

Progress towards larval fish-based metrics for assessing habitat restoration effectiveness

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Why a larval fish metric?

- AOC Habitat restoration projects need ways to assess effectiveness
- Adult fish metrics not site based
- Larval fish less mobile, may be responsive at site scale
- Functional indicator (nursery habitat)
- Pre-restoration benchmark status
- Part of multi-biotic approach to inform project design



Design

Building on 2016 SLRE Studies

Phenology of species occurrence

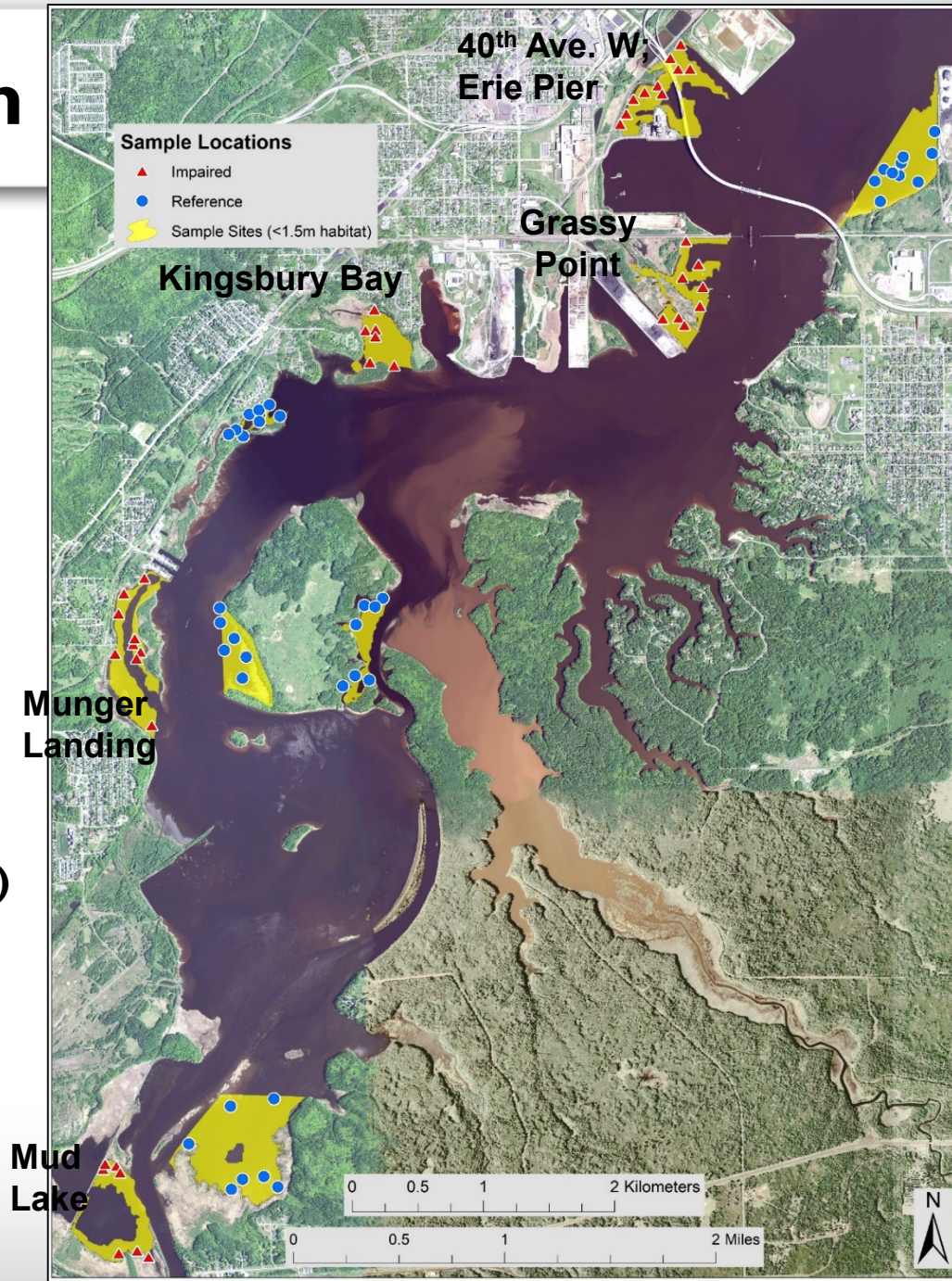
Vegetated habitat (H. Ramage)

Early July (max species richness, veg)

10 sites (includes 5 restoration sites)

- Range of habitat condition
- 0.5m – 1.5m depth zone (veg potential)
- 6 – 10 random stations per site

Replicate efforts in both 2018 and 2019





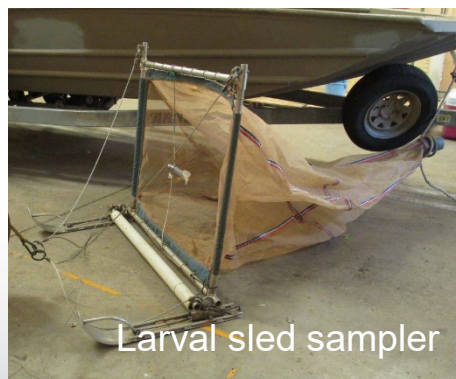
Data Collection

Habitat Data

- Submerged aquatic vegetation (SAV)
 - Hydroacoustic (Biosonics®)
 - Visual estimates
 - Rake samples
- Substrate classification
- Water quality (Hydrolab®)

Early life stage (ELS) fish community

- 50m sled tow (25-30m/min)



Larval sled sampler



Hydroacoustic transducer



2018 Early life stage fish

21 Species
(by abundance)



Morphological ID
(2,918 fish in 2018)



(2019 looks to be 2X more)

Lepomis sp.

Tubenose goby

Spottail shiner

Golden shiner

Rock bass

Johnny darter

Tadpole madtom

Common carp

Freshwater drum

Yellow perch

Black crappie

Troutperch

Logperch

Emerald shiner

White perch

Rainbow smelt

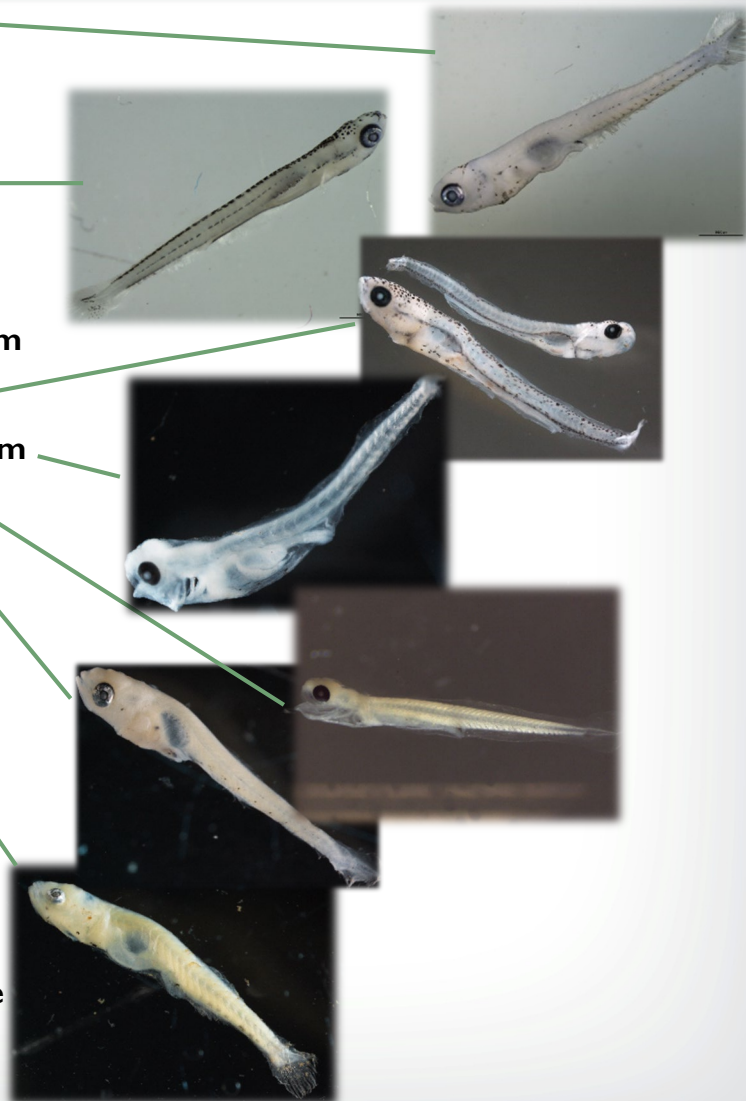
Round goby

Ruffe

Brook silverside

Northern pike

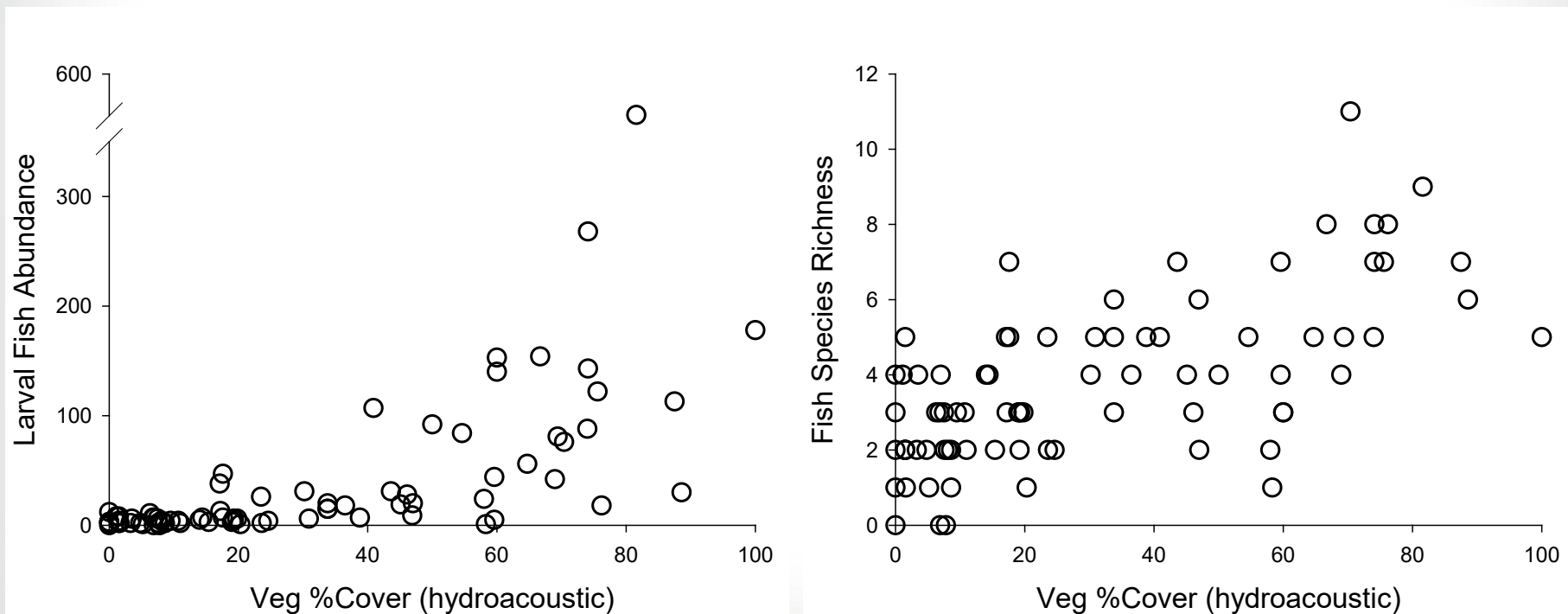
Walleye





Preliminary results (2018)

Fish – Vegetation Relationships (all sites/stations combined)



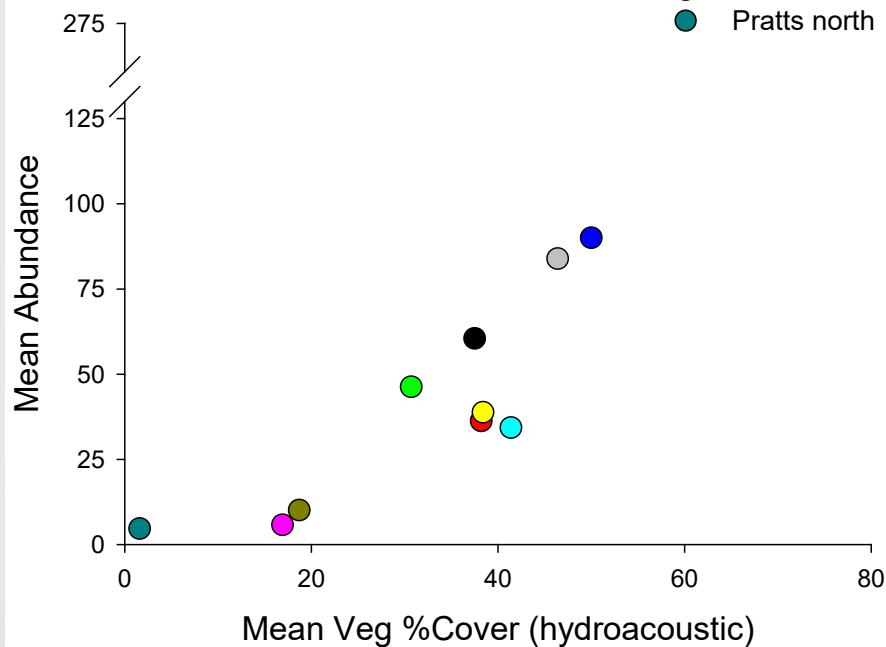


Preliminary results (2018)

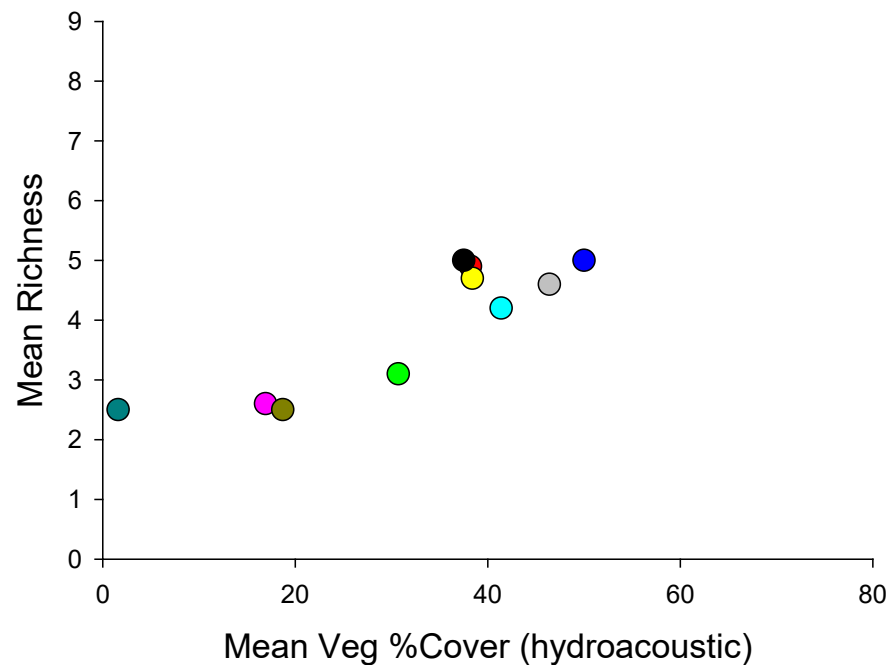
Fish – Vegetation Relationships by Site

- Mud Lake
- Little Pokegama
- Munger Landing
- Tallas Is.
- Clough West
- Kingsbury
- Grassy Point
- Clough East
- Erie Pier
- Pratts north

Fish Abundance



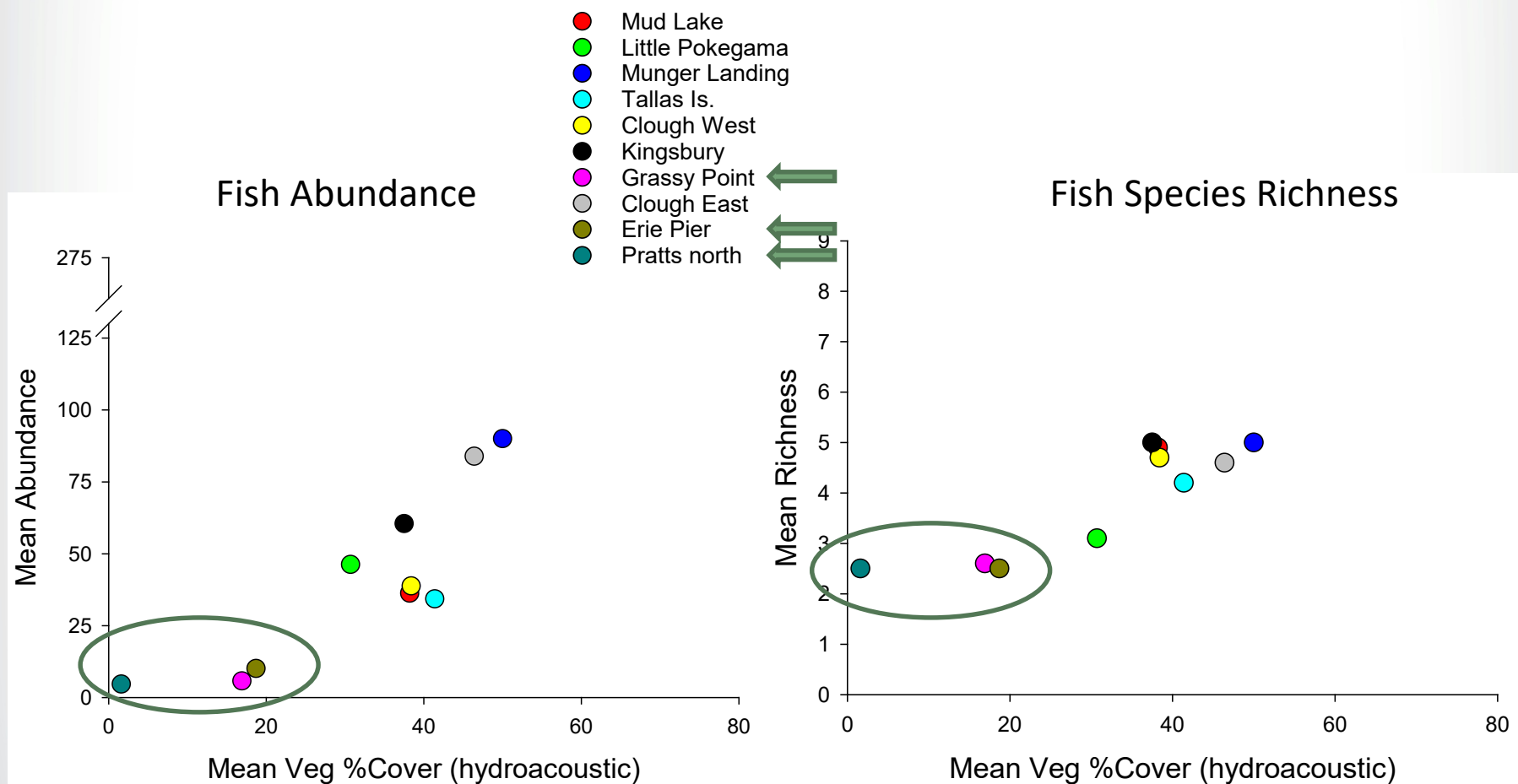
Fish Species Richness





Preliminary results (2018)

Fish – Vegetation Relationships by Site



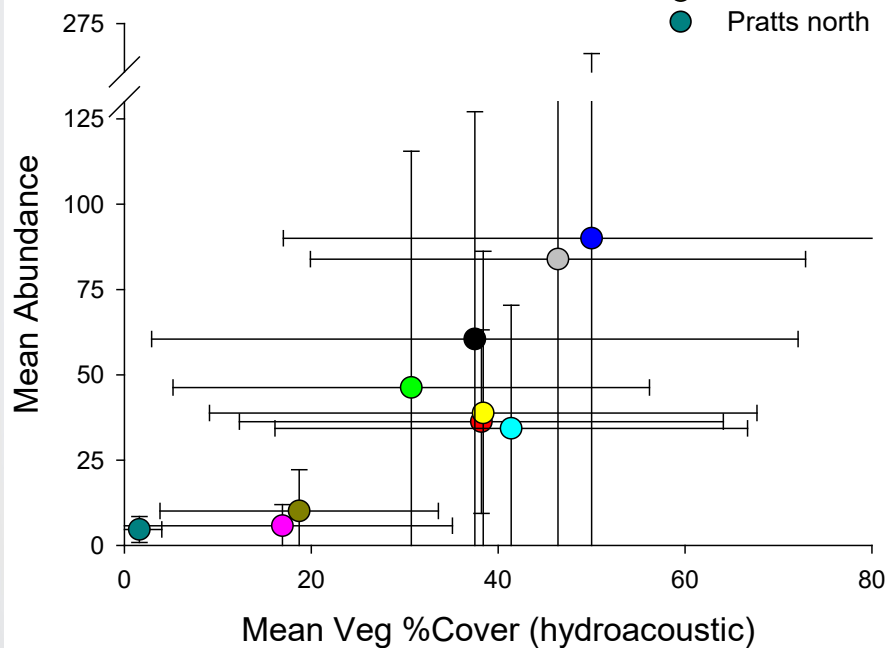


Preliminary results (2018)

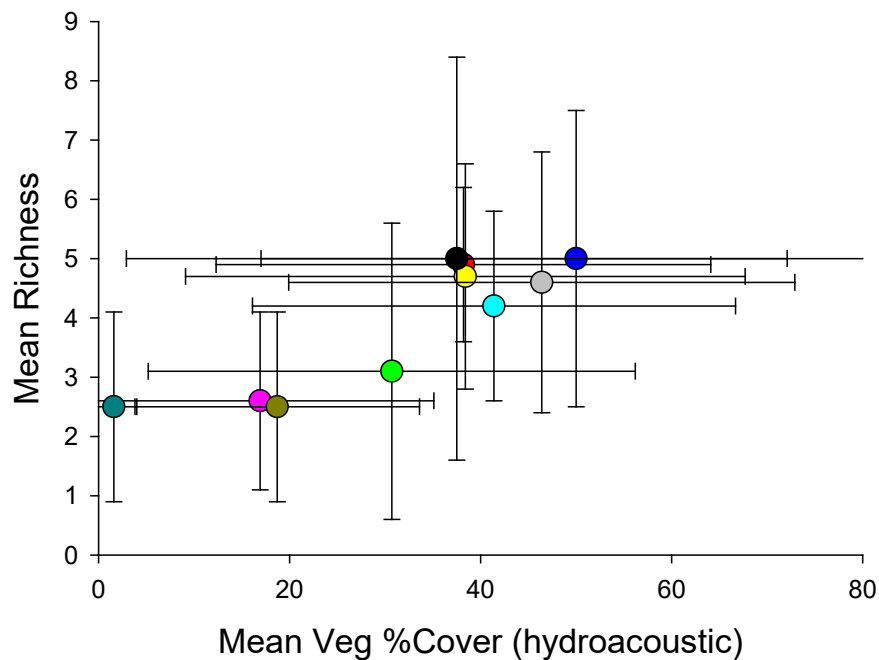
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Fish Abundance



Fish Species Richness



Next Steps

2018/2019 Data
Metric Selection/Testing
(examples)



Fish-based metric of
Habitat/Site Condition

J. Great Lakes Res.
Angradi et. al., (2017)
SLRE – Tri-metric index
Degraded Benthos

Environ. Monit. Assess.
Cooper et. al., (2018)
Adult fish IBI – GL wetlands



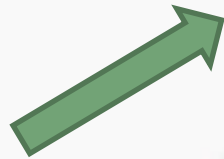
Application for Habitat
Restoration/Conservation
Assessment

Pre-restoration Benchmark

Fish
Diversity
Richness
Abundance
Key species
Native/Non-native
Community structure
Ecological niche
Other...

Habitat
SAV density
SAV composition
Substrate

2019 sample process status



- Sample picking done soon
- Fish ID to begin in March
- Hydroacoustic data in progress