



Constructed Wetland Sewage Treatment Ponds as Pathways and Vectors of Aquatic Invasive Species

A Case Study



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Constructed Wetland Water Treatment

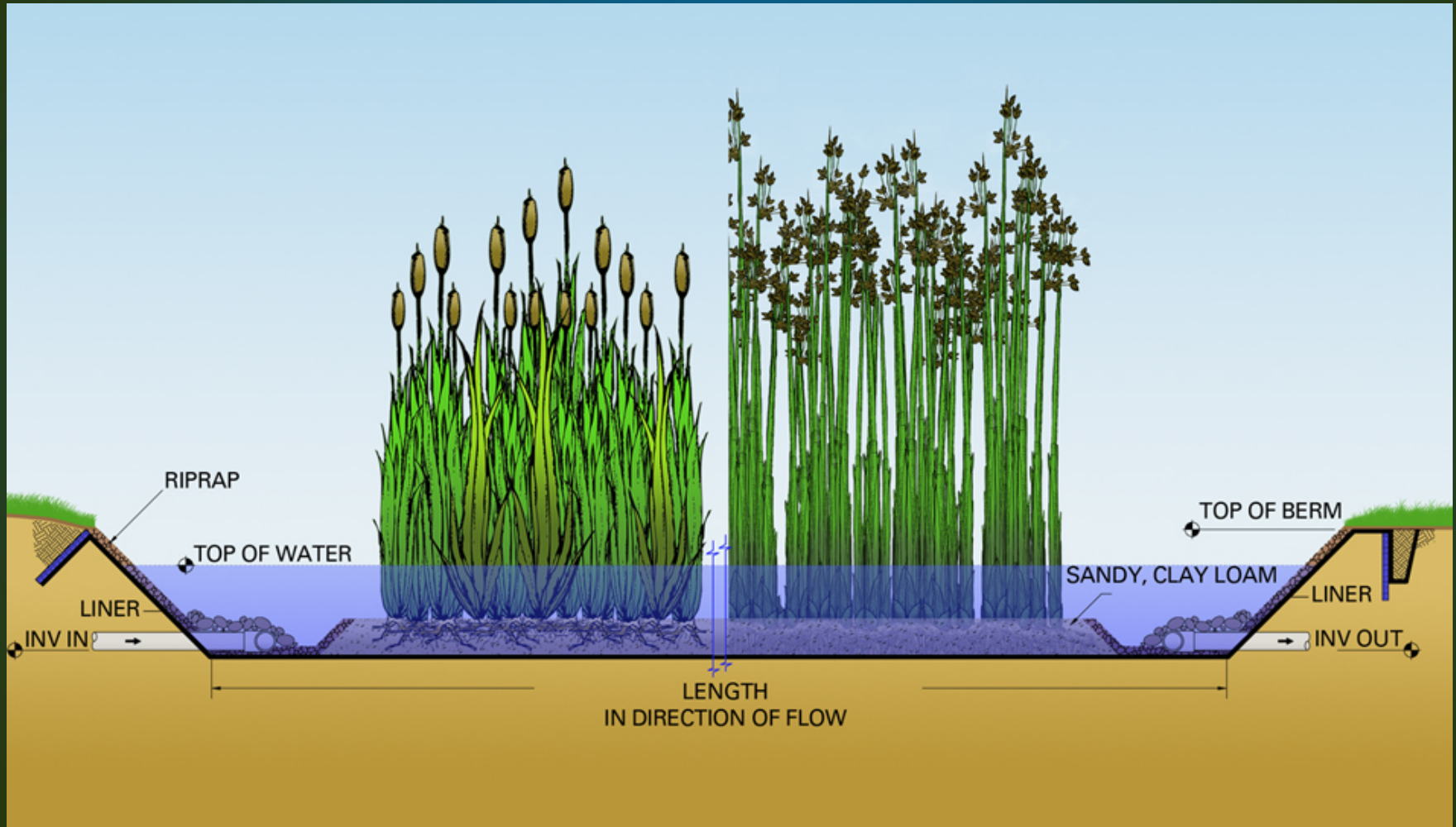


Photo Credit: www.natsys-inc.com

Constructed Wetland Water Treatment

Advantages

- Inexpensive to build
- Energy efficient
- Effective water treatment
- Increased wildlife habitat
- Better looking
- Good public acceptance



Photo Credit: programmed.com.au



Photo Credit: virginiaplaces.org

Disadvantages

- Requires more land
- Can harbor mosquitoes
- Not for all wastewater types
- Performance varies
- Prolonged start-up time
- Ideal habitat for **Invasive Species**
- AIS control options limited

West Jackson County Land Treatment Facility

- 5 Million Gallons/Day
- Land application + constructed wetlands
- New ponds planted w/ aquatic plant species from out-of-state grower
- Attracts large numbers of waterfowl
- Discharges into Bayou Costapia



Photo Credit: Google Earth

Giant Apple Snail Egg Mass Sighting

- Report from volunteer Audubon Birdwatcher, Sept. 2014
- First sighting in Jackson, County, MS
- Eggs and live snails present
- No snails larger than 6.5 cm
- Found only in newly-planted ponds



Possible Effects of Giant Apple Snail Infestation



Giant Apple Snail Control Efforts

- Baited Traps Ineffective in Dense Duckweed
- Plant Workers Hand-Removing Egg Masses
- Use of Metal Salt-Based Molluscicides Not Feasible
- Recent Infestation - No Fully Grown Snails Found
- Common Salvinia Also Found in Ponds w/ Apple Snails



More Aquatic Invasive Species Found at WJCLTF



Bloodfluke Planorb (*Biomphalaria glabrata*)



Photo Credit: Vectorbase.org



- Tropical freshwater snail
- Native to South America, Caribbean and Puerto Rico
- Identity confirmed by Dr. Robert Hirshler
- High reproductive rate - 14,000 eggs/snail possible
- Intermediate host to parasite causing Schistosomiasis
- 83 million people in 54 countries infected w/ parasite
- Considered a threat to agriculture

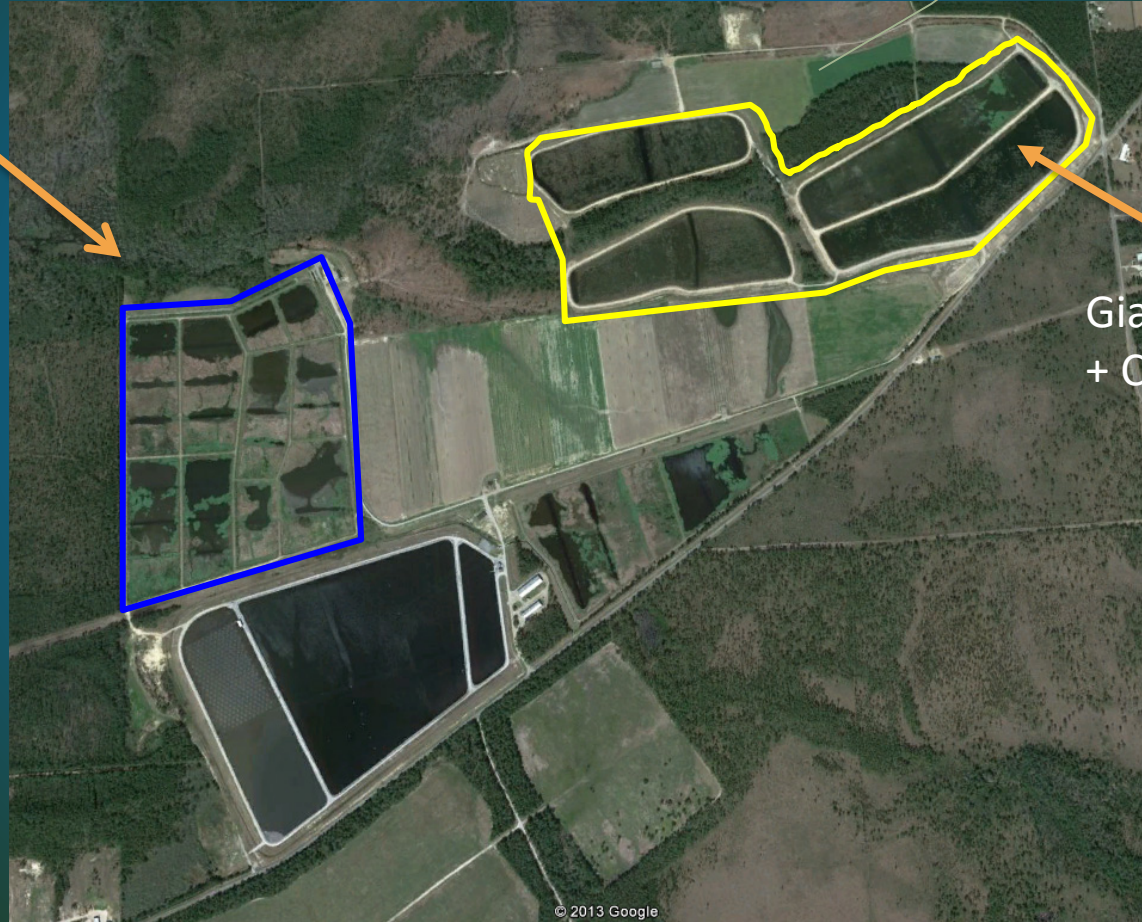
***B. glabrata* – General Observations**

- Large number of snails in infested ponds
- Trapping was not necessary to capture live specimens
- Observed to be feeding on water lettuce
- Will feed on common salvinia in captivity
- Raccoons appear to enjoy eating these snails
- Escape into Bayou Costapia prevented by chlorination chamber
- No exotic snails found in discharge so far
- USGS has requested funding to genetically identify this population
- First US report since 1991, First MS sighting



Map of Aquatic Invasive Species Found at WJCLTF

Planorb Snails
+ Water Lettuce



Giant Applesnails
+ Common Salvinia

Potential Means of Dispersal

- Attach to bird feet
- Pass thru stomachs of birds
- Attach to crawfish, turtles, nutria, alligators and hogs
- Single snail capable of establishing population
- Flooding of treatment plant ponds



Photo Credit: USFWS – Creative Commons via Flickr

Recommendations

- Identify constructed wetland treatment systems and retention ponds in your area and monitor for AIS
- Provide AIS identification/control resources and education to treatment plant personnel
- Require that aquatic plants grown off-site be inspected for AIS, quarantined and have a phytosanitary inspection certificate



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Questions?
Comments?
Ideas?



Photo Credit: marccortez.com