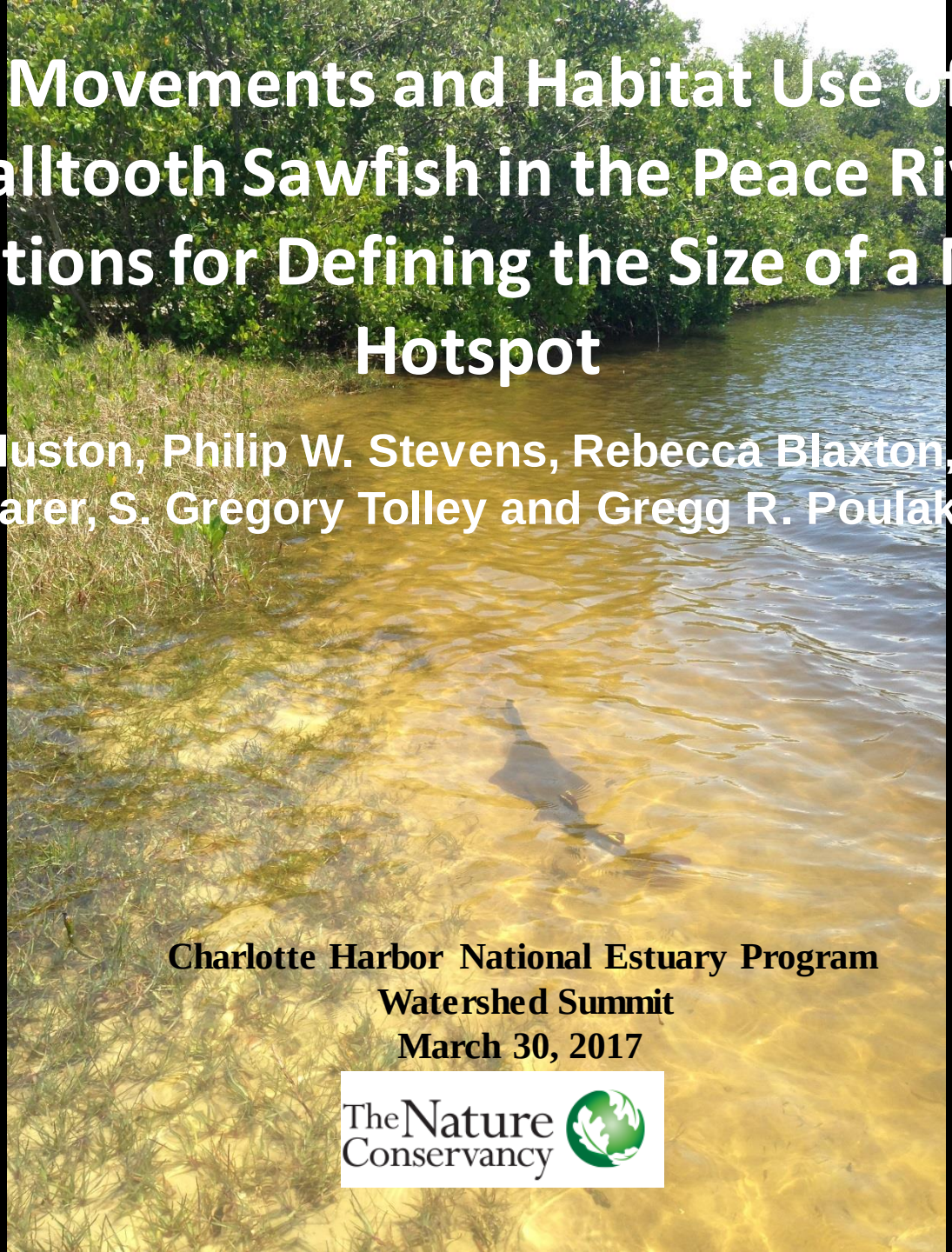
Diel Movements and Habitat Use of the Smalltooth Sawfish in the Peace River: Implications for Defining the Size of a Nursery Hotspot

Cecily A. Huston, Philip W. Stevens, Rebecca Blaxton, Rachel M. Scharer, S. Gregory Tolley and Gregg R. Poulakis



Charlotte Harbor National Estuary Program
Watershed Summit
March 30, 2017

Outline

- Introduction and Methods
- Nursery comparison
  - Distribution
  - River background
  - Electivity
  - Habitat use
  - Locations
- Fine-scale movements
- Exploring behavior (Next sawfish talk)
- Ultra fine-scale movement

Outline

- Fine-scale movements
  - Internship/preliminary study
  - Manual tracking
  - Acoustic monitoring
  - “Future direction”

Summer internship → Thesis

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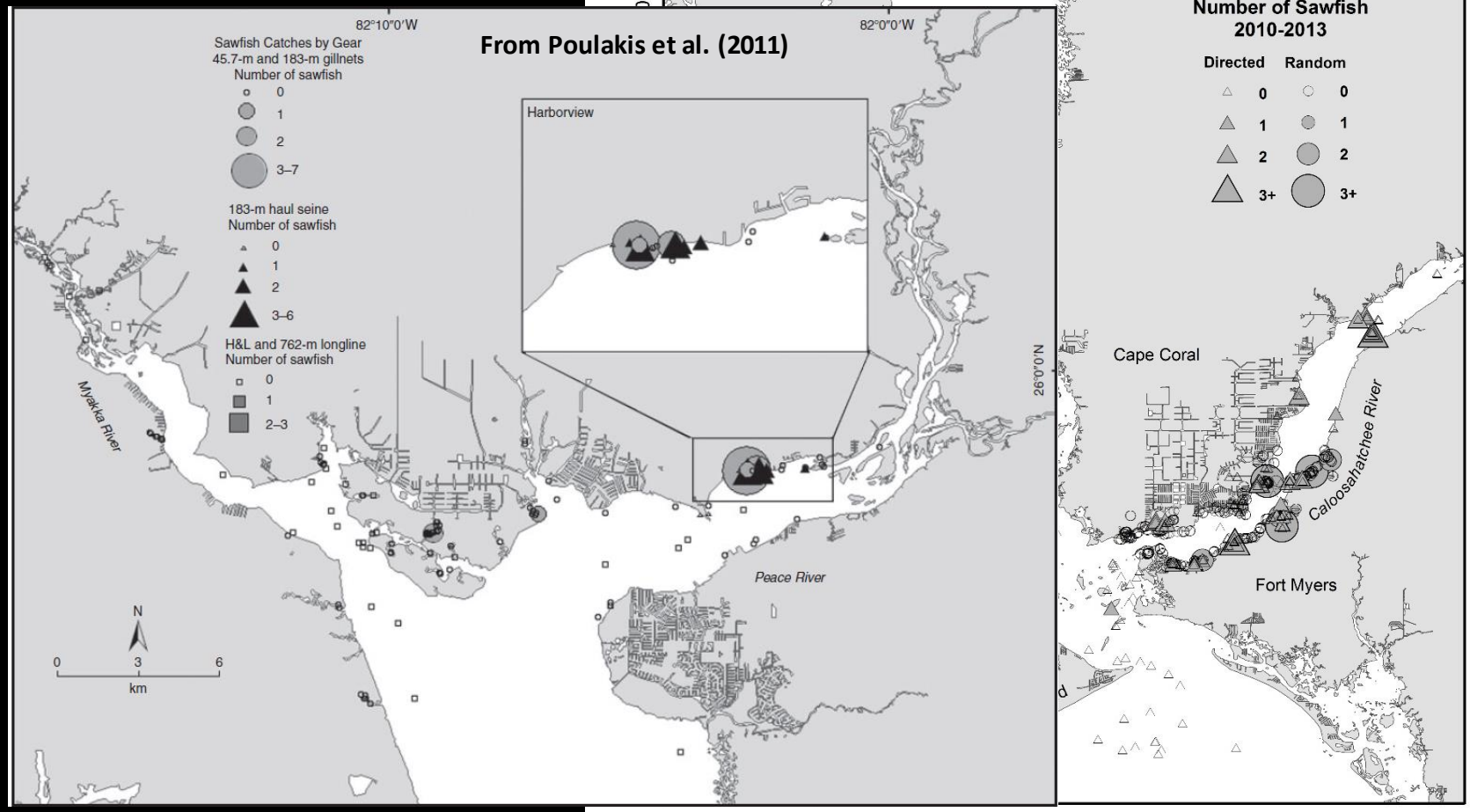
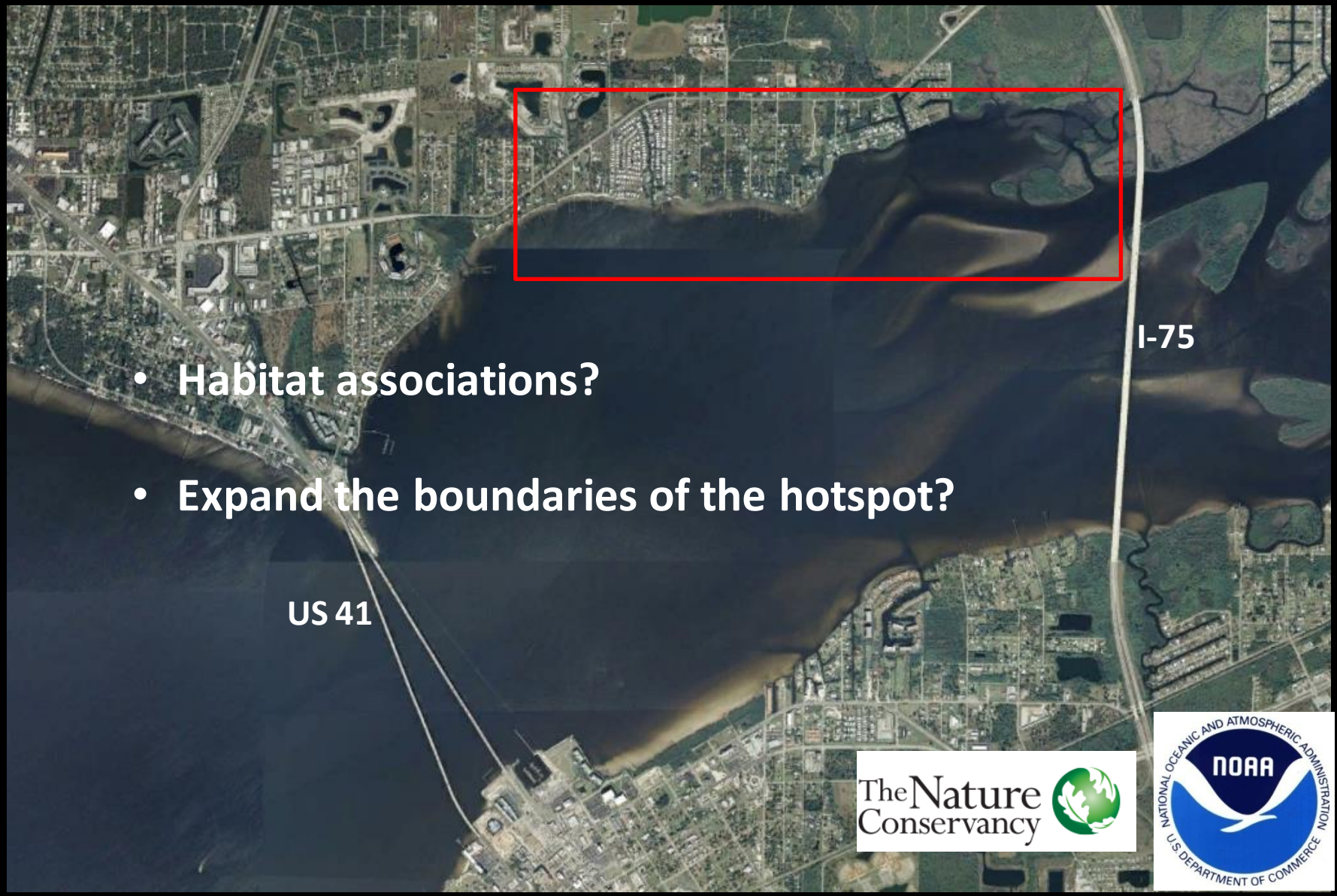
Peace River

- Natural flow
- One hotspot
- Natural habitat

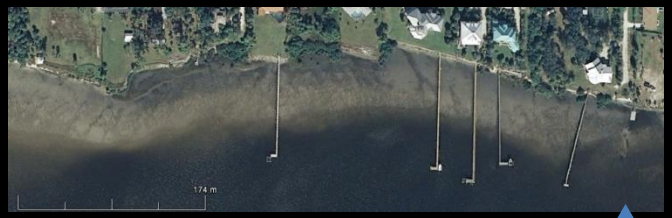


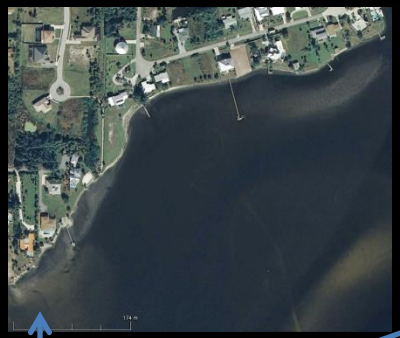
Peace River hotspot

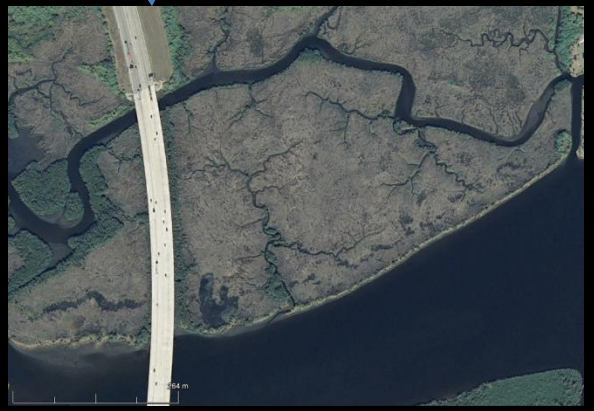


- Habitat associations?
- Expand the boundaries of the hotspot?

Manual tracking study areas







Site descriptions

Site	Shore Habitat	Bottom Habitat
1	Beach/Dock	Sand/Mud/Oyster
2	Beach/Dock	Sand/Mud/Oyster
3	Oyster/Riprap/Seawall	Sand/Mud
4	*Spartina*/Red Mangrove/Beach	Sand/Mud
5	Seawall	Sand/Mud
6	Seawall	Mud
7	Red Mangrove/*Juncus*	Mud/Sand/Oyster
8	Red Mangrove/*Juncus*	Mud

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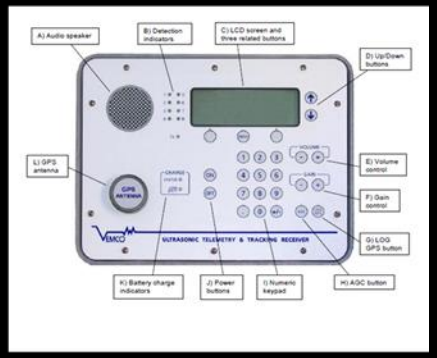
Manual tracking

- Tracked sawfish by acoustic tags
- Some received continuous tags (~5 sec)
- All received acoustic tags (1-3 min)

- Tracked using VR100 and directional hydrophone
- VR100 decoded acoustic tag number
- Directional hydrophone helped estimate direction fish was in



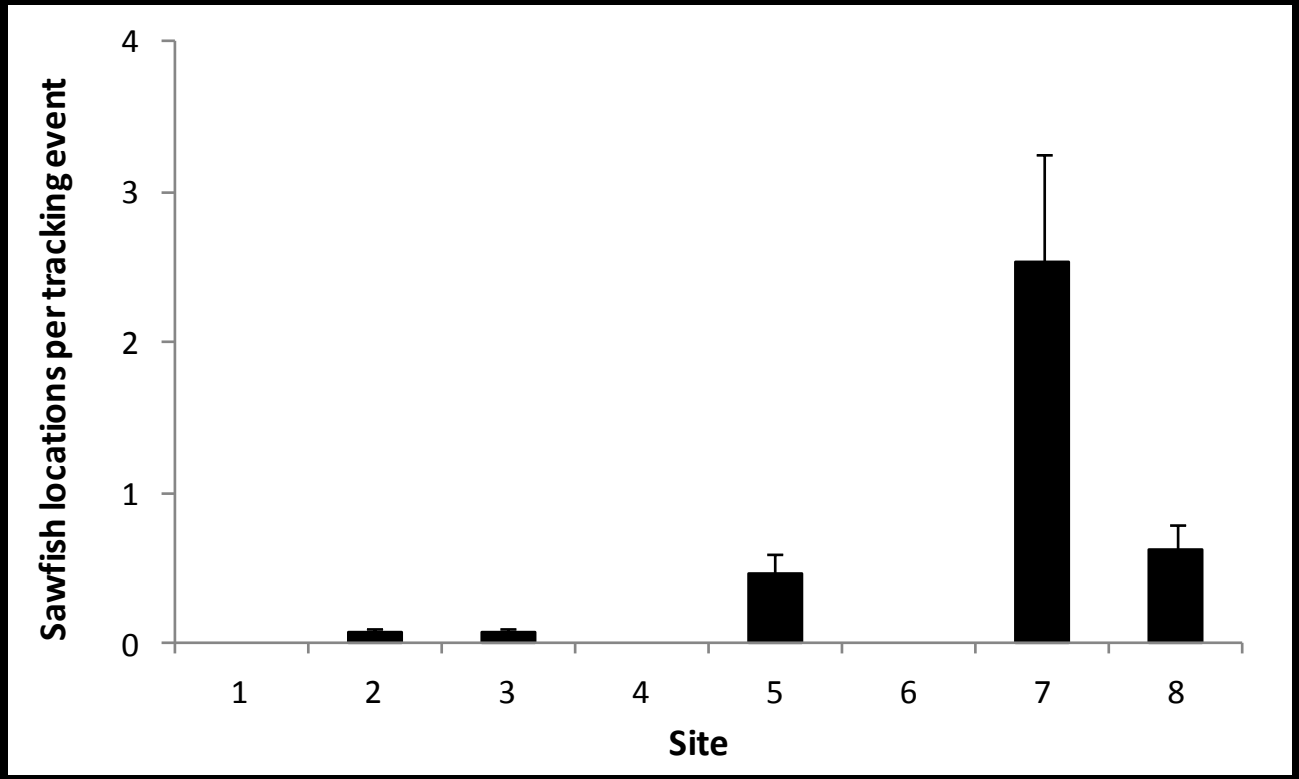
Manual tracking (Day)

- Used kayaks
- Paddle to each site
- Locate tagged sawfish
- Define habitat

Manual Tracking (Night)

- Same goal as day tracking
- Use boats instead of kayaks
- Limitations on locating
  - –Signal strength
  - –Shallow areas

Sites vs sawfish locations



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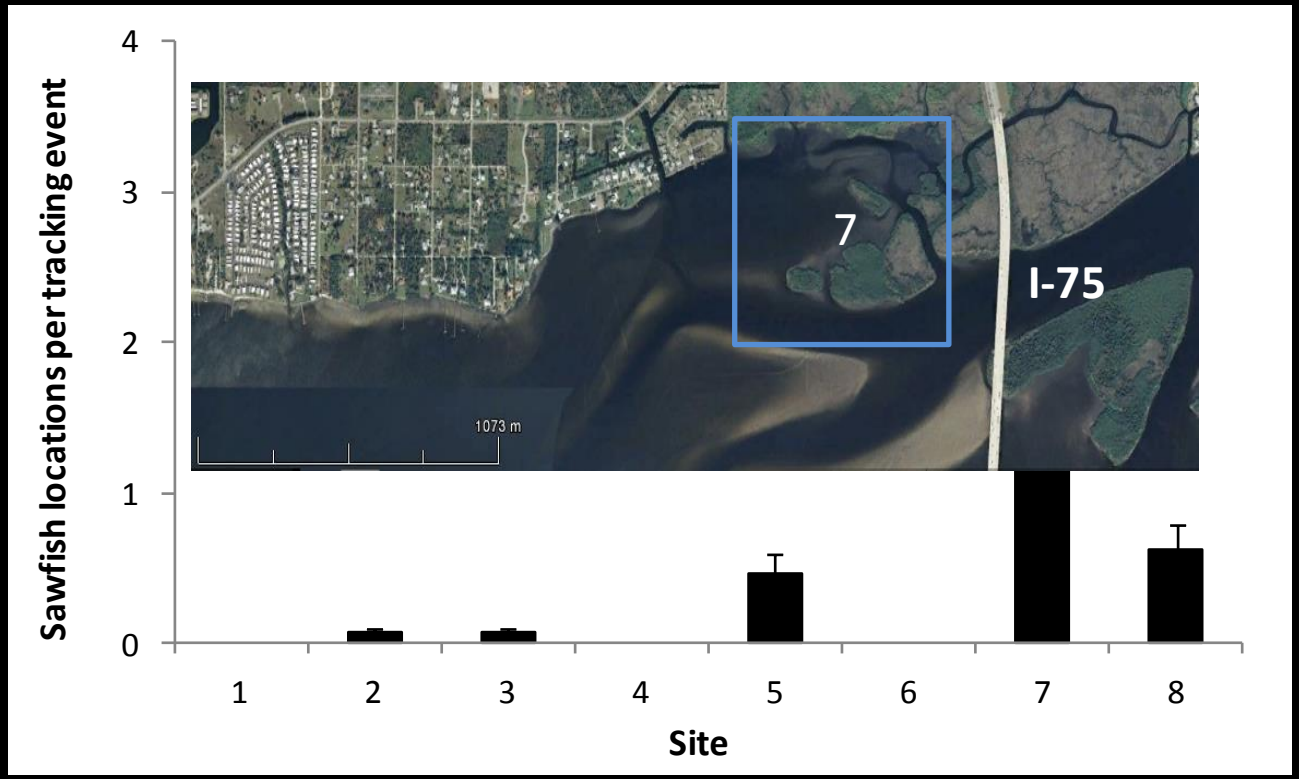
Sites vs sawfish locations



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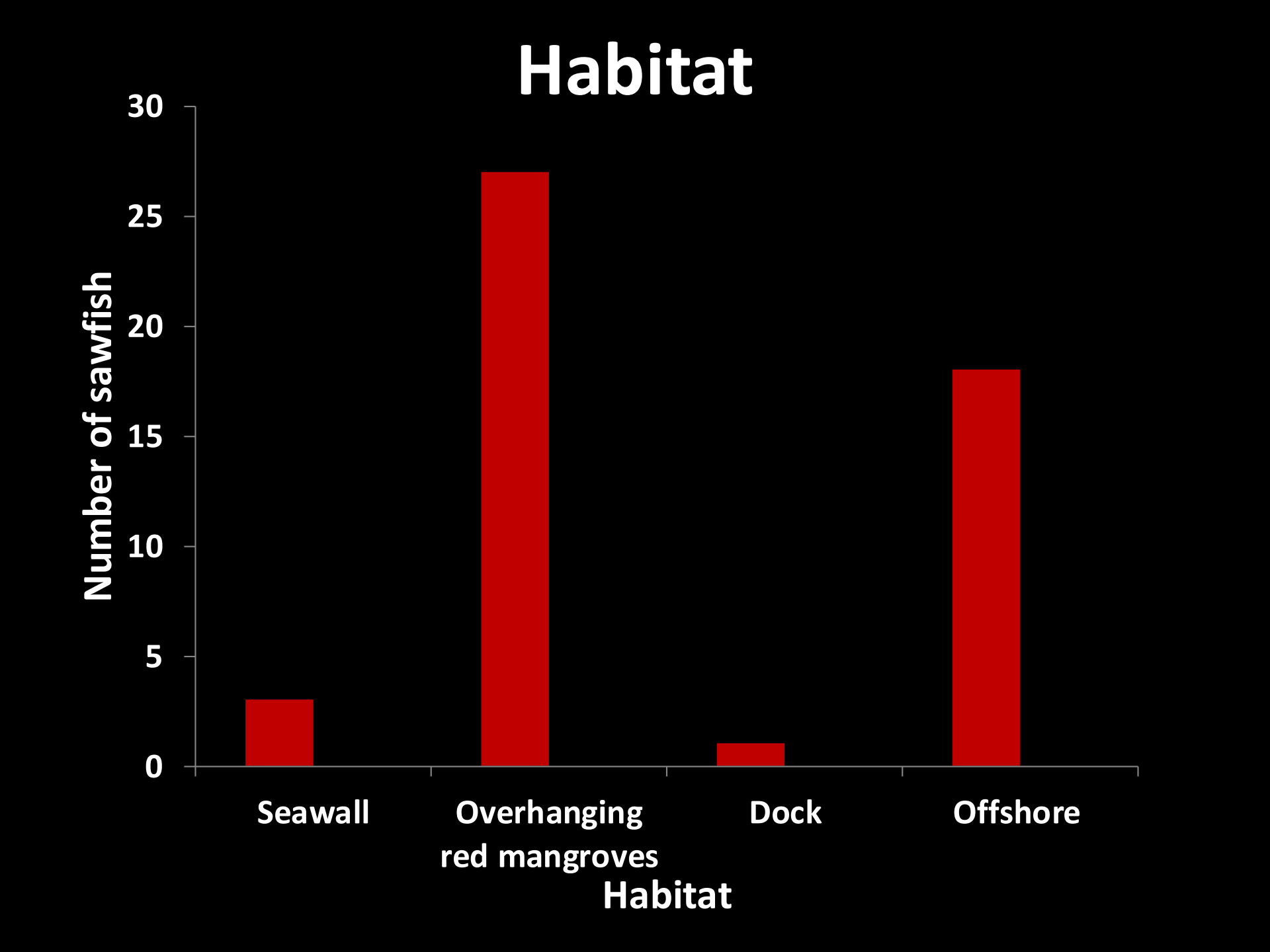
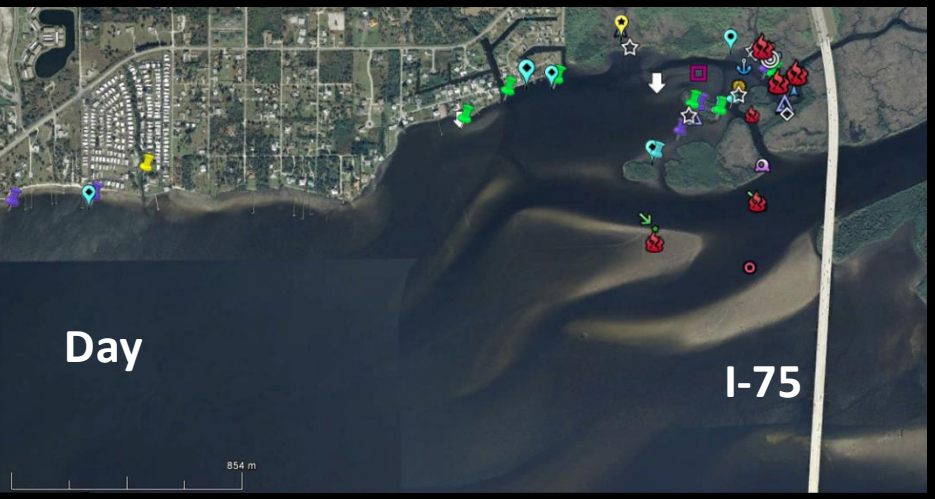
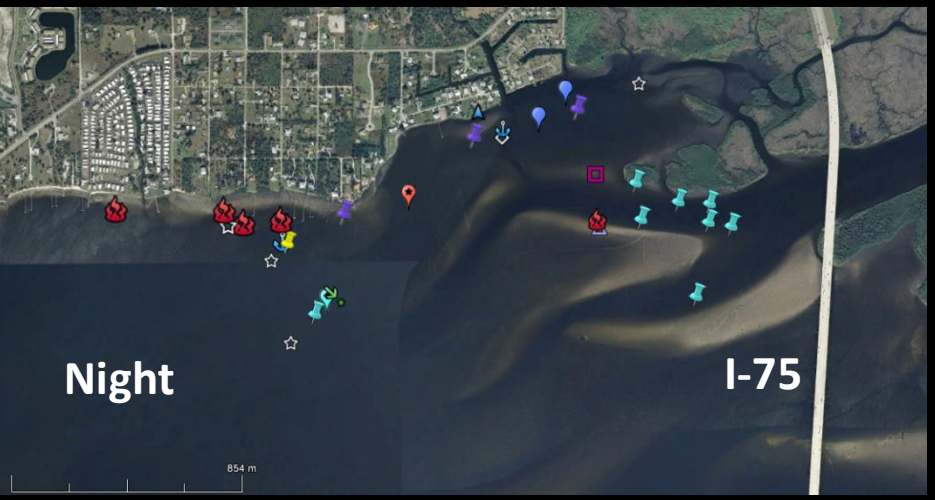
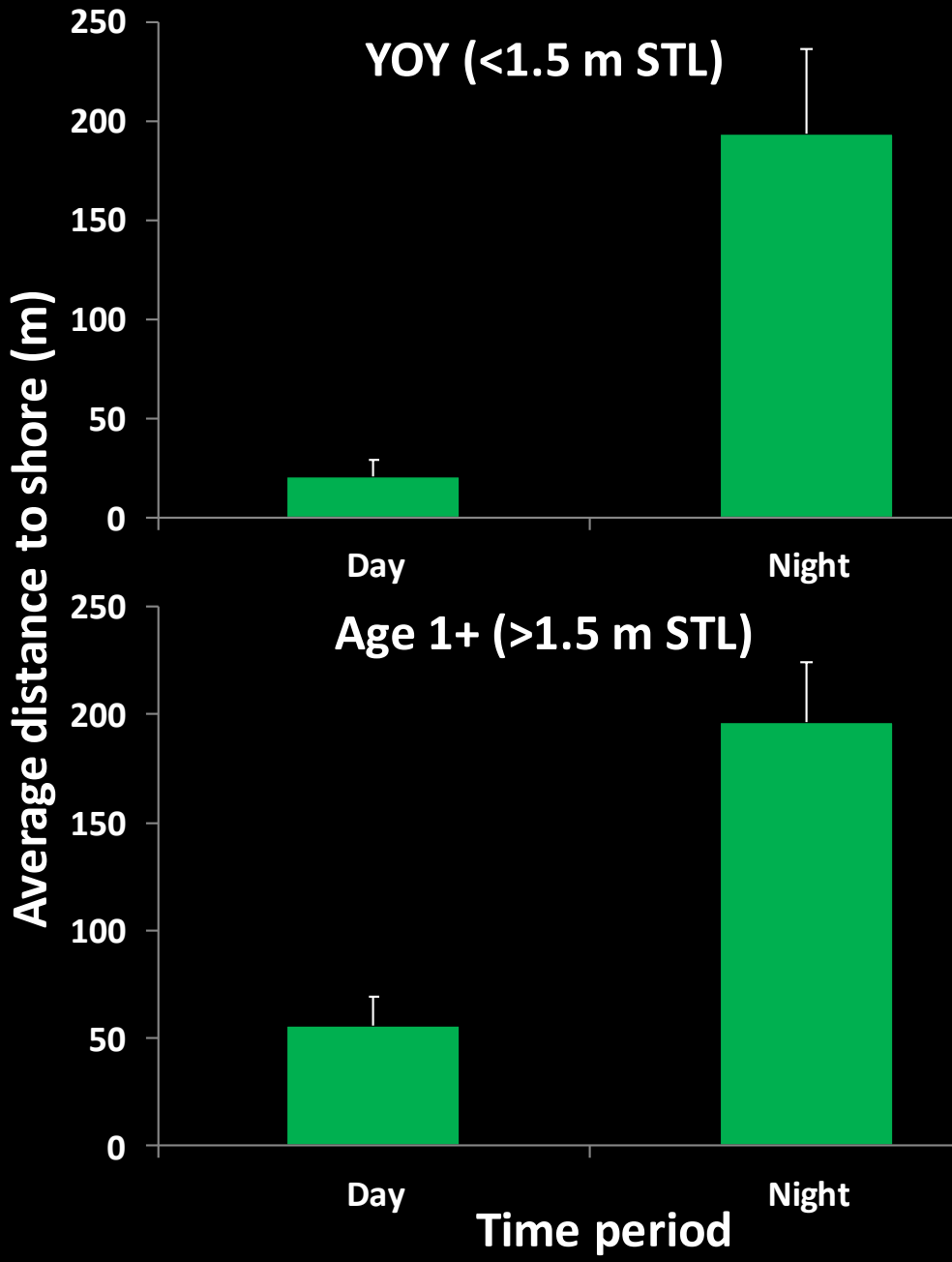

Habitat
30
25
20
15
10
5
0
Number of sawfish
Seawall
Overhanging red mangroves
Dock
Offshore
Habitat

Day vs. night


Day
I-75
854 m


Night
I-75
854 m


YOY (<1.5 m STL)
Age 1+ (>1.5 m STL)
Average distance to shore (m)
250
200
150
100
50
0
Day
Night
Time period

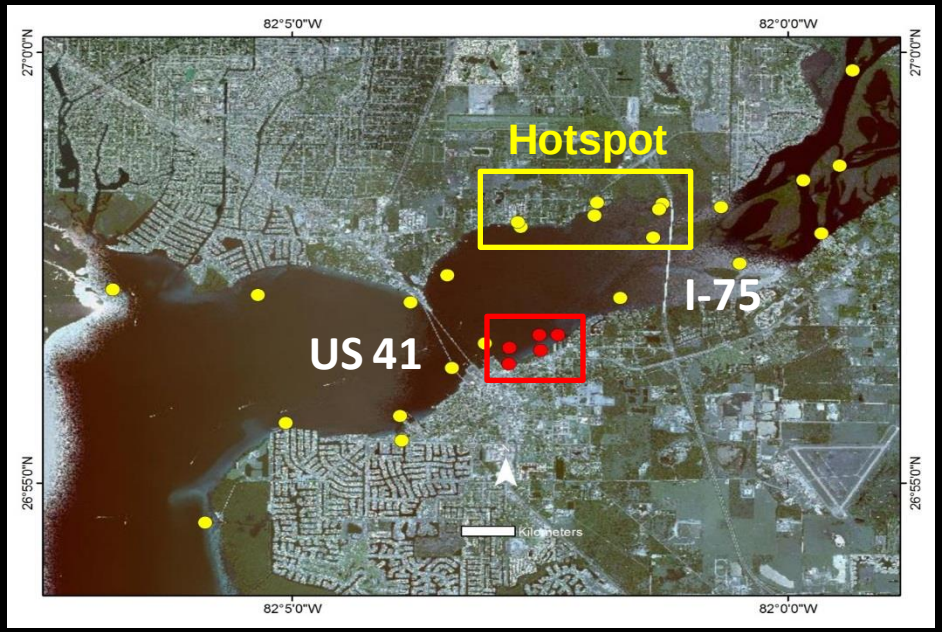
Outline

- Fine-scale movements
  - Internship/preliminary study
  - Manual tracking
  - Acoustic monitoring
  - “Future direction”

Acoustic monitoring arrays: fine-scale

- Objective: Determine sawfish locations during the day and night to see if they are using southern shore near oyster restoration site

- 5 VR2Ws (red) added to the existing array (yellow)

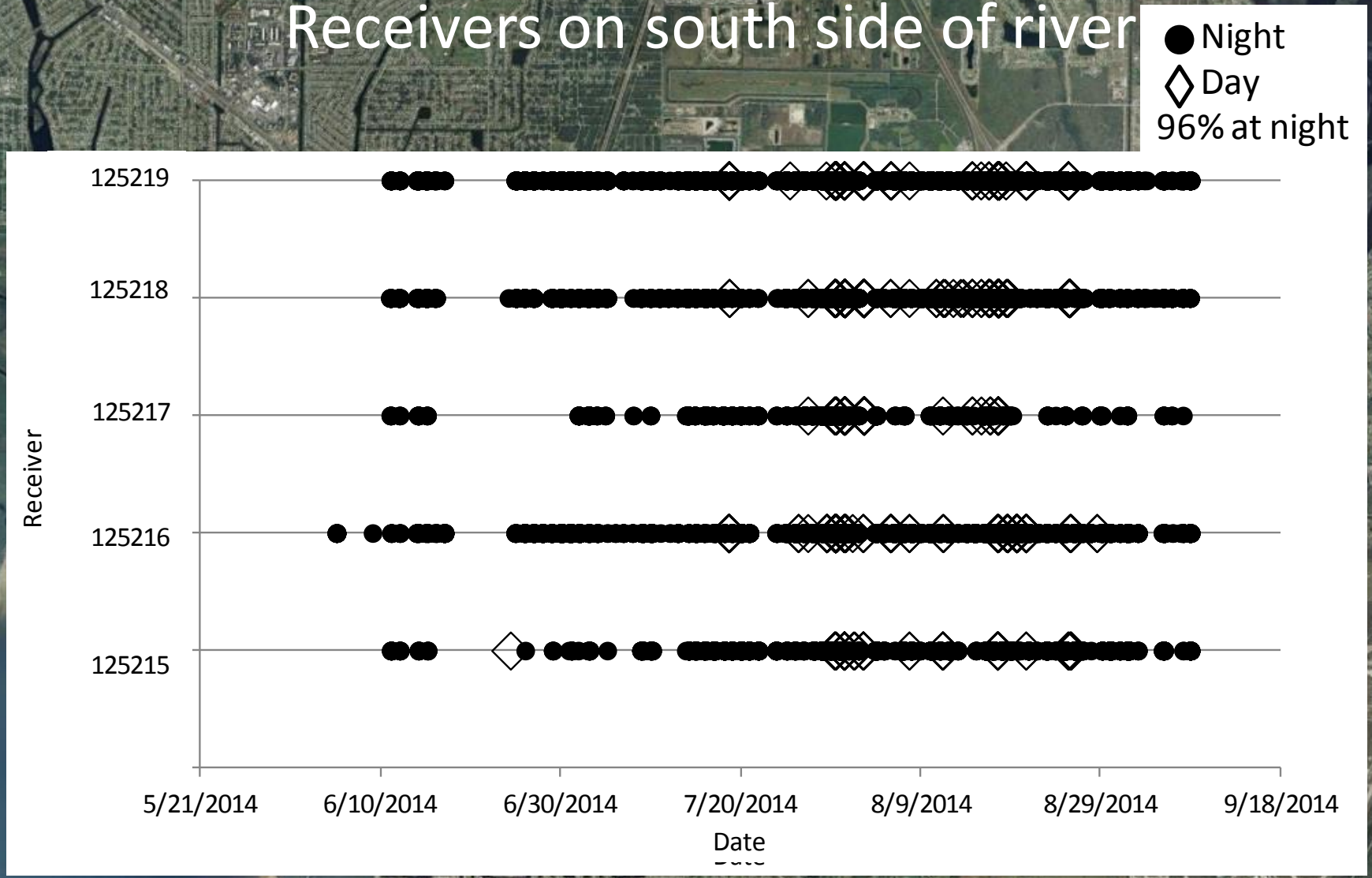


Upper Harbor Acoustic Array

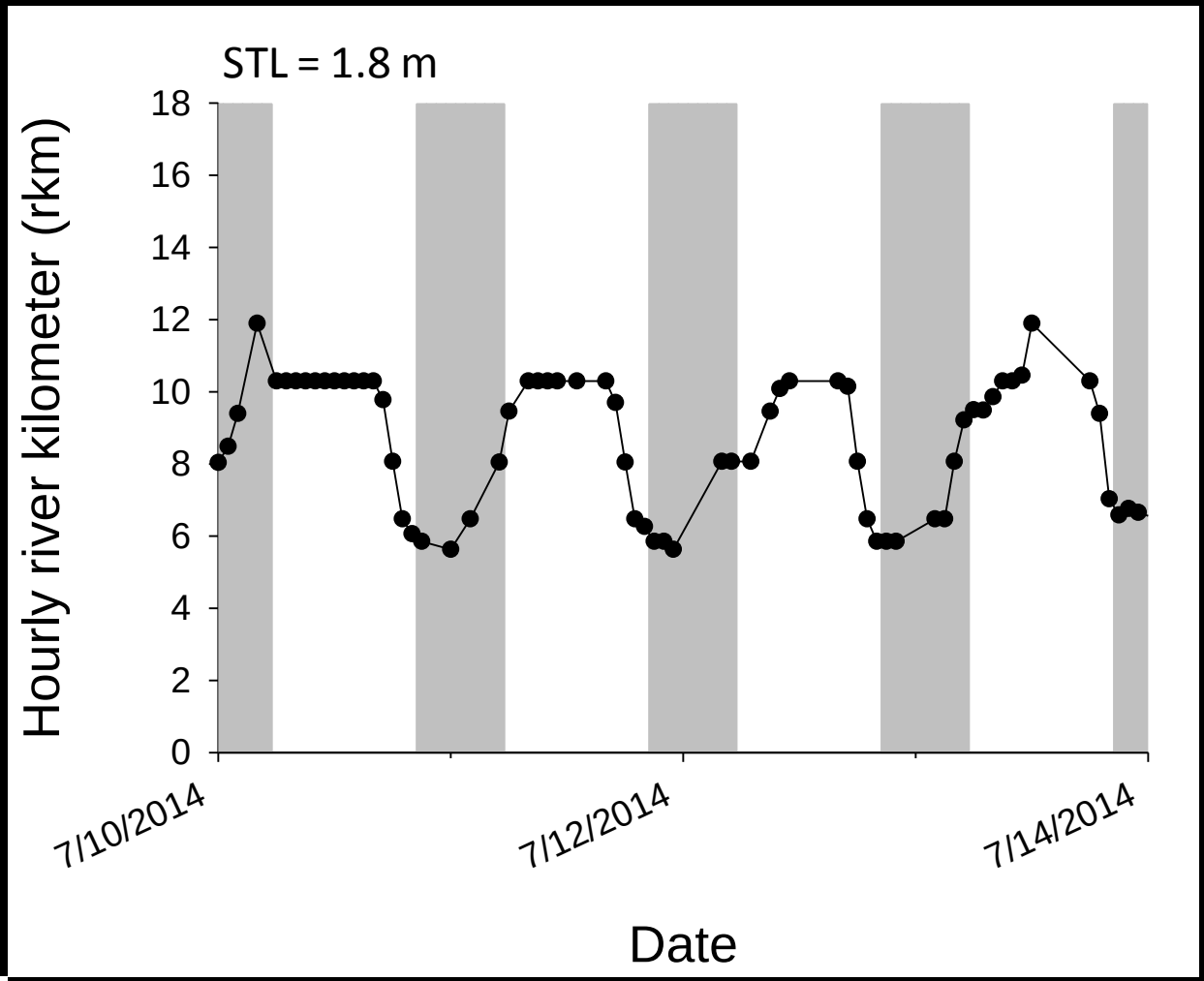
Upper Harbor Acoustic Array


Receivers on south side of river

Receivers on south side of river



Diel location patterns



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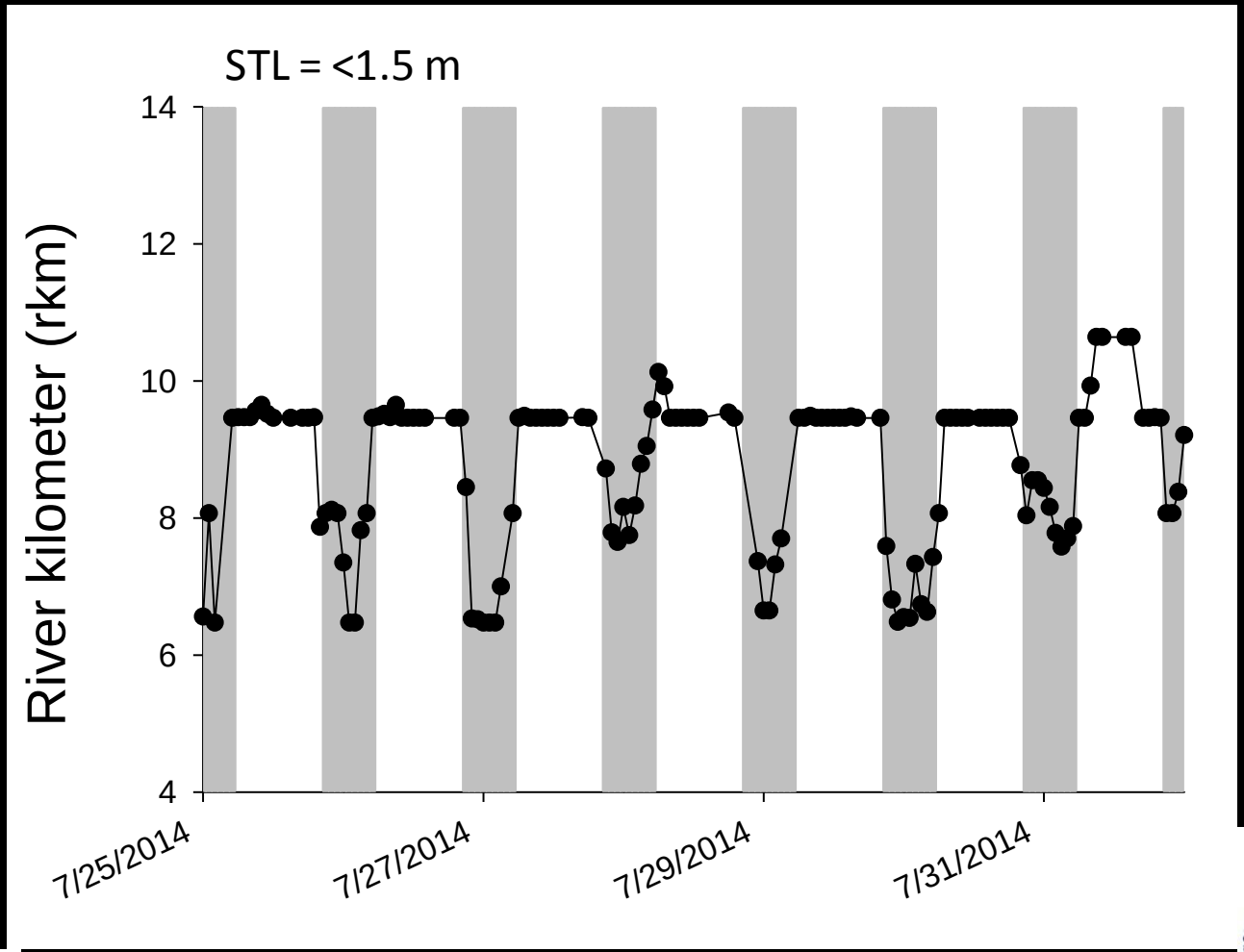
Diel location patterns



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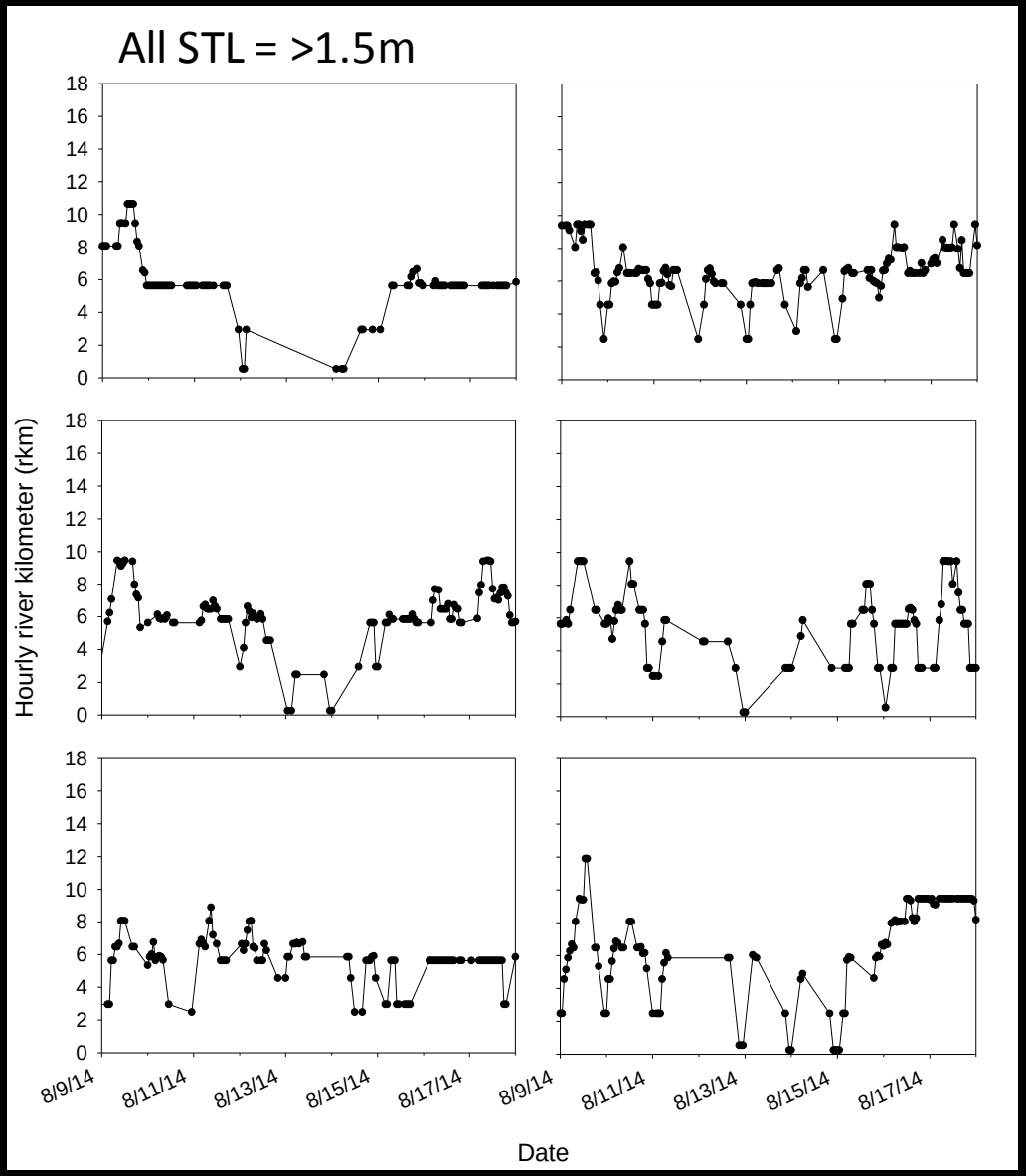
Downriver movement



Day/night vs. north and south shore

YOY	Day	Night
North	2857	5617
South	163	1240

Age 1	Day	Night
North	4909	4637
South	848	4346

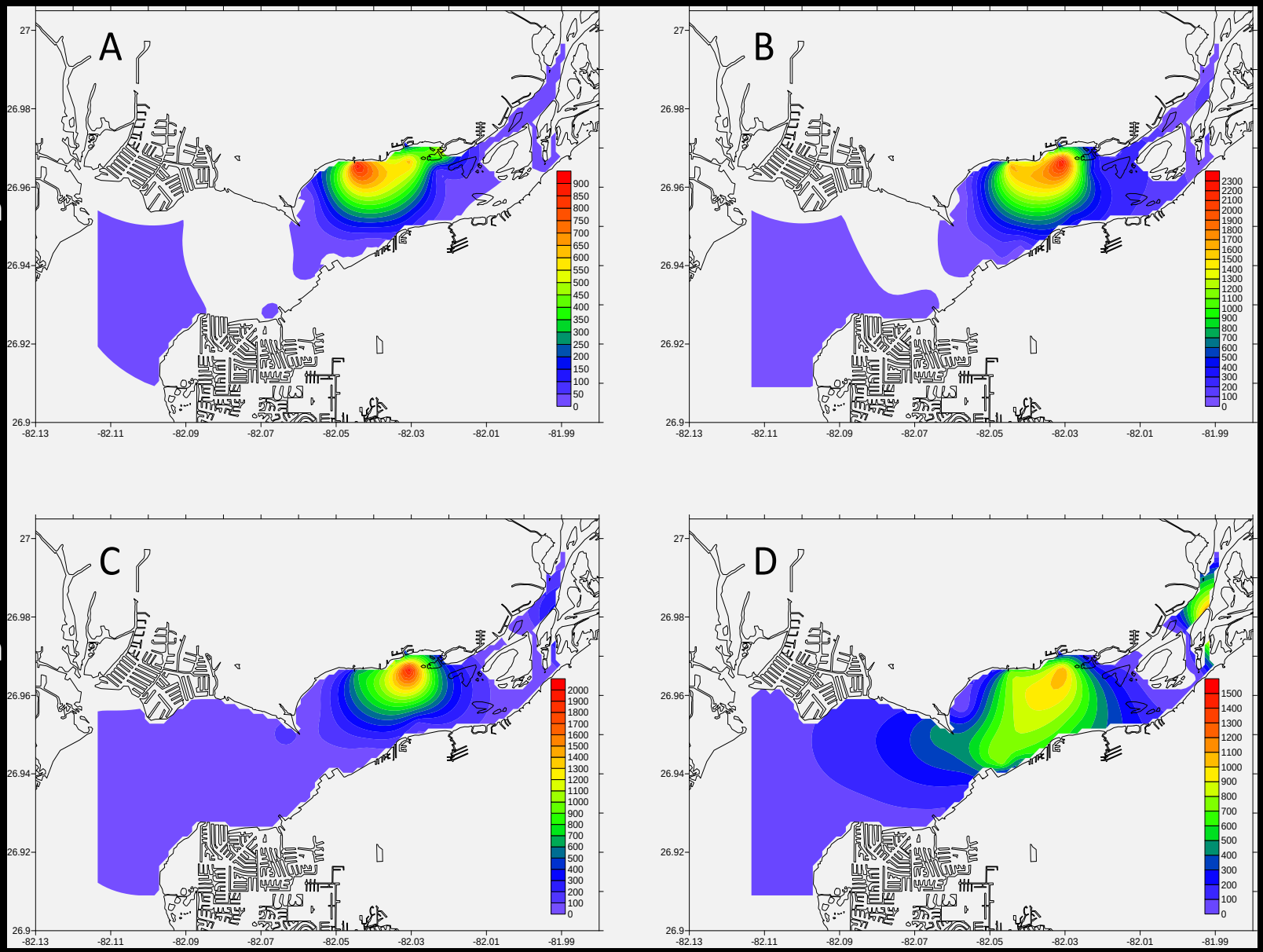
General linear mixed model with a binomial distribution

Day

Night

YOY
<1.5 m

Age 1
>1.5 m



Why is it important to know sawfish location patterns?

- Expand the boundaries of the known hotspot
- Habitat protection

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Outline

- **Fine-scale movements**
  - Internship/preliminary study
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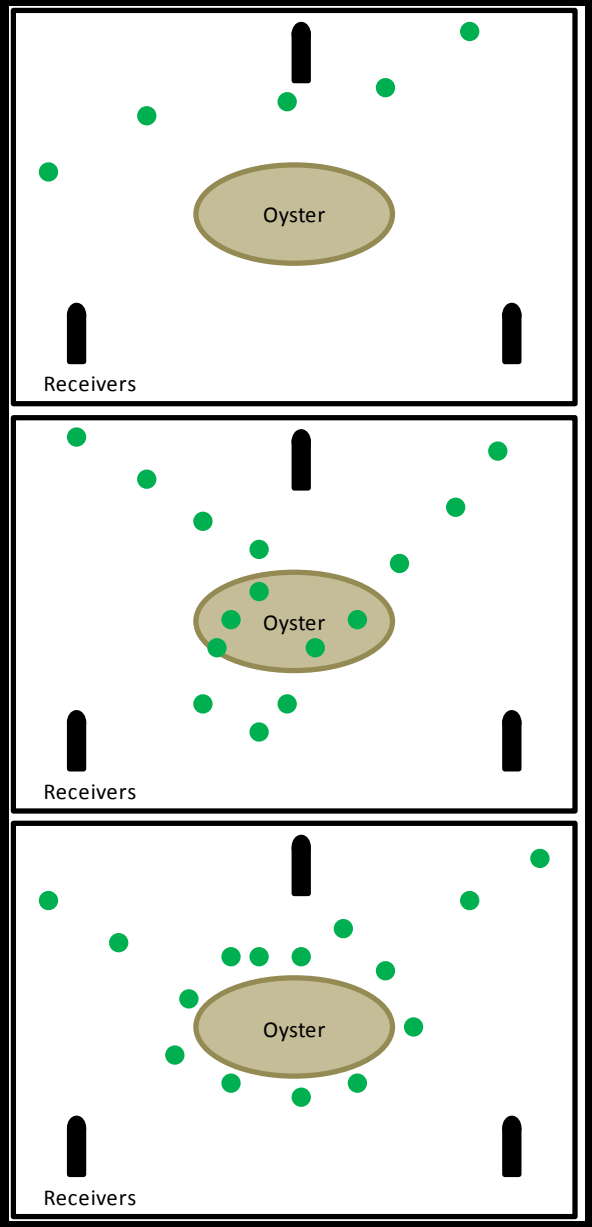
  - **"Future direction"**

“Future direction”



Use Vemco Positioning System (VPS)

- Triangulate data points
- Estimate locations (within a few meters)

- Stay tuned after lunch at 1:20 Rebecca May will talk about this research!

Thank you! Questions?

Research funding:

The Nature Conservancy

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Next Sawfish talk – Exploring behavior with Gregg Poulakis!