

Participatory Mapping of Surface Water Hydrology

November 7, 2017

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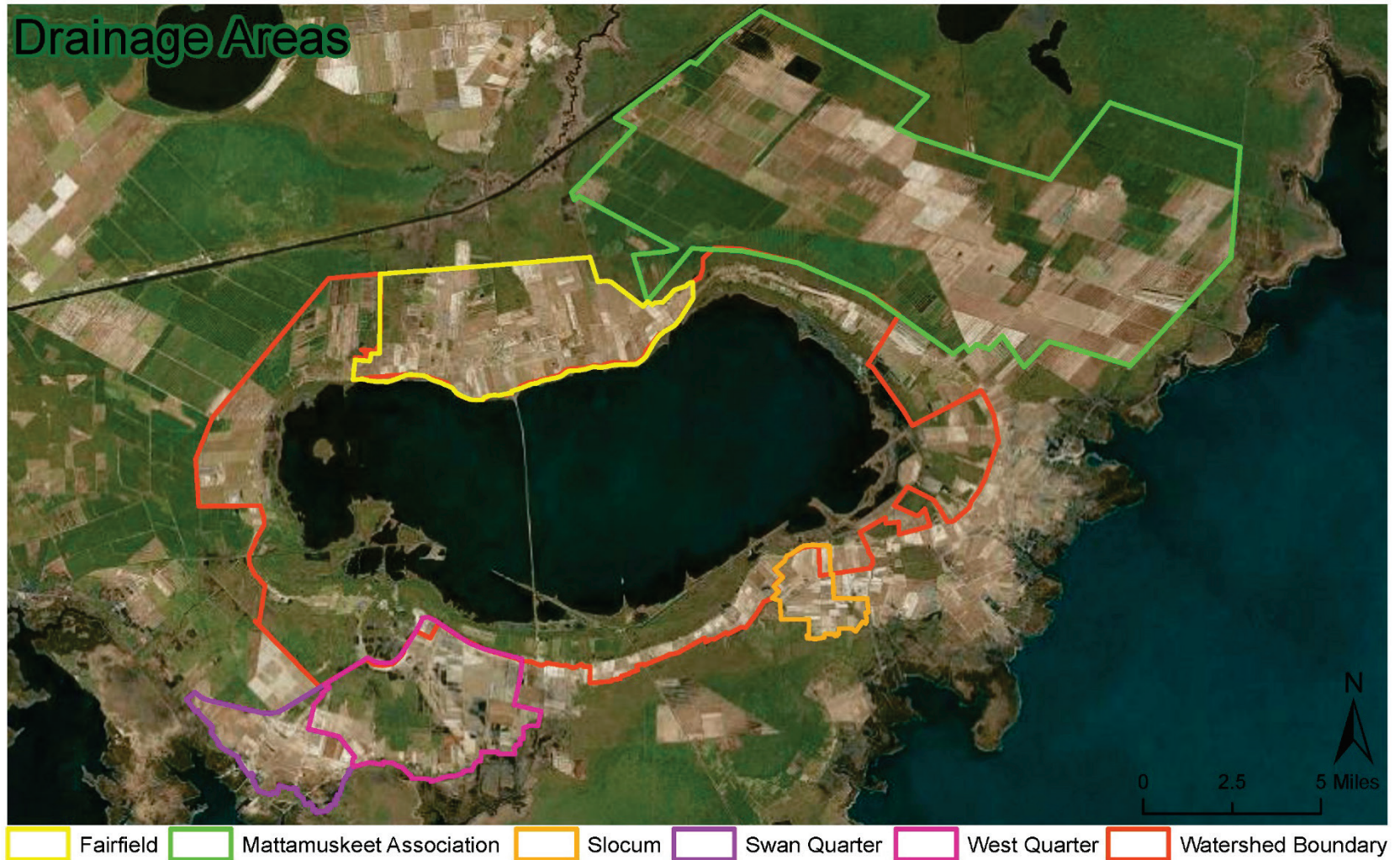
Department of Engineering, Center for Sustainability



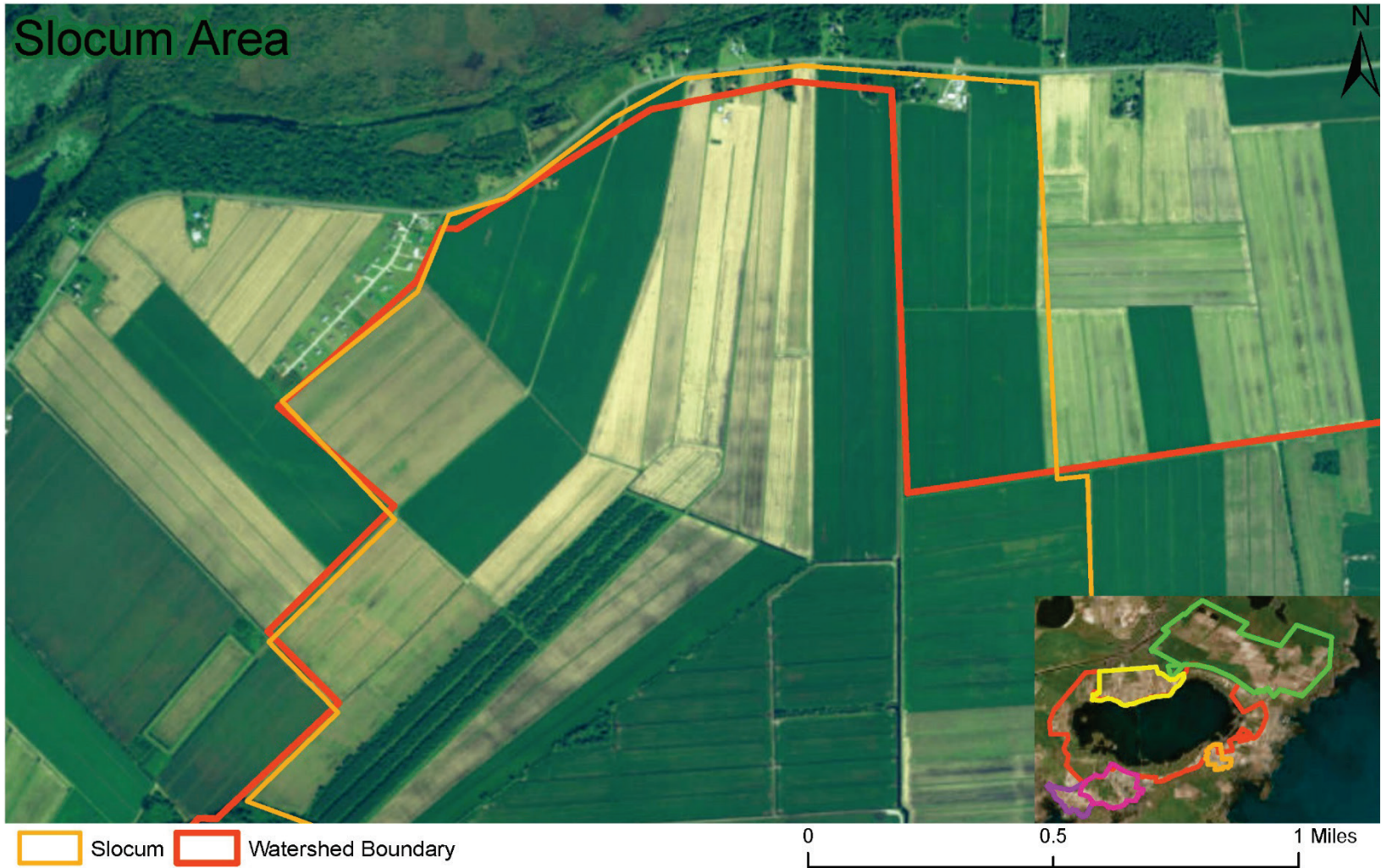
Goals for study

- Improve the understanding of the hydrology through mapping and community survey
- Identify the major problems facing Lake Mattamuskeet as viewed by members of the community
- Compile proposed solutions from community members

Watershed Mapping



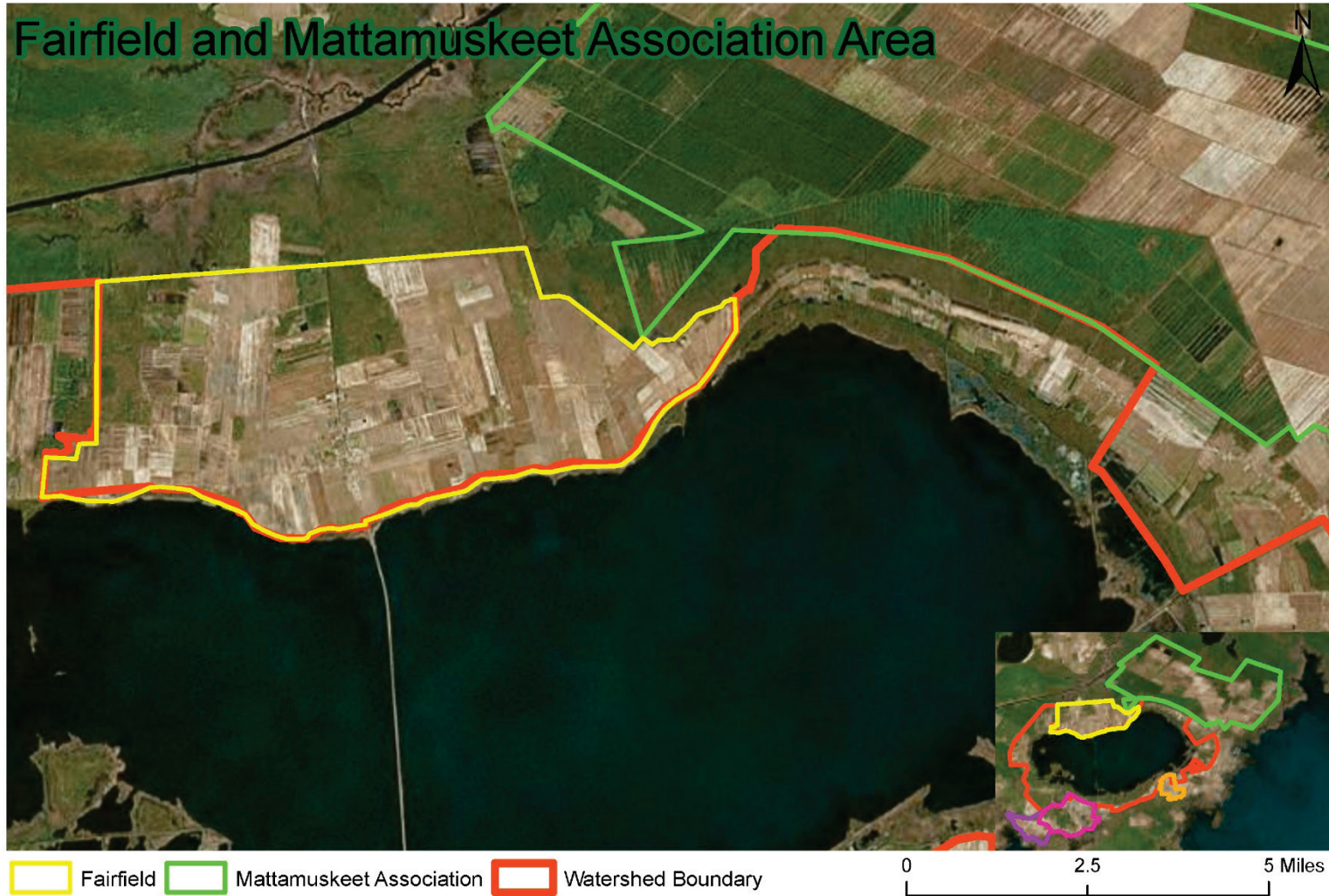
Watershed – Drainage Districts



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Pumps



Survey – Greatest water problem

1. Water level/flooding (42%)
2. Water quality (27%)
3. Other (12%)

Survey – Impact on water quality

- Fertilizer application (22%)
- Pesticide application (19%)
- Stormwater (16%)

Survey Results

- Greater than 80% of participants are interested in economic and environmental sustainability
- More than 85% are concerned about the water quality in the lake and the lack of aquatic vegetation impacting waterfowl numbers
- Greater than 70% of participants would be willing to alter their behavior if it was shown to negatively affect Lake Mattamuskeet

Water Management

- Most pumps are surface water pumps
- Some groundwater pumps are used to fill waterfowl impoundments
- Impoundments are primarily flooded and drained based on hunting season and crop growth needs
 - May be some flexibility in timing
 - Some willingness to alter practices



Water Management Strategies

- Most impoundments (65%) have an average water depth of 1-2 feet
- Majority of pumps are managed manually (52%)
 - Varies based on weather
 - Some vary based on season
- Some settling basins and buffers already in place



Survey – Top Management Practices

- Address erosion (30%)
- Install automated equipment to manage water in agricultural fields (20%)
- Reduce the use of pesticides, fertilizers, or other chemicals (19%)
- Cost is the primary reason more of these practices are not implemented

Outreach - Ways to reach the people

- Read printed fact sheets, bulletins, or brochures (19%)
- Look at a website for information and tips (16%)
- Watch a video (12%)

Outreach – Topics of Interest

- Agricultural water management (13%)
- Watershed management (13%)
- Nutrient and pesticide management (11%)

Suggested Solutions from the Community

- Pump water out of the lake
- Keep tide gates clean
- Organic farming
- Changes in water management
- More research
- Settling ponds
- Use impoundments to store water
- Use wetlands to treat water

A few things to keep in mind...

- Unlikely that a single solution will fix this problem
- Solutions should be viable for 20+ years
- Solutions should not harm other industries

Ongoing research

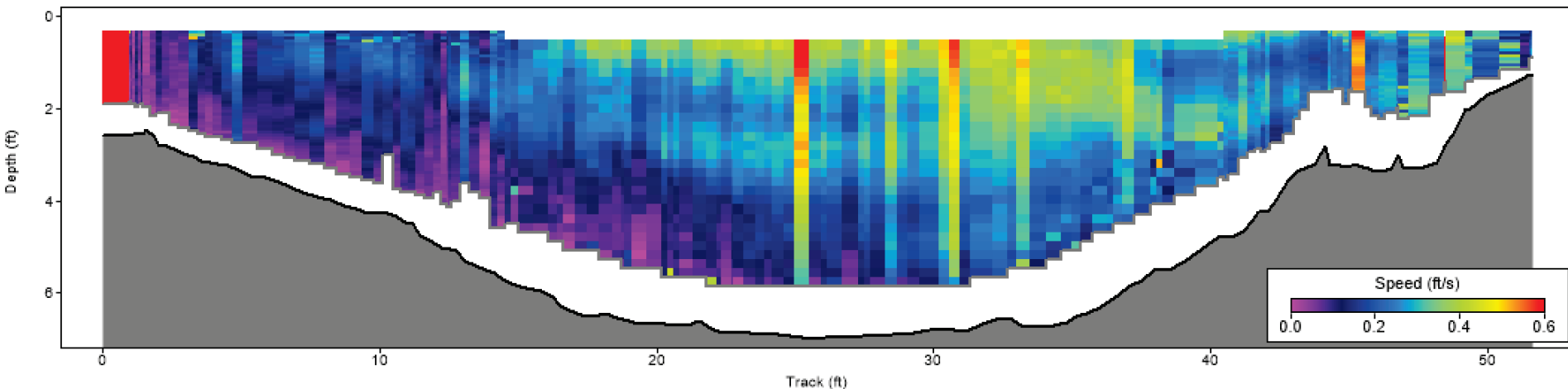
- Research question: How much nitrogen and phosphorus is being exported by a waterfowl impoundment on the Refuge and an impoundment managed by a private landowner?
- Monitoring complete: Spring 2018



Ongoing research



- Research question: Is sea level rise or sedimentation the primary factor causing a reduction in flow in the four canals draining from Lake Mattamuskeet to the Pamlico Sound?
- Goal for project completion: Spring 2018



Questions?

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