Oyster Physiology and Reef Ecology: The Design and Assessment of the Picayune Strand Restoration Project, Ten Thousand Islands

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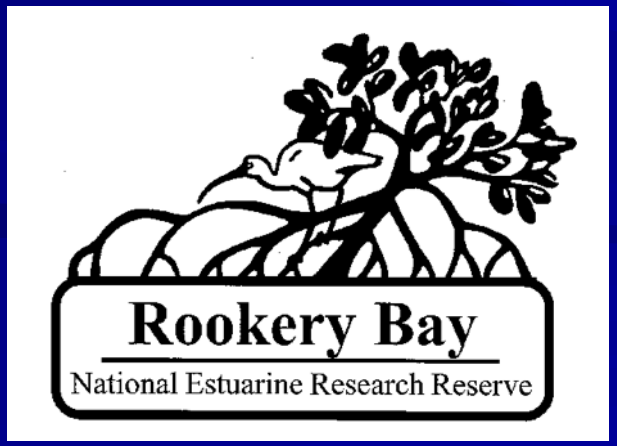
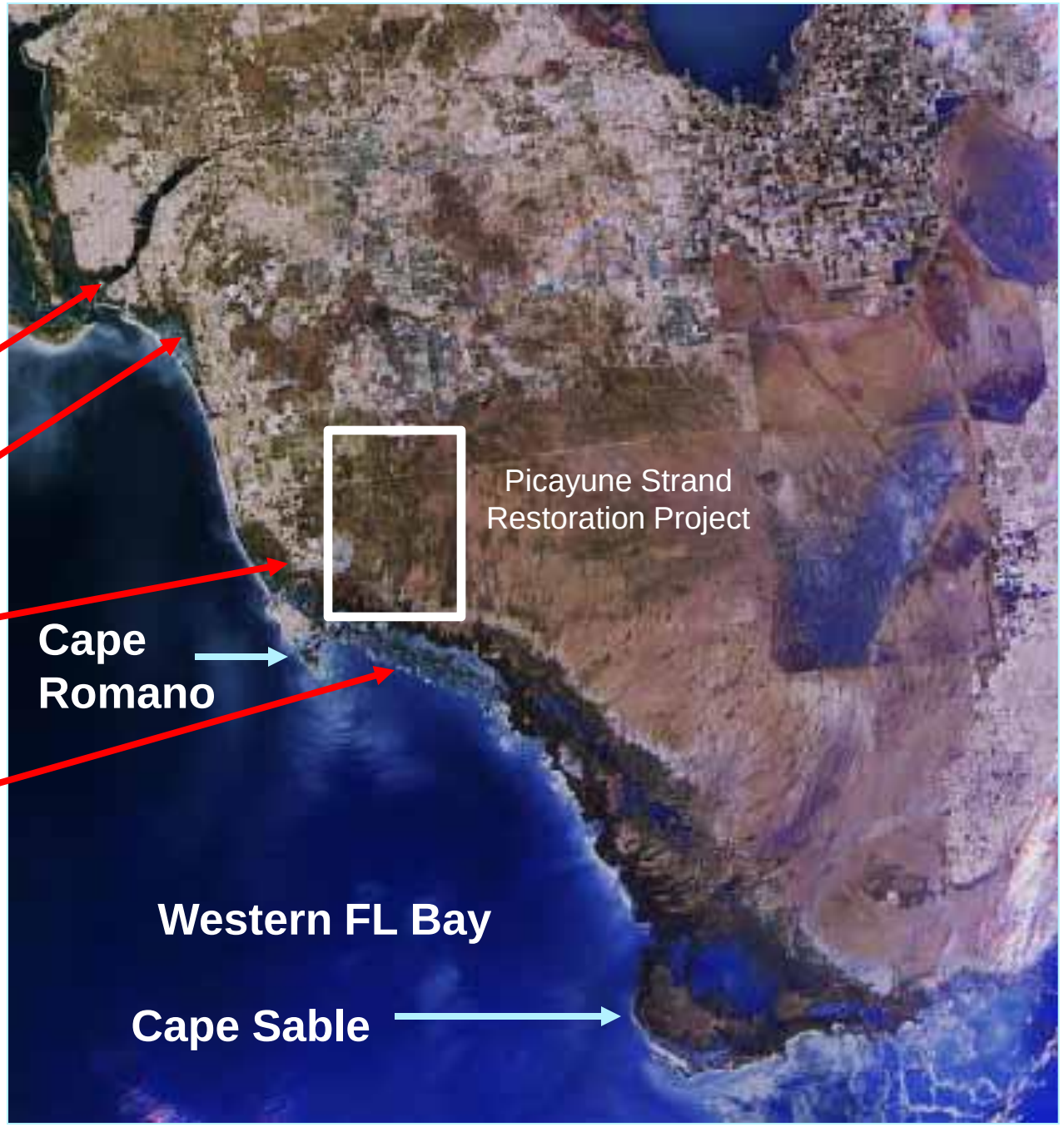
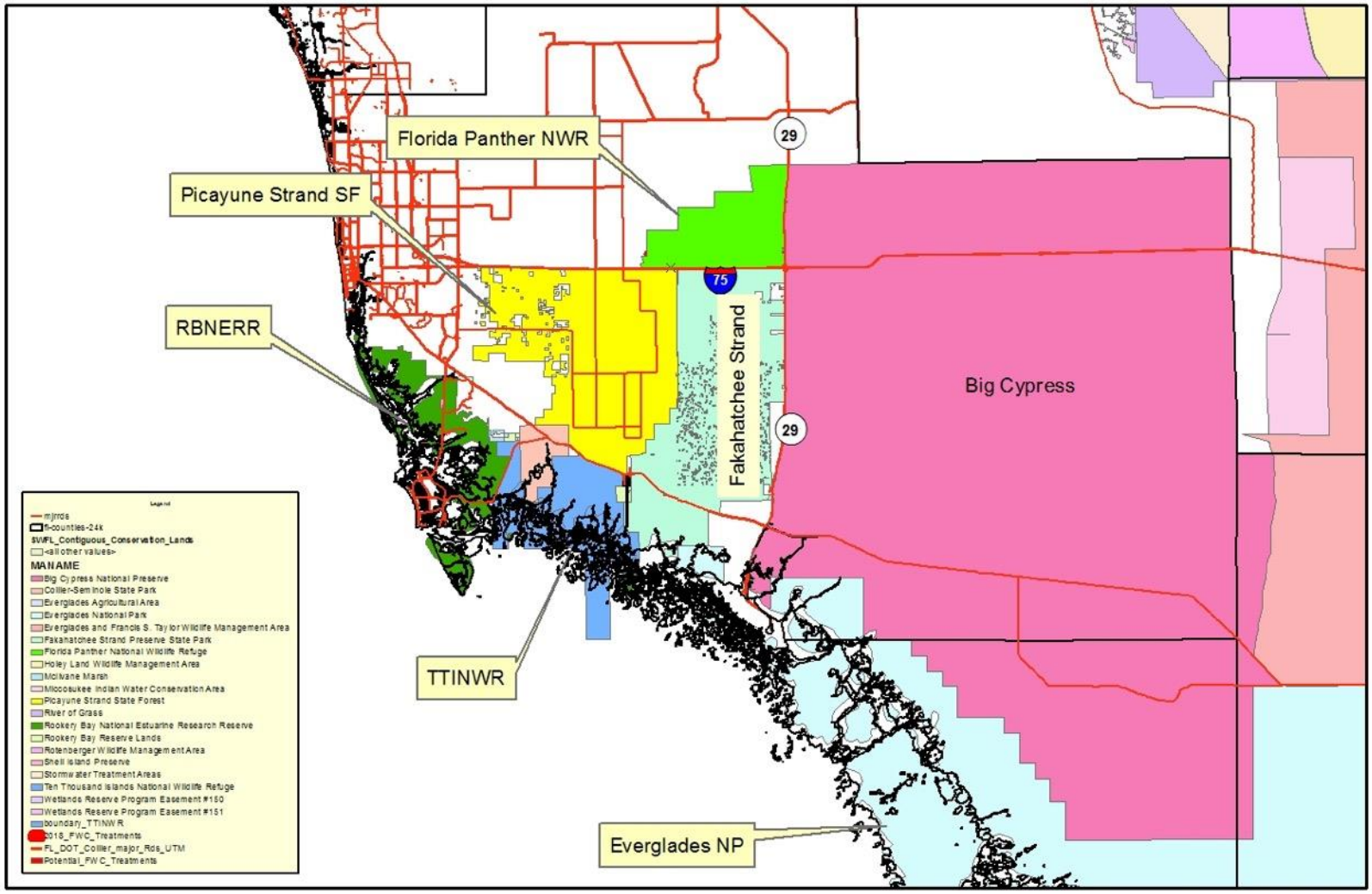
Contributions from: Aswani Volety, Greg Tolley



Southwest Florida



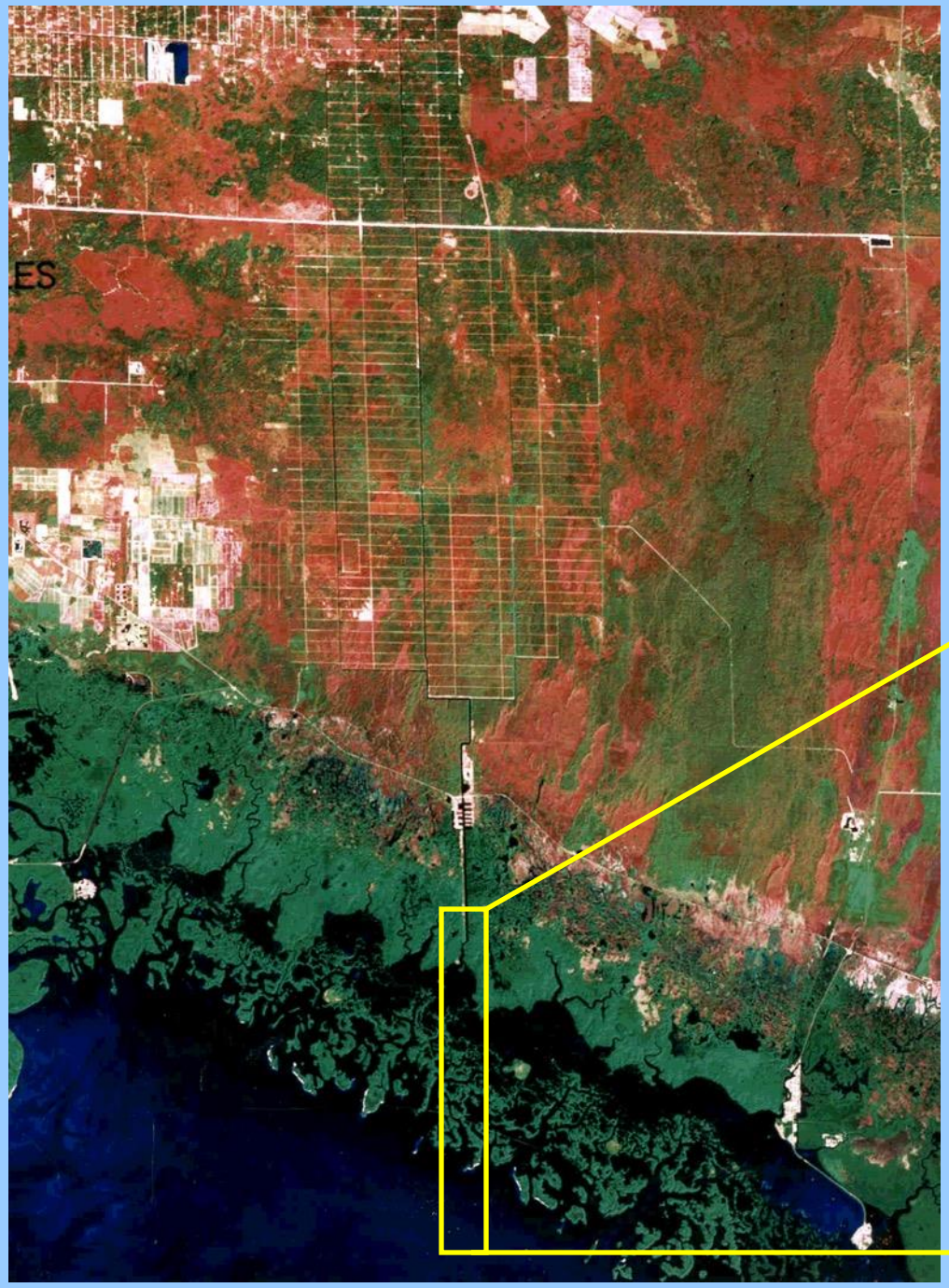


N
W
E
S

SWFL Contiguous Conservation Lands

0 3 6 12 18 24 Miles

Coordinate System: Transverse Mercator
Central Meridian: 81°0'0"W
1st Std Parallel: 0°0'0"
2nd Std Parallel: 0°0'0"
Latitude of Origin: 24°20'0"N

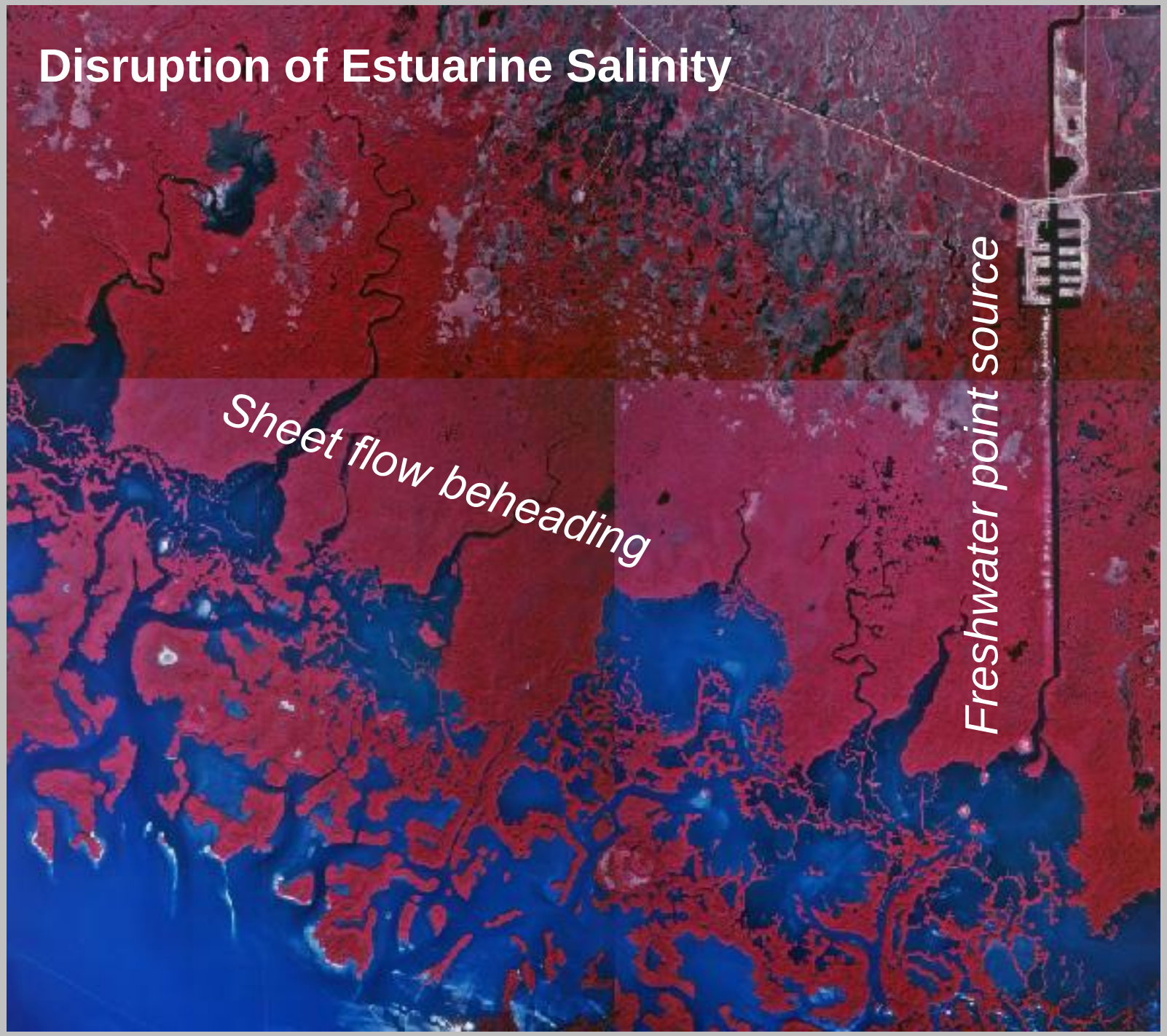


Southern Golden Gate Estates

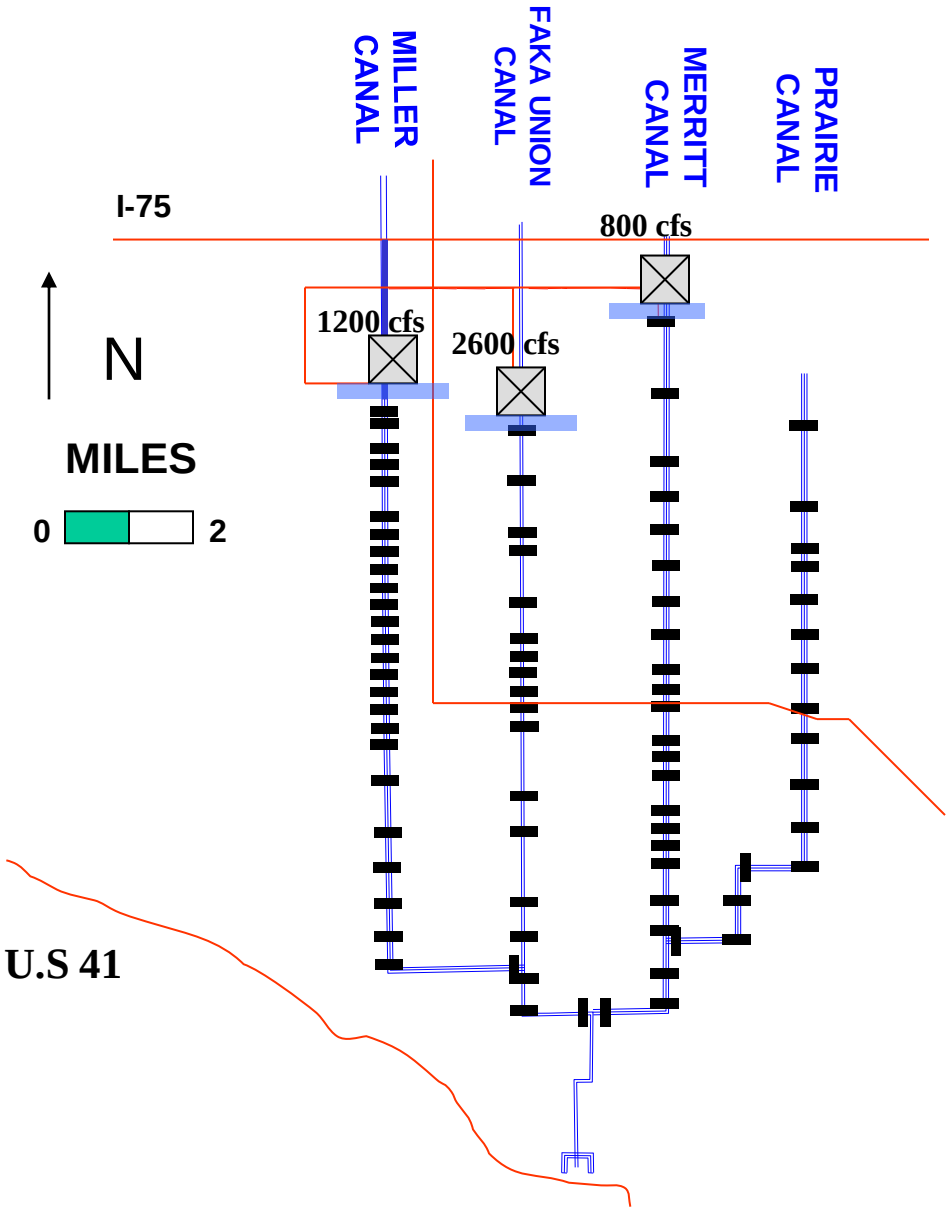
- 279 miles of roads
- 48 miles of canals

Terrestrial & Estuarine Impacts:

- 70,000 hectares of drained wetland.
- All water flows out of one canal into Faka Union Bay.


Disruption of Estuarine Salinity
Sheet flow beheading
Freshwater point source

Alternative 3D



Elements

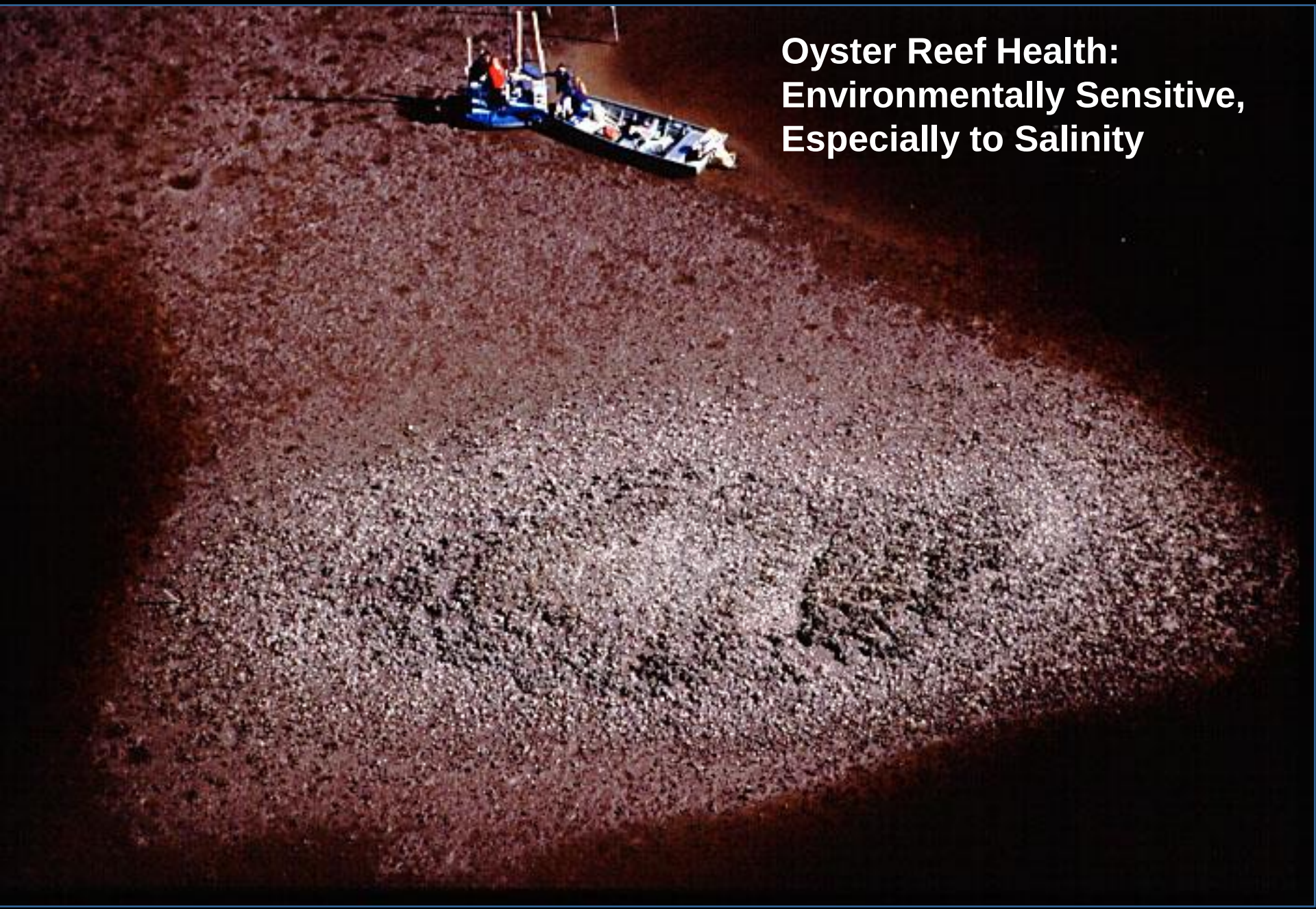
- Three Spreaders
- Three Pump Stations
- 225 Miles of Road Removed
- 83 Canal Plugs

Merritt Pump Station

Restoration Planning Followed Rigorous Protocol

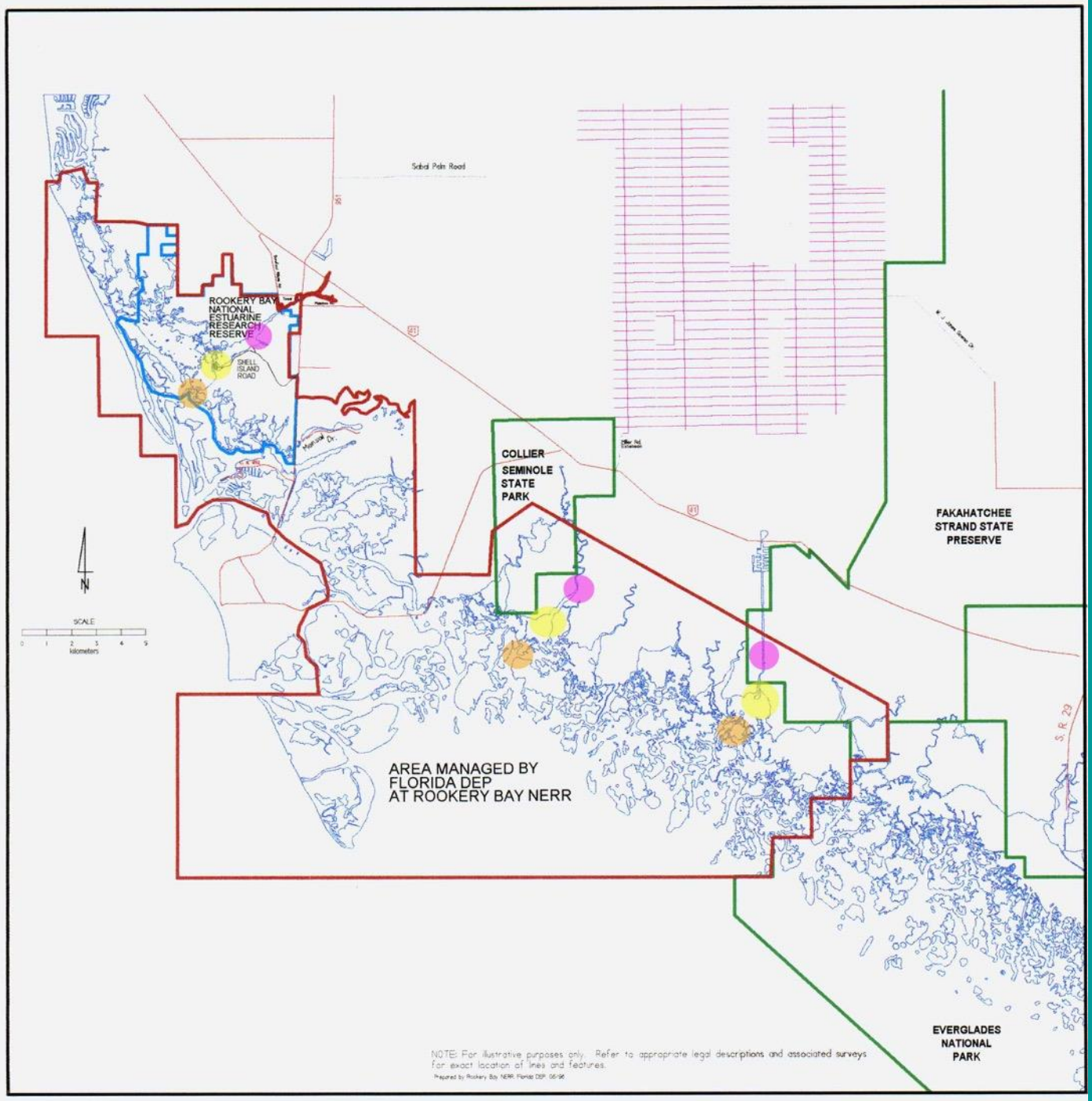
1. Establish restoration goals.
2. Characterize the present system; conceptual ecosystem modeling.
3. Define the pre-altered state.
4. Design alternative restoration scenarios.
5. Establish performance measures and targets.
6. Predictive hydrologic modeling.
7. Establish a restoration monitoring plan.
8. Constraints by human use.
9. Implement preferred alternative.
10. Adaptive management.

Steps involving oysters


Oyster Reef Health:
Environmentally Sensitive,
Especially to Salinity

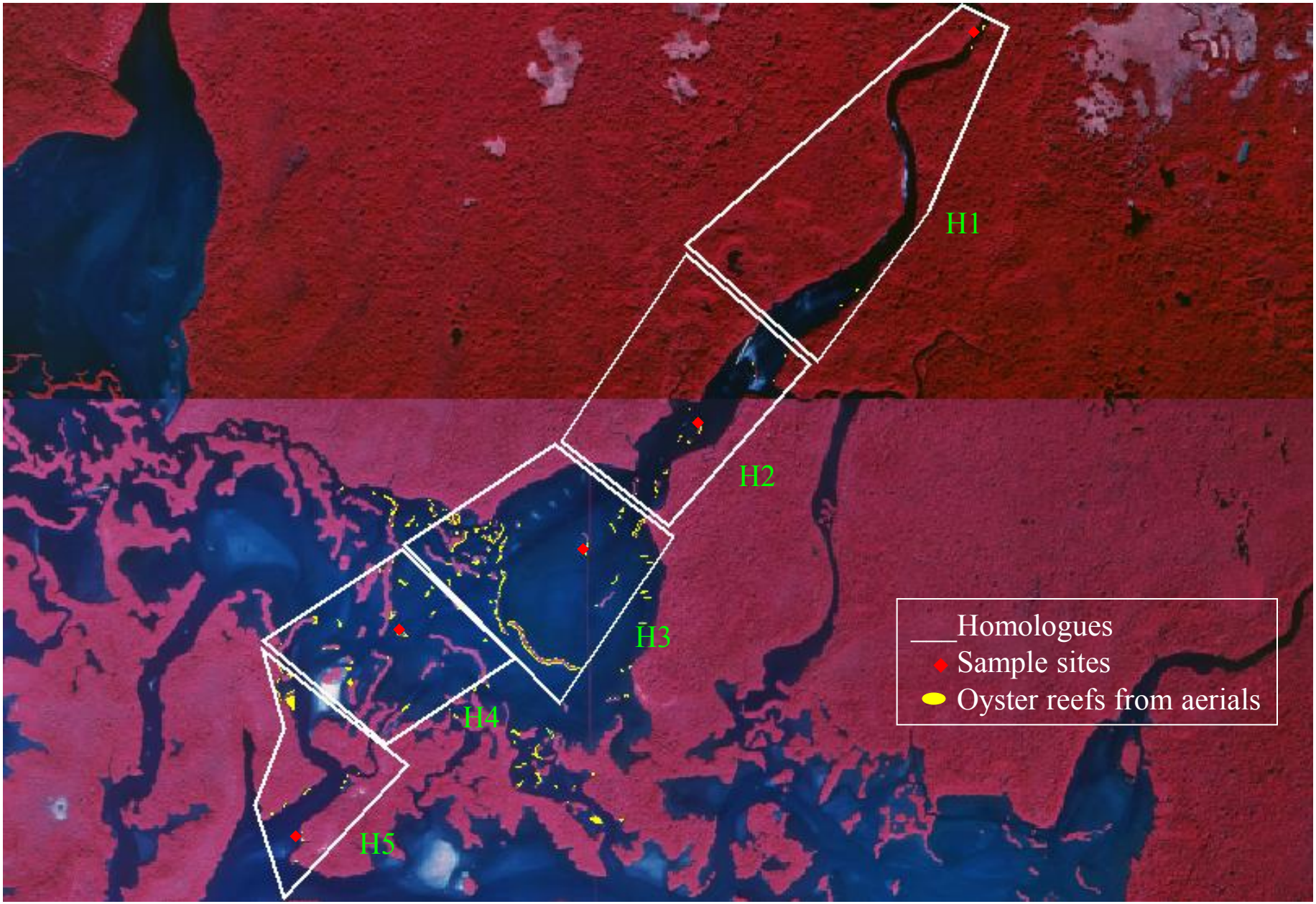
Oyster Parameters Monitored

1. Reef geographic distribution & aerial extent.
2. Living density.
3. Survival rate.
4. Condition index.
5. Spat recruitment.
6. Gonadal index.
7. Growth rate.
8. Disease (*Perkinsus marinus*) prevalence (% infected) & intensity (infection intensity).

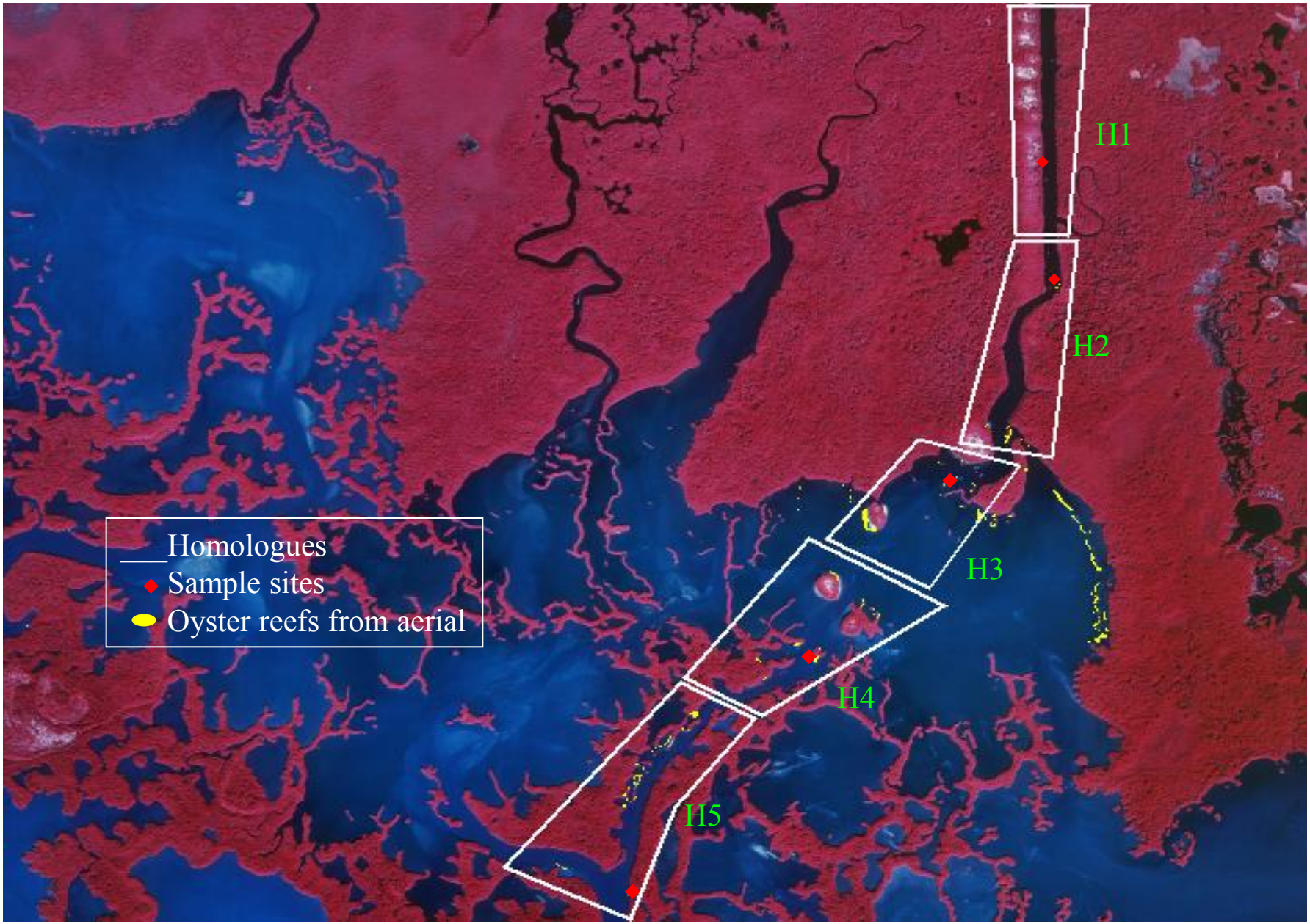

Sabal Palm Road
ROOKERY BAY NATIONAL ESTUARINE RESEARCH RESERVE
SHELL ISLAND ROAD
COLLIER SEMINOLE STATE PARK
FAKAHATCHEE STRAND STATE PRESERVE
N
SCALE
kilometers
AREA MANAGED BY FLORIDA DEP AT ROOKERY BAY NERR
S.R. 29
EVERGLADES NATIONAL PARK
NOTE: For illustrative purposes only. Refer to appropriate legal descriptions and associated surveys for exact location of lines and features.
Prepared by Rookery Bay NERR, Florida DEP, 06-96

Oyster Reefs Prolific

Reef Distribution in Blackwater



Reef Distribution in Faka-Union

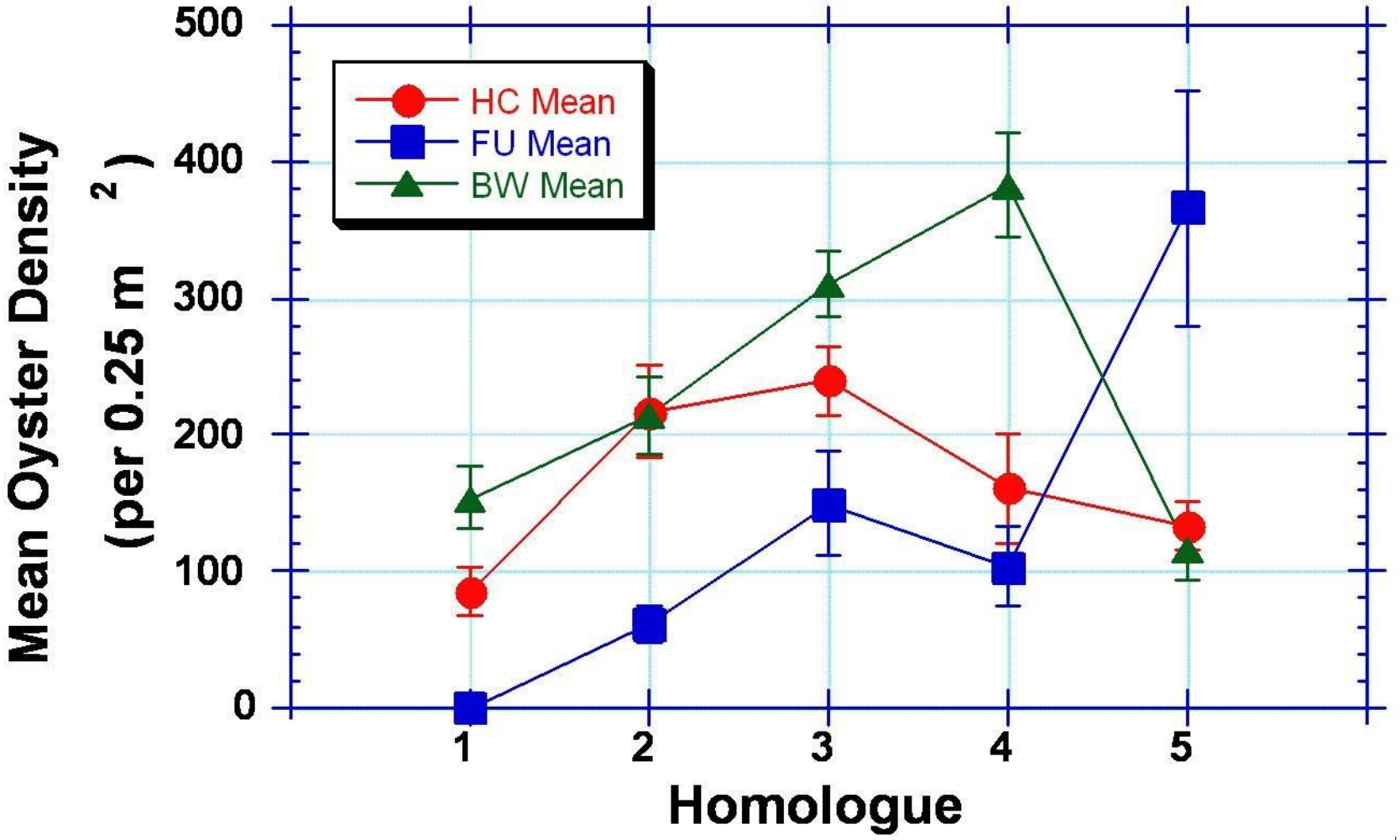


Distribution of Oyster Reefs

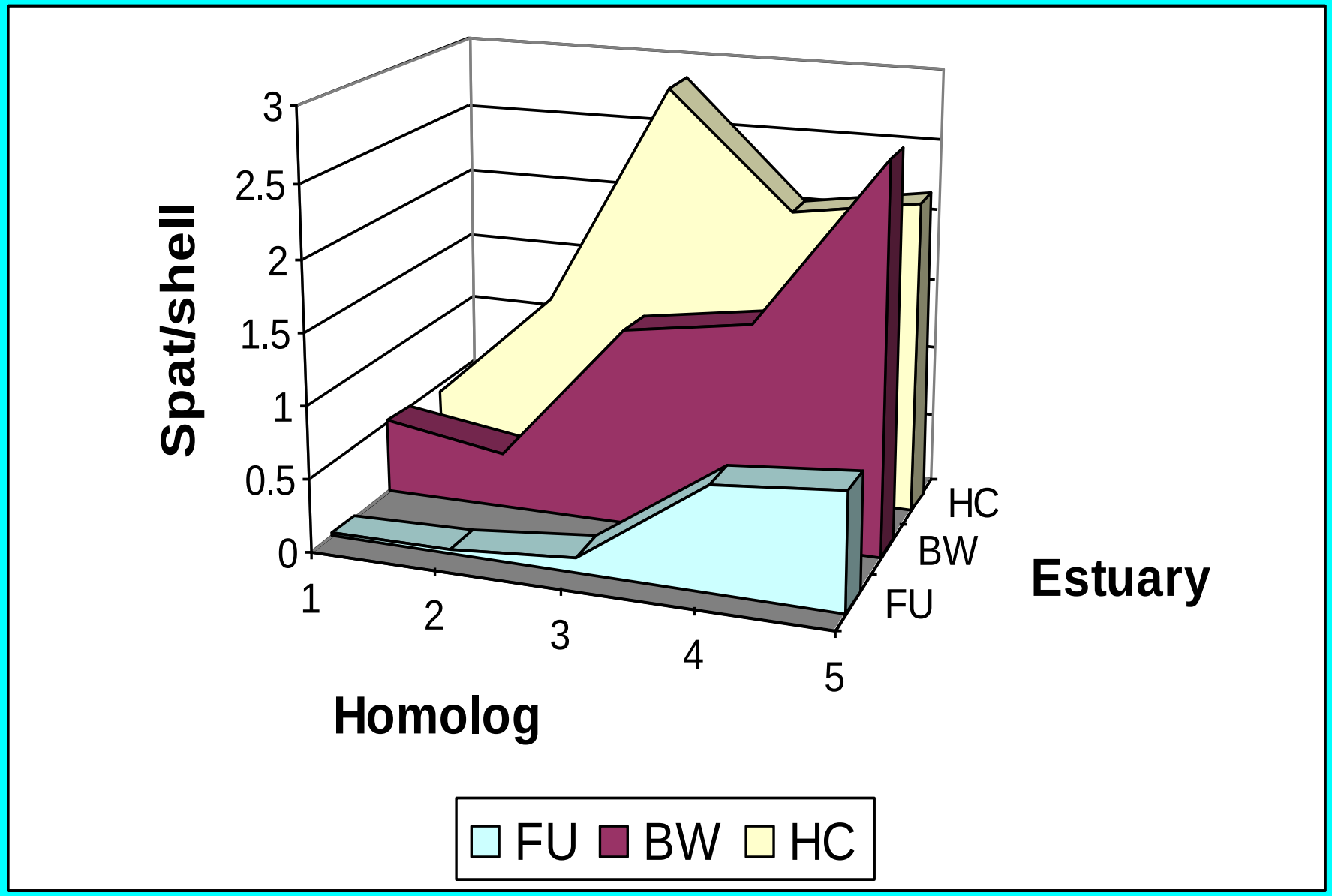
Location	Reef Area (m^2)	Accommodation Space (m^2)	Percent Reef Coverage
Faka-Union	24,270	2,334,685	1.04%
Henderson	47,656	2,956,326	1.61%
Blackwater	35,365	2,034,695	1.74%

- Within Blackwater & Henderson reefs dominate at homologues 2, 3, & 4.
- Within Faka-Union reefs dominate at homologues 4 & 5. No living reefs at homologue 1 (relict reefs occur).

Oyster Living Density



Oyster Recruitment



Hurricane Impacts

- Inside: sedimentation / smothering (Radabaugh et al., 2019)
- Outside: erosion, physical disruption by waves & tidal surge

Oyster Reef Monitoring

- Monitoring for restoration effectiveness & impact of storms.
- Other than incidental oyster monitoring, no long-term oyster monitoring program has ever been established in the Ten Thousand Islands.
- TTINWR, RBNERR, FGCU & other partners have been collaborating with one another to develop an oyster monitoring program for the Ten Thousand Islands.


Thanks . . .
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