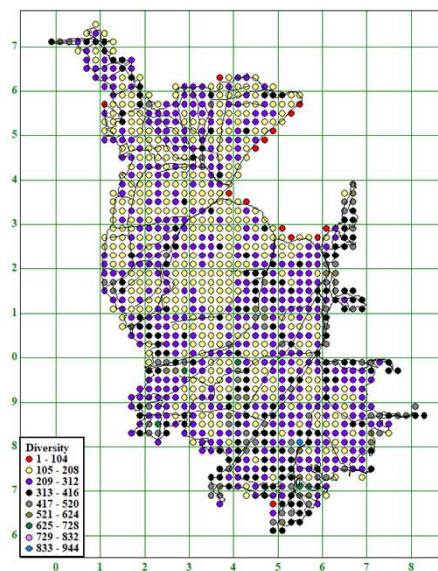


Aquatic Fenland Flora

Jon Graham & Owen Mountford

05/02/2025

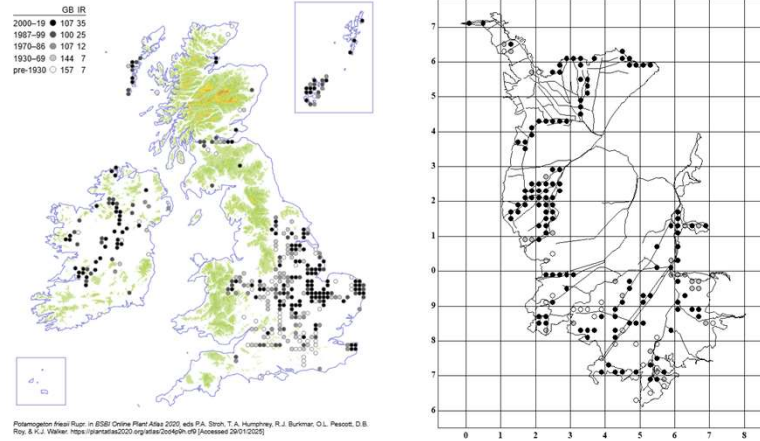
Fenland Flora – recording coverage



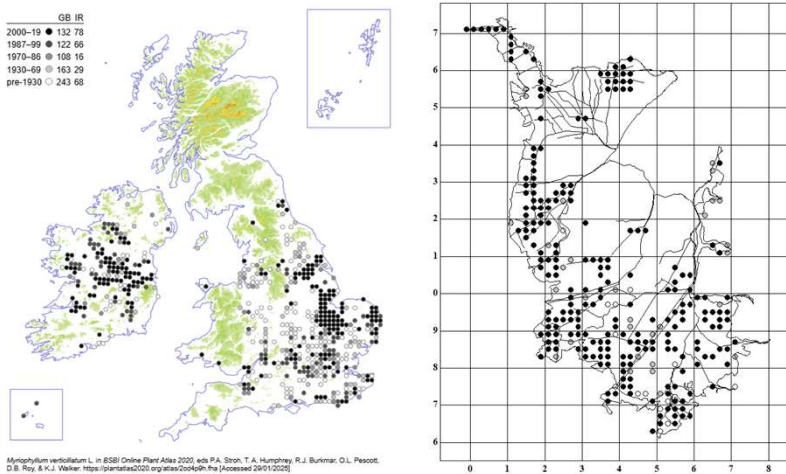
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Key Finding : Fenland of national importance for southern aquatics

Flat-stalked Pondweed (Red List Vulnerable in England)



Whorled Water-milfoil (Red List Near Threatened in England)



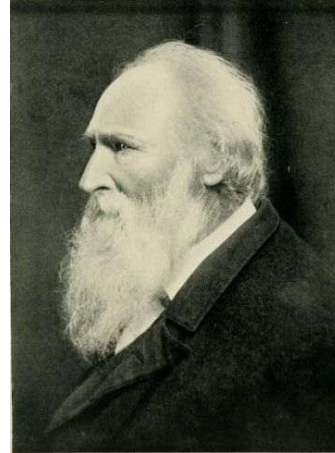
Fryer recorded plants from the last of the unploughed Sedge Fens (1880s) and specialised in pondweeds

Broad-leaved Pondweed



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Alfred Fryer



Fryer noted plants from the last of the Sedge Fens but also from the newly cut drains within them

Sedge Fens (Saw-sedge);



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**19th century drains
(Flat-stalked Pondweed)**



By early 20th century, most Sedge Fens lost to the plough (remnants now only within NNRs)



Relict (though modified) Sedge Fen
(Woodwalton Fen)

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However, many of the aquatics recorded by Fryer from new ditches within the Sedge Fens survived within the modern ditch network



Turf Fen today (near Warboys)

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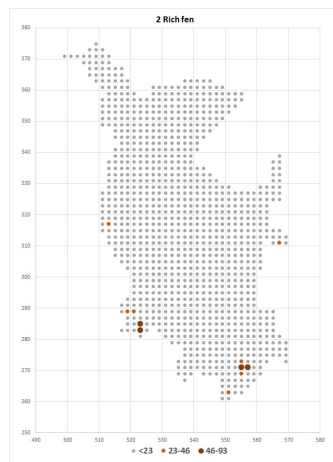
Various-leaved Pondweed still occurs at Pidley Fen
exactly where Fryer found it in 1880



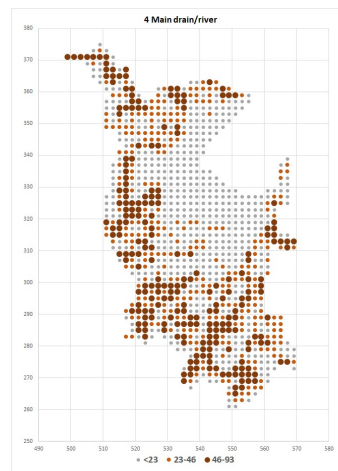
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Habitat Cluster analysis showing modern
scarcity of relict Sedge Fens

Rich Fen cluster



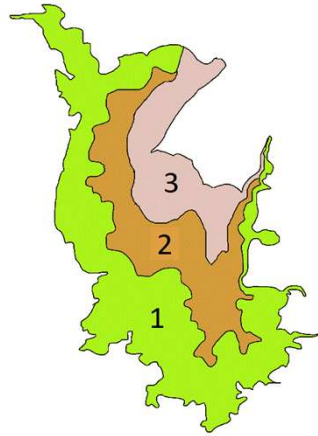
Drain and washland clusters



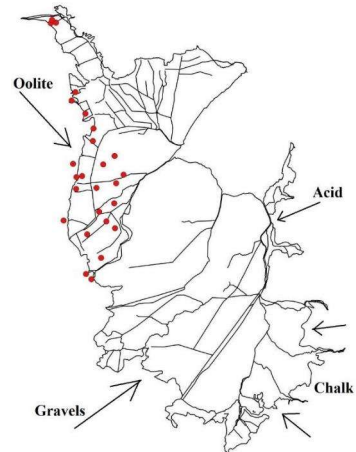
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Zones of species diversity for aquatics

Zones



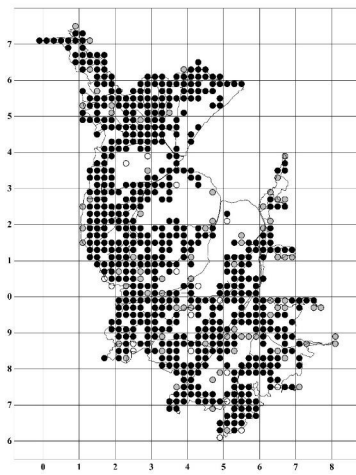
Ground water sources



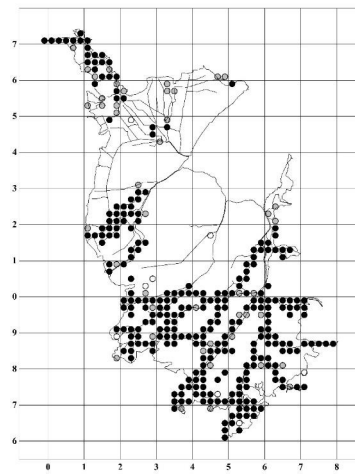
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Modern tidal limits

Fennel Pondweed



Yellow Water-lily



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Zone 1 - Intermediate 3 – 5 m wide IDB drains



Adventurer's Drain (Haddenham drainage district)

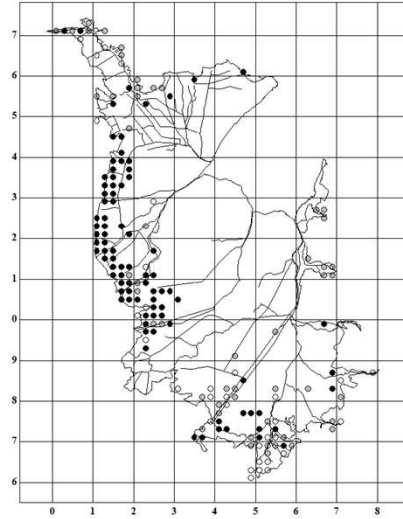
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An intermediate Blackbush drain (Whittlesey drainage district)



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Western margin species – Opposite-leaved Pondweed



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Zone 2 Old rivers and large drains to tidal sluices

Lark (Prickwillow)



**Maud Foster Drain
(Rawson's Bridge)**



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Zone 3 Coastal

Welland Out flow



Drains behind sea banks



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Aquatics limited to a few specialists – Spiral Tasselweed and Brackish Water-crowfoot



Summer drawdown (washland pools and field drains)



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How can botanically rich ditches coexist with modern
intensive farming?
(Fenland with c 50% of Grade 1 agricultural land
in England)



Queens Dike (Pidley Fen)

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Macro algae (Ulva)
– South Holland Main Drain (Aug. 2021)



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Dales Head Dike (Dales Bridge, Timberland)



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Factors determining aquatic richness identified by our research

- Groundwater connection towards margin of basin dilutes nutrient inputs;
- High water level in summer for crop irrigation
- Routine IDB management partly replicates the dynamic freshwater/tidal hydrology of the undrained fens
- Remoteness of Fenland (less run-off from the built environment, smaller sewage treatment works etc.)
- Smaller IDB drains often disconnected hydrologically from main river

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Importance of a high water-level in summer Example - Shining Pondweed



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Importance of disturbance for some species



Grass-wrack Pondweed

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Turions



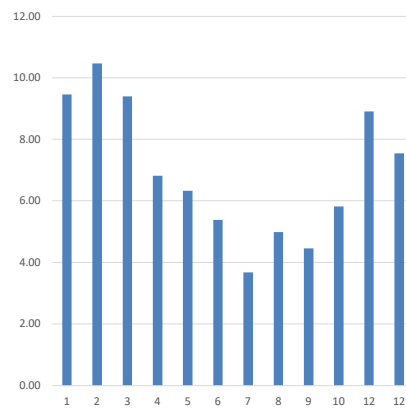
Factors that are less clear

Iron ochre chemistry



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Annual nutrient cycle
(TON for Twelve Foot Drain)



Summary

- Fenland a national stronghold for aquatic plants with a southern distribution
- IDB management of the modern ditch network is key
- Though the NNRs are our most important sites botanically in Fenland, the most biodiverse drains and rarest aquatic plants occur within IDB drains

05/02/2025