Canal & River Trust
Making life better by water

CRISEP Project Update

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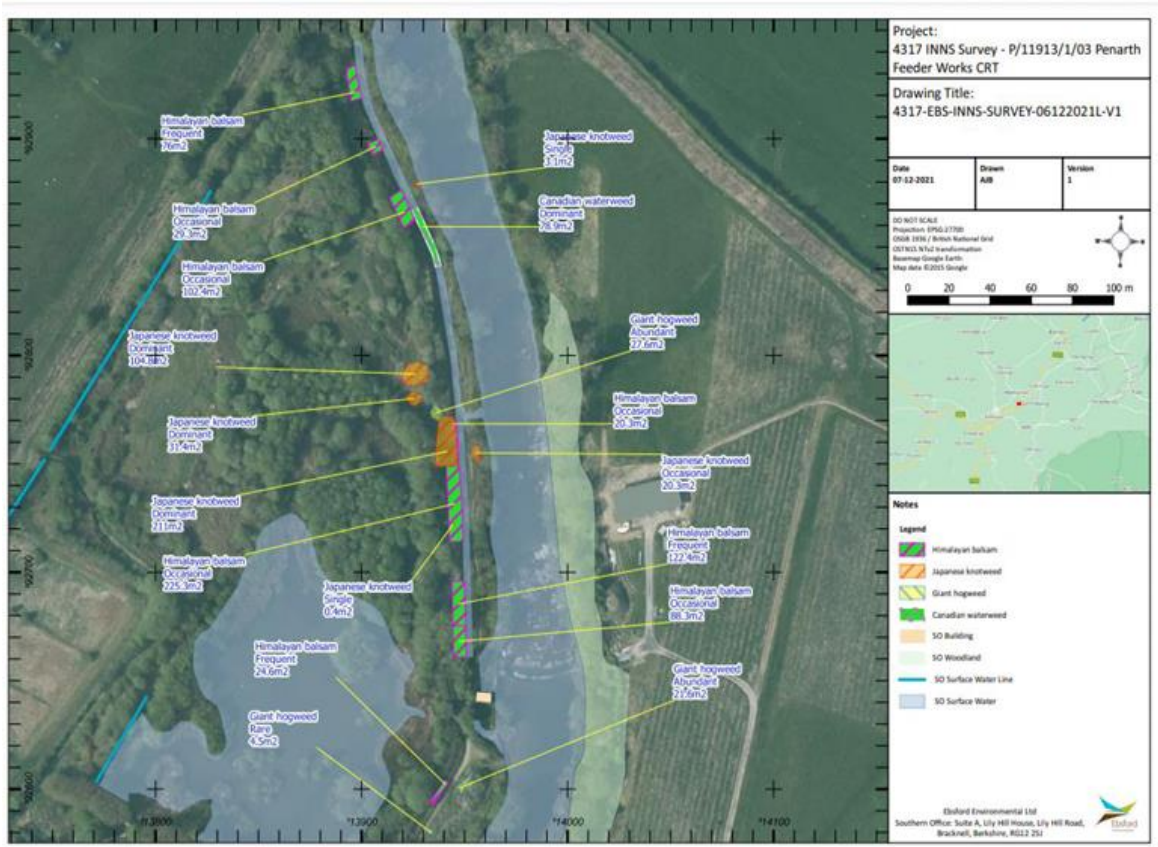
CRISEP 2021 - 2025

- One of the largest INNS project on inland waterways
- Funding from Severn Trent worth **£600,000**
- Winner of **CIEEM NGO Impact Award 2022** for projects having a major impact in benefitting nature & society
- To date, we have delivered **313km** of INNS management across our waterways
- Species include Japanese Knotweed, Giant Hogweed, Floating Pennywort & Water Fern (trials for Himalayan Balsam)


Southport
Rochdale
Huddersfield
Bolton
Manchester
St Helens
Liverpool
Sheffield
Rhyl
Bangor
Chester
Caernarfon
Lincoln
Skegness
Wrexham
Stoke-on-Trent
Boston
Nottingham
Derby
Grantham
Snowdonia
National Park
Oswestry
Shrewsbury
England
Leicester
Wolverhampton
Peterborough
Birmingham
Corby
Cardigan
Bay
Aberystwyth
Coventry
Kettering
Thetford
Wales
Redditch
Wellingborough
Northampton
Bury St Ed
Worcester
Cambridge
Bedford
Hereford
Banbury
Milton Keynes
Luton
Stevenage
Gloucester
Hemel
Hempstead
Oxford
Merthyr Tydfil
Created by: Environment
Created on: 2/2/2023

New methods?



Himalayan Balsam Trial 2022 & beyond:

- Himalayan Balsam trial at Penarth Feeder in Wales. This takes water feed from the River Severn to the Montgomery Canal SSSI/SAC.
- Innovative approach of using natural materials to suppress the growth of the plant and provide biodiversity/environmental net gain.

Process:

- Installation of hessian matting 2-3m width on top of Balsam seedbank in winter 2021.
- Dredging silts from the feeder and disposal to bank under D1 Exemption and NRW agreement.
- Hydroseeding (BFS 8) used to cover silt with native grasses and wildflowers.
- Manual removal & bank commander of steep-bank plants as part of wider management plan.

New Trials – Himalayan Balsam

Floating Pennywort

Floating Pennywort Mechanical Works:

- To date we have improved 75km of waterway through mechanical removal of this plant species
- Includes canals, rivers and feeders
- Improvements to protected sites including SSSIs/SACs
- **In 2022 & 2023, 1,467 tonnes removed in EM from the River Soar across 35km of waterway**

River Soar - Floating Pennywort

Biocontrol

Floating Pennywort Biocontrol 2022/23:

- Floating Pennywort biocontrol utilising the *Listronotus elongatus* weevil.
- Granted ministerial approval in Sep 2021 and CABI issued with releaser's license
- Weevil shipments from Argentina in Sep 2021 & May 2022 facilitate overwintering field trials and early season mass rearing
- Early studies found successful overwintering and impact on localised pennywort populations
- X2 sites became unviable due to localised environmental conditions and vandalism
- In 2023, Trust first release on a SSSI (Bittell Reservoirs SSSI)

[Releasing weevils to tackle floating pennywort - YouTube]

Summary of field trials for CRT

Table 1: *Listronotus elongatus* releases and monitoring to date (see Figs 2-3)

Site	Total number of weevils released	Release dates	Monitoring dates	Status in 2023
Worcester & Birmingham Canal, West Midlands	262	July 2022, Aug 2023	Sept 2022, March 2022, Aug 2023 and Oct 2023	Overwintered, spread >6m, multiple generations
River Wreake, East Midlands	112	July 2022	Sept 2022, March 2023, Aug 2023,	No evidence of weevils- likely compromised by high flows / possibly unsuitable
Wyrley & Essington Canal, West Midlands	124	Sept 2022	Nov 2022, March 2023, Aug 2023	Pennywort slow to return and patchy, no weevil evidence, possibly unsuitable
Leeds & Liverpool Canal, West Yorkshire	315	Sept 2022, Aug 2023	Nov 2022, March 2023, August 2023 and Nov 2023	Localised impact and 1st generation of weevils emerging from 2023 top up release
Jacob's feeder, Bittel Reservoirs, West Midlands	200	July 2023	Oct 2023	1st generation of weevils emerged, breeding and spreading; mining at new release point and 8m beyond, localised mat collapse

Figure 2. Jacob's Feeder site, Bittel Reservoirs: (A) Weevil release, July 2023; (B) Monitoring visit, October 2023 and example of weevil stages found in October 2023 (C) (a) mature larva and (b) eggs at release point and (D) New adult, 8m from release site

Water Fern Biocontrol

Pratt et al. CABI Agriculture and Bioscience (2022) 3:70
https://doi.org/10.1186/s43170-022-00136-0

CABI Agriculture and Bioscience

RESEARCH Open Access

A century of *Azolla filiculoides* biocontrol: the economic value of *Stenopelmus rufinasus* to Great Britain

Corin F. Pratt*, Kate Constantine and Suzy V. Wood

[A century of Azolla filiculoides biocontrol: the economic value of Stenopelmus rufinasus to Great Britain | CABI Agriculture and Bioscience | Full Text (biomedcentral.com)]

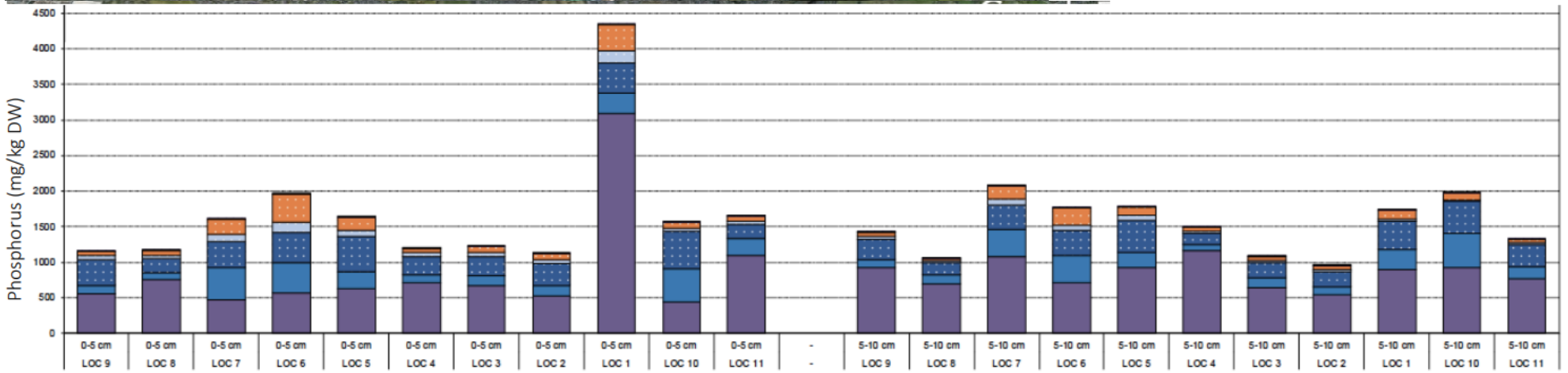
Case Study (Azolla filiculoides):

- 12km of waterway covered in Water Fern
- Cost comparison on control methods
- Mechanical removal costs of £12,600
- X3 per year - £37,800
- Costs of weevil release - £2,100
- Biocontrol much more successful control method than mechanical for this target species (58% of sites under control in 8 weeks)

Research - Nutrient Loading

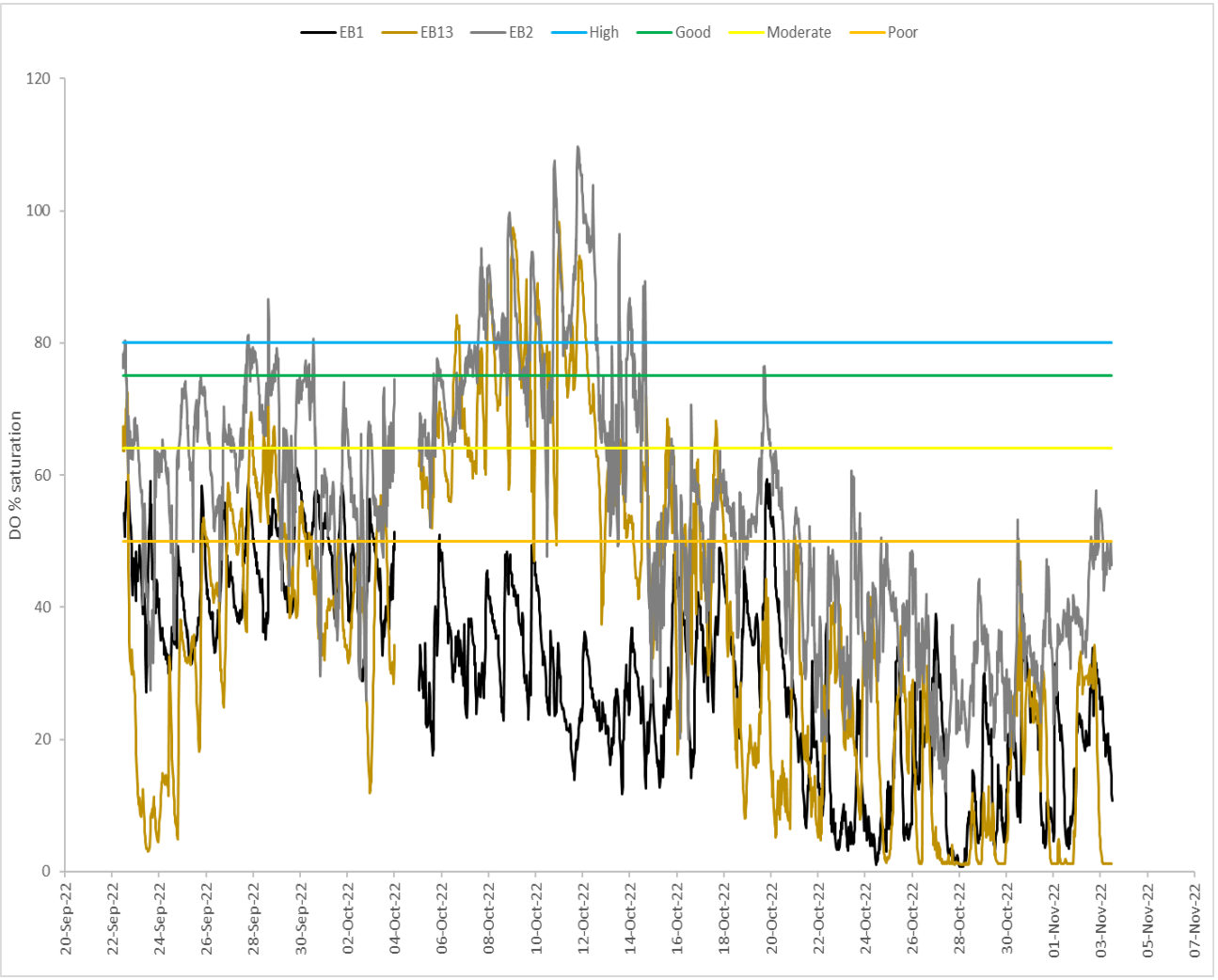
- What are the impacts of nutrient enrichment on aquatic invasive macrophytes?
- 12-month study on internal and external loading of nutrients on the Wyrley & Essington Canal
- Sources: external – stormwater sewers, agricultural runoff. Internal – canal sediments
- **2.24 tonnes of releasable P within top 10cm of canal sediment** (analysis in Germany) This is mostly organic P and appears to be an important nutrient source for the canal.
- Could targeted dredging or P immobilisation (i.e., Phoslock) be part of the answer to aquatic weed on our waterways?

Internal Loading



- labile P (pore water)
- Fe/Mn bound P, labile in anoxic conditions
- organic P, labile in reduktive conditions
- organic P bound in detritus, humic substances and micro organisms
- base labile P in Al/Fe-oxide
- P Residual fraction

External Loading



- 184 sources of aquatic pollution identified (85 of which were pipes)
- Nutrient inputs do occur into the canal, but standards reflect this is not severe over the 12-month period although Total P much higher than expected (WFD Fail for Reservoir)
- The data collected clearly show that low oxygen conditions do occur in the canal, which would indicate suitable conditions for release of sediment-bound phosphorus. This changes the chemical structure of metal compounds such as those of iron, which in their oxidised form bind with nutrient ions such as phosphate but, when in their low-oxygen (reduced) forms, will release phosphate into solution.
- P from sediments a significant source for invasive macrophyte growth and algal blooms

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Thank you!

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