

Understanding human impacts in the Franklin City marsh: Thermal Pollution, Biological Invasions, and Changes in Ground Water Systems.



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Causes of Hydrologic Problems

1. Oyster Shucked Beach
2. Unnaturally elevated terrain
3. Roads
4. Mosquito ditching

Shucked Oyster Shell Beach

- Originated from oyster shucking houses in the late 1800's and early 1900's.
- Shells were discarded offshore and have been redeposited during storm events
- Shell beach is being reworked marsh-ward
- Impedes saltwater flow to marsh.



Dredge Spoil Pile



Excess dredge pile acts like a retaining pond for rain water

Marsh is freshening and *P. australis* expanding into the marsh

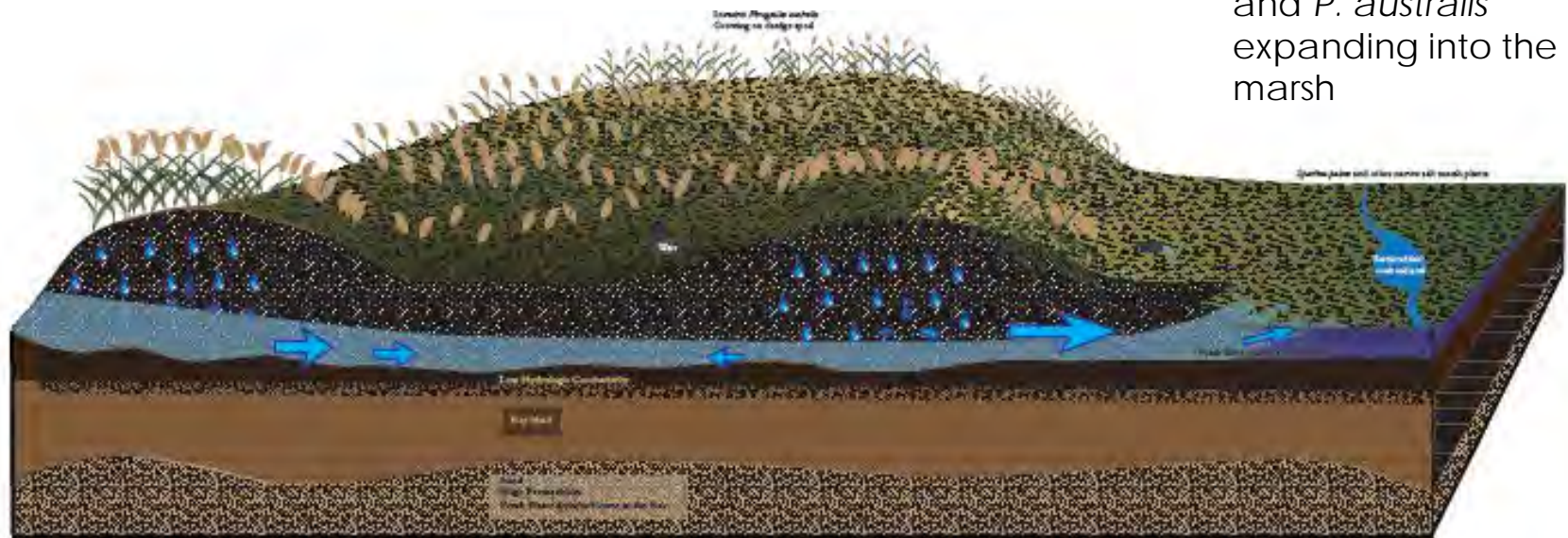


Figure 2: Hydrologic diagram of the dredge spoil pile at Goosecreekville, TN. The spoil makes a raised berm shaped like a bowl, that collects rainwater, and due to the hydrologic gradient is pushed toward the salt marsh causing substantial freshening making it resemble to the spoil of *P. australis*. In addition to the fresh water from the berm, the region suffers from a lack of tidal flow due to historic restoring water through ditches and plugging of ditches.

Other Filled Areas

- Filled areas to raise buildings above sea level
- Buildings destroyed in Ash Wednesday storm, 1962
- Large square patches of *P. australis* mark these elevated sections.



0 0.015 0.03 0.06 Miles



Restrictions



Mosquito Ditching

- Unmaintained
- Limited to no flow



Consequences of Hydrologic Restrictions

1. Spread of invasive *P. australis*
2. Increased thermal pollution
3. Nutrification
4. Bacterial matts

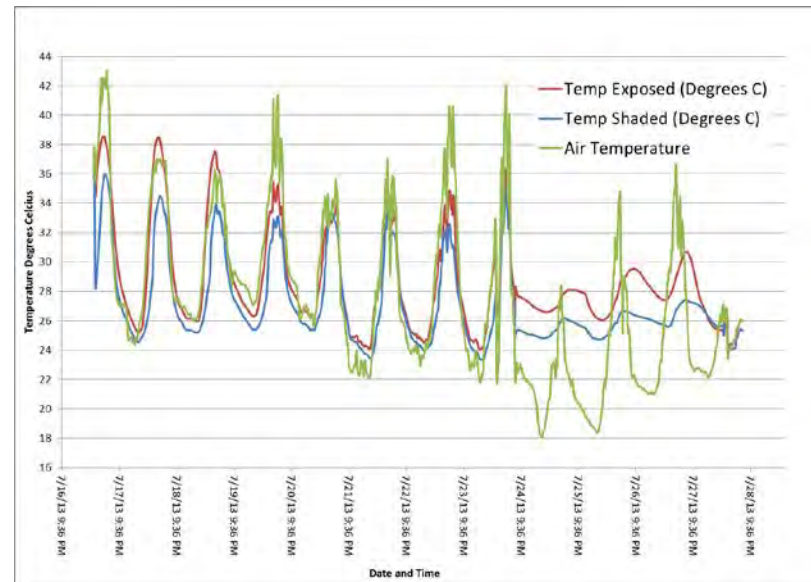
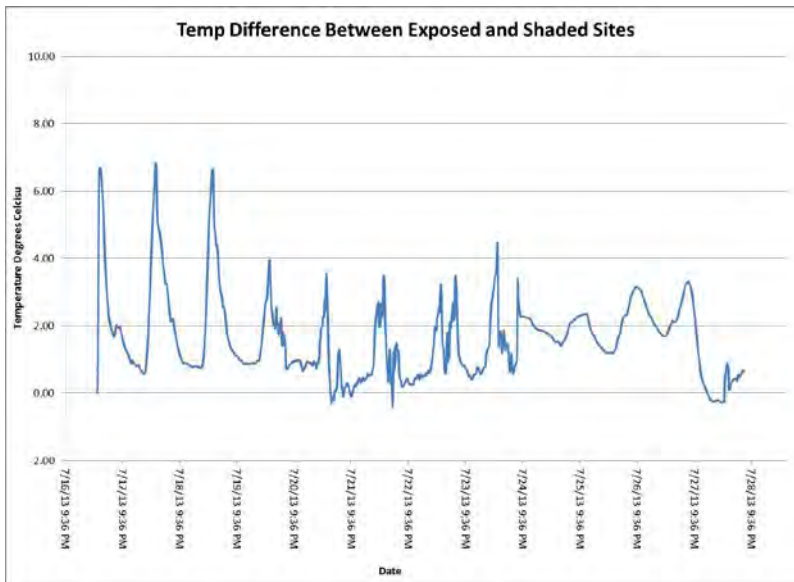


Spread of *P. australis*

- Freshening of the marsh makes it vulnerable to the invasion.
- Limits species diversity
- Limits hydrologic flow



Thermal Pollution



Bacterial Mats

- Probably caused by eutrophication of the marsh due to farmlands in the watershed, as well as thermal pollution



What are we doing?

- Monitoring
- Obtaining baseline data
- Developing a plan to restore the marsh
- Developing a living offshore structure to protect coast



Conclusions

- Human development and events have led to unnatural hydrologic functions in the marsh at Greenbackville, VA. The lack of tidal flow causes thermal pollution and intolerable conditions for many native species, minimizing biodiversity.
- We are trying to improve the hydrology back to a more natural flow. We hope that this will then assist the ecosystem, increasing diversity and lowering water temperatures during the summer months.
- We have established baseline data for the past year, are ready to begin restoration and will continue post-restoration monitoring.

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