



How are water levels managed on the Somerset Levels and Moors?

Philip Brewin

IDB Ecologist

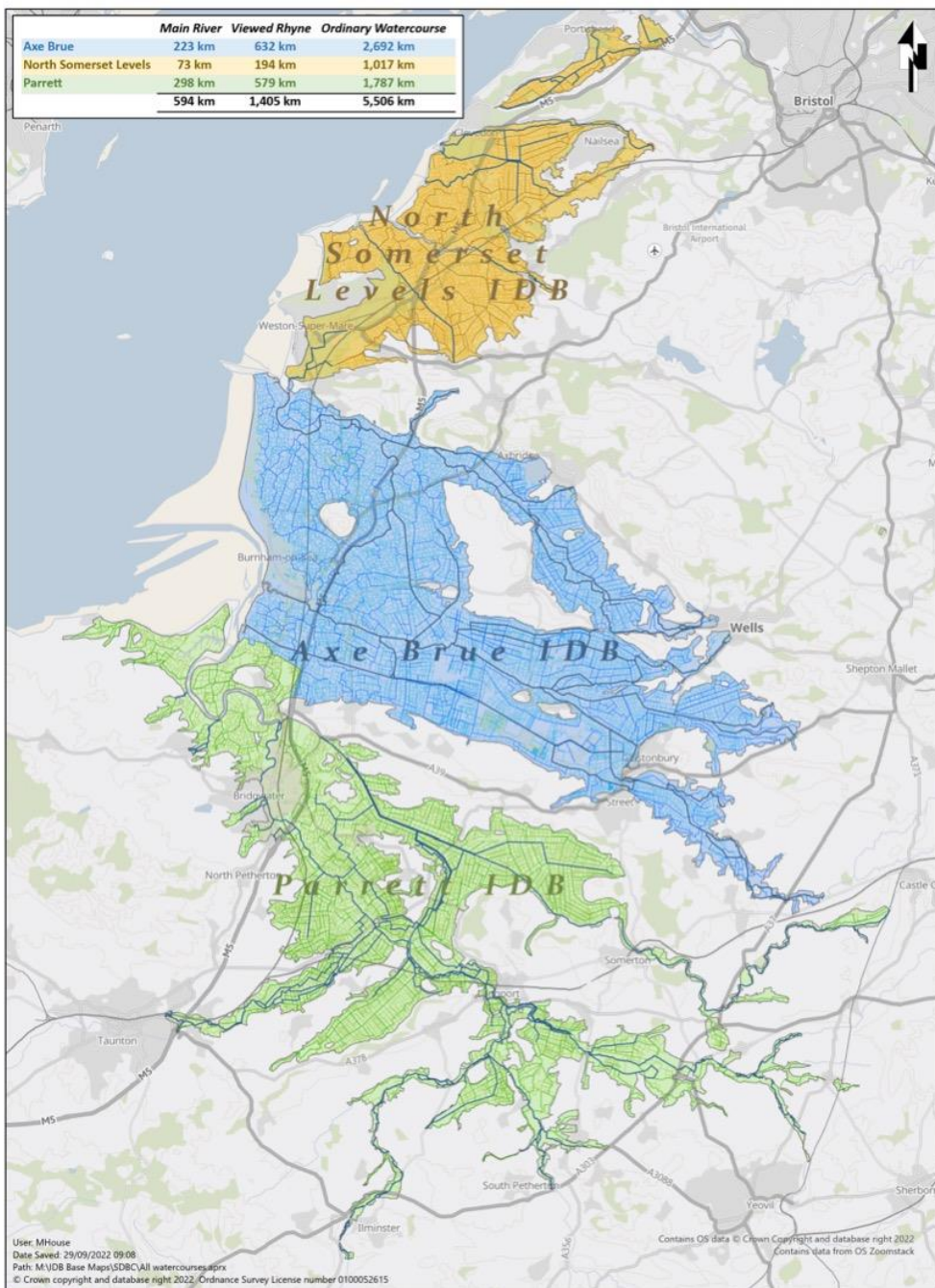
pbrewin@somersetdbs.co.uk

IDBs in Somerset

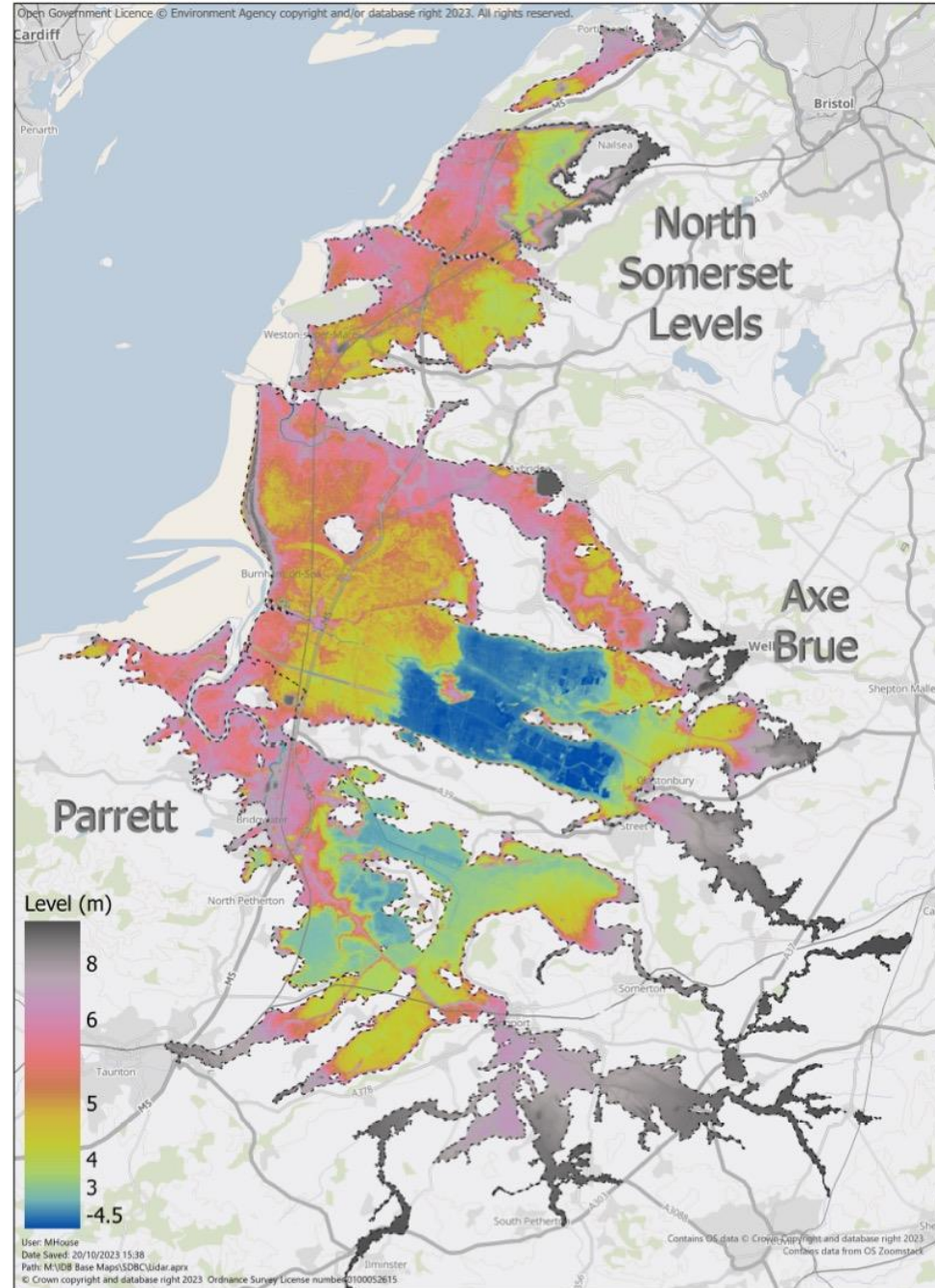
Internal Drainage Boards are independent statutory public bodies set up under the Land Drainage Act 1991 to:

- exercise general supervision over all matters relating to the drainage of land.
- have permissive powers to ensure the efficiency and effectiveness of drainage and flood risk management.
- The Boards also have duties to further conservation.

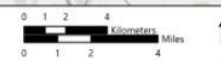




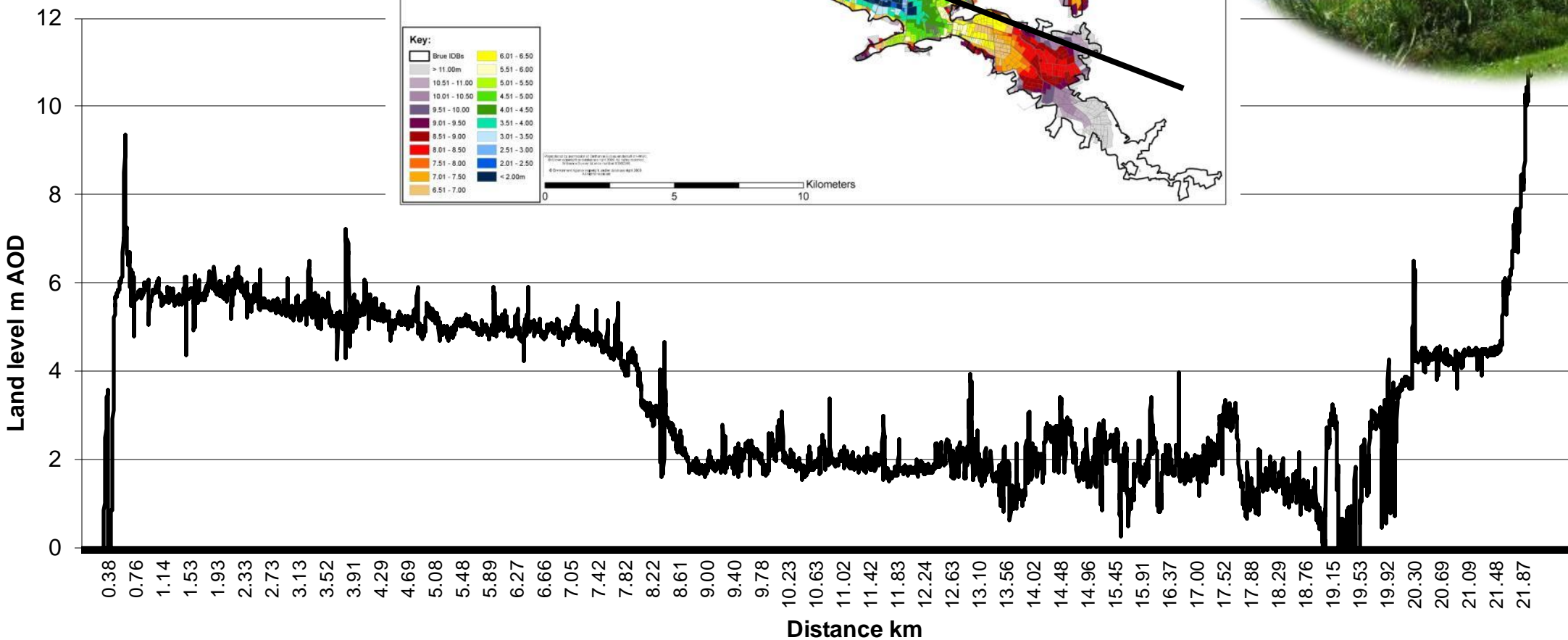
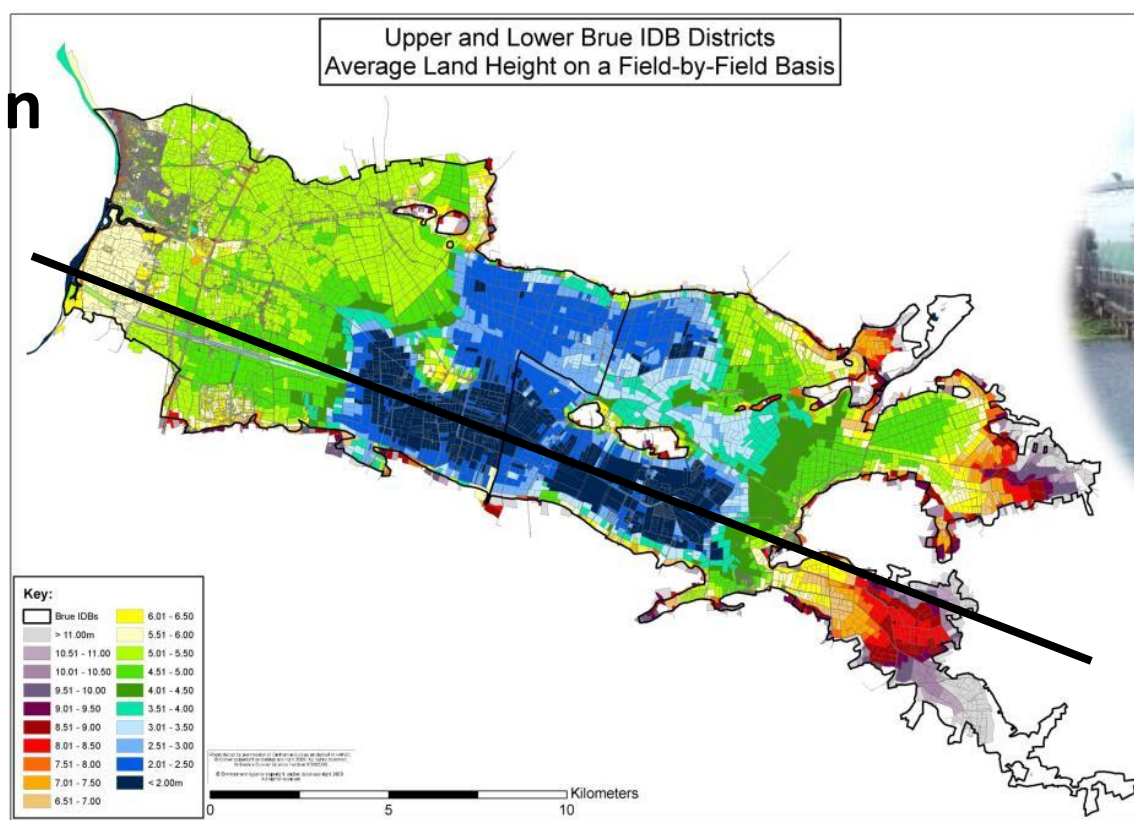
SDBC Watercourses



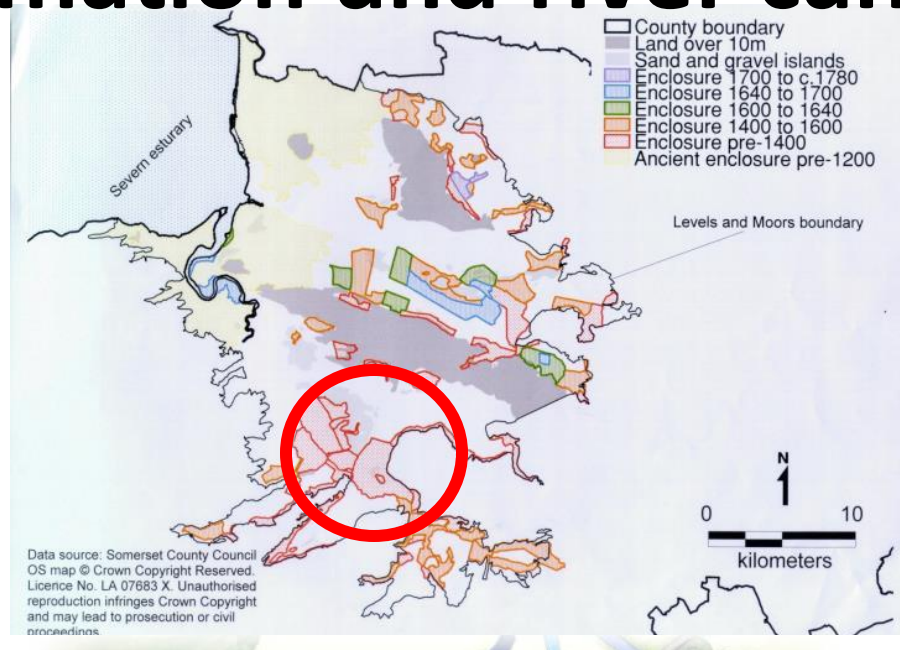
Land Levels (m)



Brue - South Drain Land level cross section



Best preserved example of Medieval wetland reclamation and river canalisation in the country



Somerset Levels

The largest remaining area of lowland wet grassland in the UK

UK wet grassland resource:

Somerset Levels and Moors:

- 23 SSSIs, 2 SPA and 2 Ramsar sites
- 8,800 ha in protected areas
- 60,000 ha of existing habitat

National:

Historical – 1,200,000 ha

Remaining – 220,000 ha

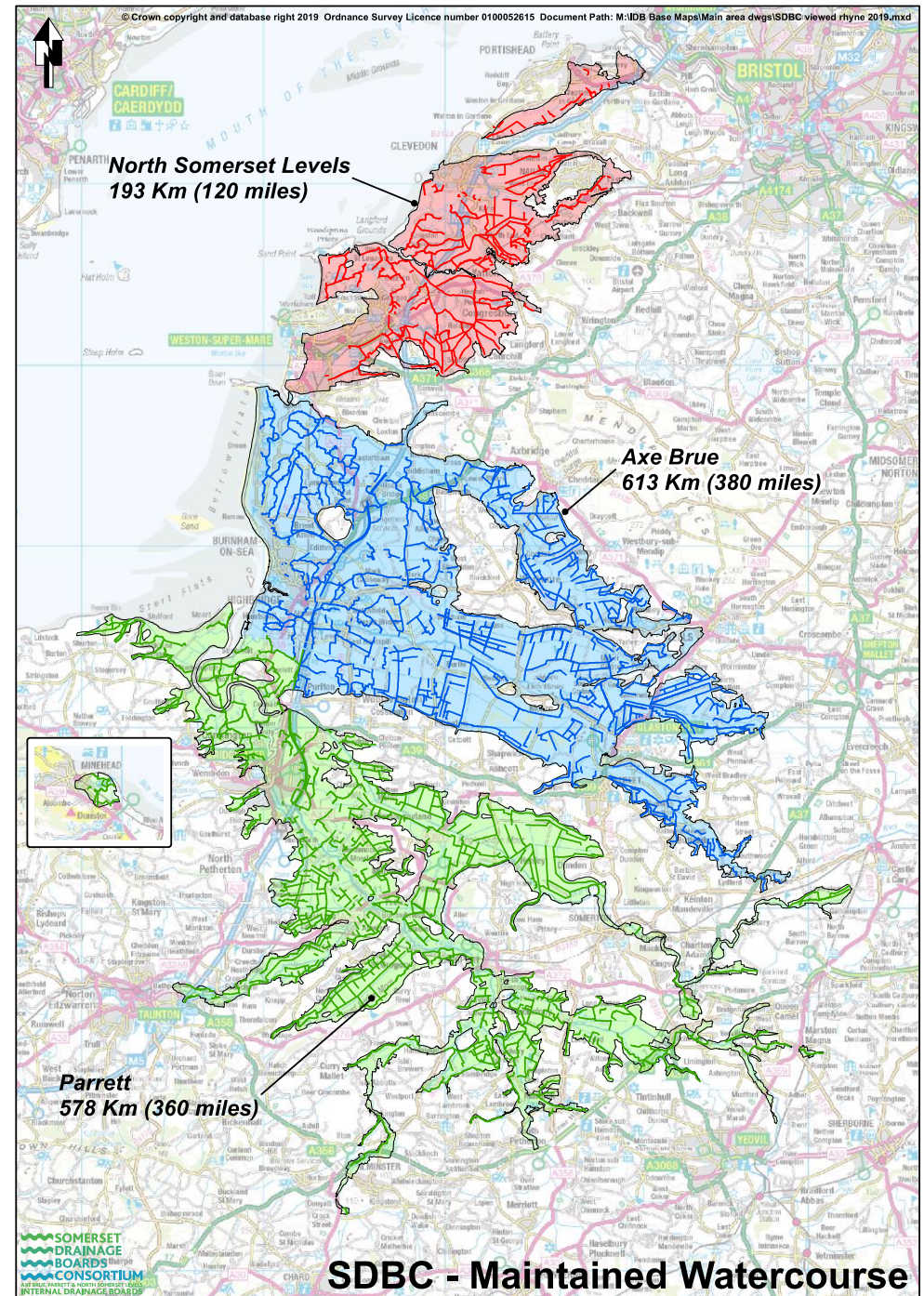


King's Sedgemoor



Southlake Moor

IDB Rhyne Maintenance



**Greylake Sluice,
King's Sedgemoor Drain:
rebuilt 2005**

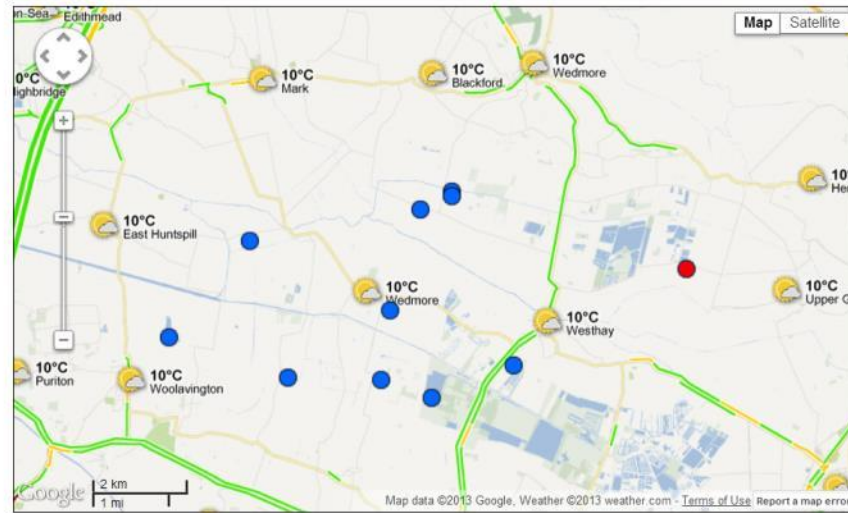






- View**
- List Latest
- Map View
- Alarms
- List Stations
- Timeview DBI
- Alarm Configuration**
- Groups and Recipients
- Message Contents
- Logger Search
- Overdue Checkins
- User Management**
- Account Settings

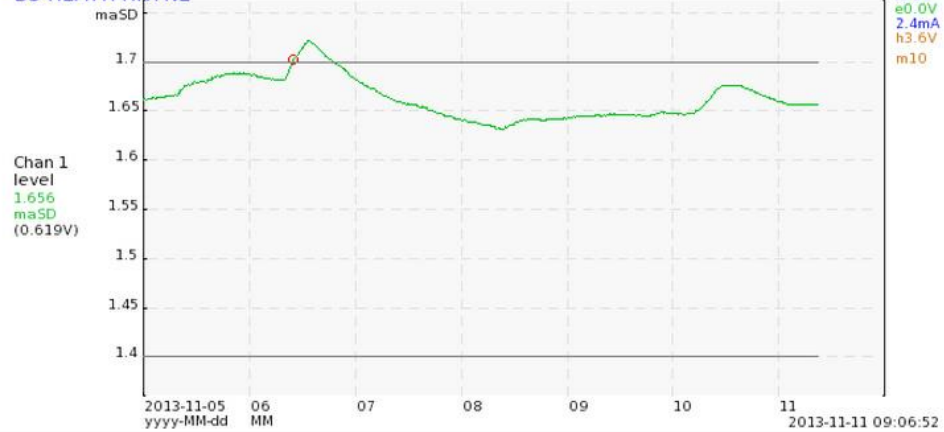
Somerset DBC



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Every 3 Hours

BS HEATH RHYNE



Account

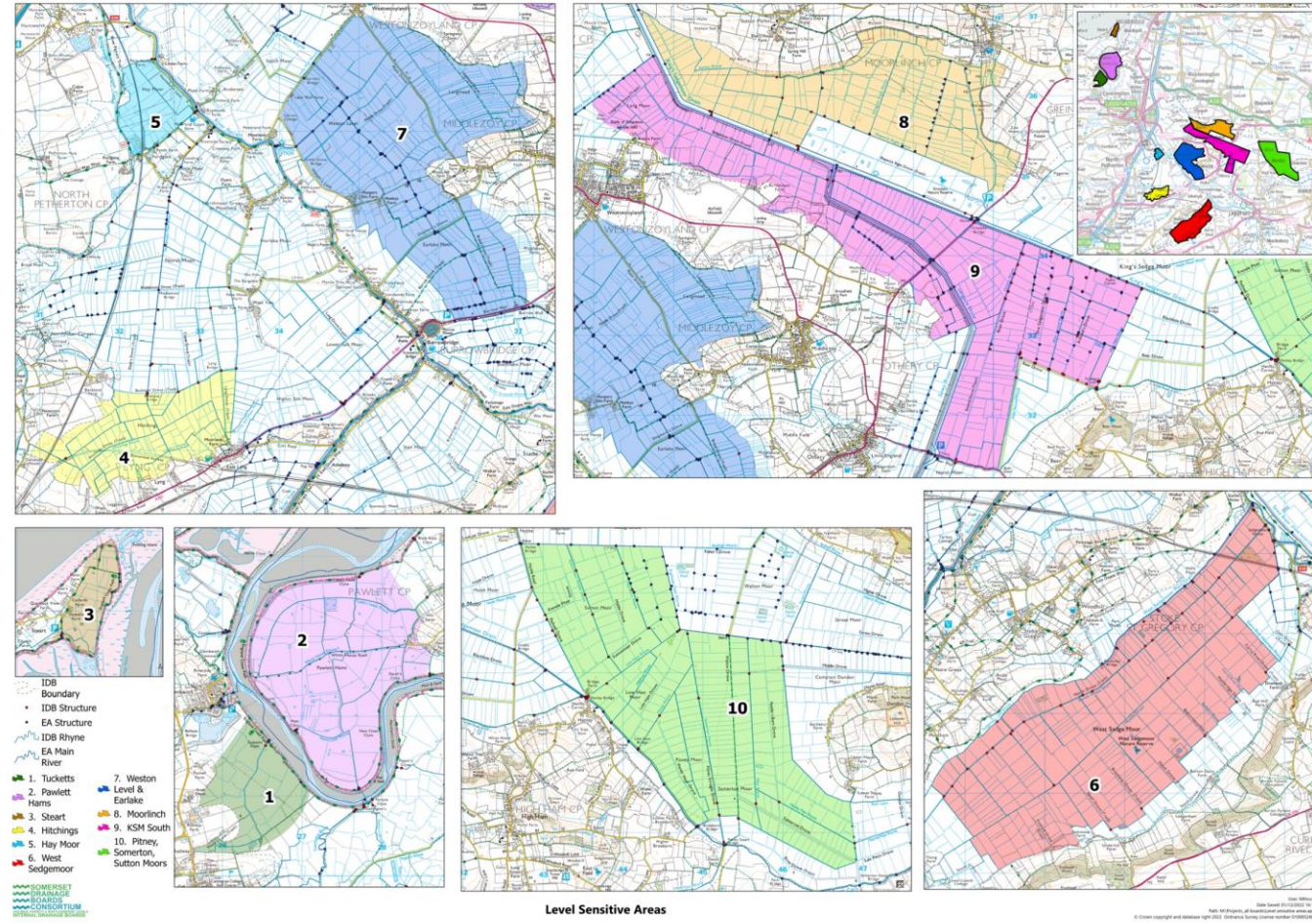
Group

Data Number

Water Level Management Plans

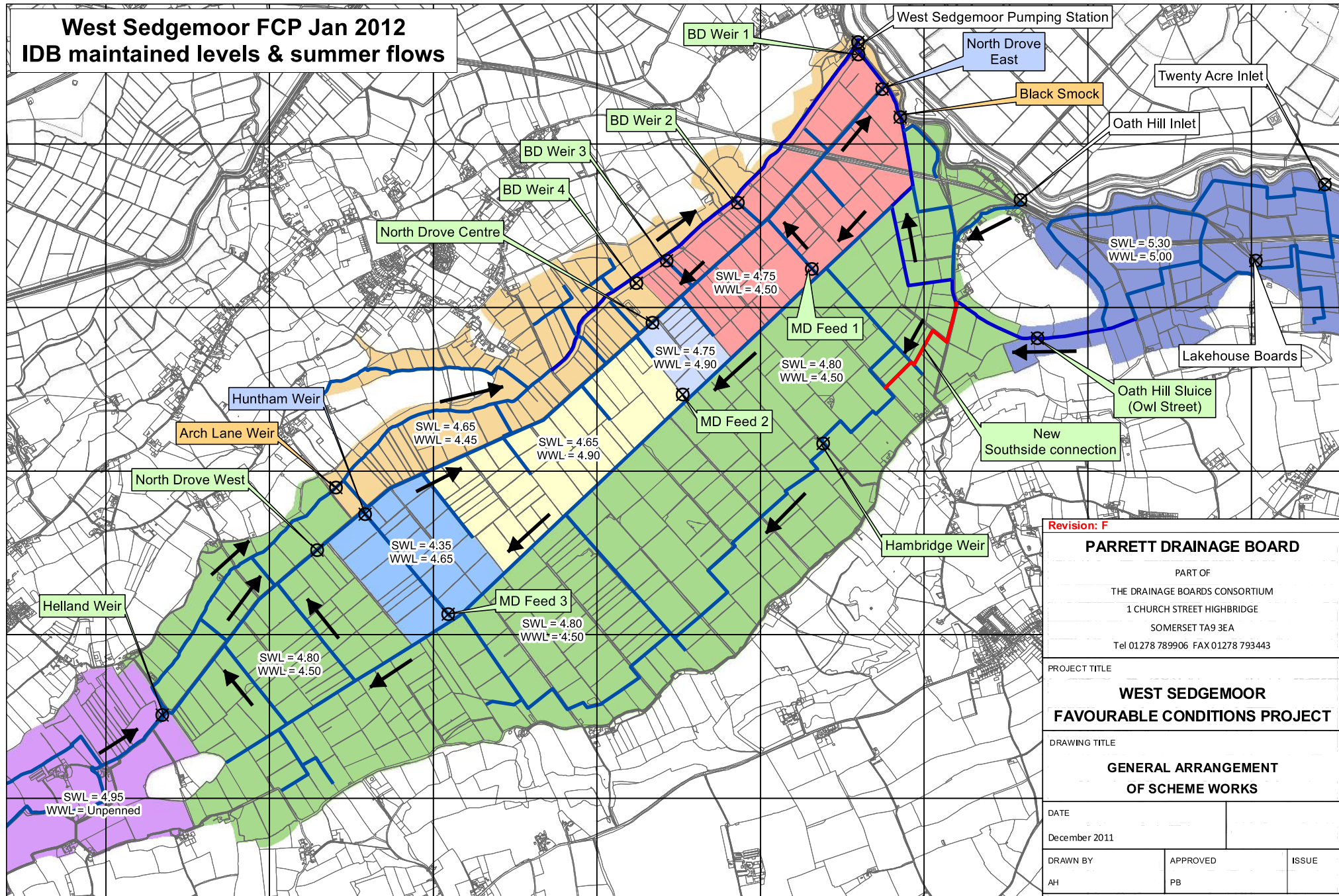
SDBC IDBs have 15 Water Level Management Plans that cover all wetland SSSIs.

The current generation of WLMPs are 10+ years old and need updating. The purpose of WLMP also needs updating, and it may be necessary to adopt more flexible and adaptive approaches to managing water levels, to better manage risk and achieve objectives for land and water management.

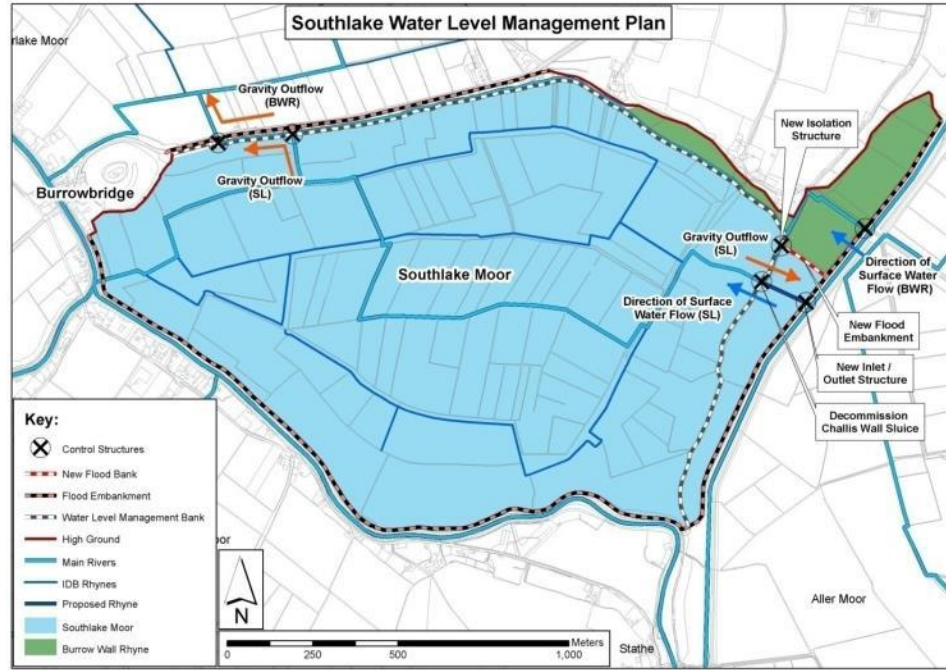


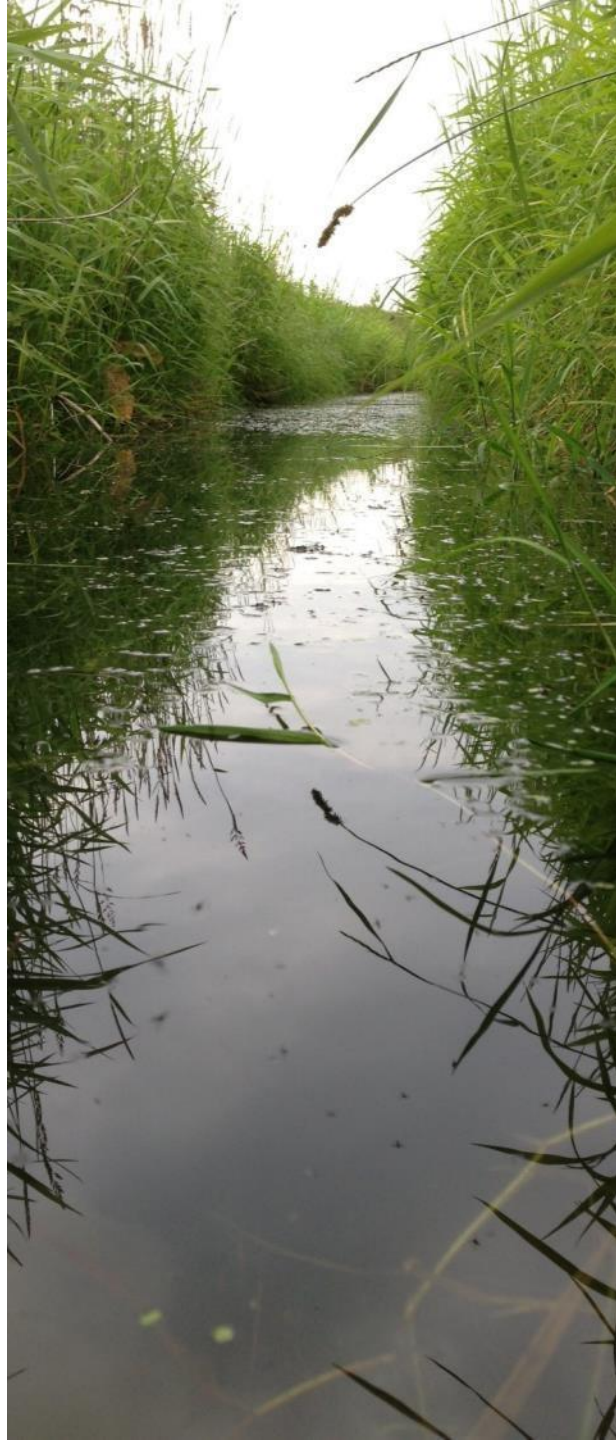
Map of water stressed areas in the Parrett

West Sedgemoor FCP Jan 2012
IDB maintained levels & summer flows



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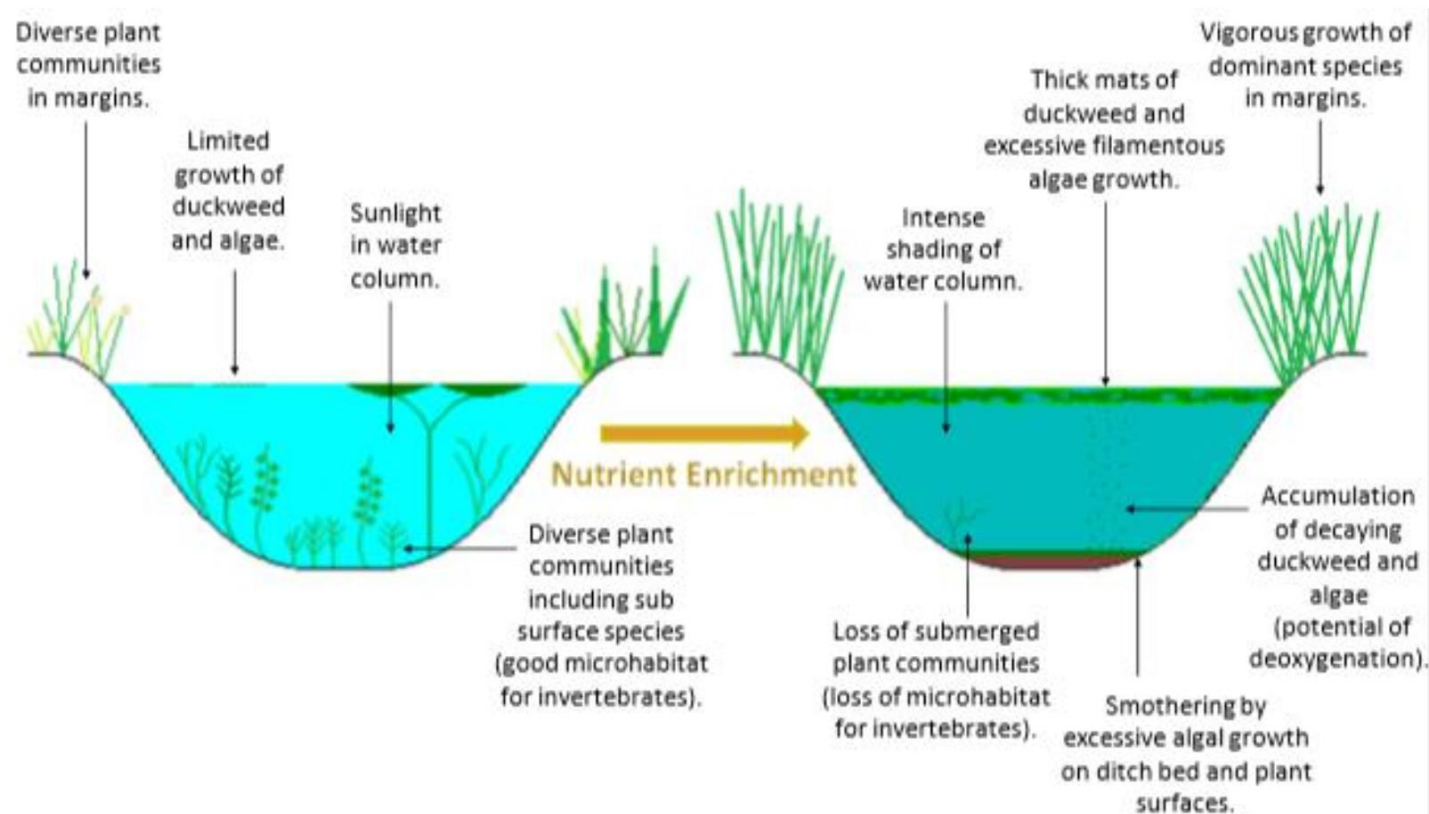
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**SOMERSET
DRAINAGE
BOARDS
CONSORTIUM**
AXE BRUE, PARRETT & NORTH SOMERSET LEVELS
INTERNAL DRAINAGE BOARDS

The problem

Somerset Levels and Moors are important lowland wetland systems that support exceptionally rich water plant communities and diverse aquatic invertebrate fauna. These ecosystems are sensitive to hyper-eutrophication, a condition caused by excessive nutrient enrichment, though the evidence for indisputable adverse effects on SSSI systems is relatively recent.

Figure 1. Schematic showing the effects of nutrient enrichment on ditch ecology



The problem

University of Plymouth data clearly shows there is a substantial legacy of phosphorus pollution within the sediment of watercourses and peat soils of the Levels and Moors. This is likely to hamper ecological restoration unless wetland systems are managed in a way which promotes the net export of phosphorus.

Spatial distribution of sediment phosphorus in a Ramsar wetland

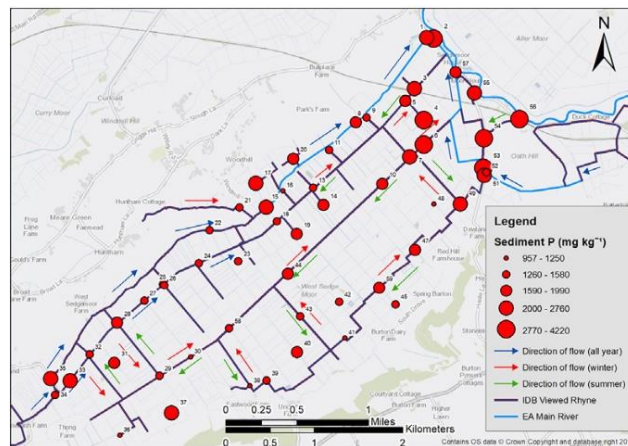
Ry Crocker, William H. Blake, Thomas H. Hutchinson, Sean Comber*

School of Geography, Earth and Environmental Sciences, University of Plymouth, Plymouth, Devon PL4 8AA, UK

HIGHLIGHTS

- Exceptionally high sediment P concentrations observed e.g. $>4000 \text{ mg kg}^{-1}$.
- Higher P concentrations observed at the north of the moor, the inlets and outlet.
- Principal component analysis distinguished sites by land management approaches.
- Higher P concentrations observed near agricultural land compared to nature reserve.
- Observations indicate relatively higher P input from agricultural land.

GRAPHICAL ABSTRACT



The problem

Available data suggest phosphorus pollution of sediment and peat soils within the Levels and Moors is severe, probably resulting from elevated phosphorus loads in rivers entering the systems over decades, and the direct applications of nutrients in the past.

Water level and flood risk management operations on the Levels and Moors may also be perpetuating internal cycling of nutrients within the system, making them a sink for pollution.



King's Sedgemoor SSSI, early summer algae bloom, May 2023









Done

20118821_1 - Farming and Wildlife Advisory Group.PDF



Client: Farming and Wildlife Advisory Group Project: 14859 West Sedgemoor Main Drain
 Quote Description: Surface Water analysis
 Folder No: 004084403 Sampled on: 15-Feb-18 @ 12:00
 Comments: WSM2 Huntham
 Quote No: 14859 Matrix: Surface Water

Analyte	Result	Units	Flag	MRV	Accred	Lab ID	Testcode
Alkalinity to pH 4.5 as CaCO ₃	390	mg/l		5	UKAS	SX	25
Ammoniacal Nitrogen as N	2.01	mg/l		0.03	UKAS	SX	25
Chloride	66.3	mg/l		1	UKAS	SX	25
Nitrite as N	0.418	mg/l		0.004	UKAS	SX	25
Nitrogen : Total Oxidised as N	16.3	mg/l		0.2	UKAS	SX	25
Orthophosphate, reactive as P	1.09	mg/l		0.01	UKAS	SX	25
Silicate, reactive as SiO ₂	16.0	mg/l		0.2	UKAS	SX	25
Phosphate : Total as P	1.24	mg/l		0.02	UKAS	SX	235
Conductivity at 20C	997	uS/cm		10	UKAS	SX	9
pH	7.73	pH Units		0.05	UKAS	SX	9





Strategic framework for reducing nutrient pollution to the Somerset Levels and Moors and site restoration

Strategy for reducing the ecological impacts of nutrient pollution in the Somerset Levels and Moors, including actions for IDBs that may be able to mitigate the impacts and reduce the very high levels of nutrient stored within wetland systems.

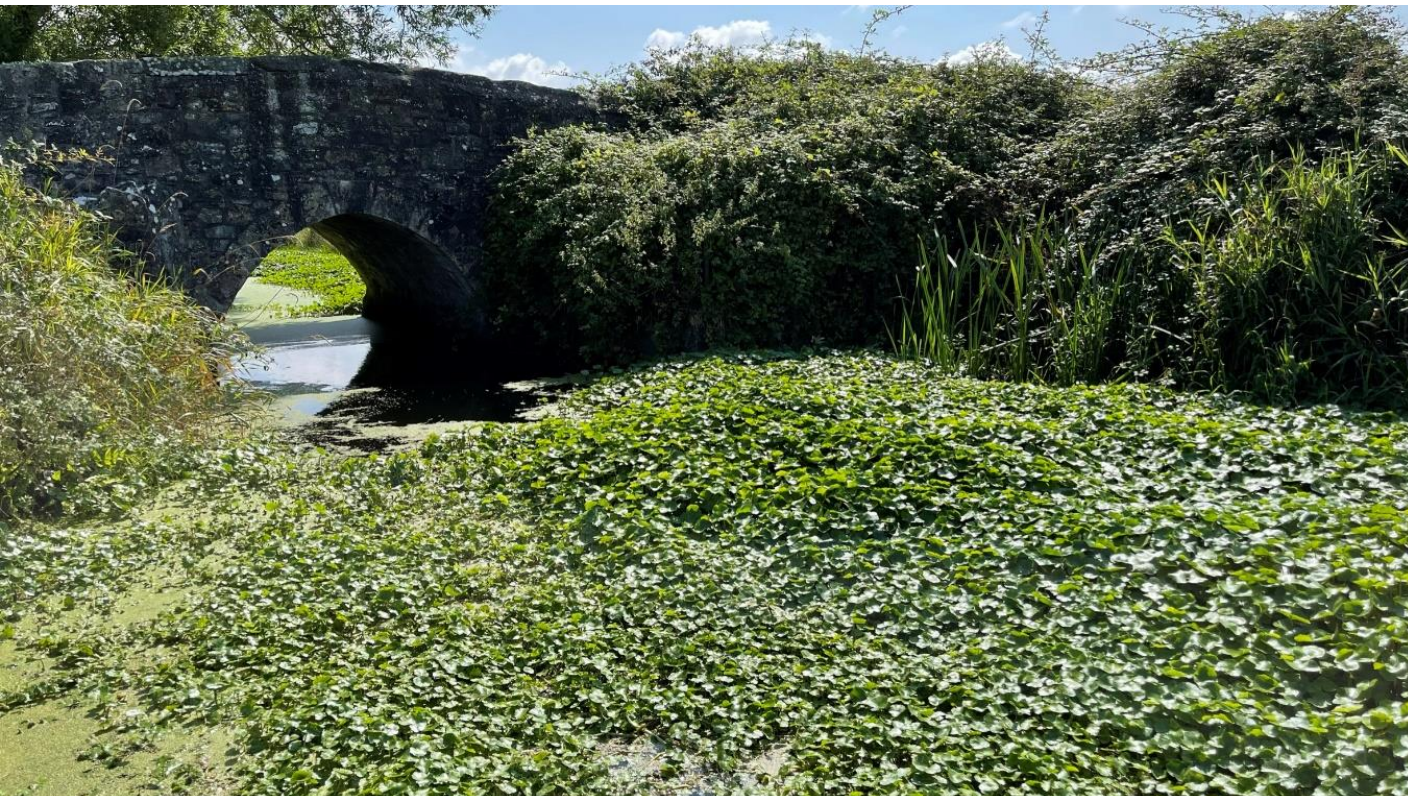


South Drain, Catcott Broad Drove, Azolla bloom during summer drought 2022

Invasive Non-native Species on the Somerset Levels

Non-native invasive species are a serious threat to water management and wetland ecology in Somerset.

Failure to control invasive non-native species can increase flood or drought risk and be harmful to the environment and public health.



“With floating pennywort, the tiniest fragment is a disaster”

EAC Invasive Species Inquiry 2019