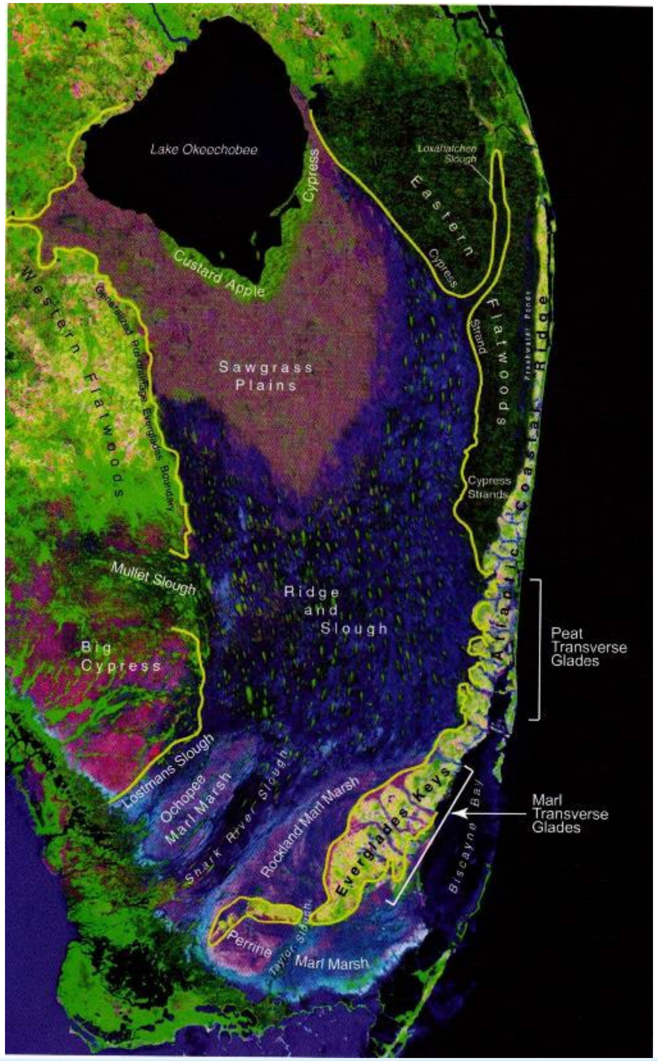
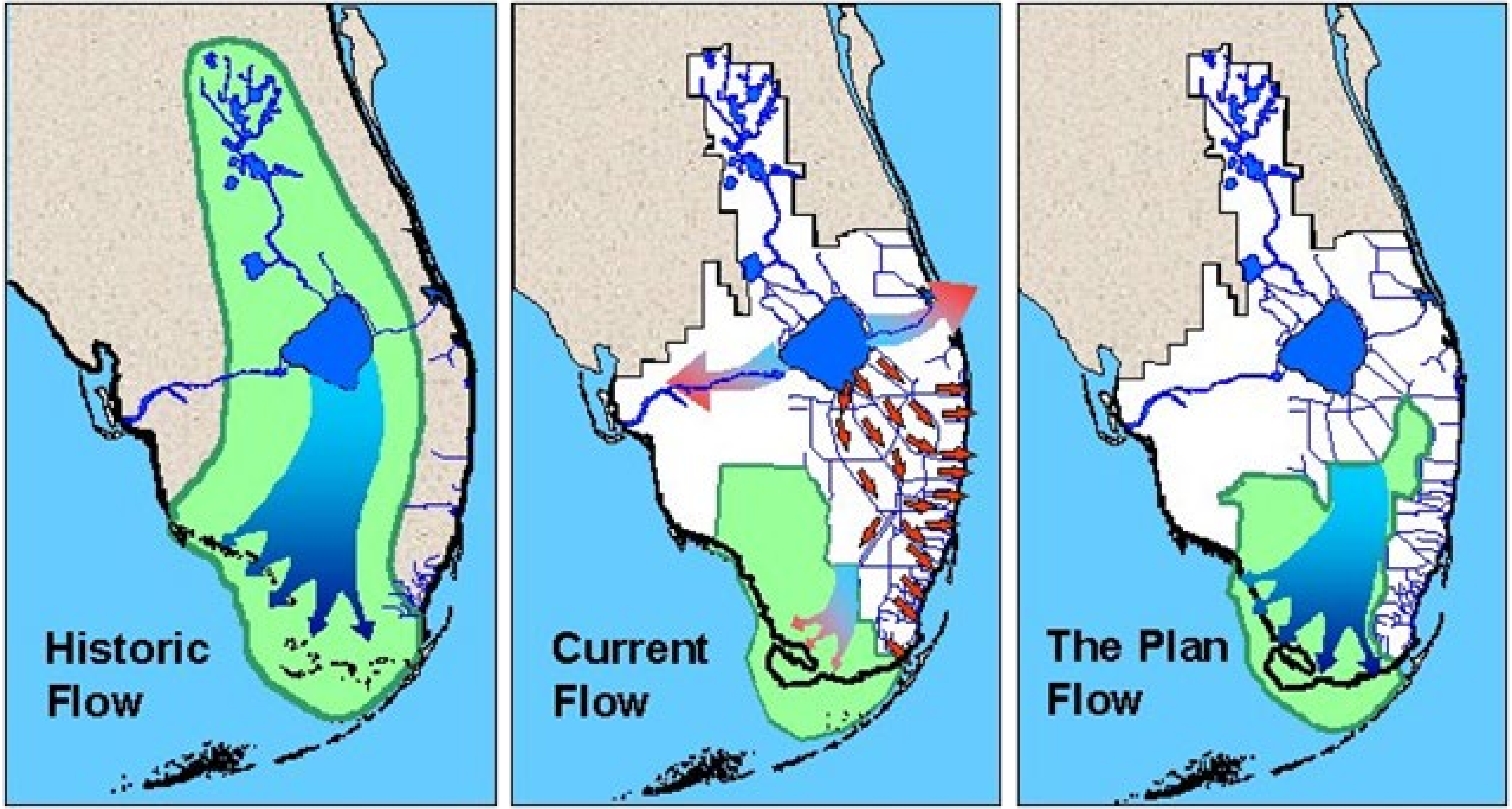
The Everglades Wasn't Built in a Day: Micro and Major Transitions in Restoration

Christa Zweig

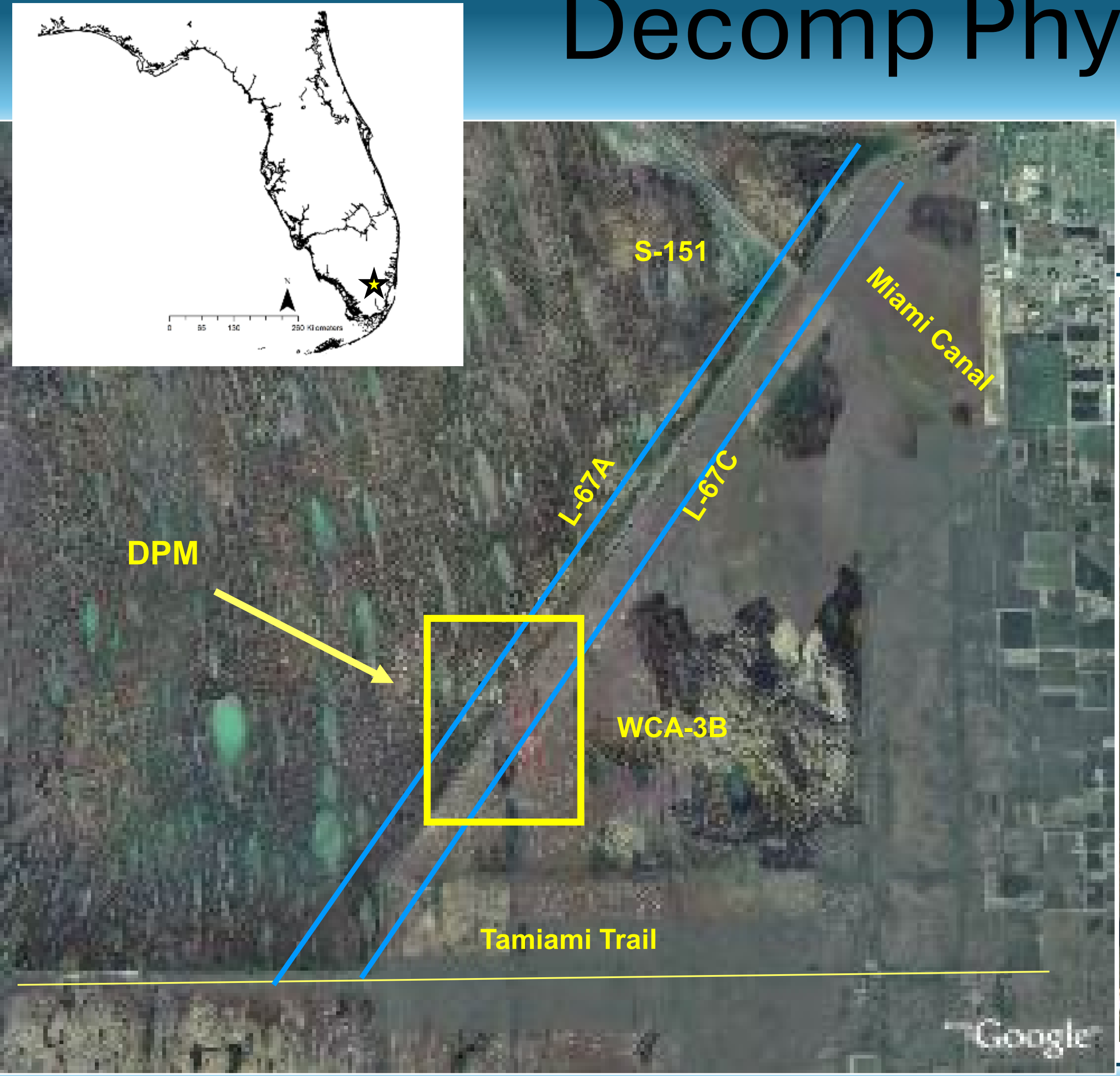
April 19, 2023

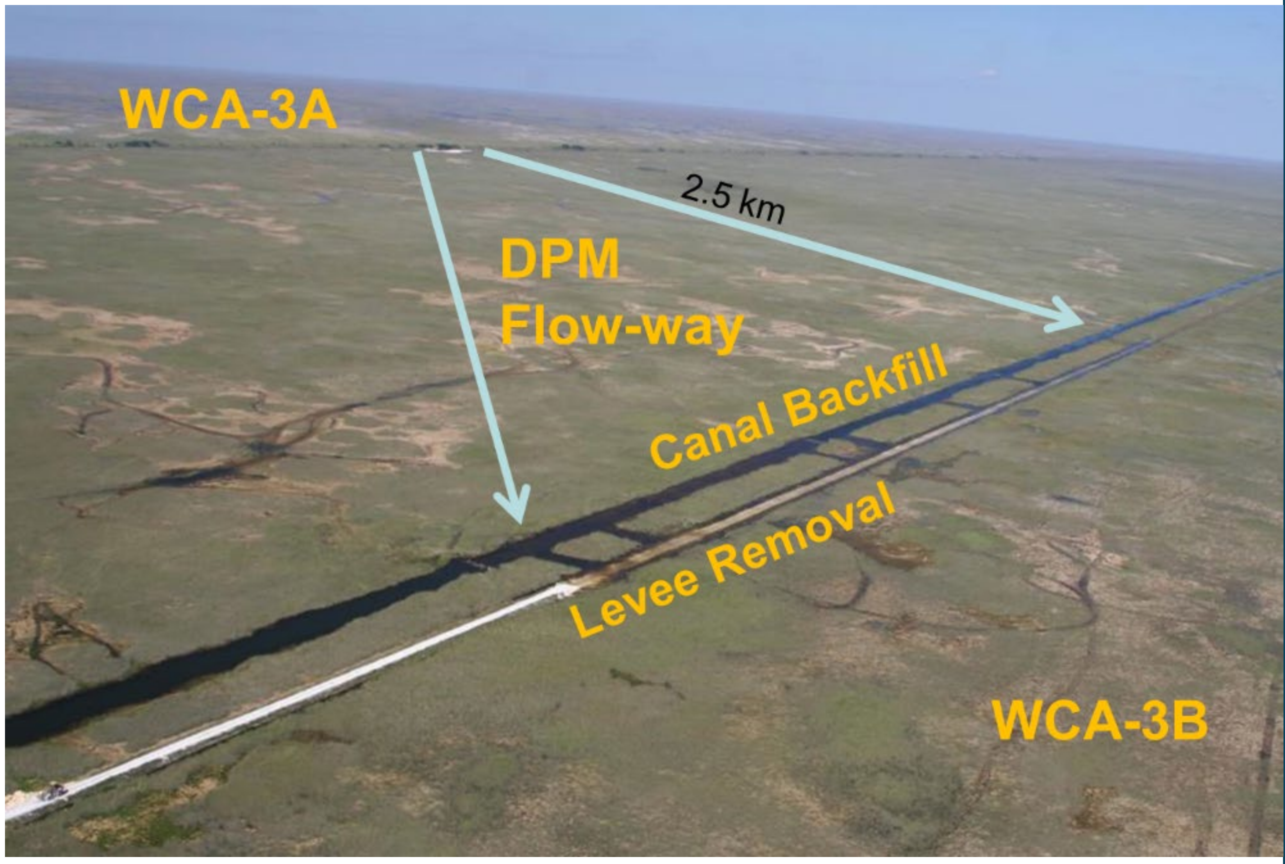
The story of the historic Everglades—Sheetflow is still a myth!





Decomp Physical Model





Wrench in the works: DPM

Decreased sheetflow

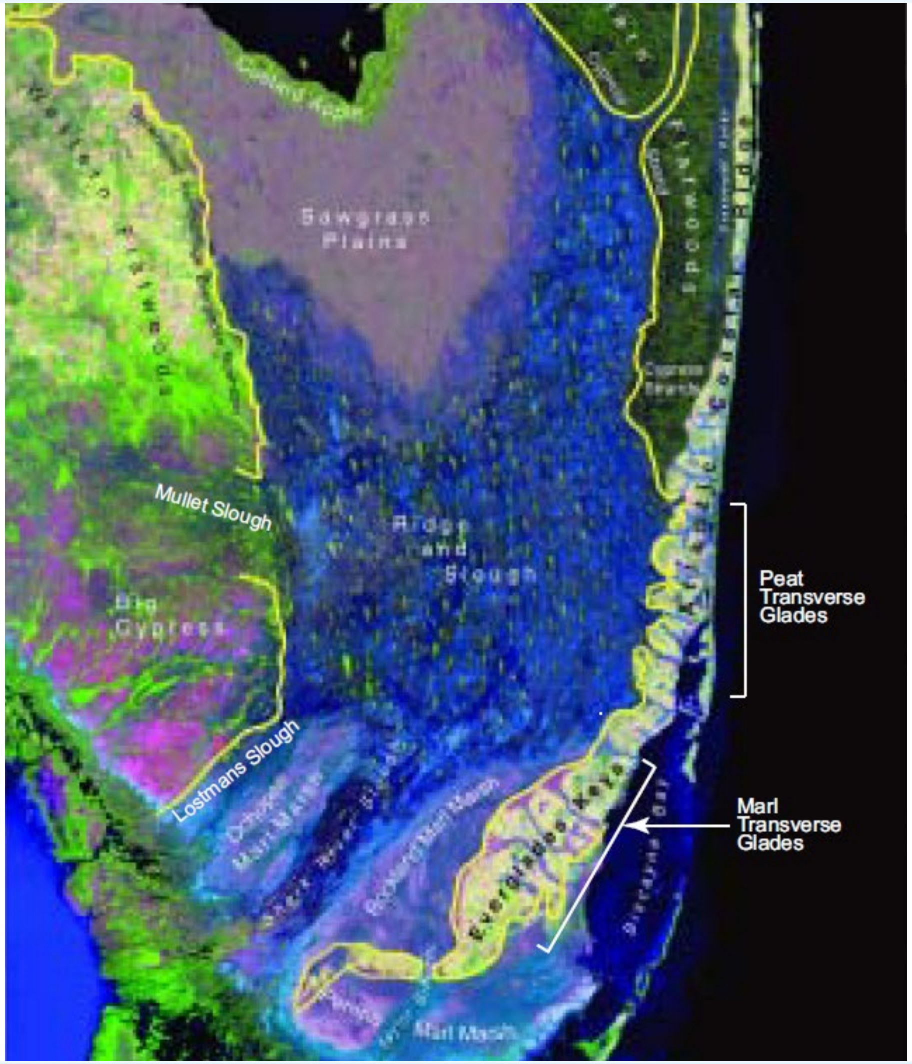
Faster flow did not extend very far into the experimental area. Even at full S-152 capacity (700 cfs), we didn't get historic flows more than 1 km from inflows.

Periphyton clearing

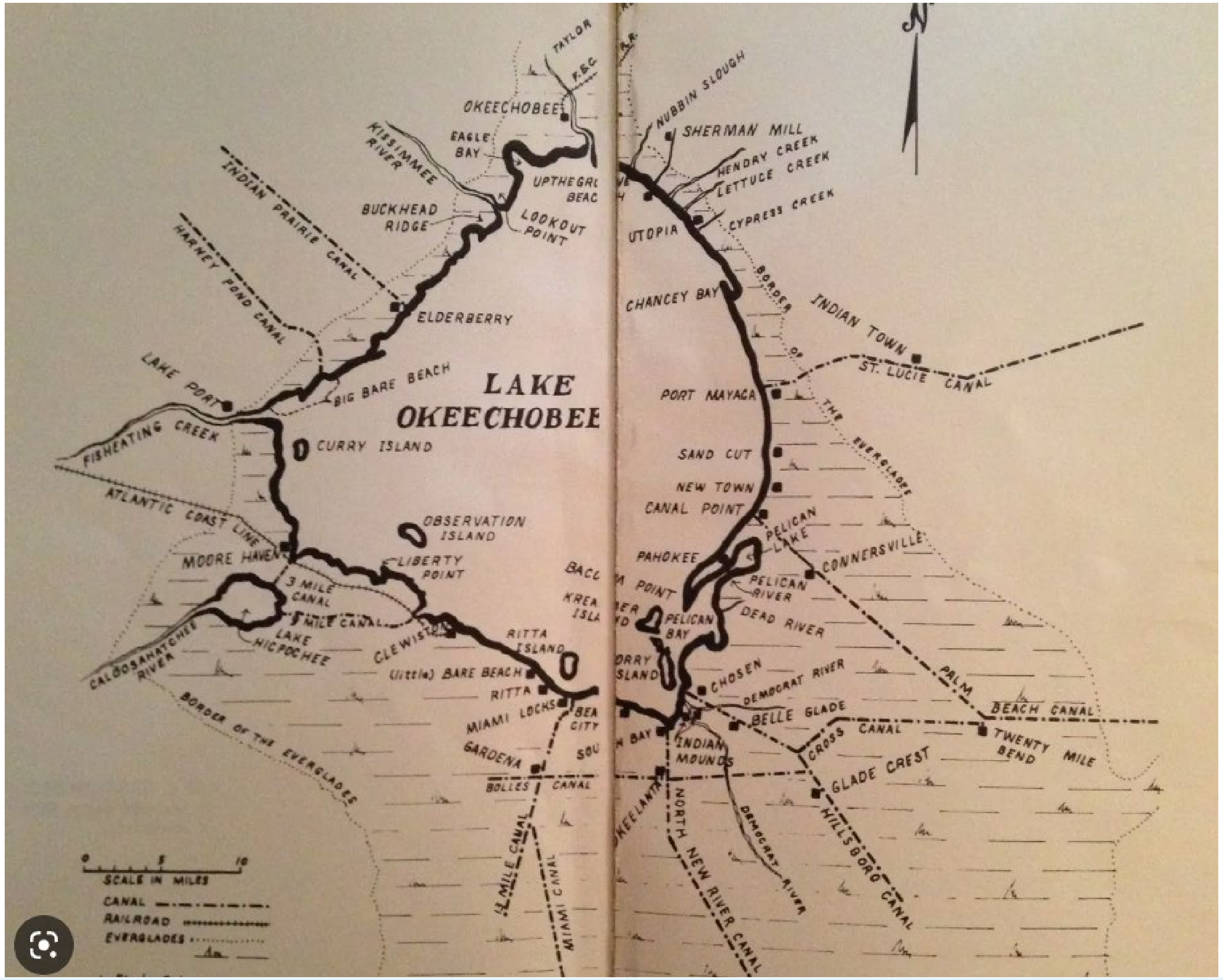
Periphyton (a mix of fungus, bacteria, and algae) is very important to the Everglades system. When faster flows were introduced, periphyton sunk and disappeared. If historic flow speeds caused periphyton to disappear, how did it work in the historic Everglades?

More nutrients

We expected more nutrients because more water was passing through the system, but the enrichment was faster than anticipated even with ≤10 ppb phosphorus concentrations. How did higher historic flows not cause enrichment?



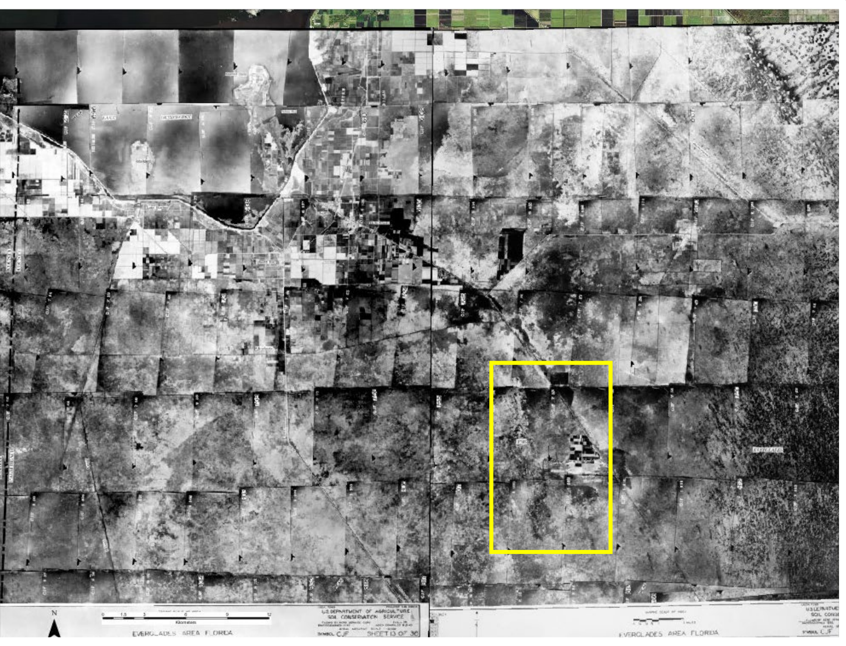
Historic Information

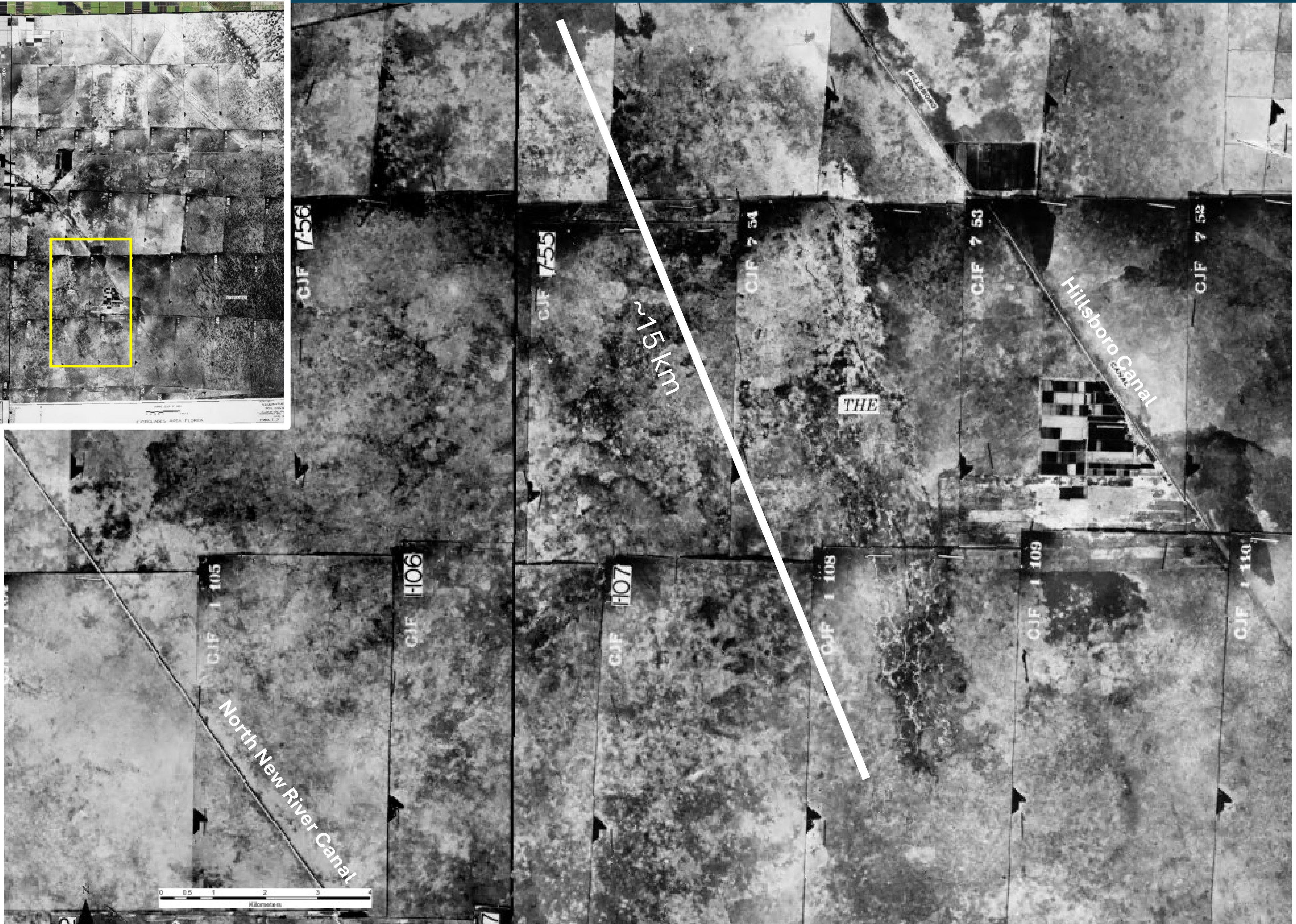


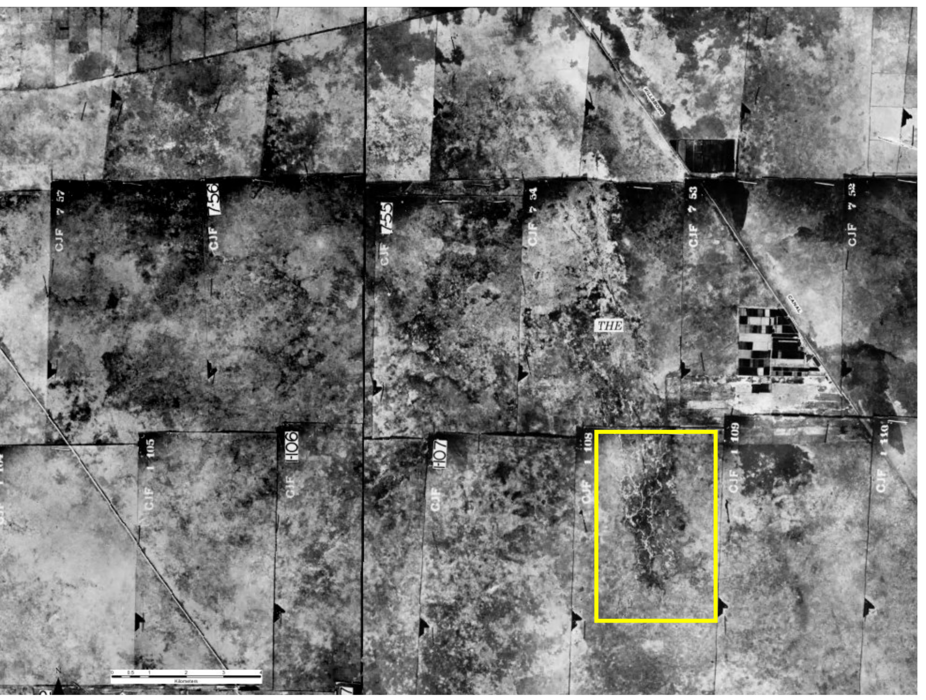
These were some of the dead rivers. There were others, but the biggest of them all, the Mississippi of the Everglades, part of the Seminole's water route from the big lake to Miami, was old Democrat. Now obliterated

One of these forks of Democrat, the south one most likely, must have continued in an open "lead" or passage through the sawgrass down to Shawano Farms where it connected with that ancient string of lakes known as Brooker's Run or Brooker's Lakes, a series of long, narrow and deep lakes maybe half a dozen miles in length. The biggest, so I've been told, was a mile and a half long and three-fourths of a mile in width. They had been discovered by that old time trader and hunter, Henry Brooker, who had declared that gators were there by thousands, that their number was inexhaustible.

Besides being fed by old Democrat, these lakes must have got a good share of their water from Hal-pat-i-okee Slough, much farther to the north, for there used to be, in the midst of all this grassy water, a sort of Gulf Stream flowing south, a channel clear of water growth and deeper than the surrounding land, and it was plumb alive with otters, fish and gators. It must have flowed as far south as the Miami River or maybe further, for Johnnie Thorpe, an old Glades hunter, has said that from his home west of Ojus he could pole his glade boat up to Brooker's Run, then past the Indian mounds and into Lake Okeechobee. It could flow a heap of water too, even after the canals had been dug, for during flood times this Gulf Stream, where it crossed the Palm Beach and Hillsboro canals, and more especially where it crossed the North New River Canal fifteen miles from Lauderdale, its current, flowing right across the canal, could throw a loaded freight boat clear off its course, an experience I've had a right smart number of times.




~15 km
Hillsboro Canal
North New River Canal
THE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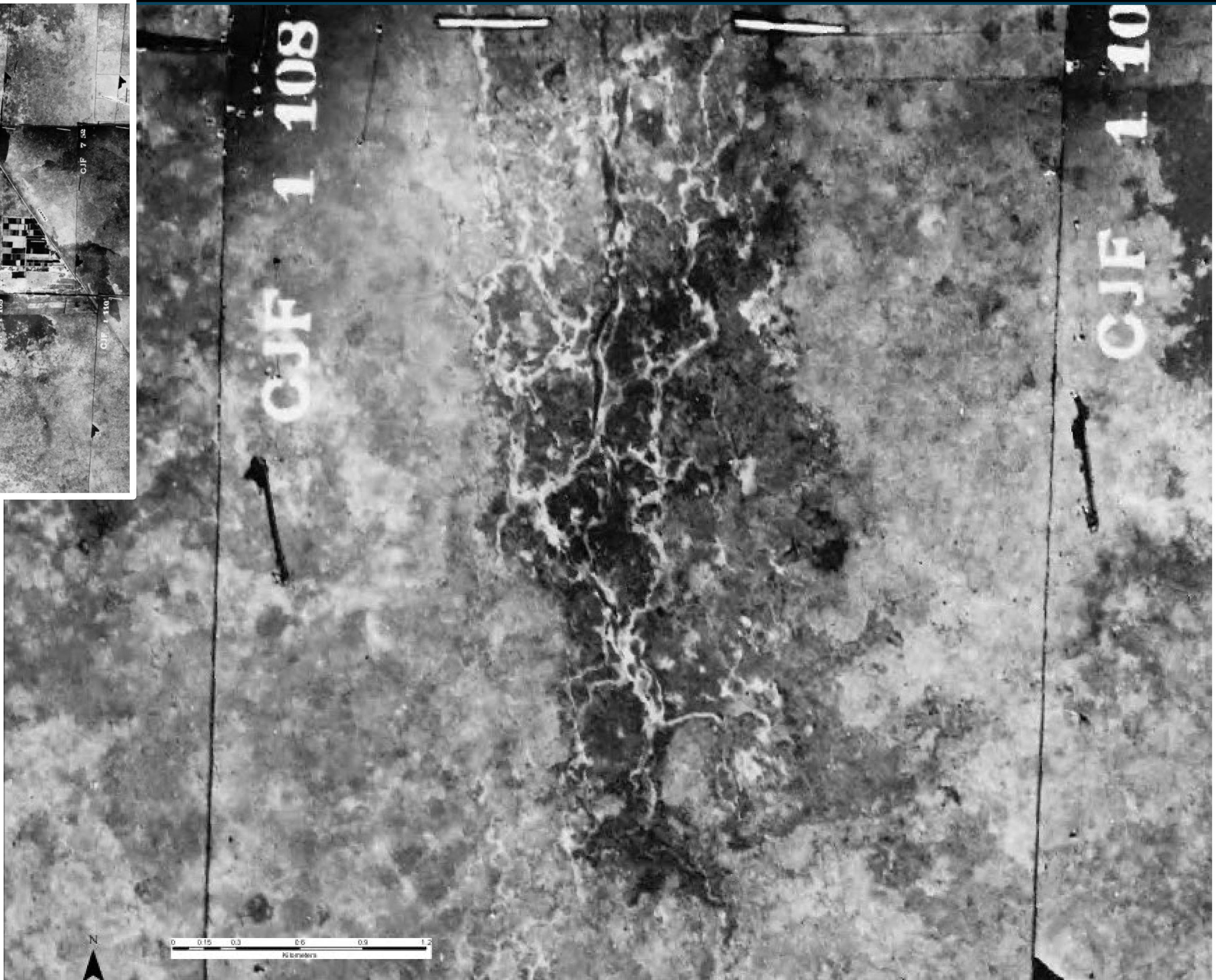
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CJF
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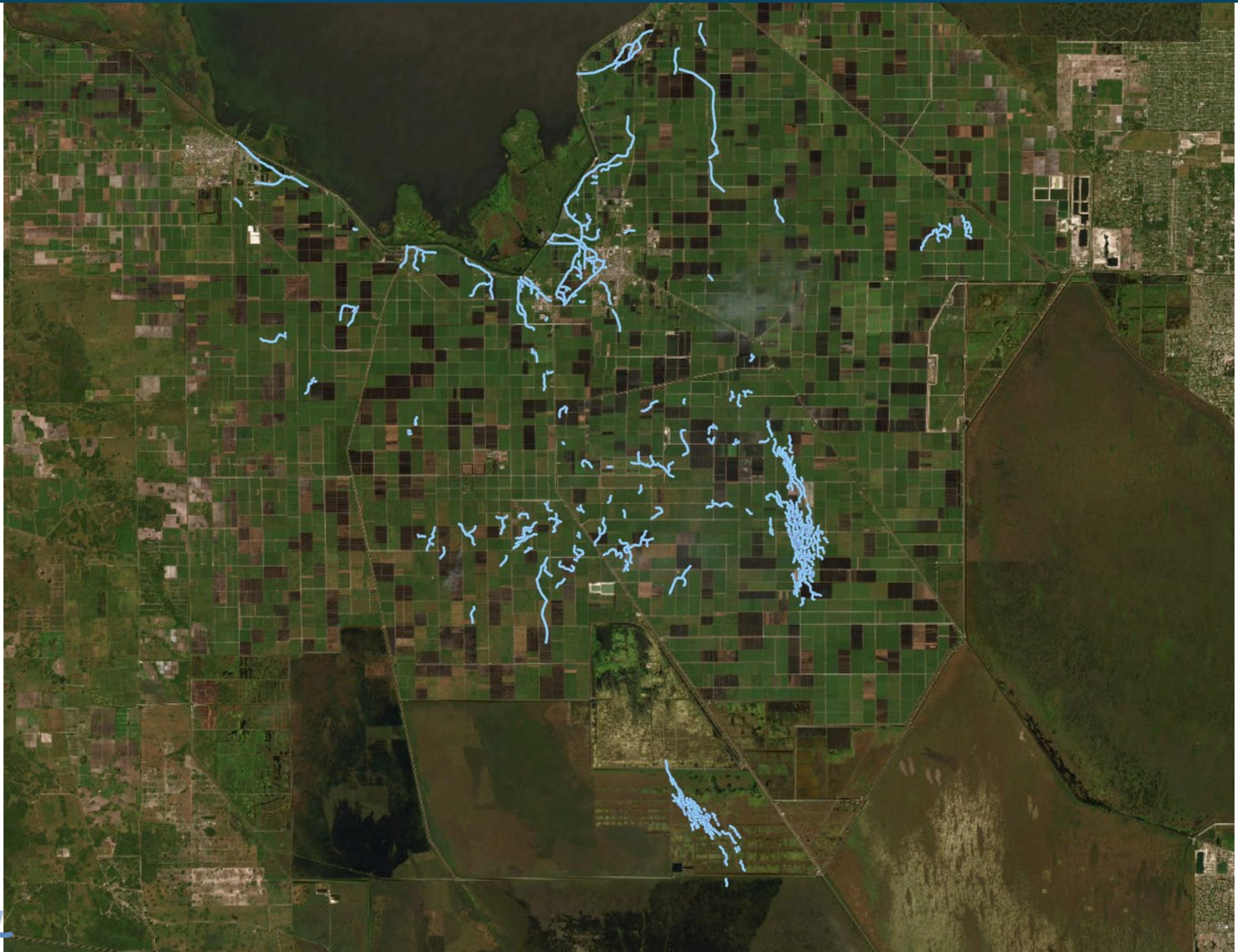
Kilometers



Flow in the Peat Record

Dachnowski-Stokes 1930

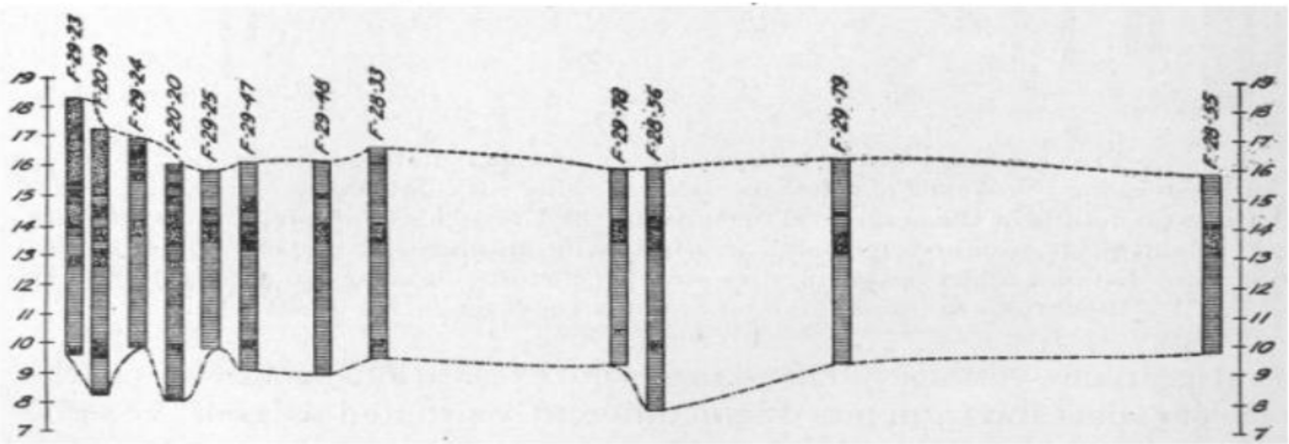


Fig. 4.—Cross-sections along the North New River canal showing rock-bottom configuration, contrasts in the sequence of peat layers, and transition of stratigraphic features from Lake Okeechobee to Okeelanta and southward. Changes in water level and shore line are recorded by the character and succession of the major layers of peat. Number and location of each profile are shown on the map of fig. 1.

Griffin et al 1982 (DoE report)

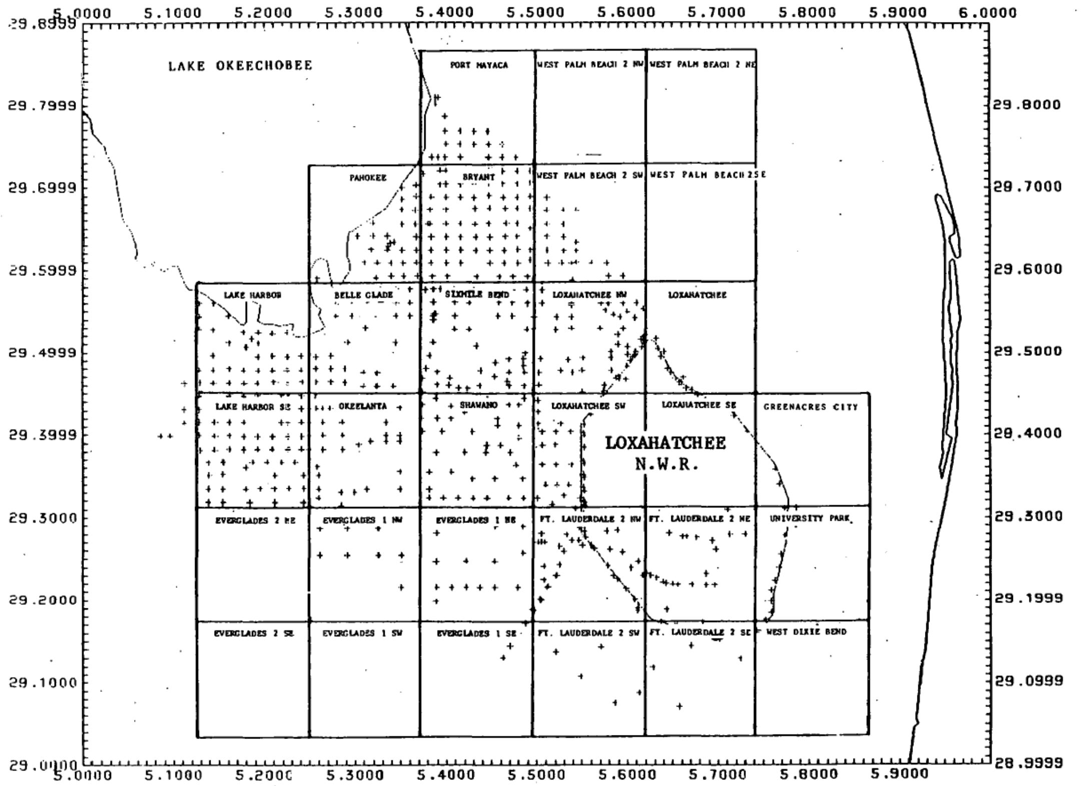
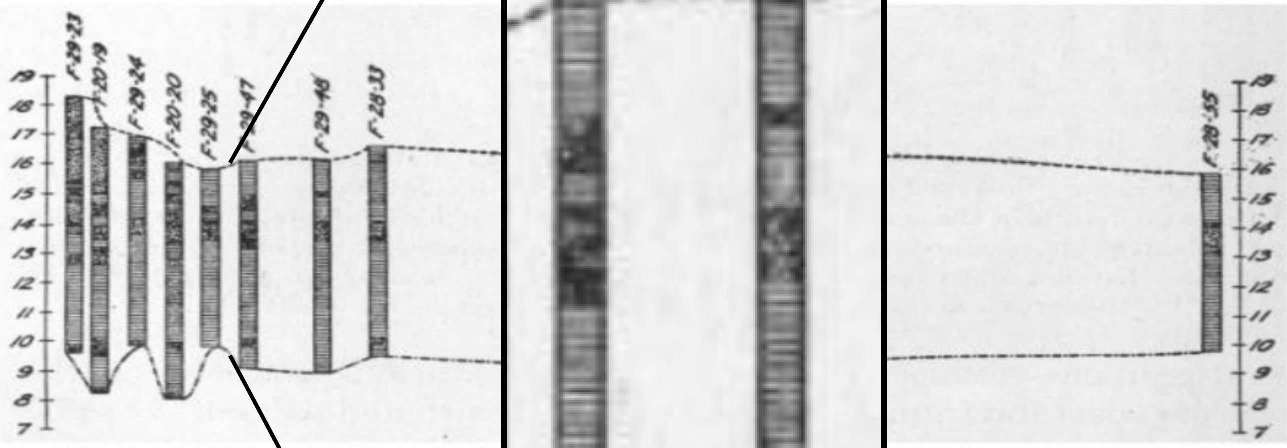


Figure 10. Index map showing core locations in the Northern Everglades and the USGS topographic quadrangles referred to in the text. Tick marks in margin are 1 km apart.

Flow in the Peat Record

Dachnowski-Stokes 193



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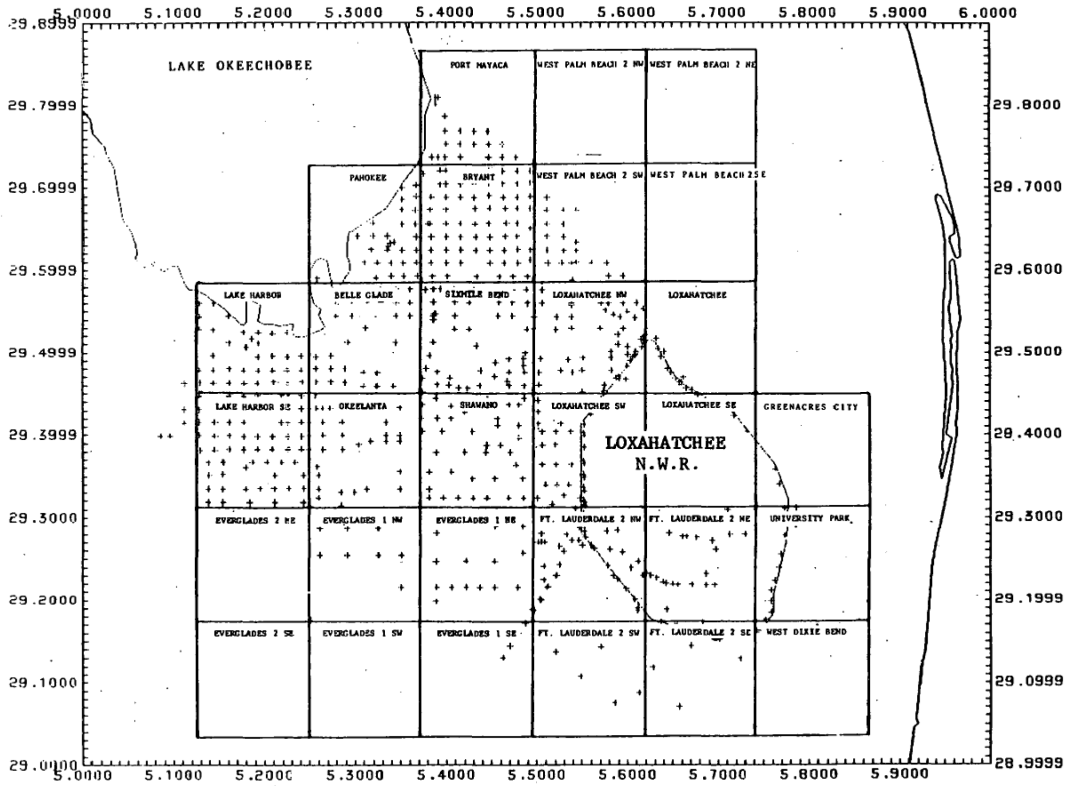

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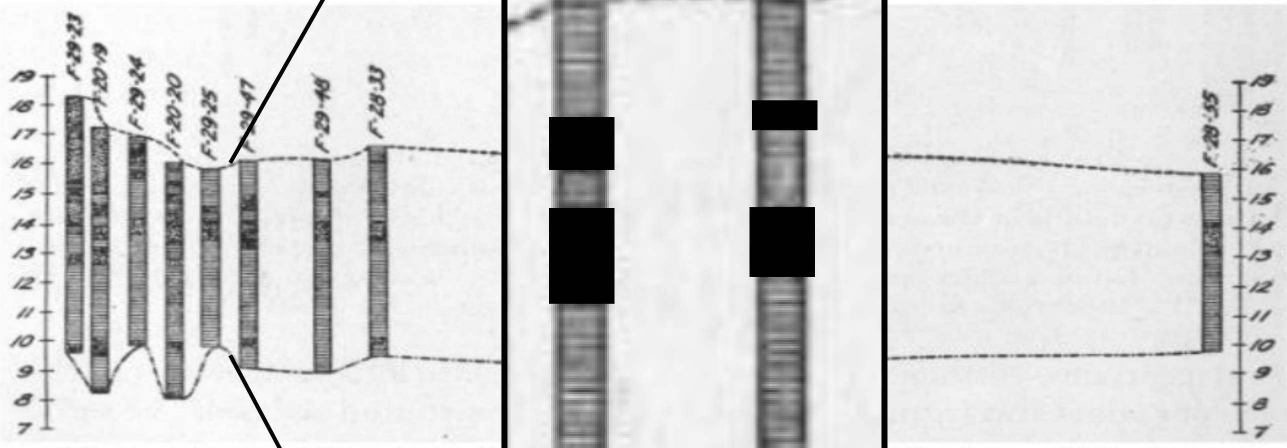

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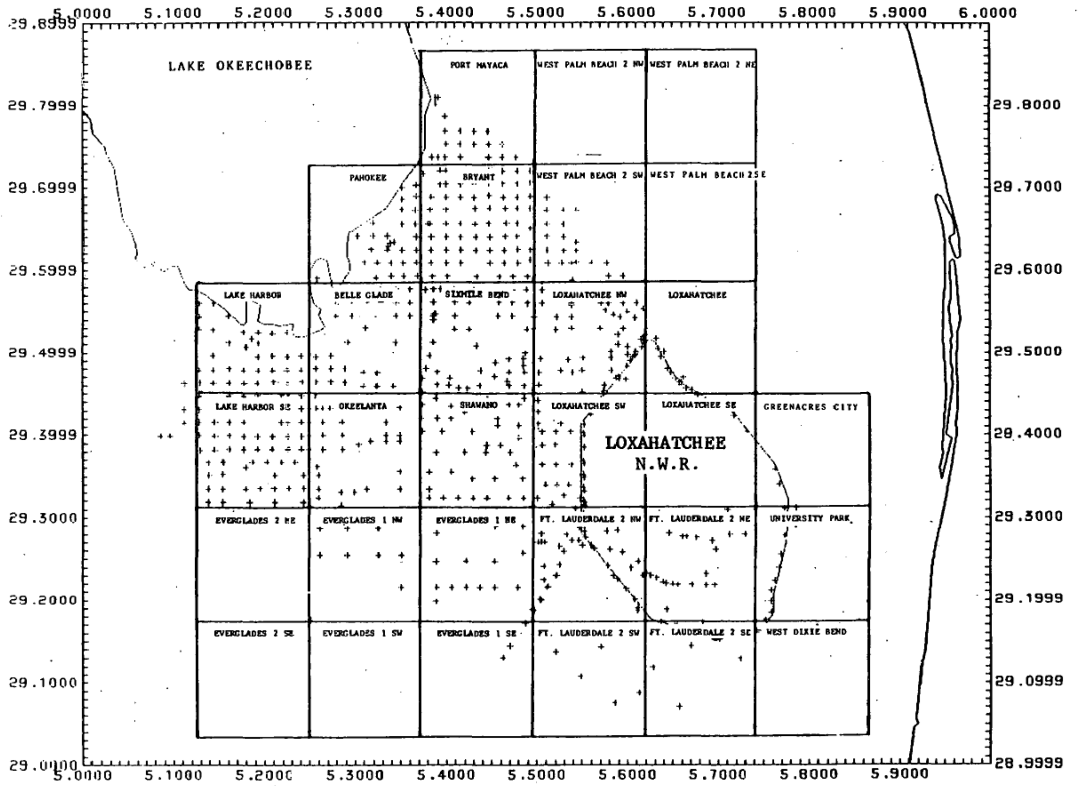

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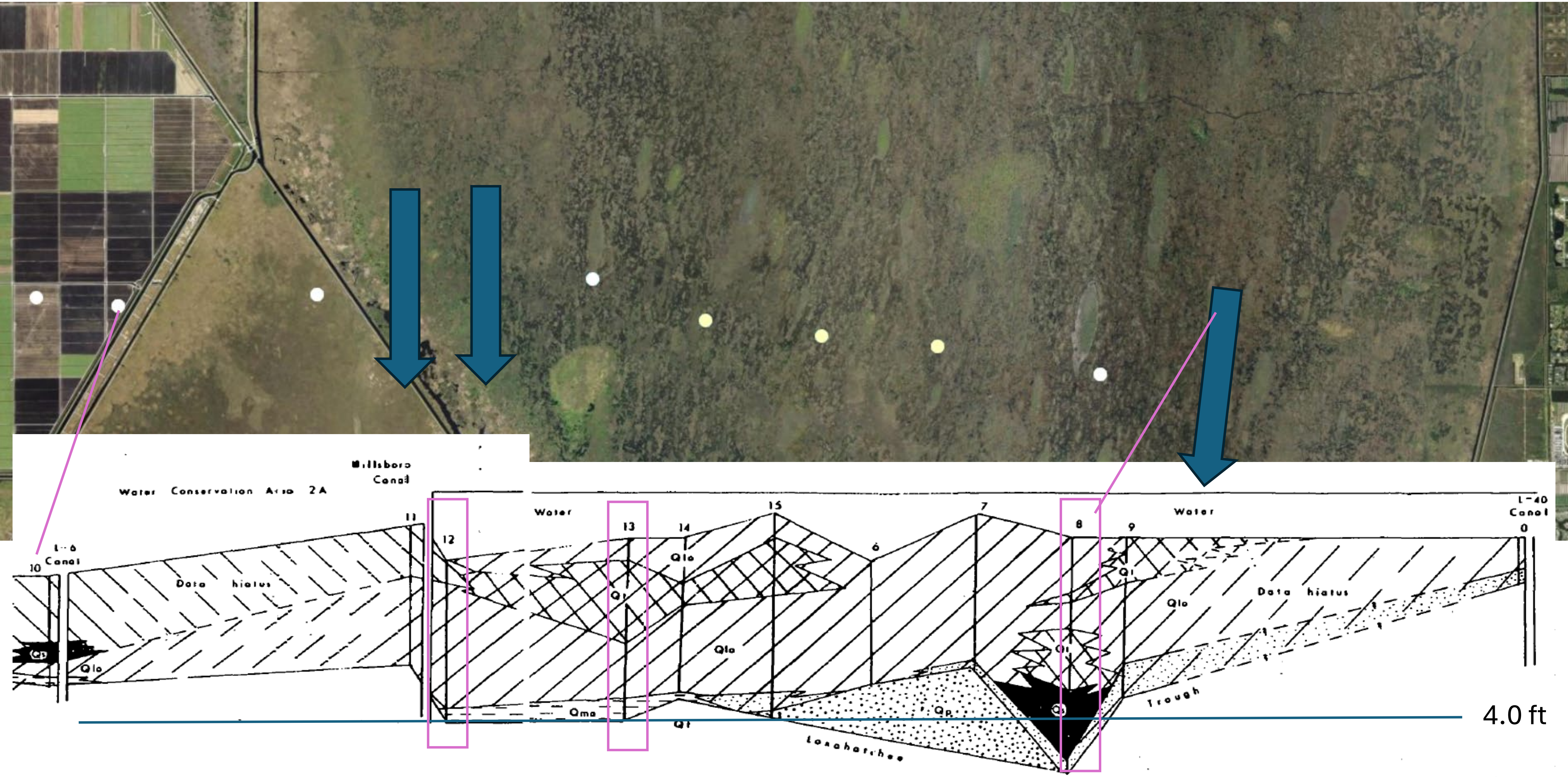
Hillsboro Canal
Water Conservation Area 2A
L-6 Canal
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Data hiatus
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Trough
Loxahatchee
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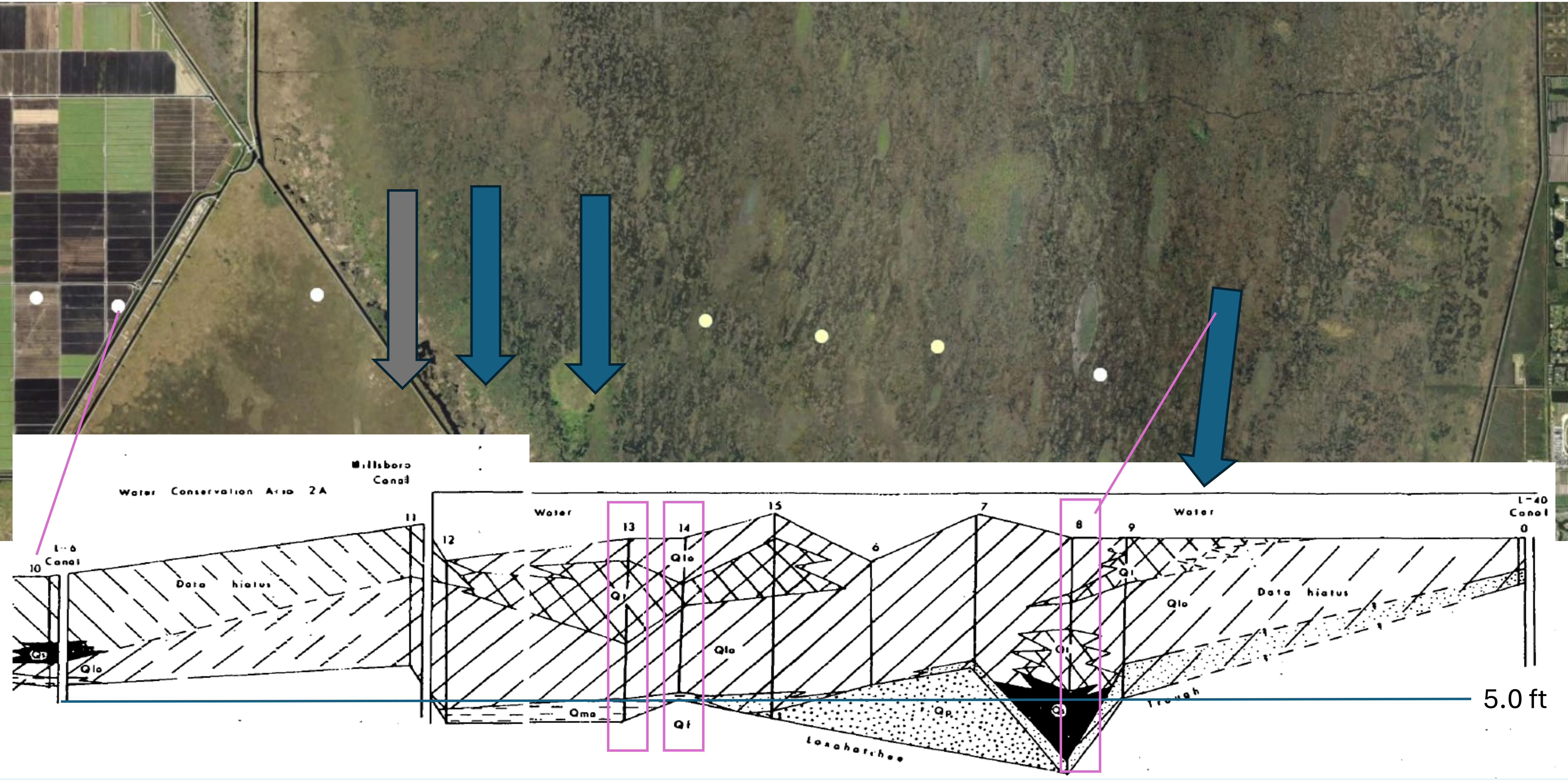
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Loxahatchee
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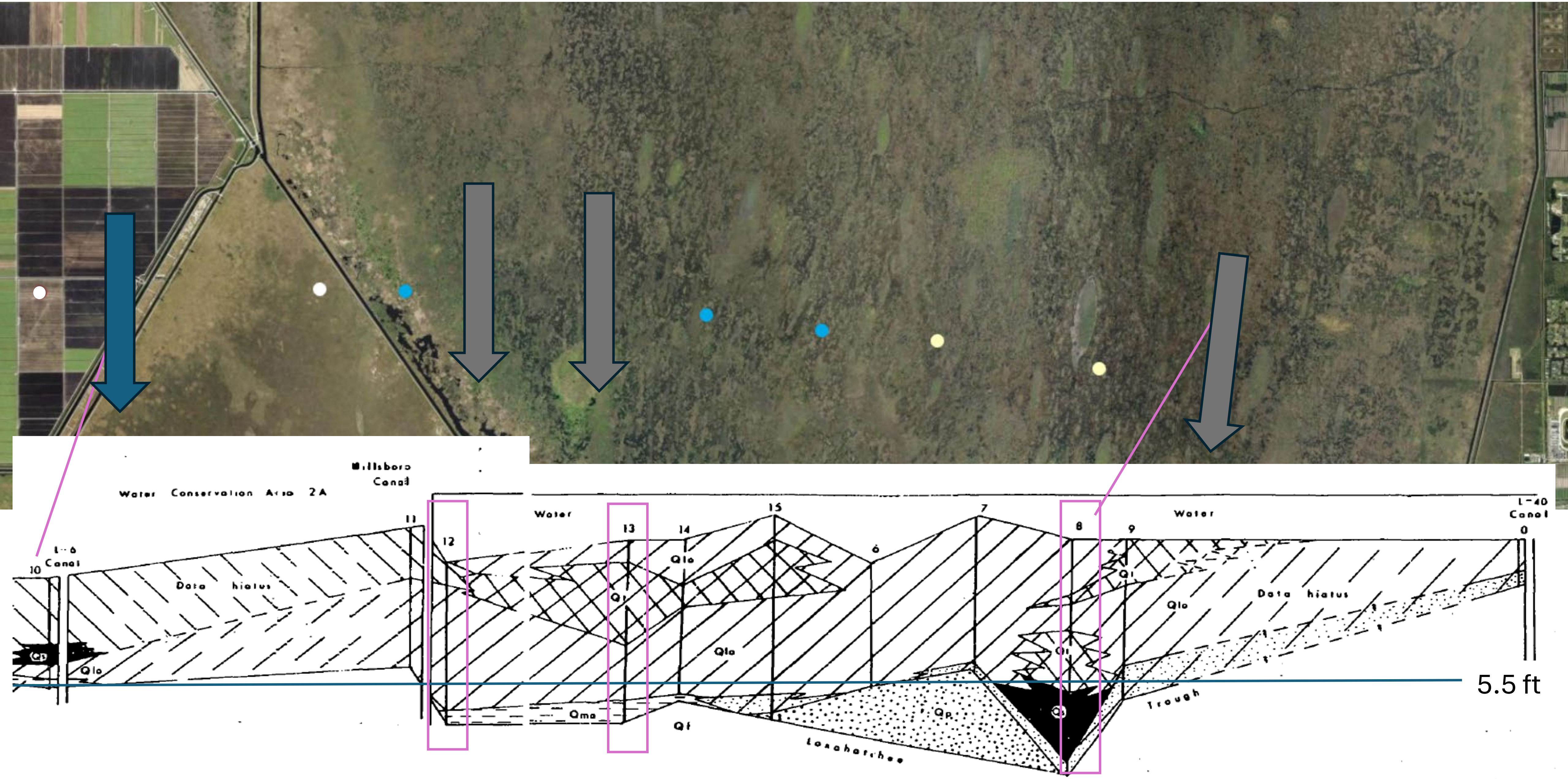

Water Conservation Area 2A
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Water
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Qmo
Qf
Qp
Loxahatchee
Trough
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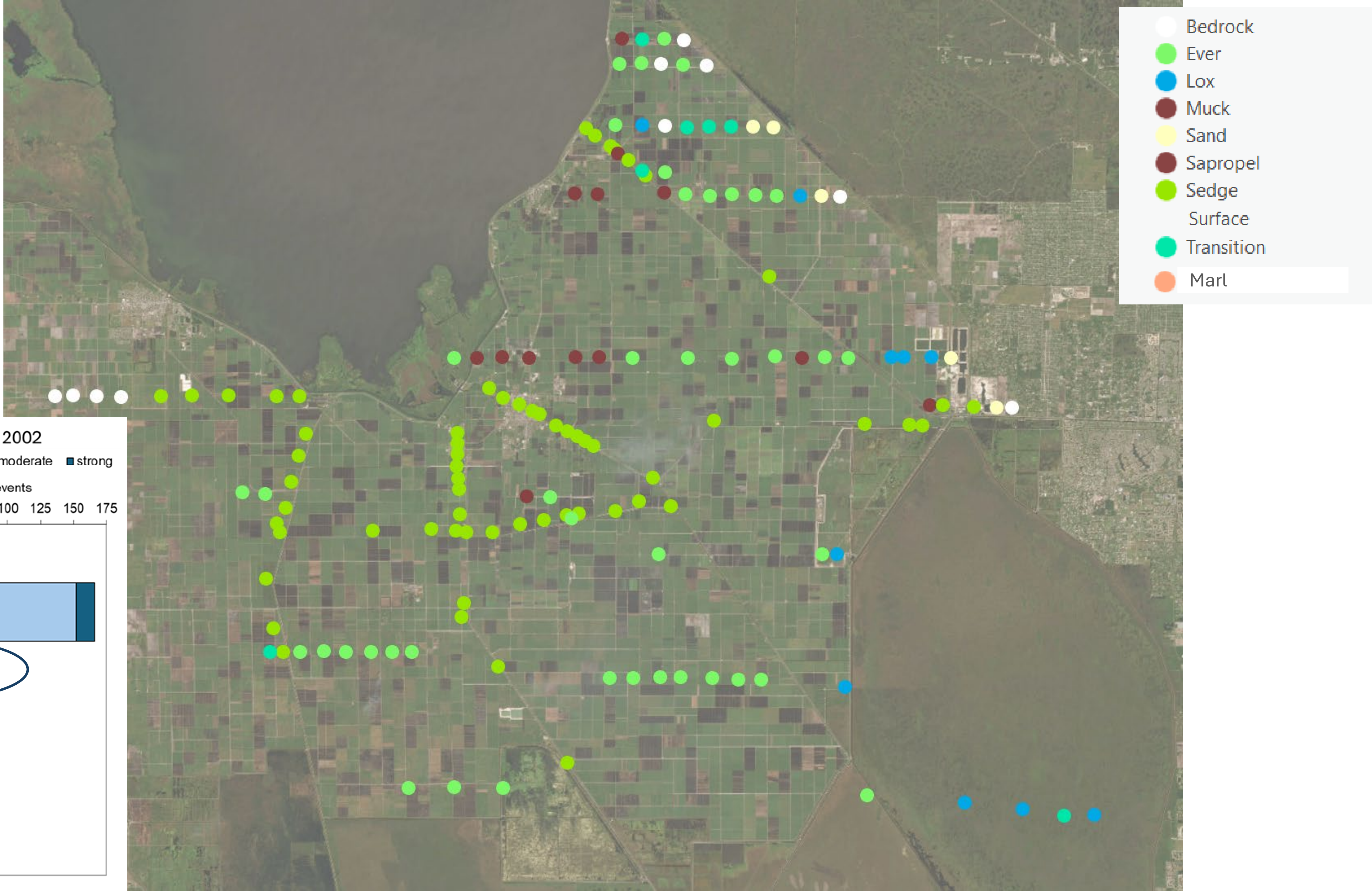
5.5 ft

7.5 ft above sea level

12.0 ft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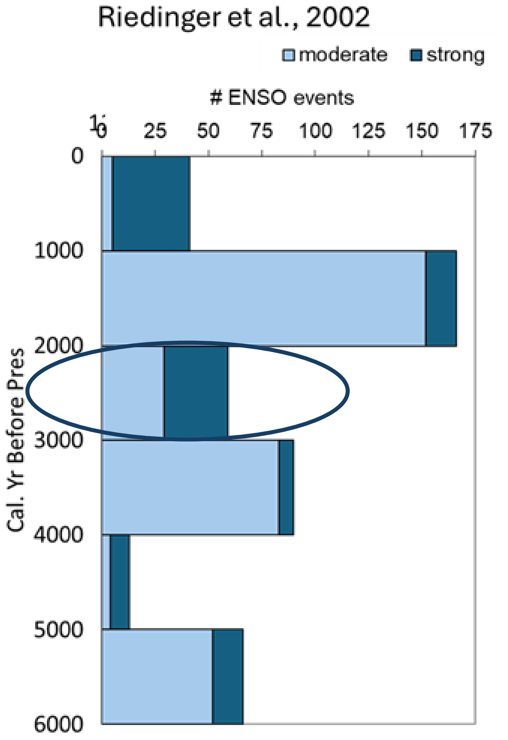
Riedinger et al., 2002
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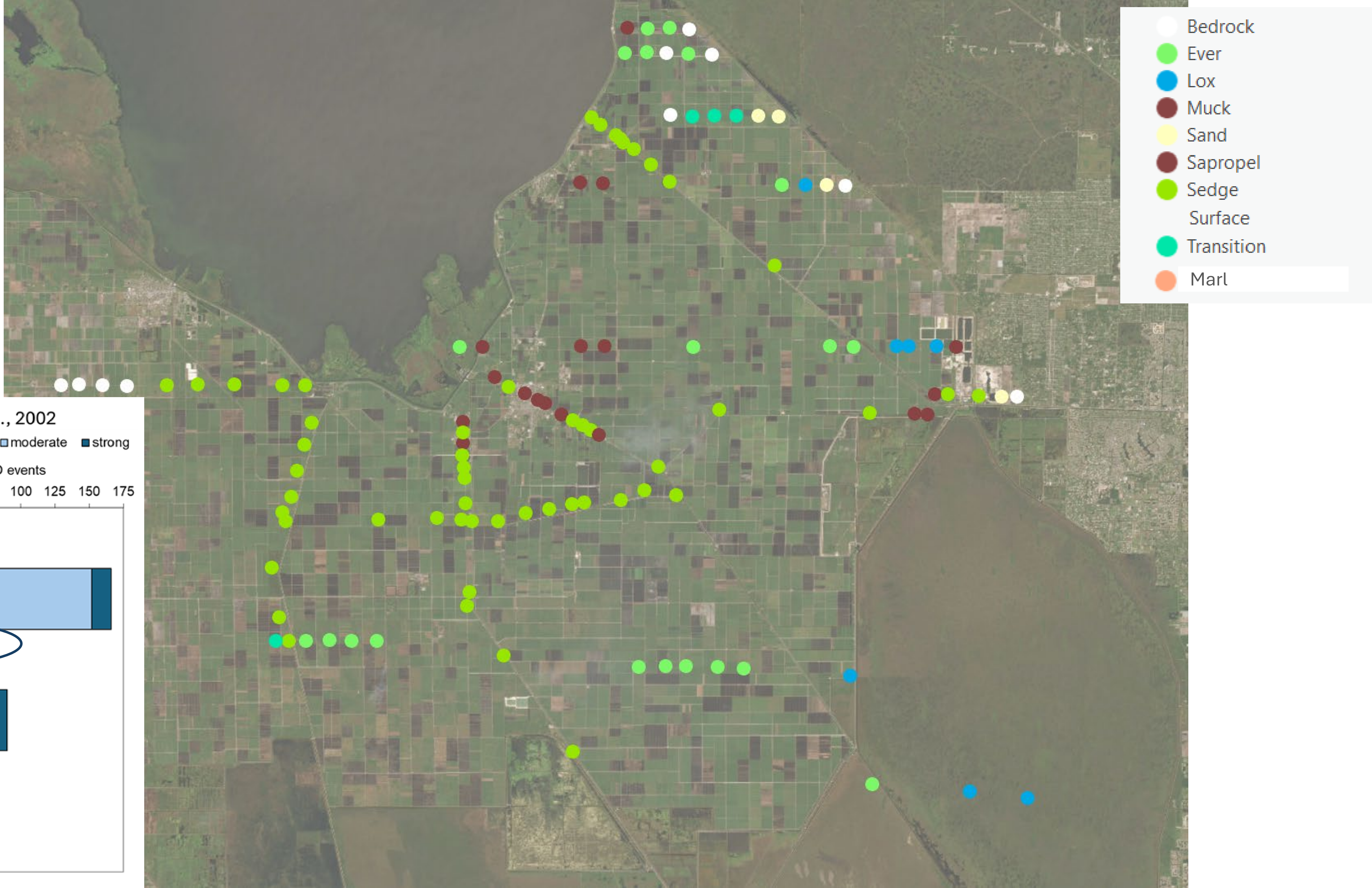
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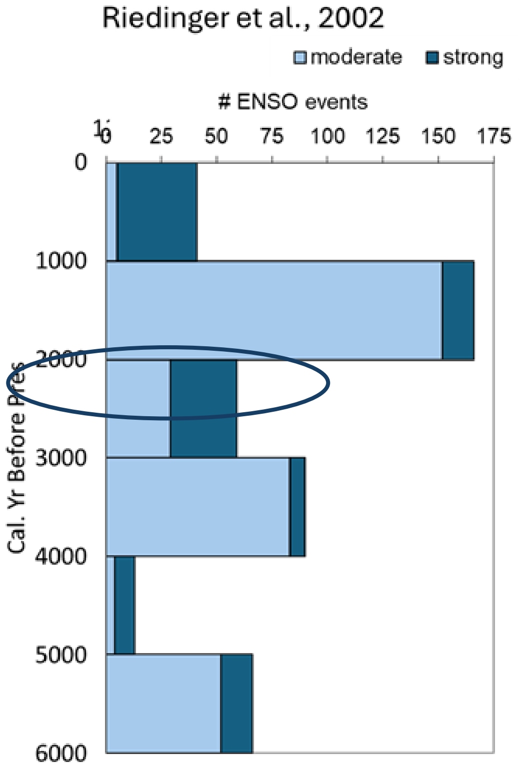
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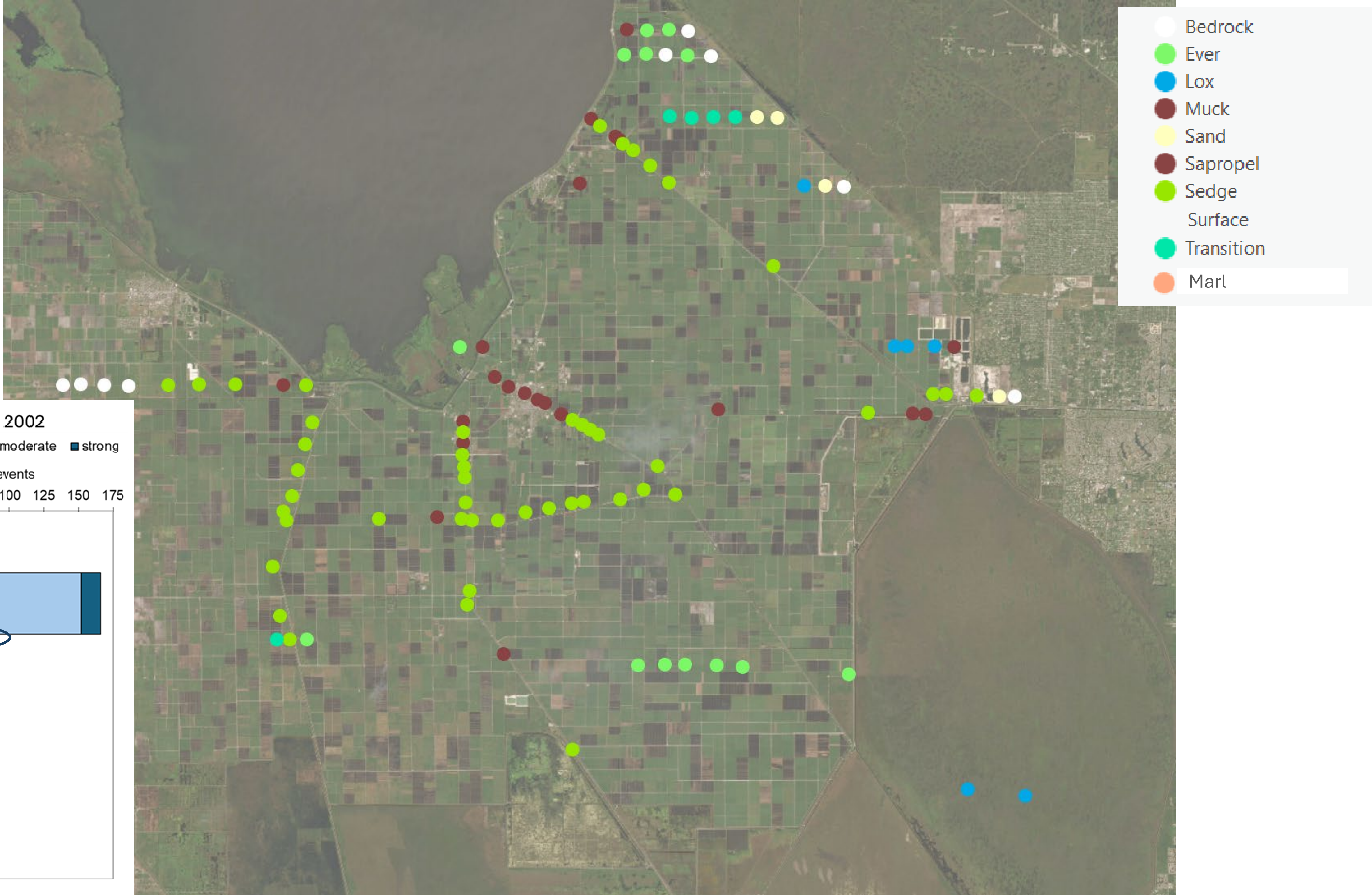

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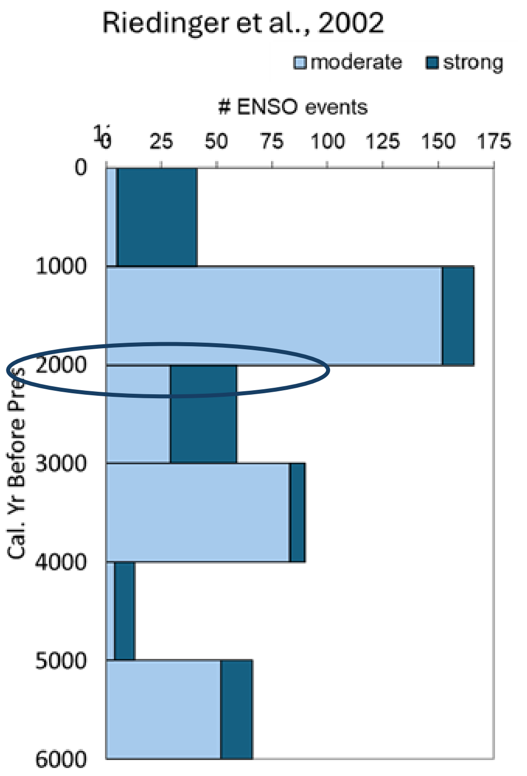

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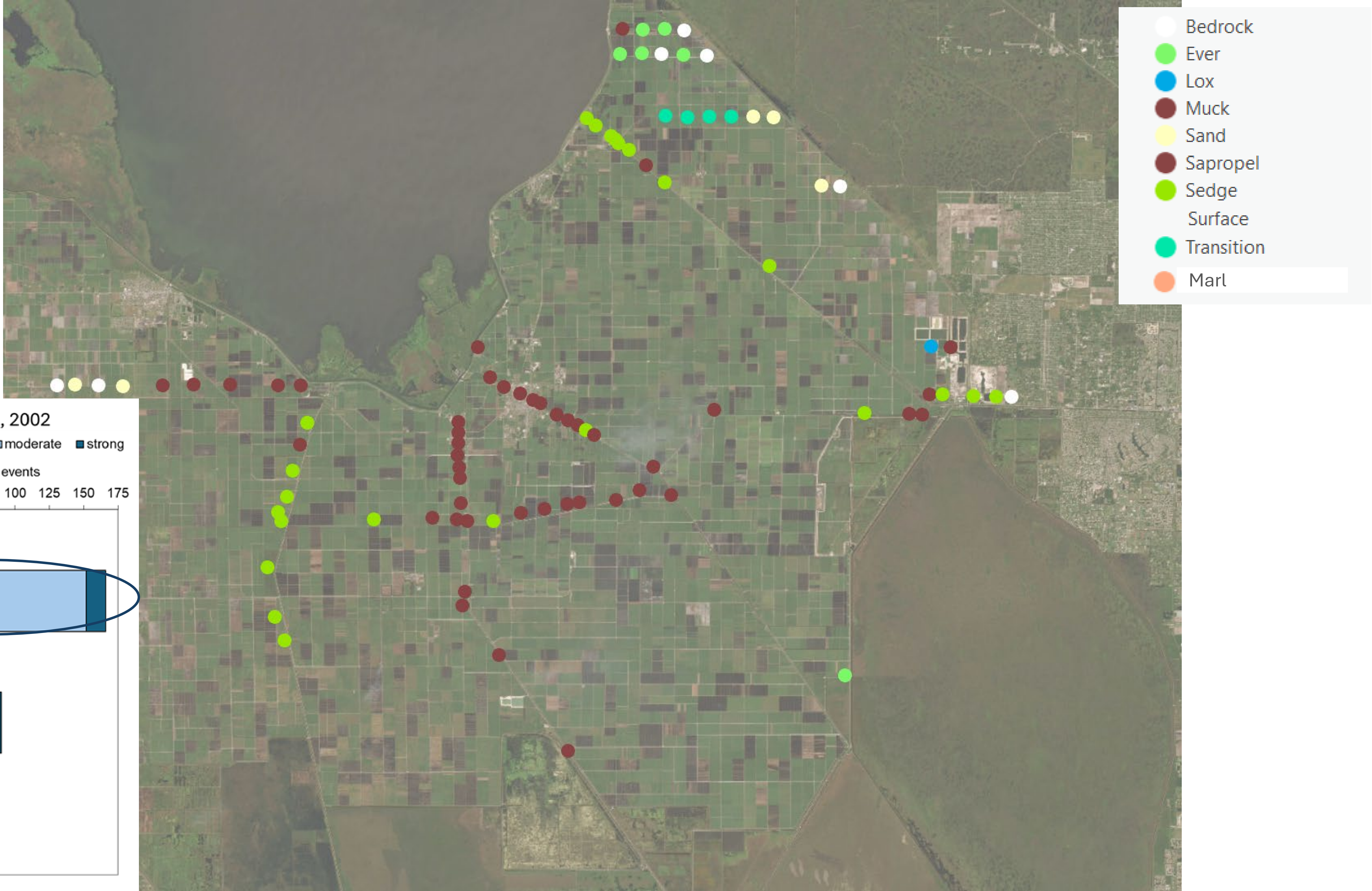
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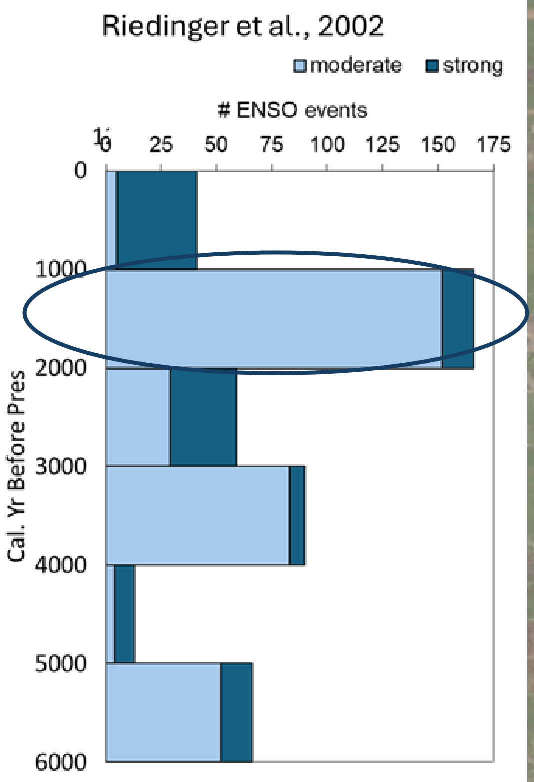
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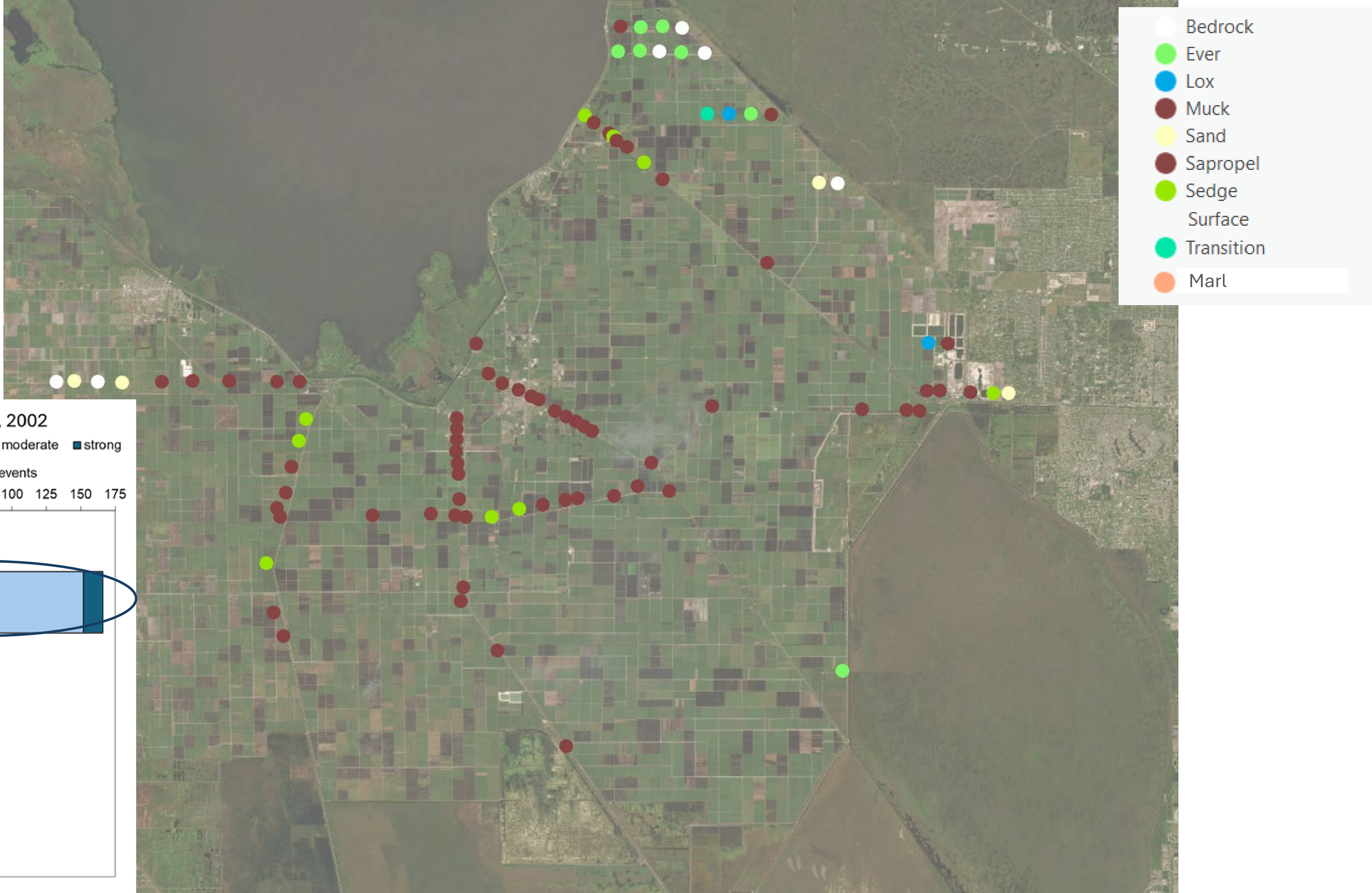

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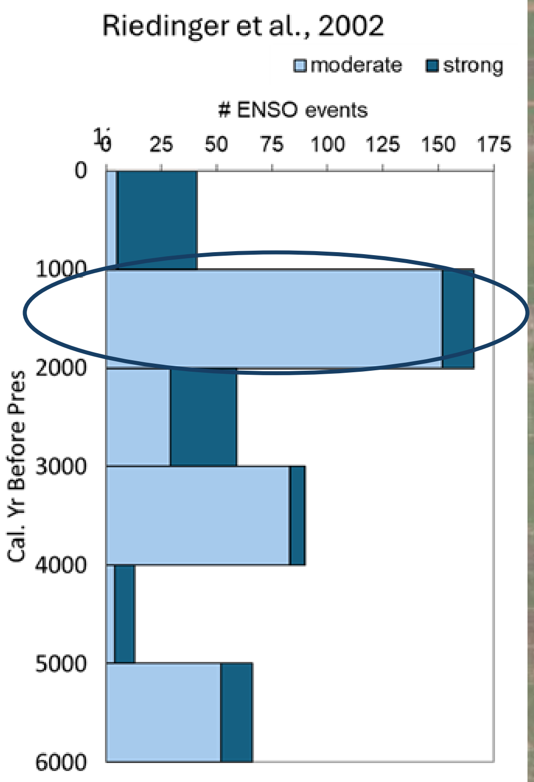

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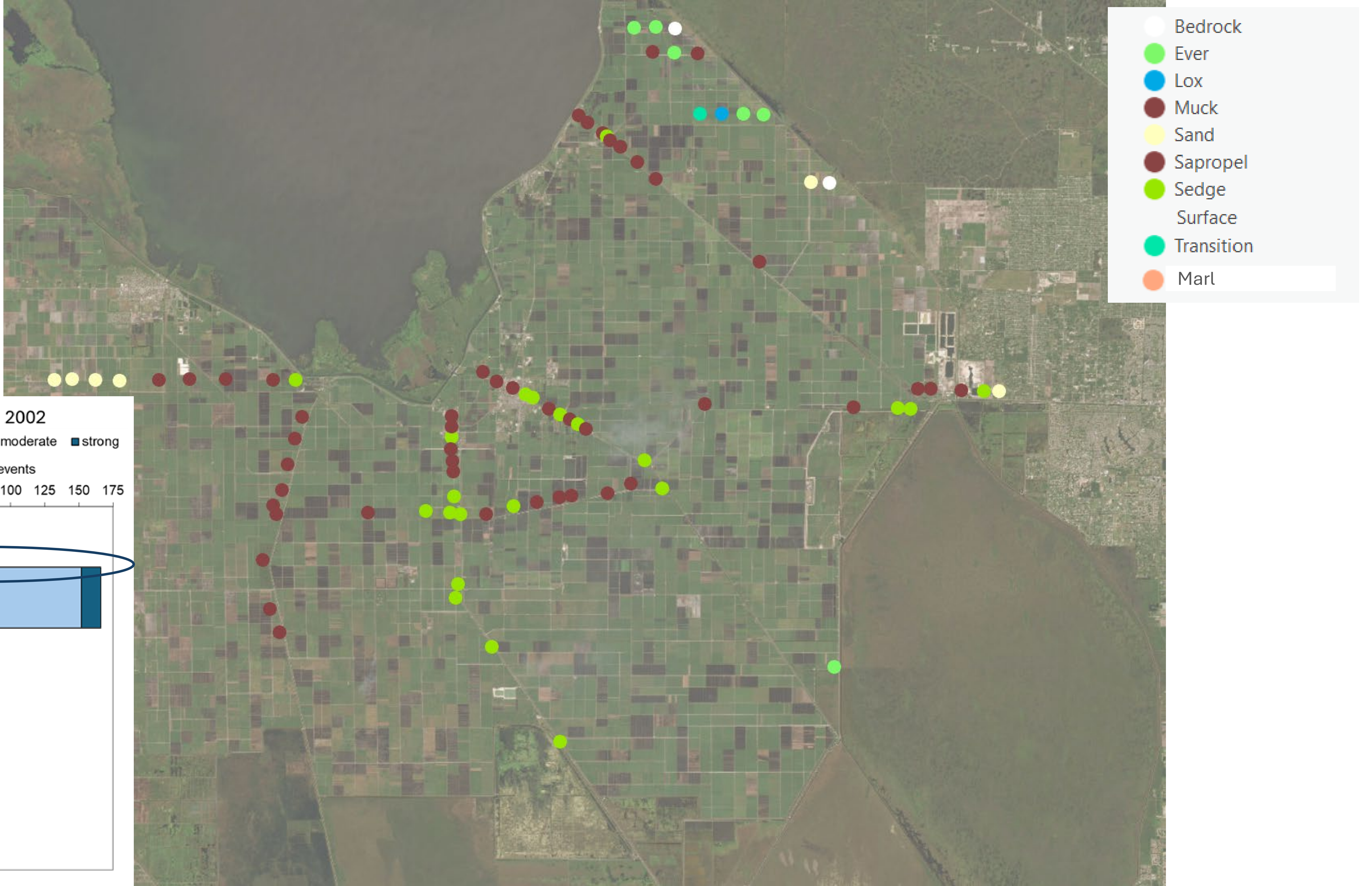

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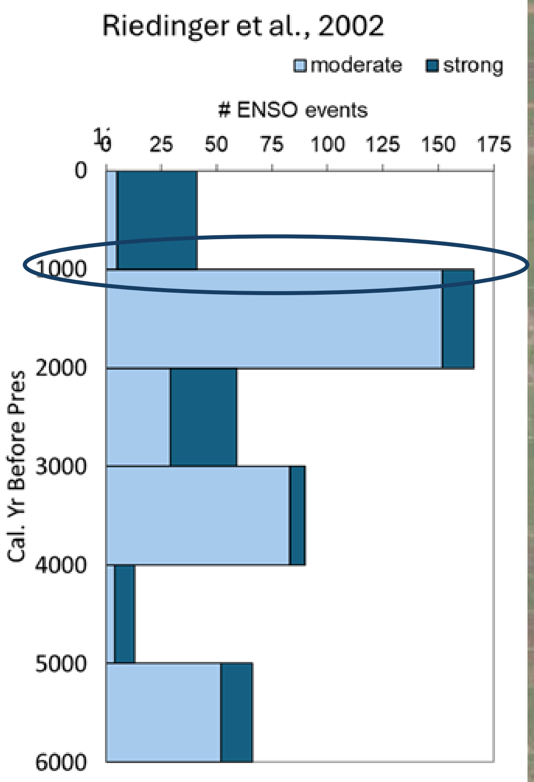

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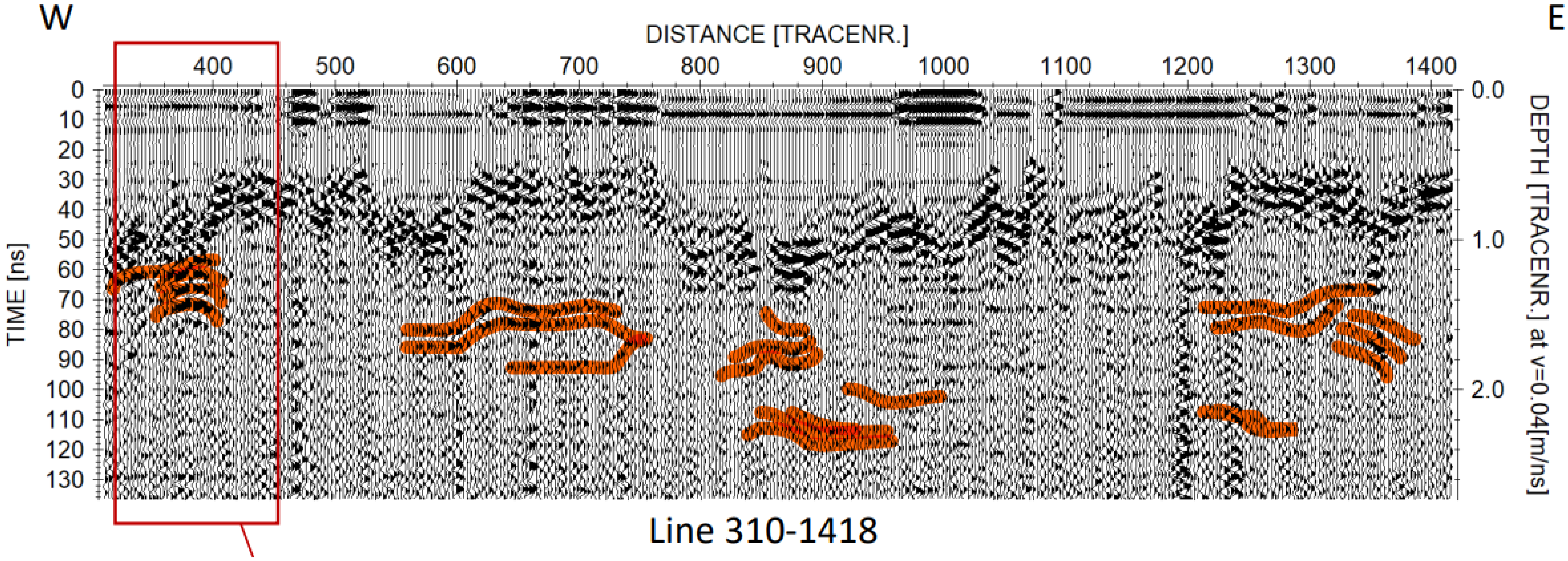
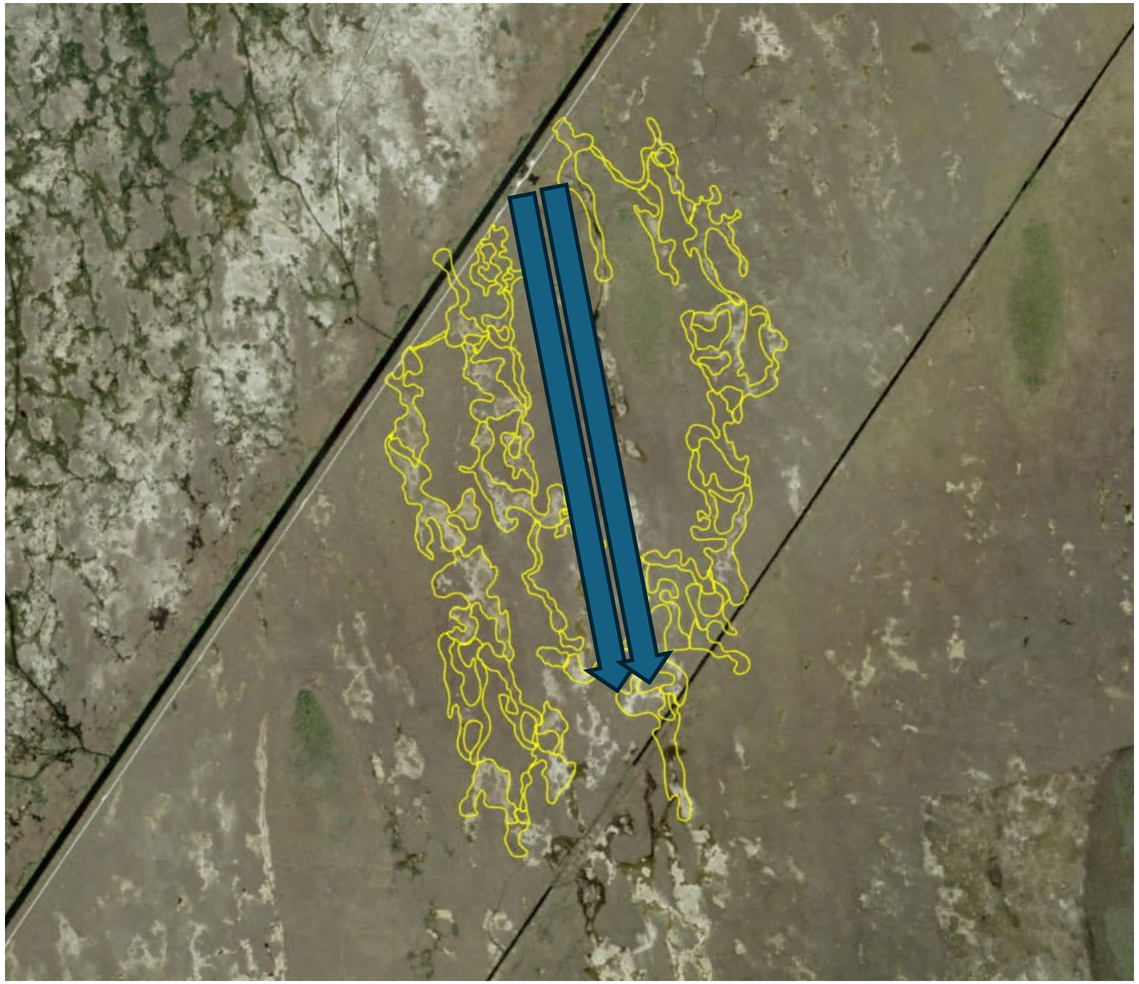


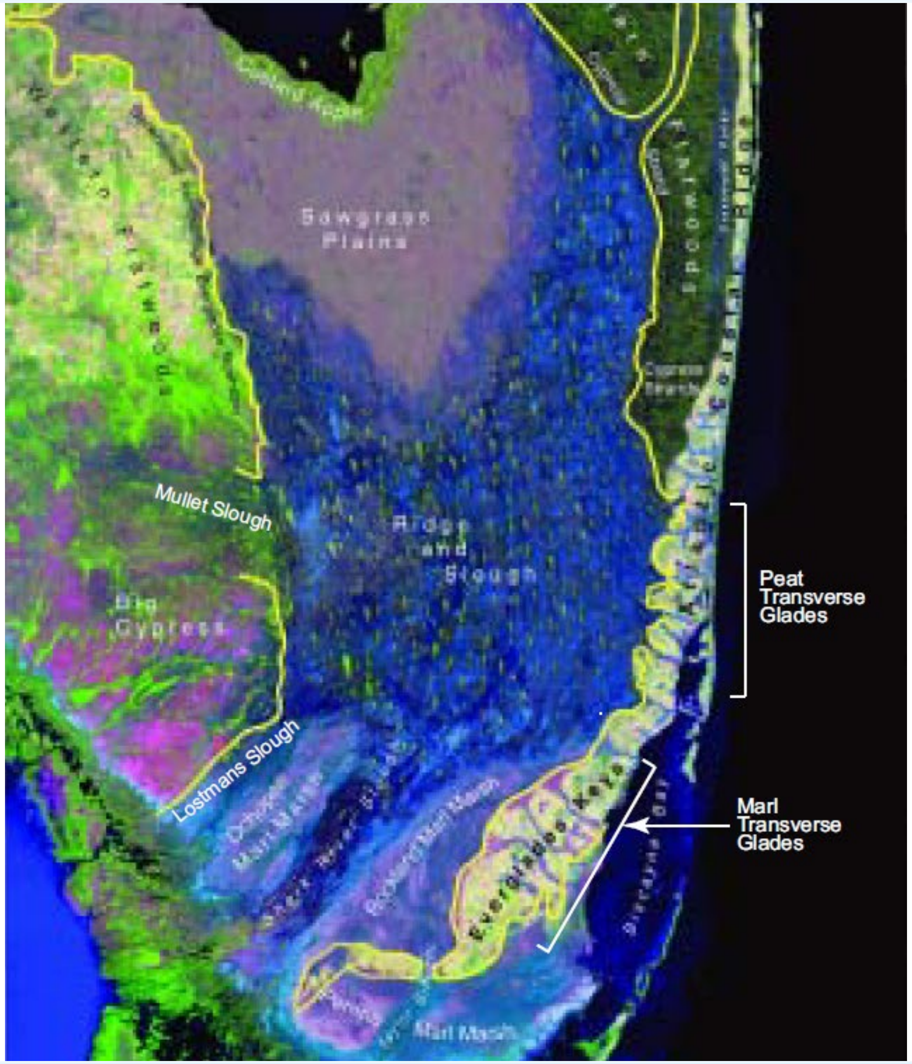
Line 310-1418

1) Wang et al 2024. Sedimentary characteristics and model of seasonal deltaic sandstone: a case study on the continental red bed from the Cretaceous Baxigai Formation, Tarim Basin, NW China. Frontiers in Earth Science.

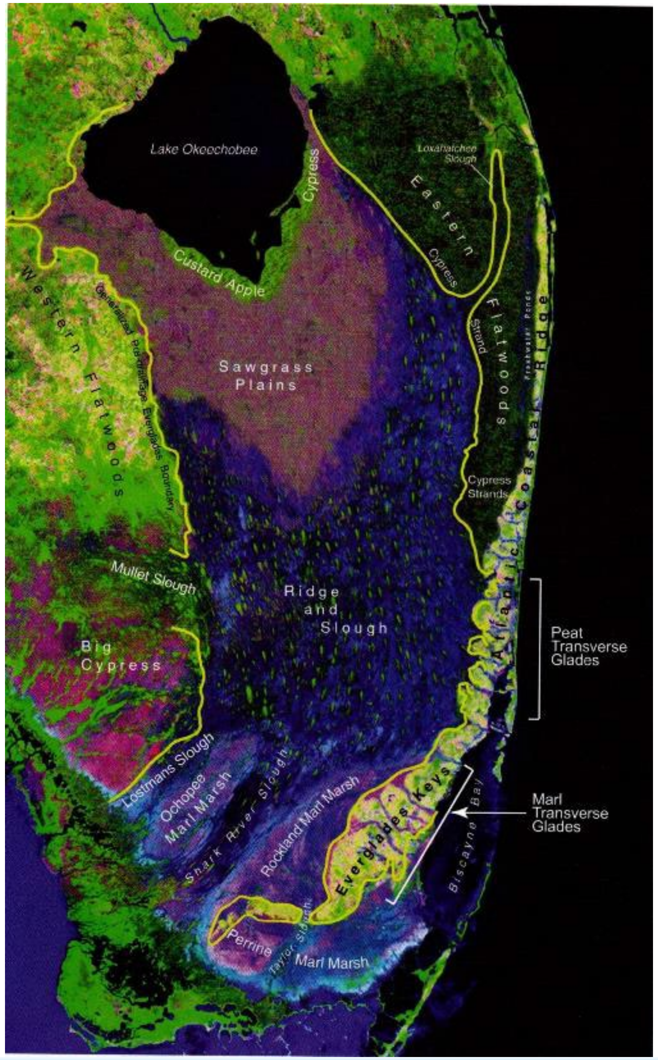
2) Candel et al. 2017. Oblique aggradation: a novel explanation for sinuosity of low-energy streams in peat-filled valley systems. Earth Surface Processes and Landforms.

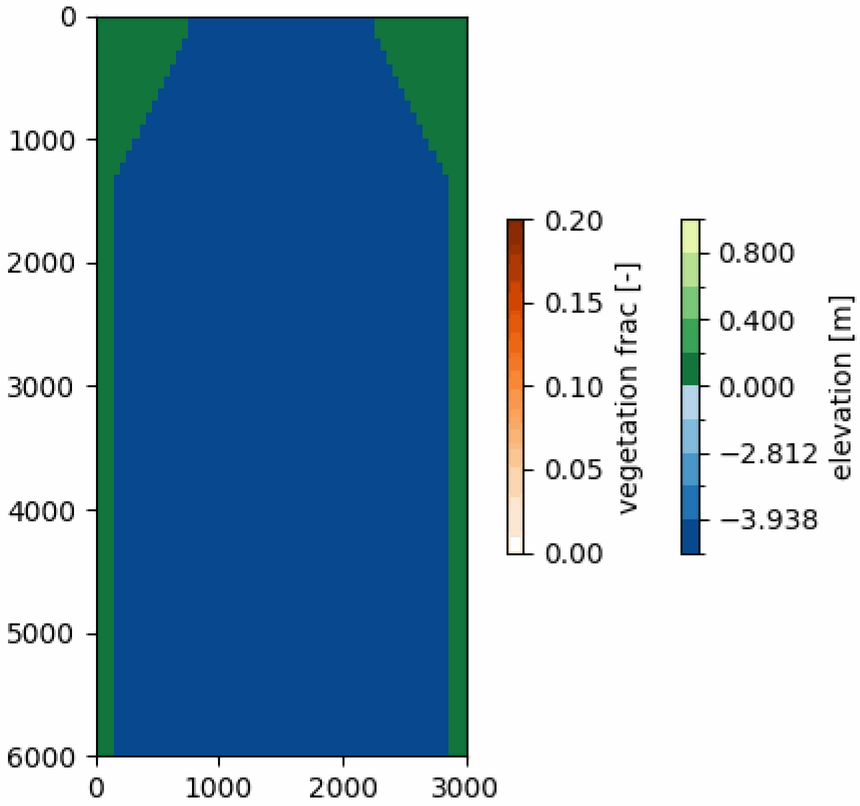
Time To Put Sheetflow Aside





How did we get here? Fluvial dynamics





Questions?

Acknowledgements: Sue Newman, Colin Saunders, Pete Rawlik, Xavier Comas, UF Aerial Imagery Library