS will complete the cost benefit analysis and ensure regulatory requirements are met for circa £45m project</p> <p>ERAS inputs/efficiencies:</p> <ul style="list-style-type: none"> Modelling has now reduced PS capacity from 30 to 20 cumecs. Modelling is exploring any further benefits of ERAS suggestion to isolate sub-catchments Currently using the same technique as Holderness above to assess the potential to dispense with a dedicated eel immigration pass (£100k) Pumping options provided to consultants by ERAS (previously discounted) appear valid – enables pumps to be installed without major disruption to the mass concrete/existing infrastructure (many £100s k) Long-running (3yrs), unresolved issue ref screening this 20 cumec site. ERAS sought extra detailed information on the Best Practice screening option, compared this to extra information sought for the alternative ('FF' pumping). Presented the facts to National Eel Screening Helpdesk panel (NESH). NESH concluded BP screening not a cost-beneficial option. Site will install 'FF' pumping and pipework. BP screening option would have cost £6.6 – £10.6m depending on Optimism Bias.
--------------------------	----------------------------	----------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

IDBs: Support PS

H

Concentrated on contentious/political site. ECRM GIA funded Stow Fen: ERAS has suggested (and agreed with Area ERG) that

Screening option up to £10.6m, cost for 'FF' pumps option £1.7m

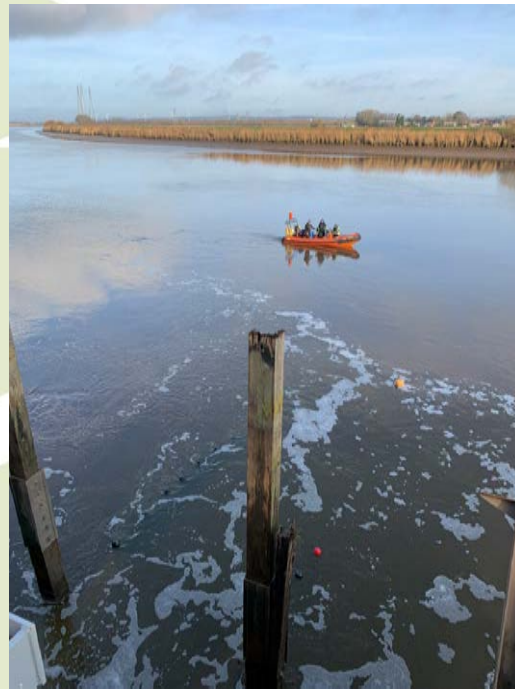


Keadby PS field trials for validation of NEN + CFD



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Health report

National Fisheries Services

This report is an internal Environment Agency document giving a health assessment of eel (post – entrainment) in an aim to determine the eel friendly status of pumping stations. These findings are based solely on the sample submitted and unless stated otherwise, will be deemed representative of wild populations undergoing the same entrainment process. All examinations were conducted under laboratory conditions following established diagnostic protocols.

Background information and sample submission details			
To	Andy Don, Jon Bolland	From	John Price
Date reported	10/03/2022	Lab ref	21/097
Origin of sample	Keadby Pumping Station South Bank Keadby with Althorpe Lincolnshire, DN17 3BU		
	NGR	SE8349511289	
Agency Area	Lincolnshire and Northamptonshire		
Capture method	Submitted as part of Keadby Pumping Station assessment trial		
Date sample submitted	15/12/2021	Sample submitted by	Oliver Evans (HIFI)

Fish examined			
Species	Number	Length range (mm)	Weight range (g)
European eel	14	418 - 959	121.2 – 1893.3



FLICKREAD Search...

BRANCH NEWS | 14th June 2023

Keadby Pumping Station renewal

In 2019 the Environment Agency (EA), along with its delivery partners, began the construction phase of a £35 million project to renew the pumping station and ensure the ongoing reliable operation of the site for years to come. Over the last 18 months the project has made significant progress on site through one of the wettest winters on record and the global construction pandemic. It is set to deliver 20 m³ of fish friendly pump capacity in 2023. All of this has been achieved whilst ensuring that flows can still be pumped and stored in approach. A major asset renewal solution was developed as the preferred option. This retained the main existing structure, whilst constructing a new outfall and inlet and replacing all the mechanical and electrical equipment of the site.

In addition to the equipment for improved resilience at the station there were two further key drivers to the project's development. The existing site had an exemption to the Eel Regulations 2006, but any changes to the station would require it to be made fully compliant. The project was also required to demonstrate a carbon saving and contribute towards the EA's carbon reduction and net zero targets.

The solution at Keadby was led by the EA, which had not been developed in isolation. As the station is an asset to a wider catchment network, the EA and its supply chain worked together with local risk management agencies to ensure that the station has been developed and agreed a system of benefits and water treatment. The benefits case for the pumping station renewal was approved by the EA's Large Projects Review Group in late 2018, clearing the way for construction to commence in February 2019.

The key component of the project has always been the replacement of the old diesel engine pumps with new electric pumps. Six specially modified, fish friendly, electric axial flow pumps were designed for the site. The pumps, supplied from the Netherlands, are capable of pumping nearly four m³ of flow with a maximum lift of 4.6 metres from the Three Rivers into the River Trent. The pumps have been specifically designed to operate in new, cast-steel pump chambers that have been cut into the existing pumping station following the removal of the old diesel engine. Specially fabricated tapered section inlet/outlet ducts from the lamby to the pumps themselves to ensure that water flow is prevented to the pumps without causing rapid changes in pressure or velocities that would injure fish and eels.

To replace diesel engines with electric motors has meant that a new high voltage (10kV) grid connection was required. Within the relatively rural setting of North Lincolnshire, this is a first, non-remote station. Throughout the design and construction phases the project team worked with the local district network operator to put in place nine kilometres of new 10kV grid power network. This meant drilling under three state roads and a major passenger and freight railway line, along with cable laying through houses and highways to connect the station to the grid. This major component of the project was completed in June 2022 with the commissioning of the pumping station's new HV switchgear, transformers, and Motor Control Centre (MCC), all of which sit on a newly constructed platform on the banks of the Three Rivers.

The final component to the project is the construction of a new outfall structure to discharge into the River Trent. The first phase of the work has been to complete new piling across the old outfall, whilst leaving a flow path for the continued operation of the pumping station during construction. In early 2023 the team will return to the site to construct a new concrete headwall and outfall chamber in the final stages of the project.

Throughout the delivery the project team has worked closely with the operational teams to avoid the construction works with the ongoing operation of a live site ensuring that flow and water levels are actively managed. It is a testament to all involved that despite record breaking rainfall, saturated flows and water levels were kept in check. With the first of the new pumps now operational the team are starting to see light at the end of the pipe as we look forward to completion in 2023.

18



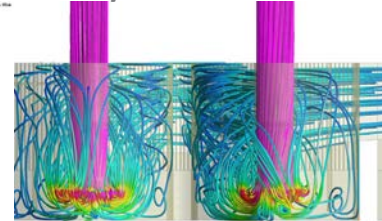
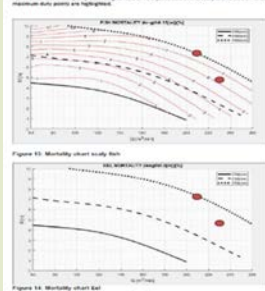
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In summary, the EA has endeavoured to be as evidence-led as possible in this process, including consultation and engagement.

Evidence and Guidance, and therefore BAEP solutions are all dynamic:



Right now we are forming better pump Guidance, feeding into a CEN Standard and are building a phone App around 'FF' pumps



Thank you for listening!



Shameless plug for IFM / EA Fish Impingement and Entrainment Conference, Liverpool July 11-13



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Fenland SOIL ADA Environment Day 2023

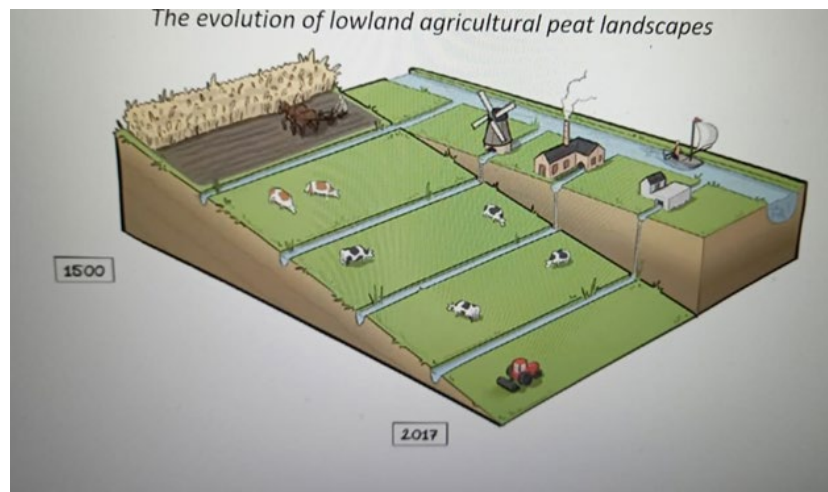
Contact: Megan Hudson, General Manager
✉ m.hudson@fenlandsoil.org
☎ 01353 727488
☎ 07761 753819



SUSTAINABILITY | OPPORTUNITY | INNOVATION | LEARNING



Peat Loss

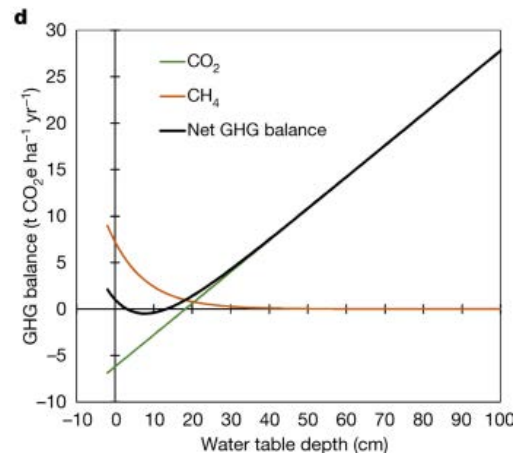


A dedicated team with farmers at its core to tackle climate issues relating to agriculture and peat in the Fens.

Soil Carbon Emissions

- Estimates suggest that agricultural land use on the Cambridgeshire Fens is currently producing around 2.6 million tonnes of CO₂ per year.
- Focus has generally been on peat soils but all high organic matter soils are emitting
 - Deep Peat – 30 t CO₂ eq per year
 - Skirt Fen – 12 t CO₂ eq per year

(First year data from Fenland SOIL flux towers)



Evans, C. D. et al (2021) *Nature*, 593, 548-522



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The Sixth Carbon Budget

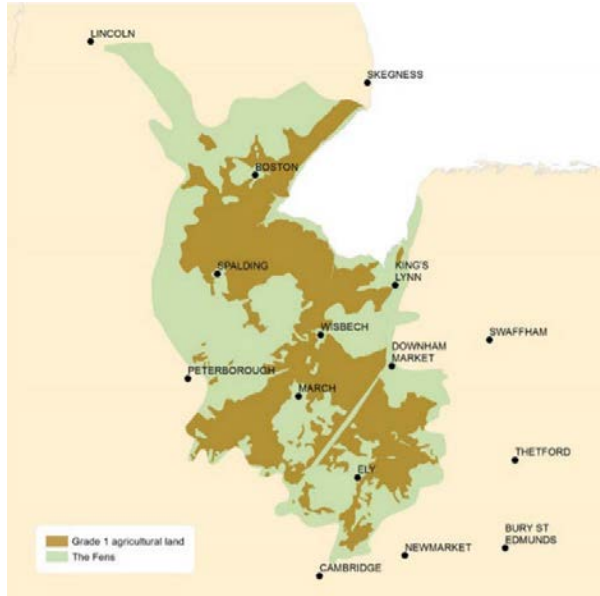
CCC 6th Carbon Budget: 10 years for major change
78% GHG reduction by 2035

Some key dates

- 2020 all energy to waste plants CCS ready (no unabated operation from 2050)
- 2025 all biodegradable waste to landfill banned
- 2028 rented homes, social housing, homes for sale to be EPC C
- 2030 70% recycling
- 2030 no new petrol and diesel car and van sales
- 2030 140-170k on street chargers needed nationally (18k public chargers today)
- 2033 no new gas boiler sales
- 2035 over 1m heat pump installations pa
- 2035 47% peat restored, 79% by 2050
 - 2050: 60% lowland peat rewetted or under sustainable management
 - Lowland cropland 40% rewetted, 35% sustainably managed
 - Lowland grassland 50% rewetted
- 2035 no operation of unabated gas power generation



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The Fens in Numbers

- 7% of the UK's food produced on just 4% of the land
- 1/3 of the UK's fresh produce
- Agricultural supply chain employs 80,000 people – equivalent to the population of Peterborough
- 88% of the land in the Fens is cultivated – 89% of which is Grade I or Grade II
- 50% of the UK's total Grade I land is in the Fens
- Contributes £3bn to the economy

Committees Aims

Sustainability	Inform and develop whole farm policies to mitigate climate change including encouraging Nature Friendly and Regenerative Practices and enhance biodiversity.
Opportunities	We will use a bottom up approach to generate opportunities for positive change to policy, creating new opportunities for farmers.
Innovation	Helping to find new approaches and techniques that allow the continuation of farming whilst mitigating emissions.
Learning	Help establish agreed figures for GHG emissions from deep, shallow and wasted peat, improve mapping and facilitate peer learning.

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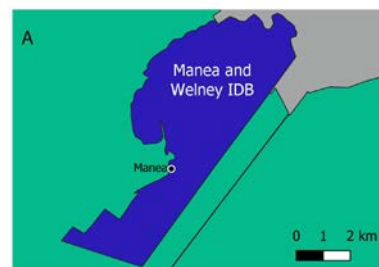
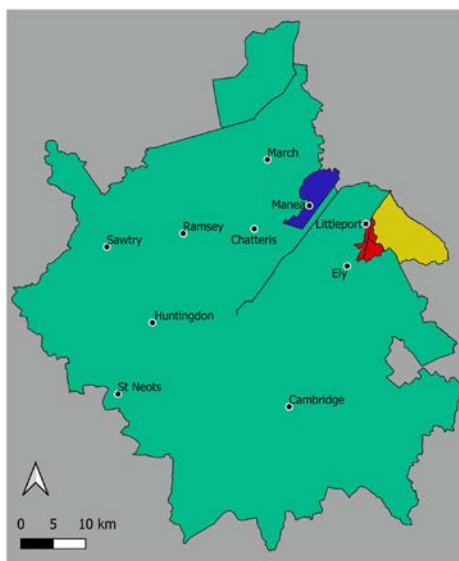


Our Workgroups

- Farmers Dialogue – upskilling farmers and encouraging peer learning.
- GHG Emissions – working with world leaders to help get the most up to date emissions data.
- Nature Based Systems – bringing together nature and farming.
- Economic and Social Impacts – identifying the cost of changing systems.
- Landscape Mapping – updating soil maps and unlocking new opportunities



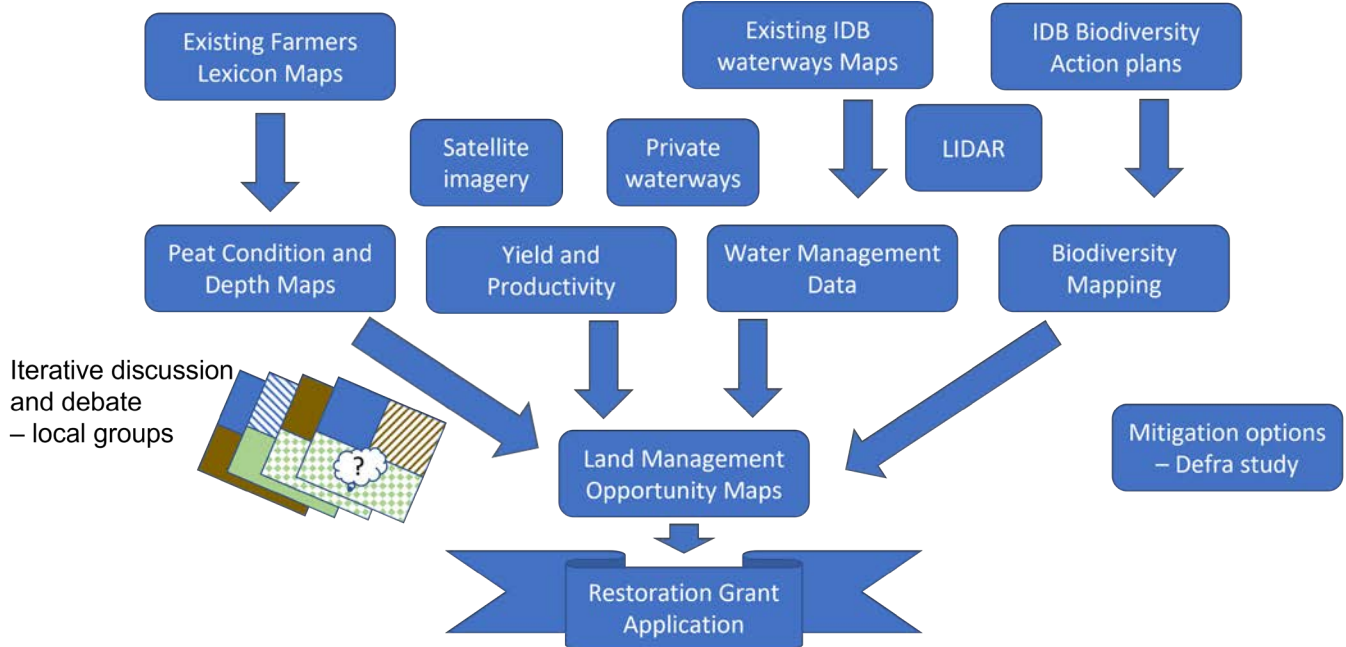
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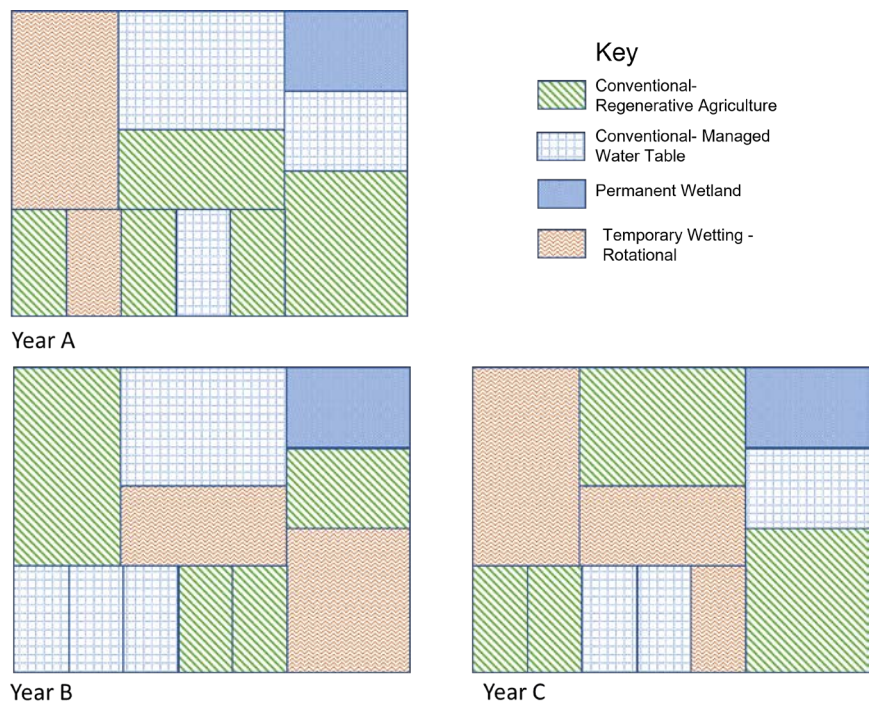
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Creation of Opportunity Maps

The project aims to bring together all of the data and look at how the layers interact with each other to inform what the best management practice may be at field scale based on all the available information. This will generate a mosaic map of opportunities for land managers to use to inform decision making.



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What Next?

- Producing a vision for the future from each of our other workstreams
- Completion of the Discovery Project and subsequent report
- Expansion of the Farmers Dialogue Group
- Continue to build up relationships with the other groups working in the area
- Assist with production of new soil maps
- Continue to produce updated emissions factors



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BOOKING NOW OPEN



**EXPLORING THE
FUTURE OF
LOWLAND PEAT**

📅 17.04.2023-18.04.2023

The Maltings, Ship Lane, Ely, Cambridgeshire, CB7 4BB
Hosted by Fenland SOIL and the Centre for Landscape Regeneration to bring together those with an interest in lowland agricultural peat. This inaugural event will explore the current thinking, gaps in knowledge, proposed policy changes and future work.

Book now on Eventbrite!



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With thanks to our 2022-2023 sponsors...



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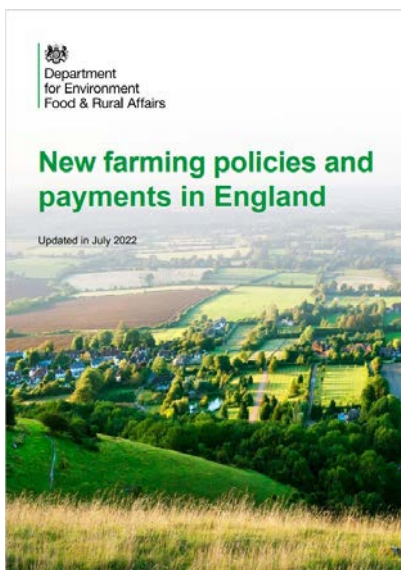
Environmental Land Management Schemes & Water Level Management

Dr Mhari Barnes
Senior Advisor, Agriculture
Natural Environment & Rural Resilience
Flood & Coastal Risk Management
Directorate

ADA Environment Day
2nd Feb 2023



Environmental Land Management Schemes



The Sustainable Farming Incentive focuses on making agricultural activities more sustainable and will pay for actions that all farmers can choose to take.

Countryside Stewardship which will be an evolution of our existing Countryside Stewardship scheme, will pay for more targeted actions relating to specific locations, features and habitats. There will be an extra incentive through Countryside Stewardship for land managers to join up across local areas to deliver bigger and better results.

Landscape Recovery will pay landowners or managers who want to take a more radical and large-scale approach to producing environmental and climate outcomes through land use change and habitat and ecosystem restoration.

The intended outcomes for these schemes include:

- bringing soil under sustainable management
- reducing agricultural emissions
- woodland creation
- halting the decline in species
- reducing the main agricultural pollutants that enter watercourses
- restoration of rivers, lakes and other freshwater habitats



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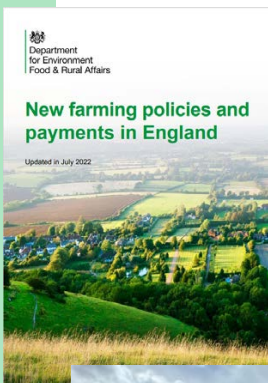
ELMs Objectives

The Agricultural Transition Plan (ATP) set out the high level aims of future farming in England that ELMs will work towards. These are:

- Improving the environment.
- Protecting the countryside.
- Improving farming productivity.
- Improving animal health and welfare.

Defra developed cross-cutting SMART objectives for ELMs focusing on: water quality, biodiversity, soils and net zero.

ELMs & EA FCERM



- National FCERM Strategy recognises the importance of farming and land management practices on floods
- FCERM staff are fully embedded in the ELM design process to ensure that we maximise the FCERM potential.
- ELM could provide a funding route for delivering and maintaining NFM measures supporting our EA NFM ambitions
- We are working closely with Defra Flood and Coast policy teams to ensure that FFCP SMART objectives are delivered
- CSF NFM Scheme



ELMs & Agriculture in the FCERM Strategy



Outcome: Farming and land management practices will better support rural resilience to both floods and droughts.

Objective

By 2030 risk management authorities will work with farmers and landowners to help them adapt their businesses and practices to be resilient to flooding and coastal change.

What will we do?

➤ Natural England and the Environment Agency will use the government's Catchment Sensitive Farming scheme, to help farmers and landowners play an active role in mitigating flood risk and in delivering drought resilience benefits.

➤ The National Farmers Union (NFU) will work with the Environment Agency to establish a rural resilience partnership focused on helping farmers and growers adapt to a changing climate. The partnership will look at how farming practices can enhance flood resilience in rural areas alongside sustainable food production.

➤ The Environment Agency and Natural England will support Defra with the development and piloting of the Environmental Land Management Schemes, notably the Local Nature Recovery scheme and the Landscape Recovery scheme. These schemes will maximise integrated outcomes for water, nature, flood and drought resilience whilst also contributing to the reduction of and adaptation to climate change.

➤ Risk management authorities will support farmers and landowners to access Environmental Land Management agreements and to adapt their businesses and practices to be more resilient to flooding and coastal change.

➤ The Environment Agency will work in partnership with Anglian Water, local councils, internal drainage boards and land managers in the Fens to develop long-term plans for managing water differently. This will be part of the work of the Future Fens: Integrated Adaptation Taskforce, which is developing ways of adapting to flooding and drought in low lying, agricultural catchments.

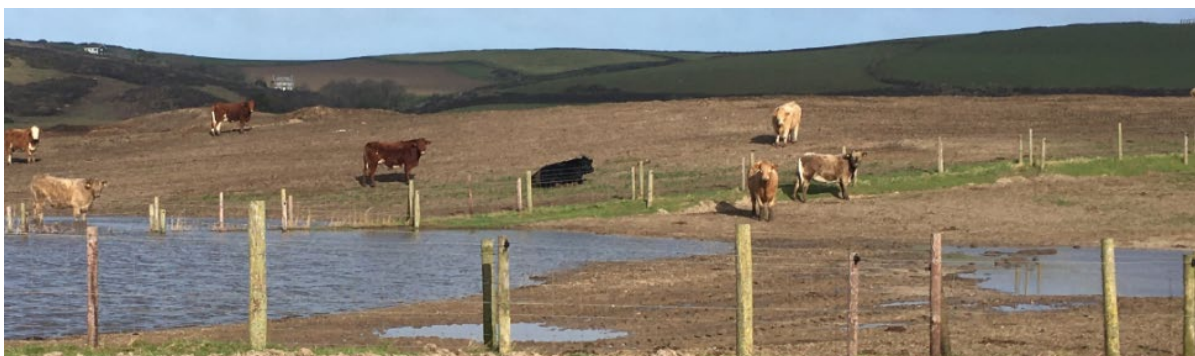
➤ The Environment Agency will support farmers, land owners and other local partners to transition to more climate friendly farming in both lowland and upland peatland areas that delivers greater resilience to future flood and droughts as well as identifying opportunities for carbon sequestration.

5

Water Level Management & ELMs

ELMs theme - Protection from and mitigation of environmental hazards

- **Natural Flood Management (NFM) and land management interventions** ✓
- **Nature-based Solutions (NbS) for water resource management** ✓
- **Traditional hard engineering** ✗ - *although actions through ELMs have the potential to complement existing and new FCERM traditional capital schemes.*
- **Actions with multiple environmental benefits** ✓



Natural Flood Management and ELMs

NFM uses the principles of natural processes to managing flood risk.

ELMs will include specific interventions or land management options which reduce flood peaks, generally in one of 3 ways:

1. **Slowing and reducing flows** by increasing roughness of flow paths
2. **Increasing losses** through water interception and evapotranspiration
3. **Attenuating or storing** water temporarily for release later in the flood cycle

Below: photo **Treraven Marshes** credit Dave Cox



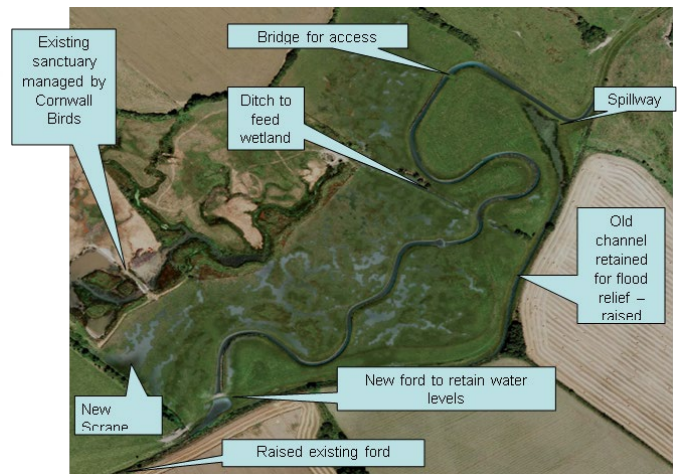
1. Sustainable Farming Incentive

- Changes to farming practice and land management
- Available to all farmers in England, not targeted or prioritised
- Potential scope for advisors to influence use of specific actions or co-ordinate efforts across a catchment



2. Countryside Stewardship

- Minor – medium scale capital NFM effective at changing hydrology and slowing flows.
- Applied in a targeted way across large areas of land. e.g. small scale floodplain re-connection, leaky barriers, dry ponds or bunds, swales, silt traps etc.



Key FCERM actions currently include:

Existing CS	New
Flood mitigation on arable reversion to grassland	Enhancing floodplain floodwater storage
Managing woodlands for flood and drought mitigation	Managing grassland for water quality, flood and drought resilience
Creating coastal sand dunes and vegetated shingle	Managing features (available to establish as capital items in CS) such as swales, bunds, silt traps and constructed wetlands to intercept and slow surface runoff
Managing coastal sand dunes and vegetated shingle	Creating and managing engineered three-dimensional (i.e., including raised ridges, scrapes and mini-wetlands) buffer strips in order to buffer waterbodies
Managing coastal saltmarsh	Managing riparian and water edge habitats to provide varied vegetation, including grasses, wildflowers, scrub and trees
Supplement to manage coastal vegetation	Managing enhanced river and floodplain habitat connectivity, allowing the development of a variety of naturally changing floodplain habitats
Creating inter-tidal and saline habitat on arable land	Managing and restoring coastal cliff habitats
Creating inter-tidal and saline habitat on intensive grassland	
Creating inter-tidal and saline habitat by non-intervention	
Raising water levels on cropped or arable land on peat soils	
Raising water levels on grassland on peat soils	

N.B Option names may change before they go live!

3. Landscape Recovery

a. Large scale land use change NFM (Capital Projects) requiring significant engineering – e.g. saltmarsh, managed re-alignment, floodplain restoration and re-connection.



b. Landscape scale land use change to create or restore habitats to increase roughness, infiltration and evapotranspiration



Next steps

- Develop the options under the revised Countryside Stewardship scheme to ensure integrated outcomes for flood and drought risk management.
- Develop an understanding of FCERM implications!!
- Work with RMAs so they can advise farmers and landowners on ELMs and help make their businesses more resilient to flood and drought risk.
- Provide advice and training to the Catchment Sensitive Farming (CSF) scheme on Natural Flood Management.

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Thanks for listening



Any questions?

EA-ELMS@environment-agency.gov.uk

