Impact of Large Fishes on SAV Growth and Establishment in the STAs

Camille Herteux[1], Janelle Goeke[2], Nathan Dorn[3]

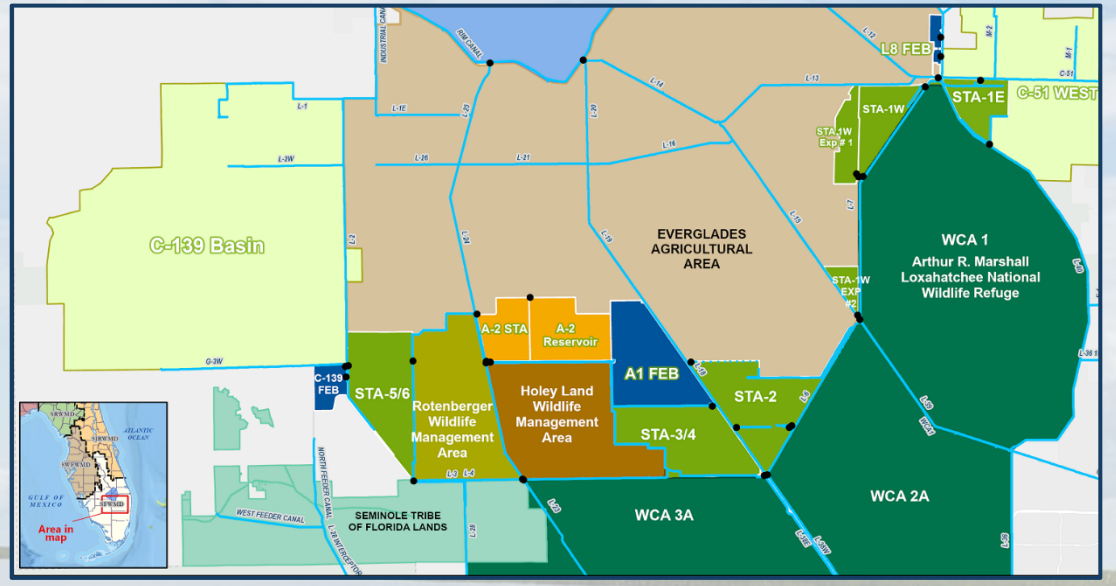
[1]**South Florida Water Management District**
[2]Casco Bay Estuary Partnership
[3]Florida International University

GEER
April 22nd, 2025

Everglades STAs and SAV

Stormwater Treatment Areas

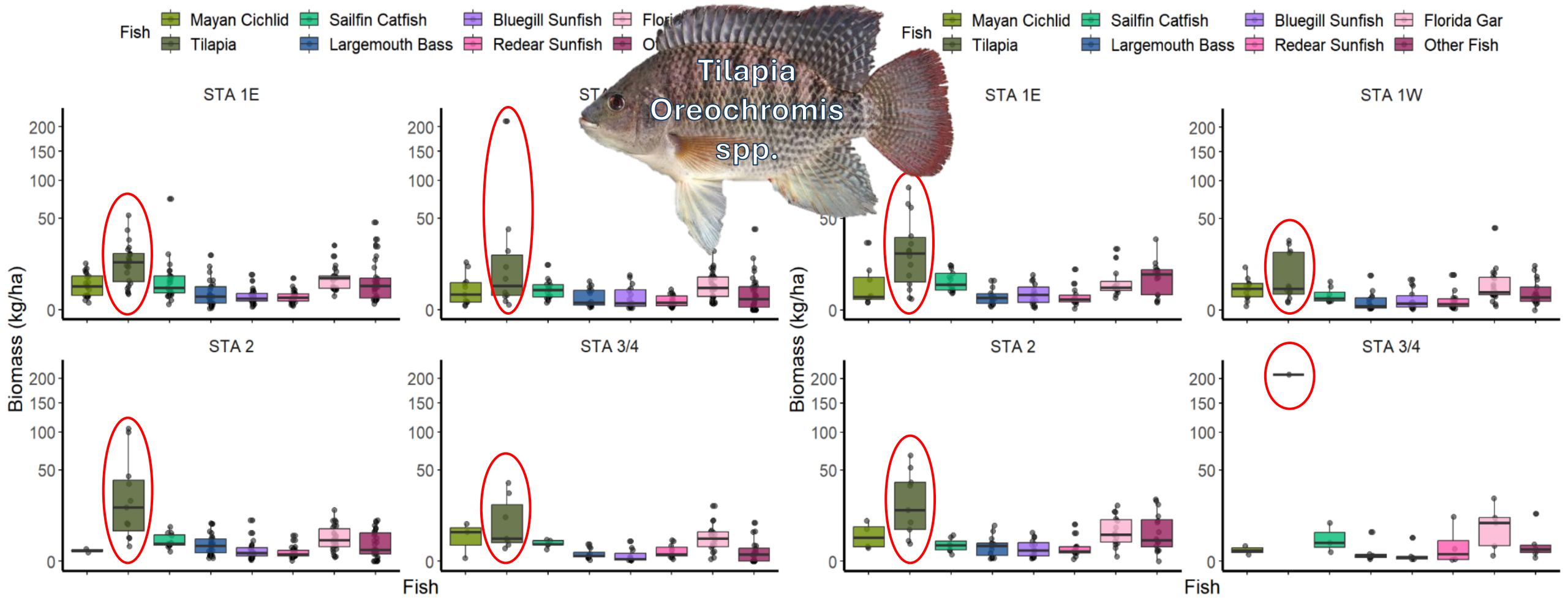
- Built to reduce total phosphorus (TP) concentrations in runoff before entering the Everglades Protection Area
- Managed for both emergent aquatic vegetation and submerged aquatic vegetation (SAV)
- Established SAV prone to periodic “crashes”



Large Fish in STAs

Wet Season

Dry Season



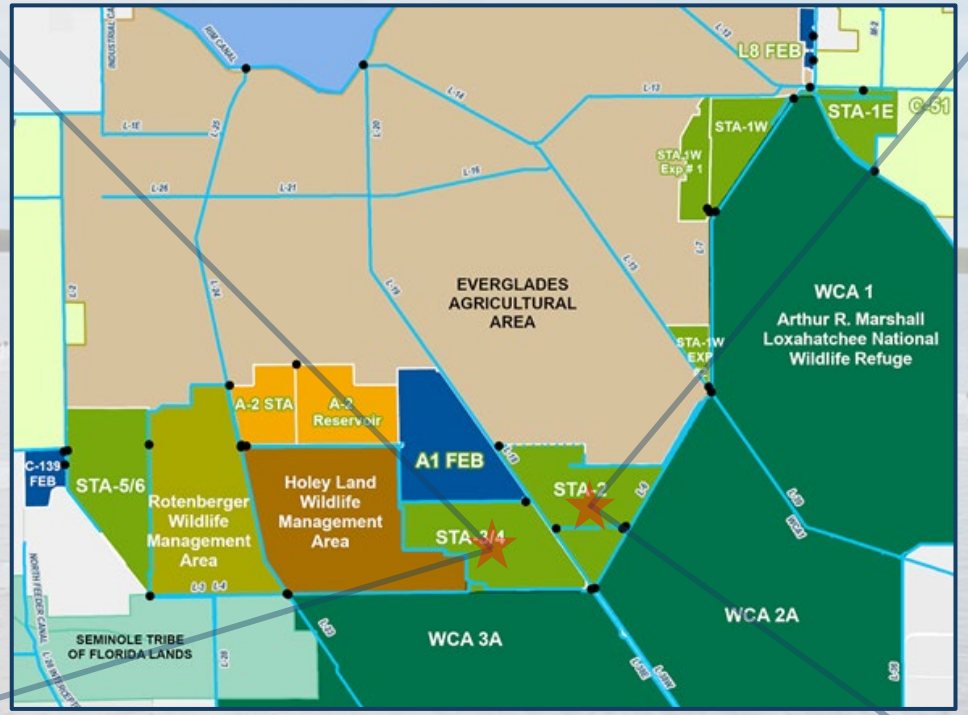
Do large fish inhibit SAV in the STAs?

M. Cook

Large Fish Exclusion Study Sites

Part 1: Summer 2023
STA-3/4 Upper SAV Cell
12-week monitoring period

Flow Direction

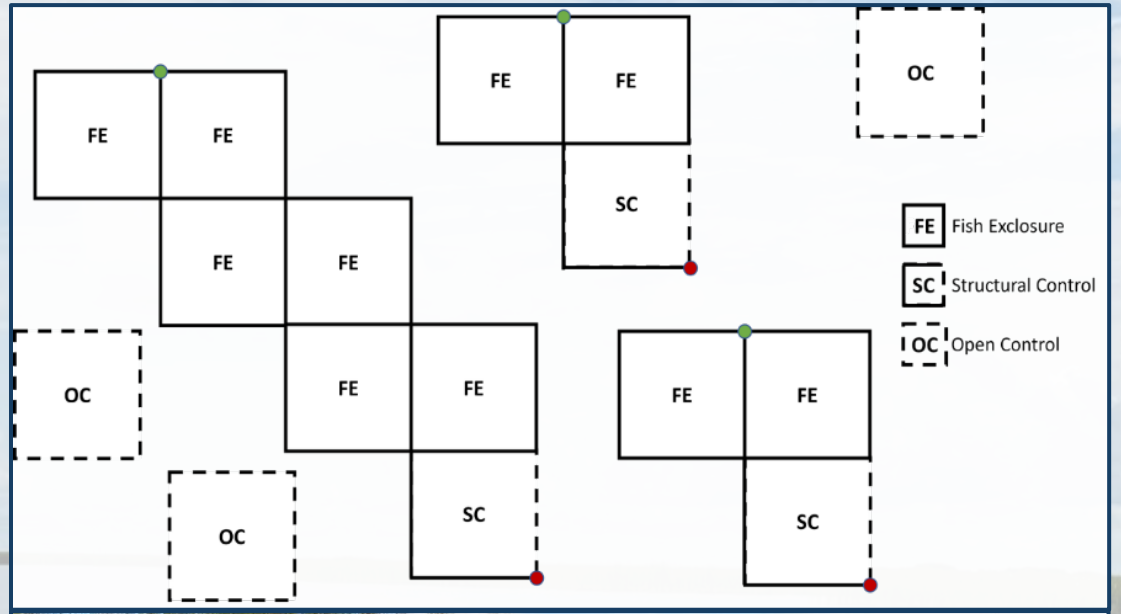


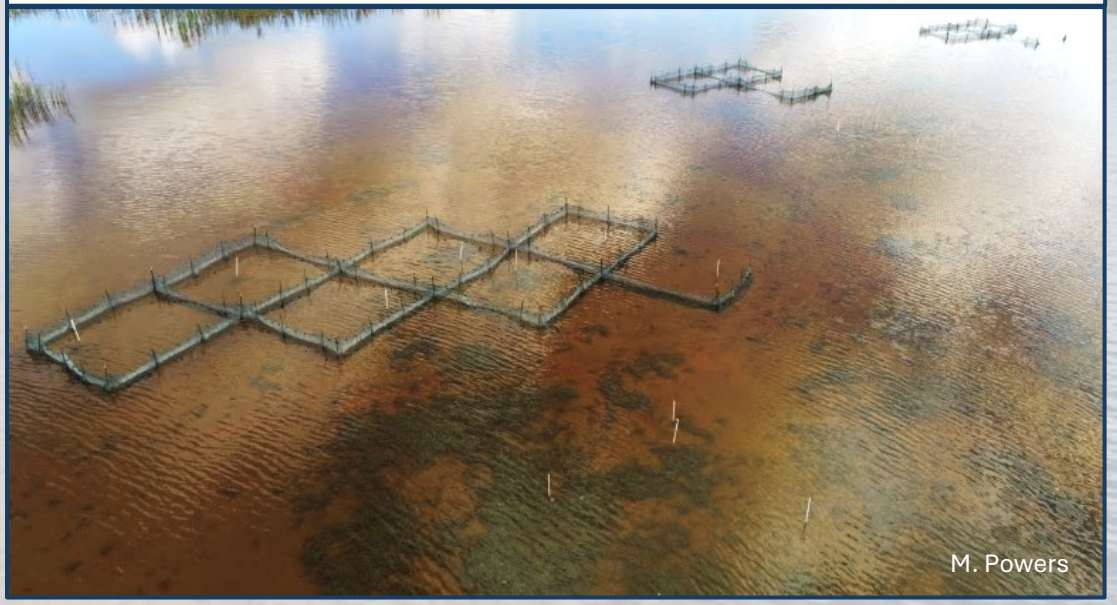
Flow Direction

Part 2: Fall/Winter 2024
STA-2 Cell 3
12-week monitoring period

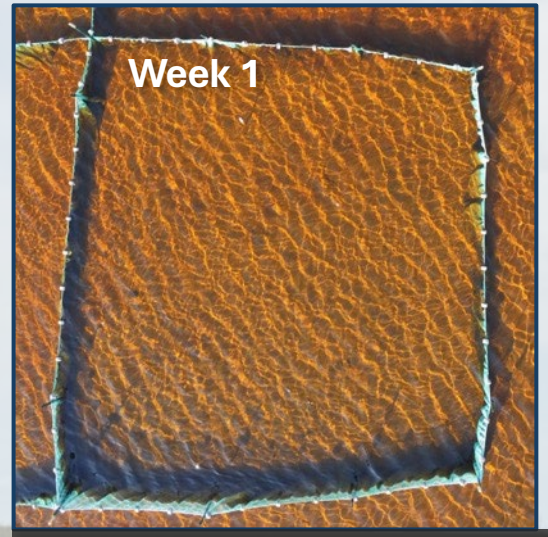
Part 1: Large Fish Exclusion Methods

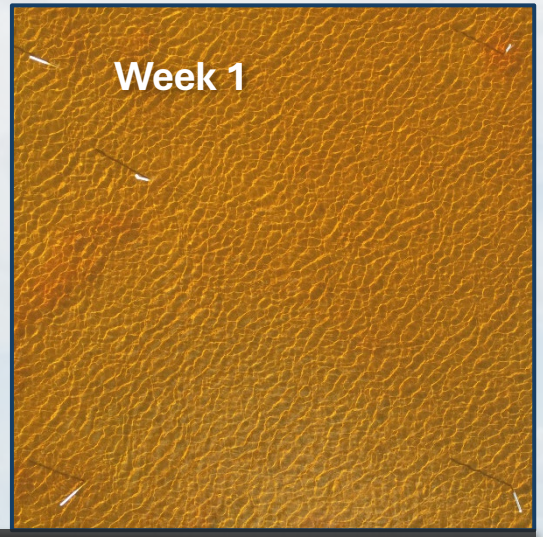
- **Upper SAV Cell- Two blocks:**
  - Northern block: bare floc sediment
  - Southern block: Patchy SAV (*Chara* spp.)
- **Treatments**
  - Fish exclosure (FE)
  - Structural control (SC)
  - Open control (OC)
- **Each block: 10 FE, 3 SC, 3 OC per site (32 plots total)**
- **All plots inoculated with SAV**



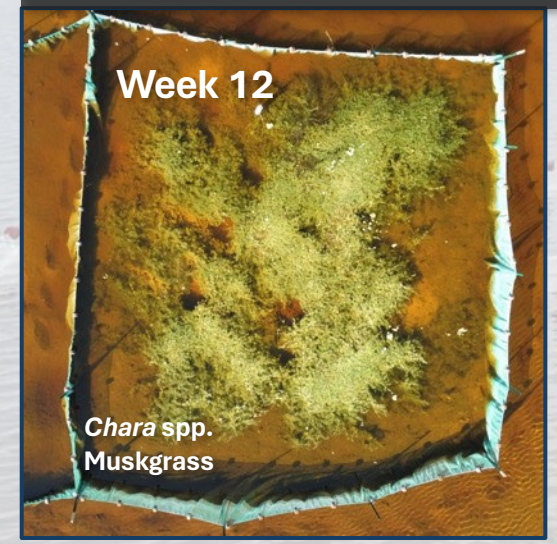


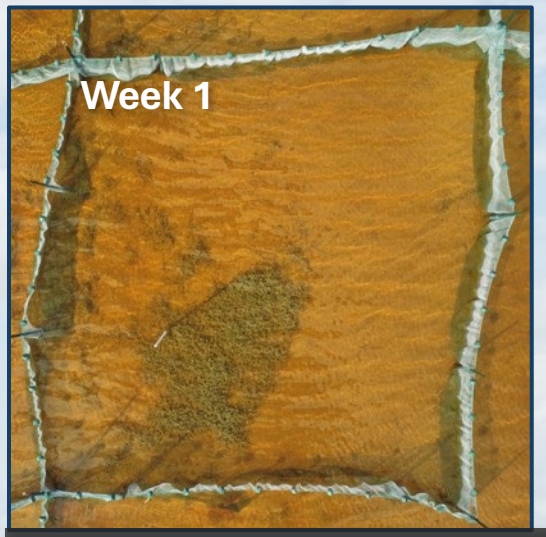
Part 1: SAV Growth Results

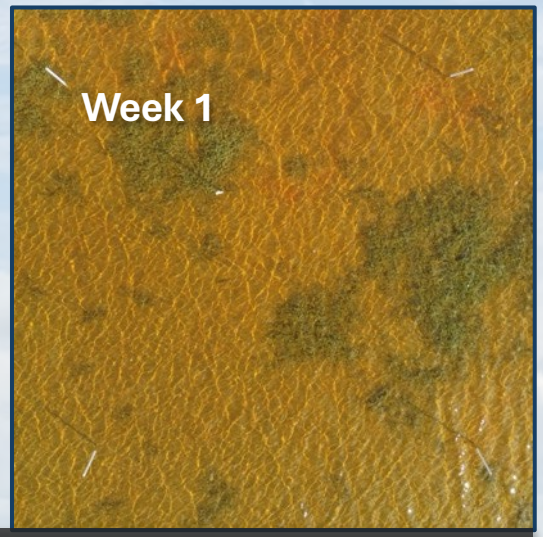




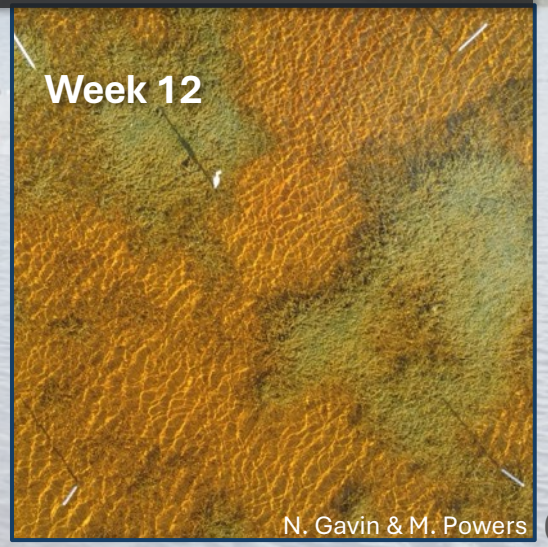
Northern Block (bare sediment)







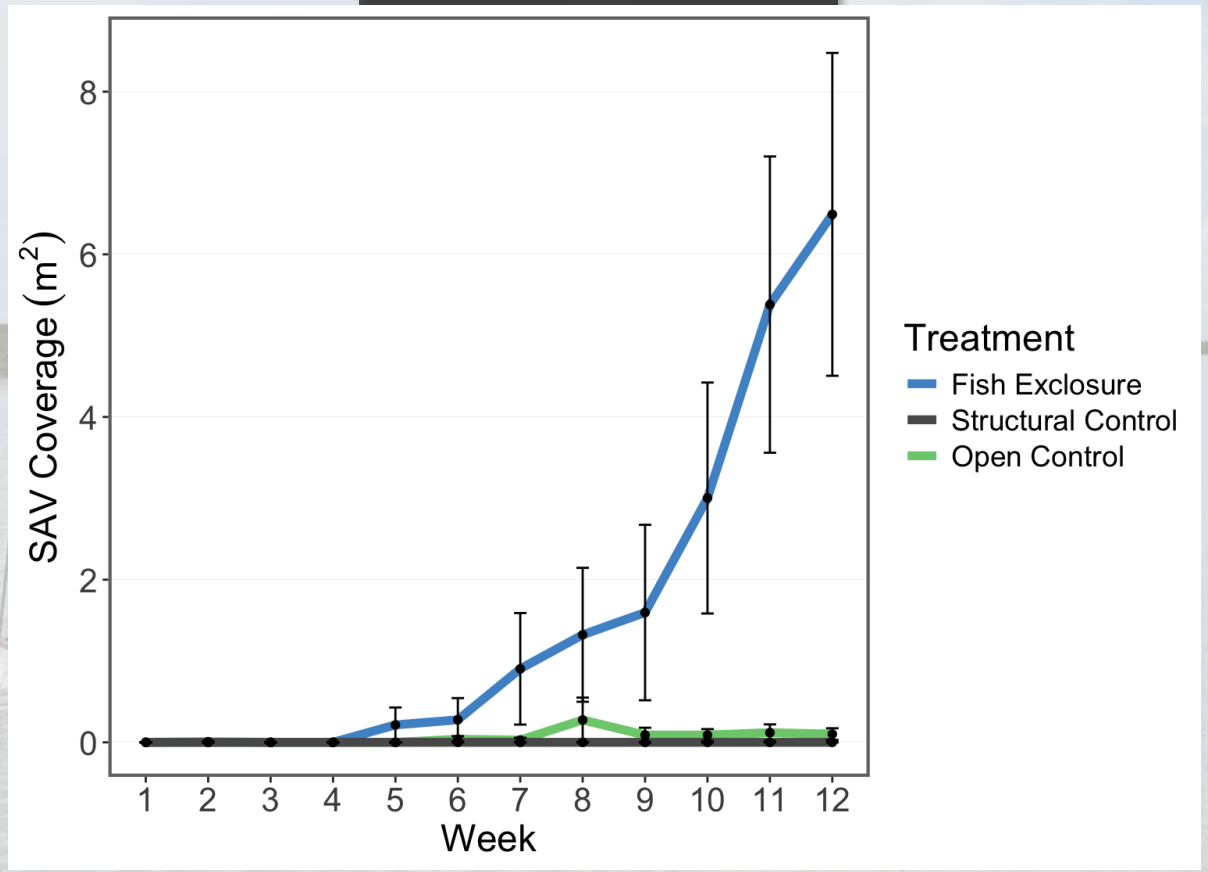
Southern Block (patchy SAV)



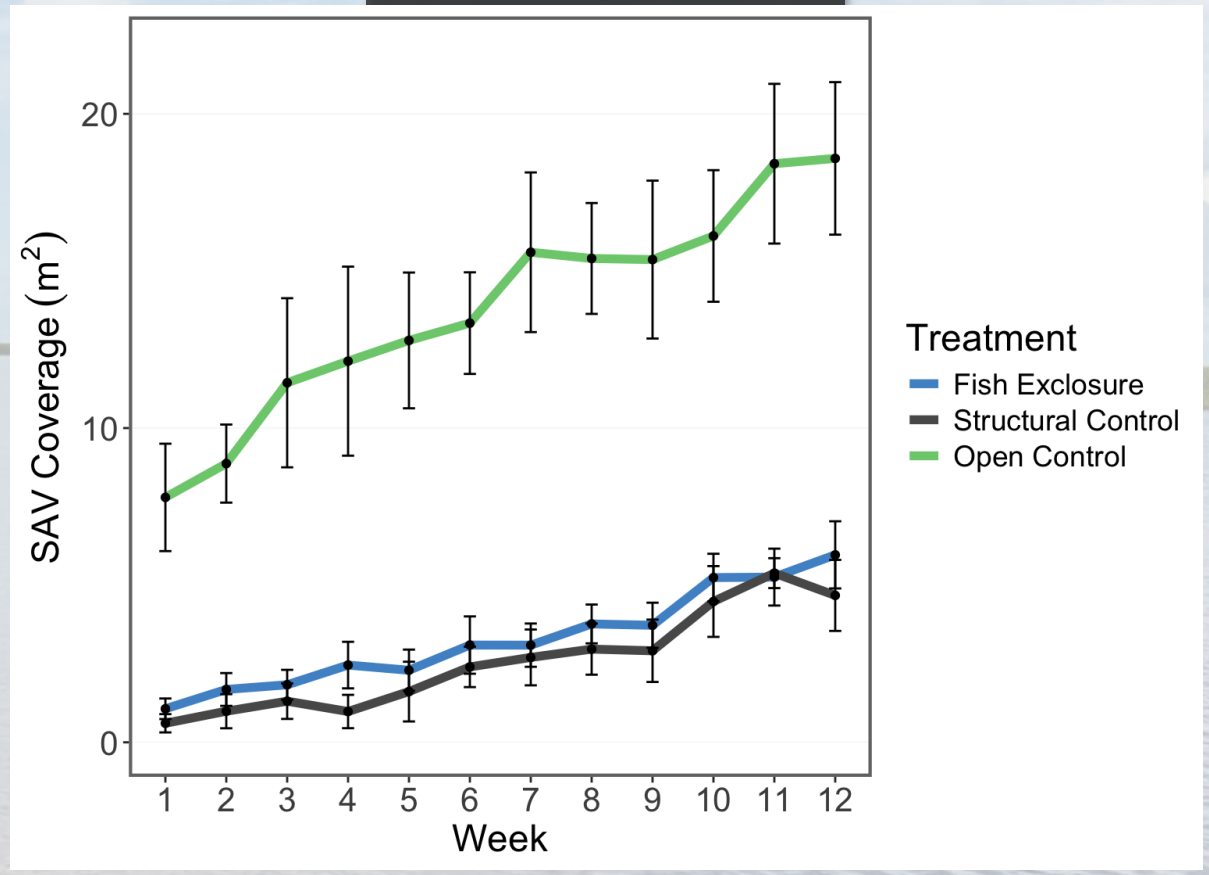
N. Gavin & M. Powers

Part 1: SAV Coverage Results

Northern Block (Bare sediment)

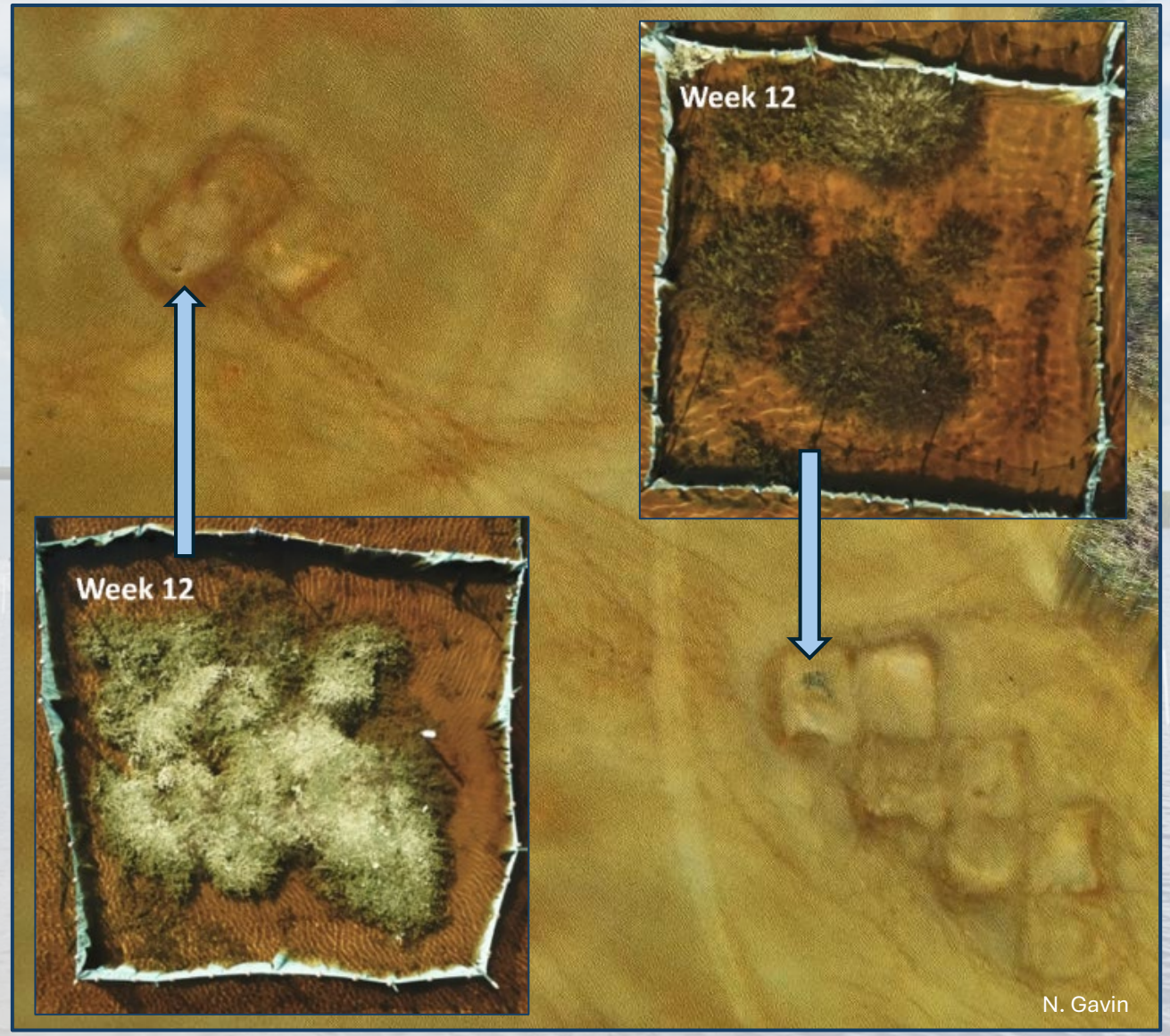


Southern Block (Patchy SAV)



What did we learn from Part 1?

- **Fish affect SAV**
  - Prevent establishment of new SAV beds
  - May not limit growth of established beds
- **What happened to SAV after exclosure removal?**



How can we apply Part 1 findings to Part 2?

Plot Types

- Only full exclosures and open controls

Plot Blocks

- Increase number of blocks from 2 to 3
- All blocks on bare sediment

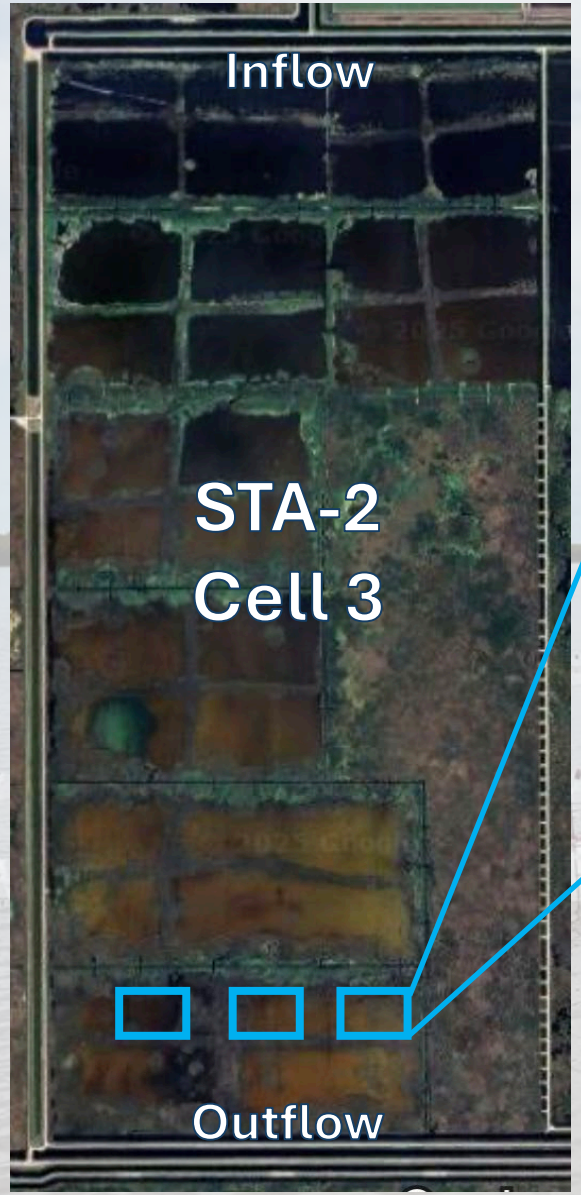
SAV Recruitment

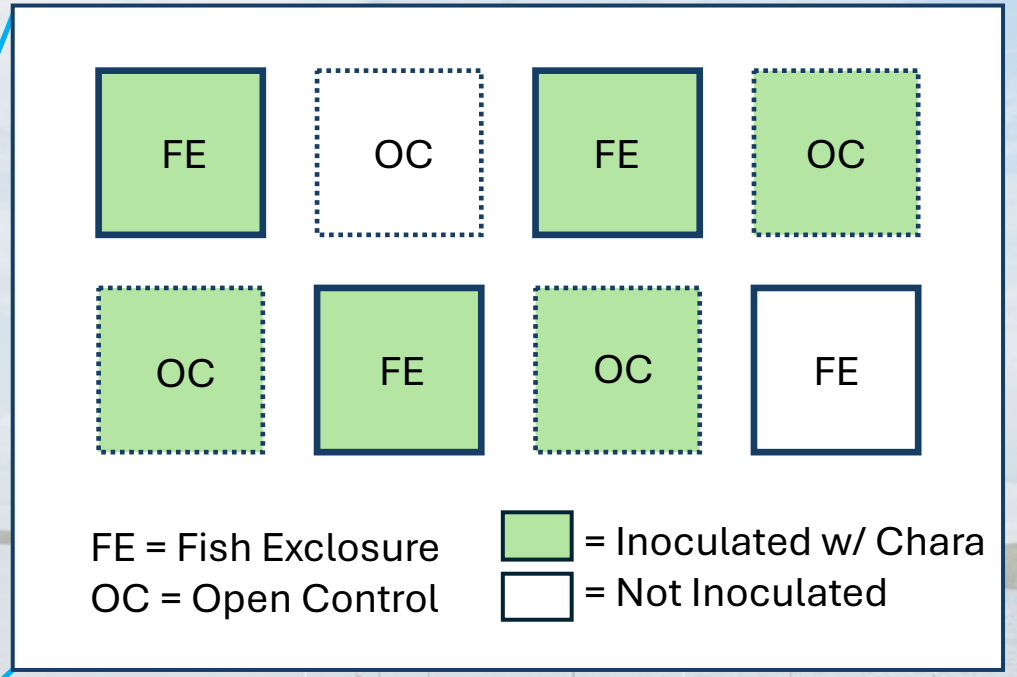
- Inoculate 3/4 plots

Exclosure Removal

- Fully remove half of exclosures
- Partially remove remaining half
- One month monitoring after removal

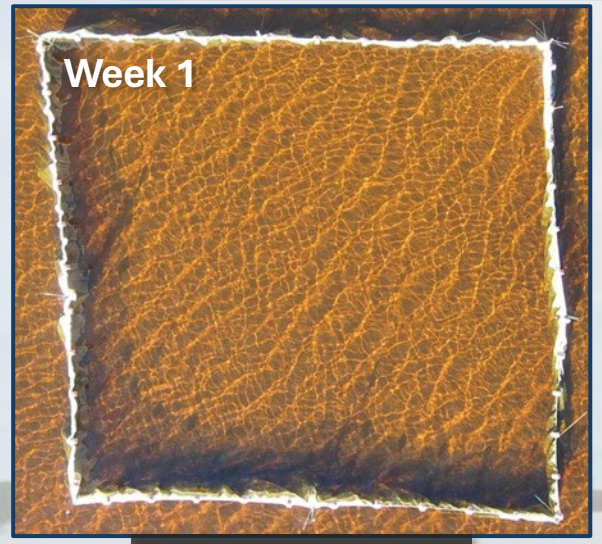
Part 2: Large Fish Exclusion Methods



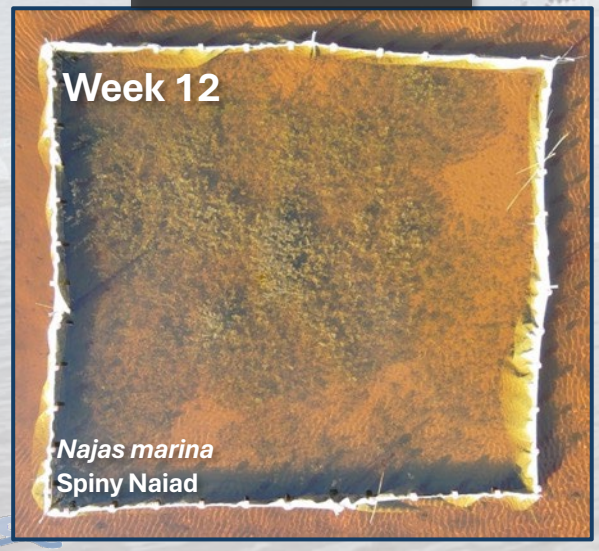


Part 2: SAV Growth Results

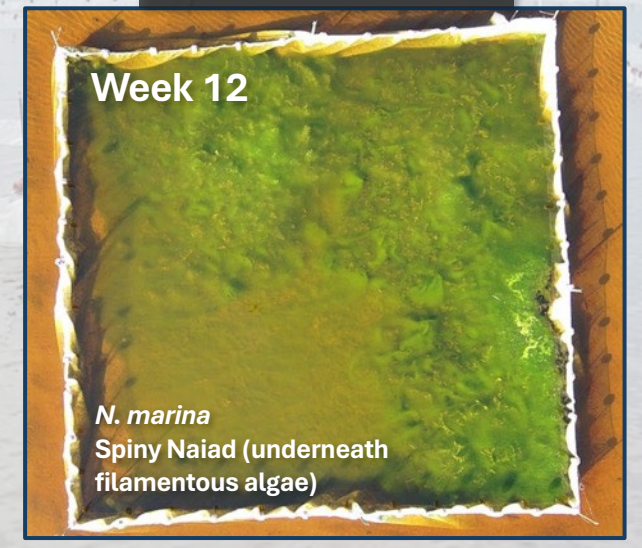
Shallower — Floc Depth — Deeper

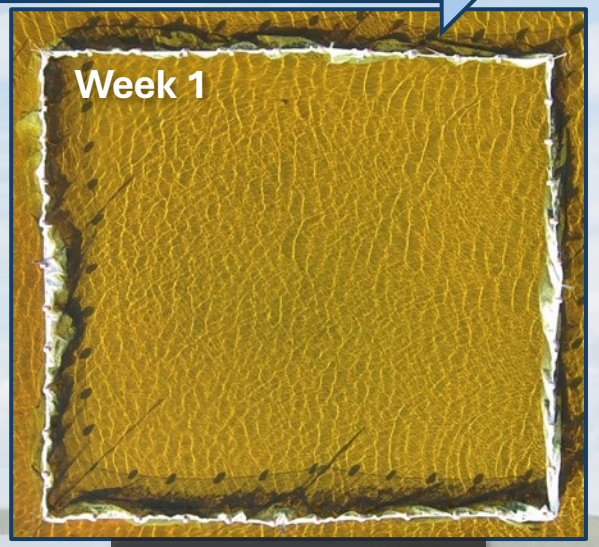


Block 1 (West)



Block 2 (Center)





Block 3 (East)

Part 2: SAV Coverage Results

Shallower

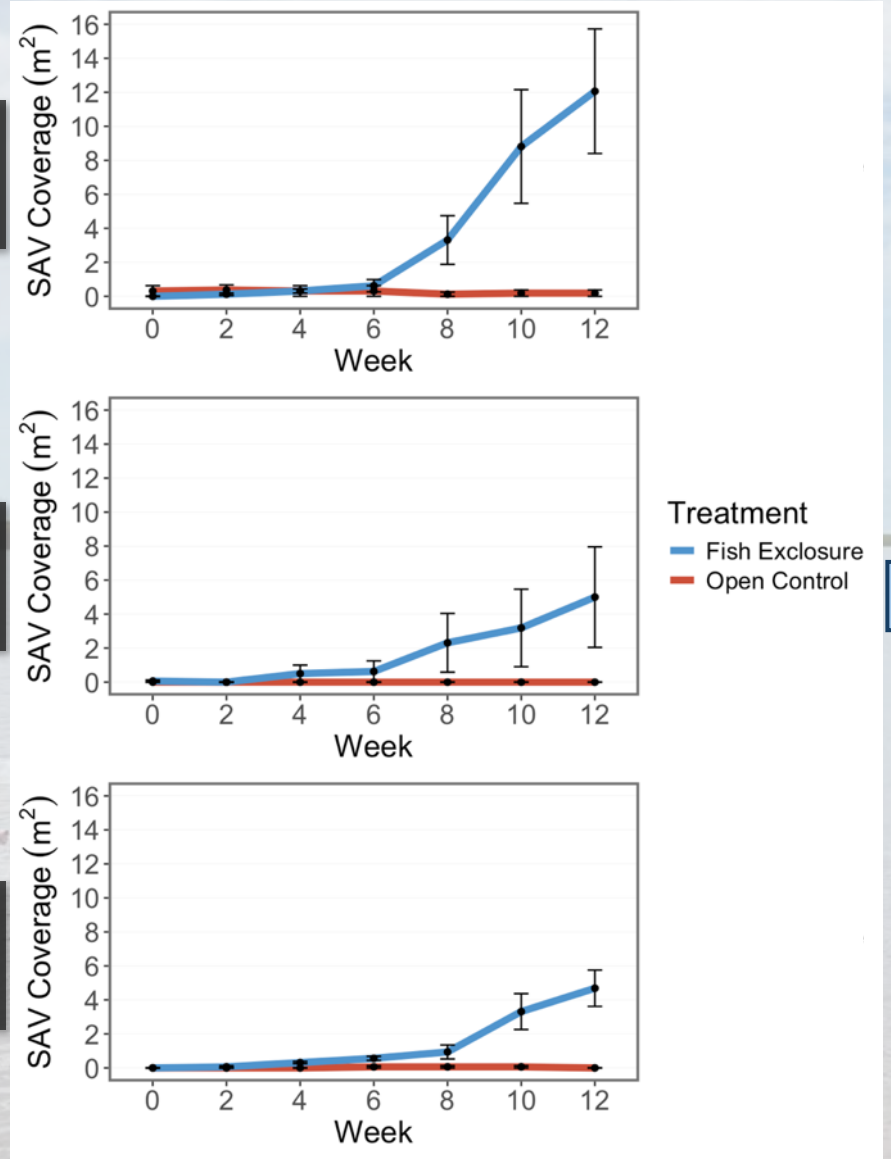
Floc depth

Deeper

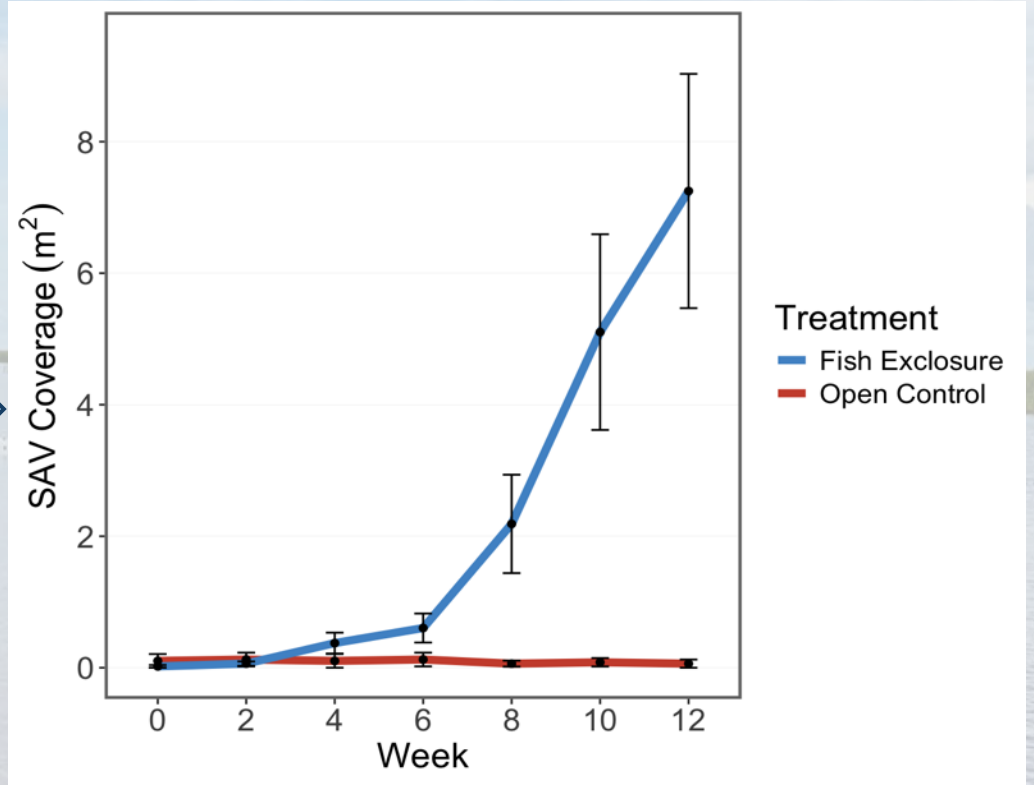
Western Block

Middle Block

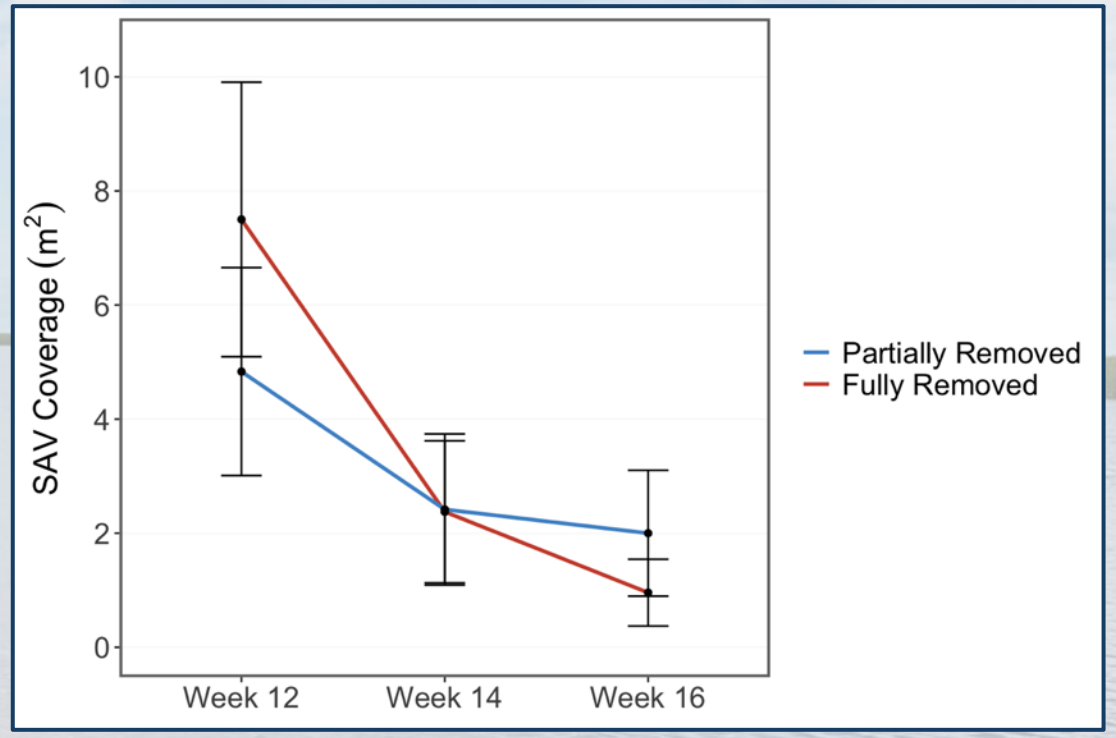
Eastern Block



All Blocks

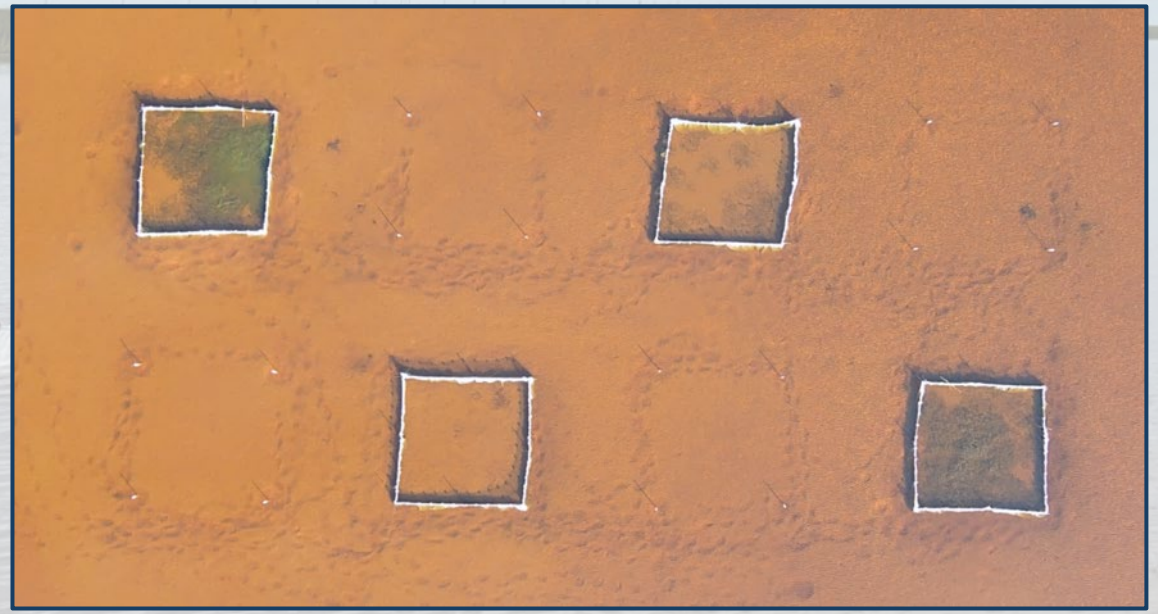


Part 2: Post-Exclosure Removal Monitoring



Large Fish and SAV: Management Implications

- Large fish do likely inhibit SAV growth but only in areas of bare sediment or newly established SAV
- Excluding fish can help SAV grow, but longer term SAV success may be related to other factors such as deep floc sediment
- Drawdown as management tool to remove herbivory/nesting pressure and also consolidate soils



N. Gavin

Acknowledgements

- Nathan Gavin
- Ryan Goebel
- Jess Jenison
- Jake Dombrowski
- Matt Powers

N. Gavin