

Utilization of coastal seagrass beds as nursery areas for economically important reef fish



Andrew W. David

National Marine Fisheries Service
Panama City Laboratory

Life History Characteristics of the Grouper-Snapper Complex

- Long lived
- Slow to mature (gag, jewfish)
- High degree of site fidelity
- High fecundity
- Estuarine dependent juvenile stages
- Complex social structure (often with protogyny)
- Aggregate to spawn (consistent in time and space)

Life History Characteristics of the Grouper-Snapper Complex

- Long lived
- Slow to mature (gag, jewfish)
- High degree of site fidelity
- High fecundity
- **Estuarine dependent juvenile stages**
- Complex social structure (often with protogyny)
- Aggregate to spawn (consistent in time and space)

Variation in Reef Fish Life History Traits

Grouper	Jewfish	Gag	Scamp	Red
<u>Estuarine Dependency</u>	Yes	Yes	No	No
Snapper	Gray	Lane	Vermilion	Red

Gag Grouper



Larvae

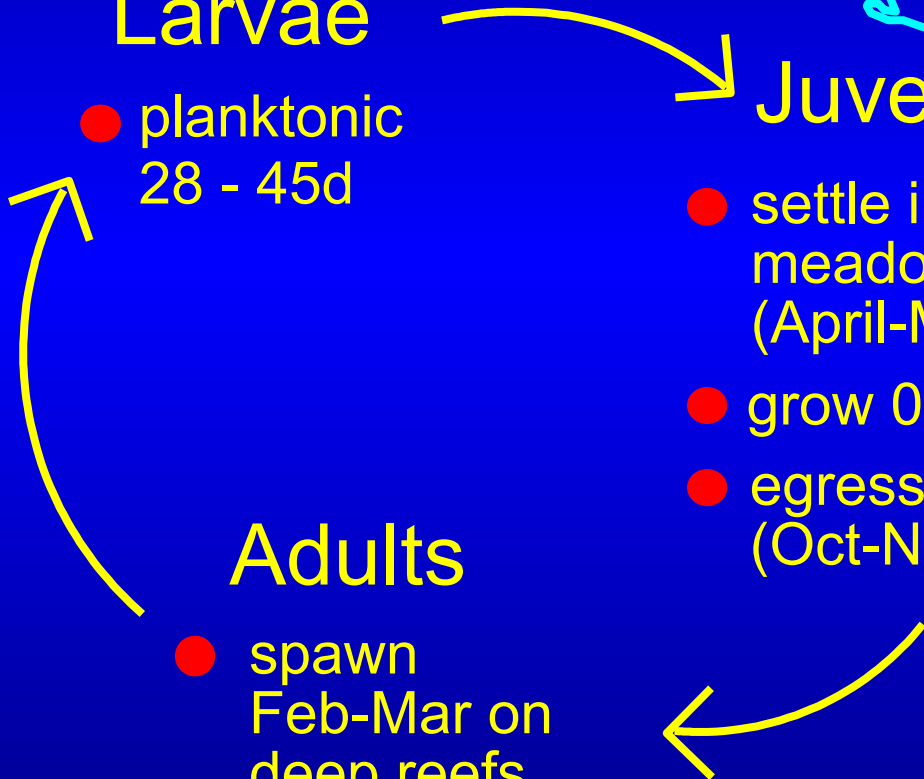
- planktonic
28 - 45d

Juveniles

- settle in seagrass meadows (April-May)
- grow 0.5-1.0 mm/d
- egress in fall (Oct-Nov)

Adults

- spawn Feb-Mar on deep reefs (50-120m)



Coastal Seagrass Sampling Locations



Gag #16 Apr 23, 1999



St. Andrew Bay, Panama City, FL

24.2 mm SL

Recruitment Forecasting

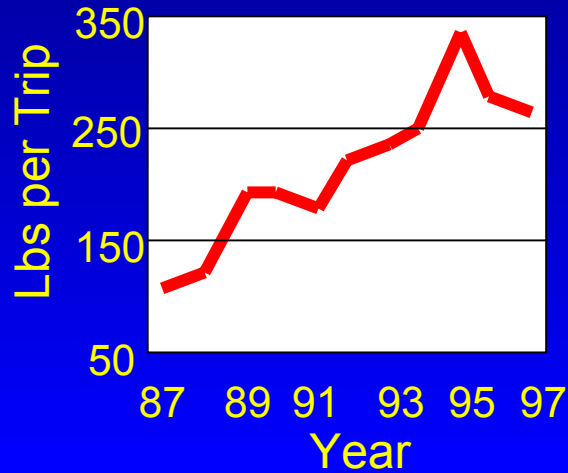
- Collect abundance data on juveniles
- Collect landings data on adults
- Standardize data
- Introduce lag time and generate model

$$\text{Adult catch} = 159.02 + 17.88t + 8.68\text{Juv}(t-2) + e(t)$$

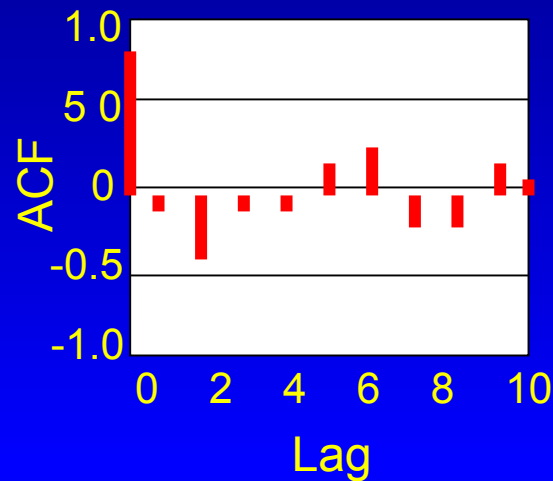
Between 1989 and 1998, $R^2 = 0.86$

Recruitment Forecasting Model for Gag Grouper

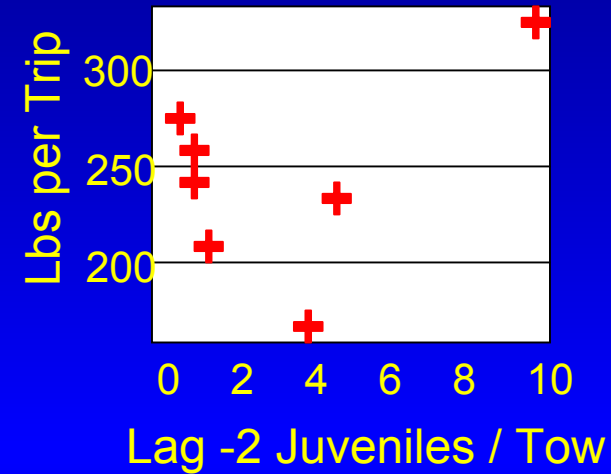
Commercial Landings



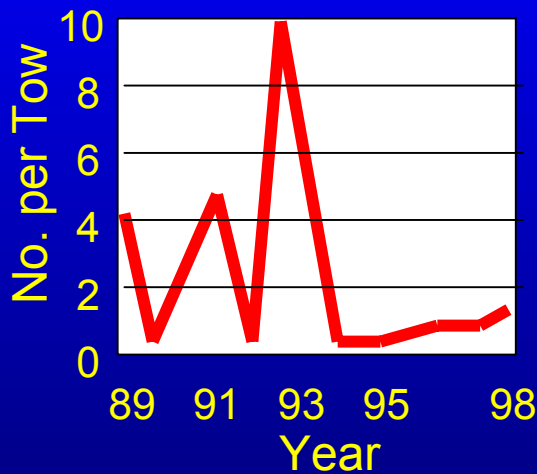
ACF of Fish Residuals



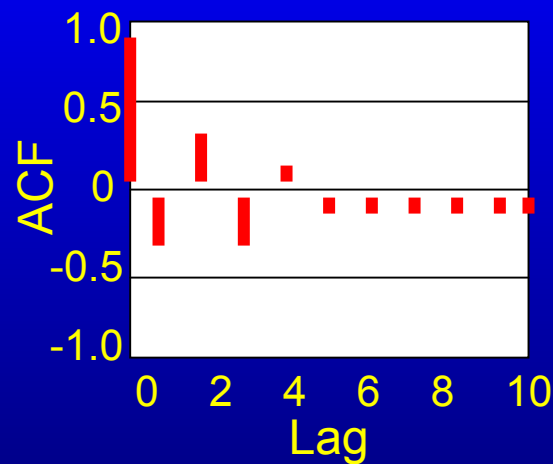
Adult vs Juveniles



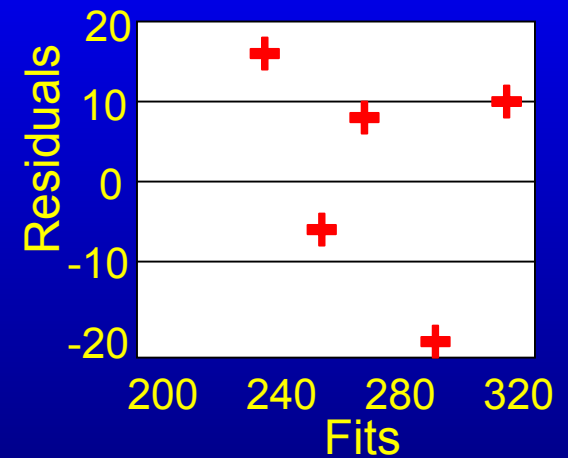
Juvenile Gag

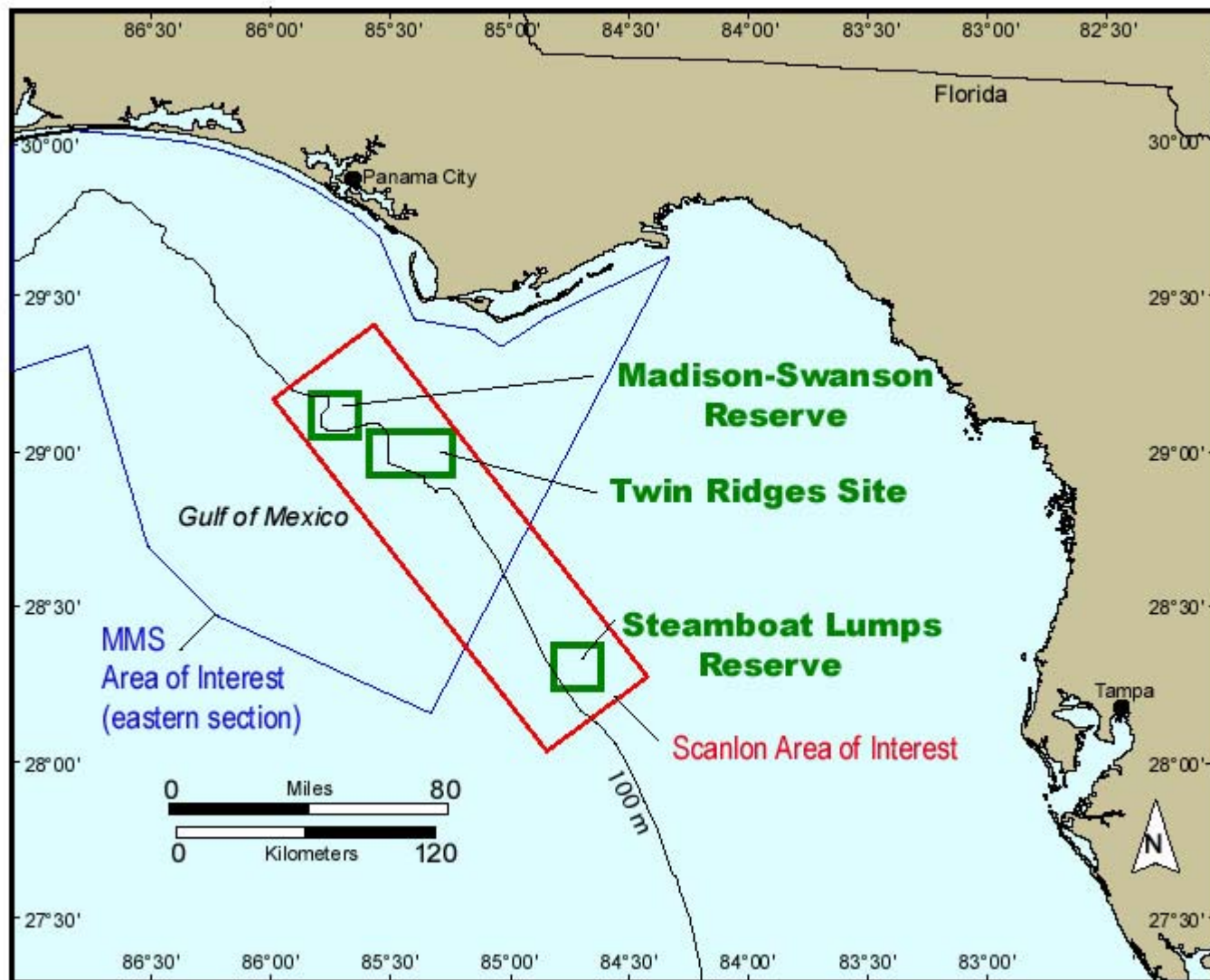


ACF of Juv Residuals



Residuals vs Fits





Lane Snapper



Lutjanus synagris

Coastal Seagrass Sampling Locations



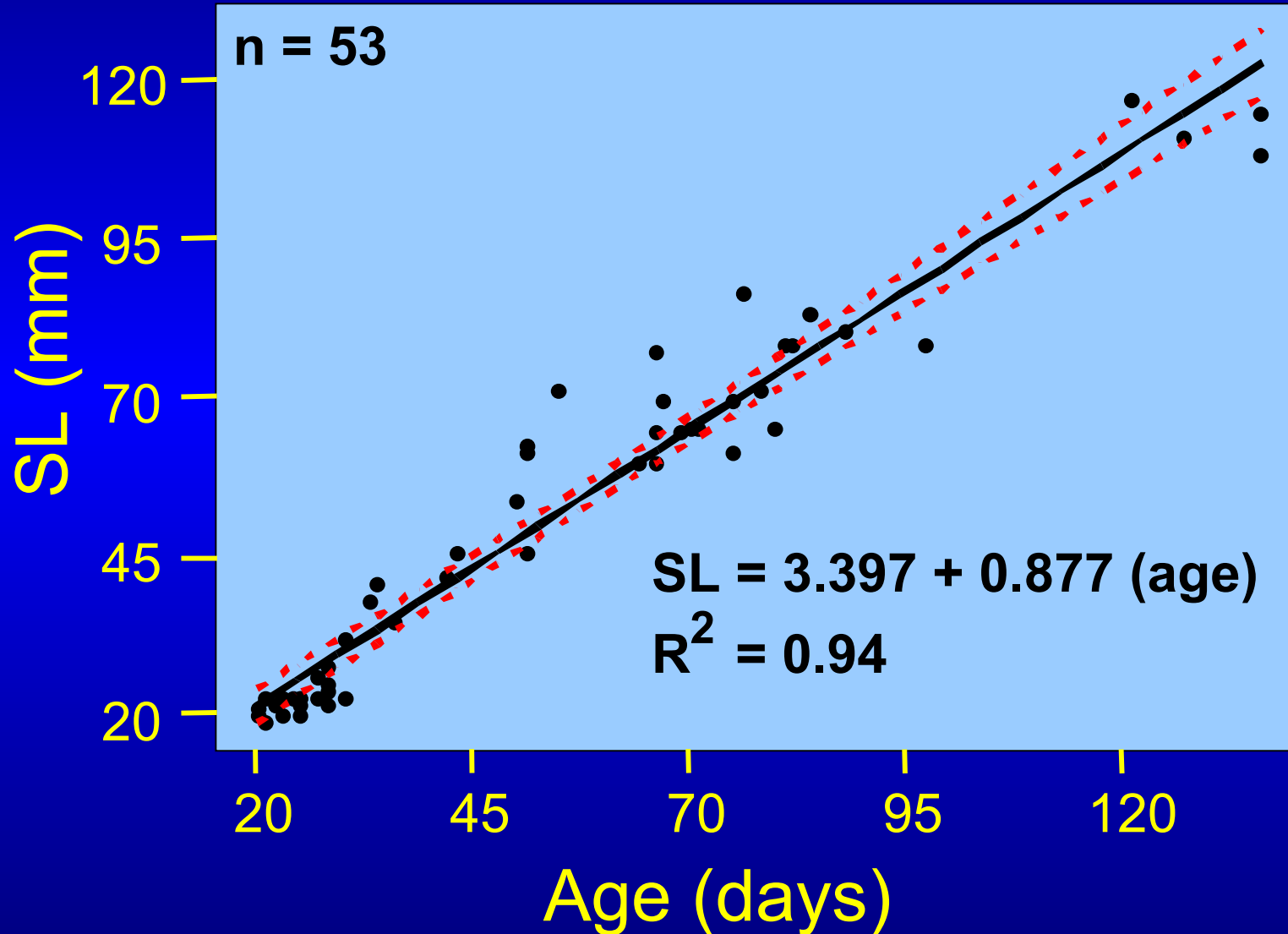
Mixture of Juvenile Grey and Lane Snapper



50 m² Trawl, St Andrew Bay, Sept 1998

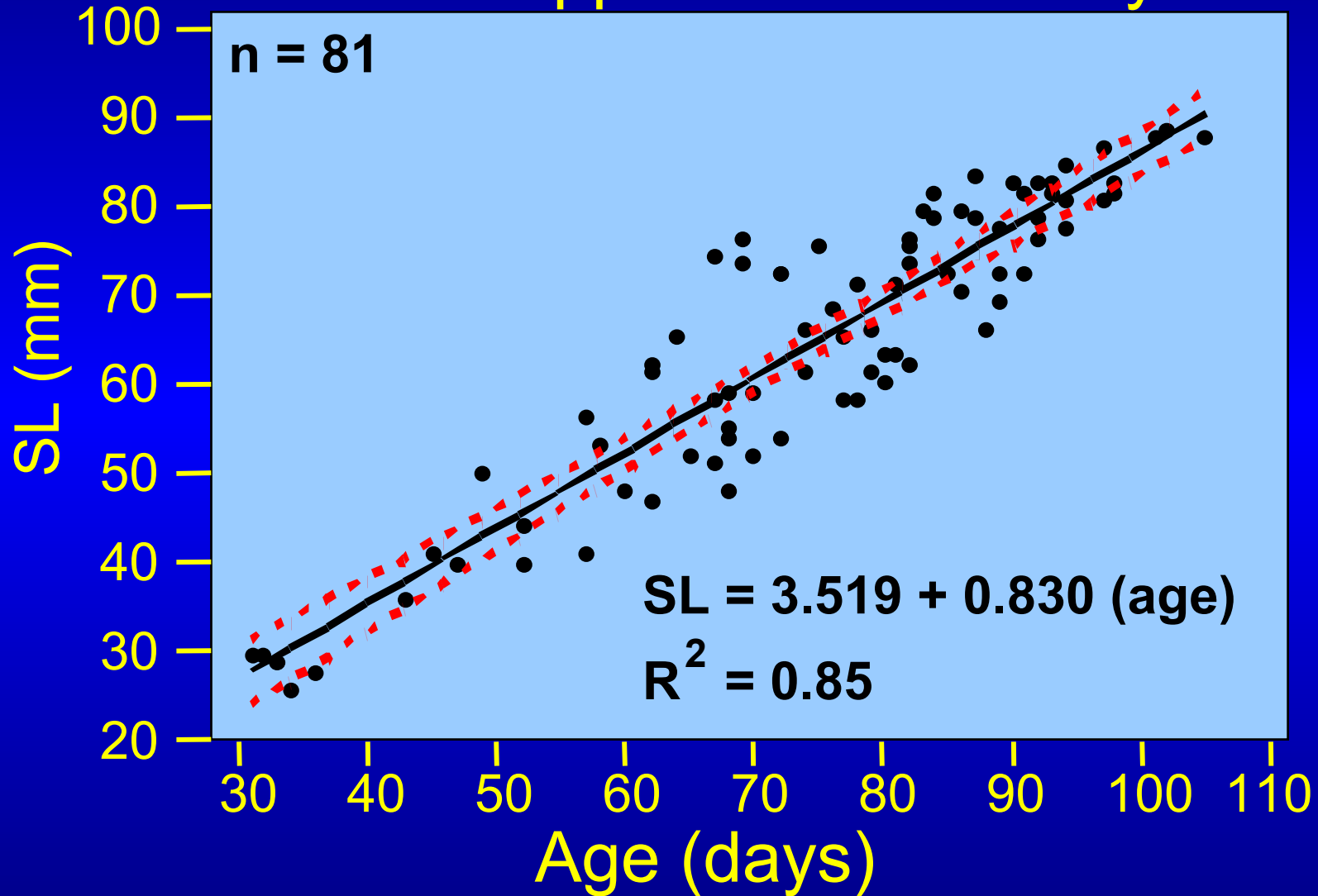
Growth Rate

Lane Snapper - Ft. Myers



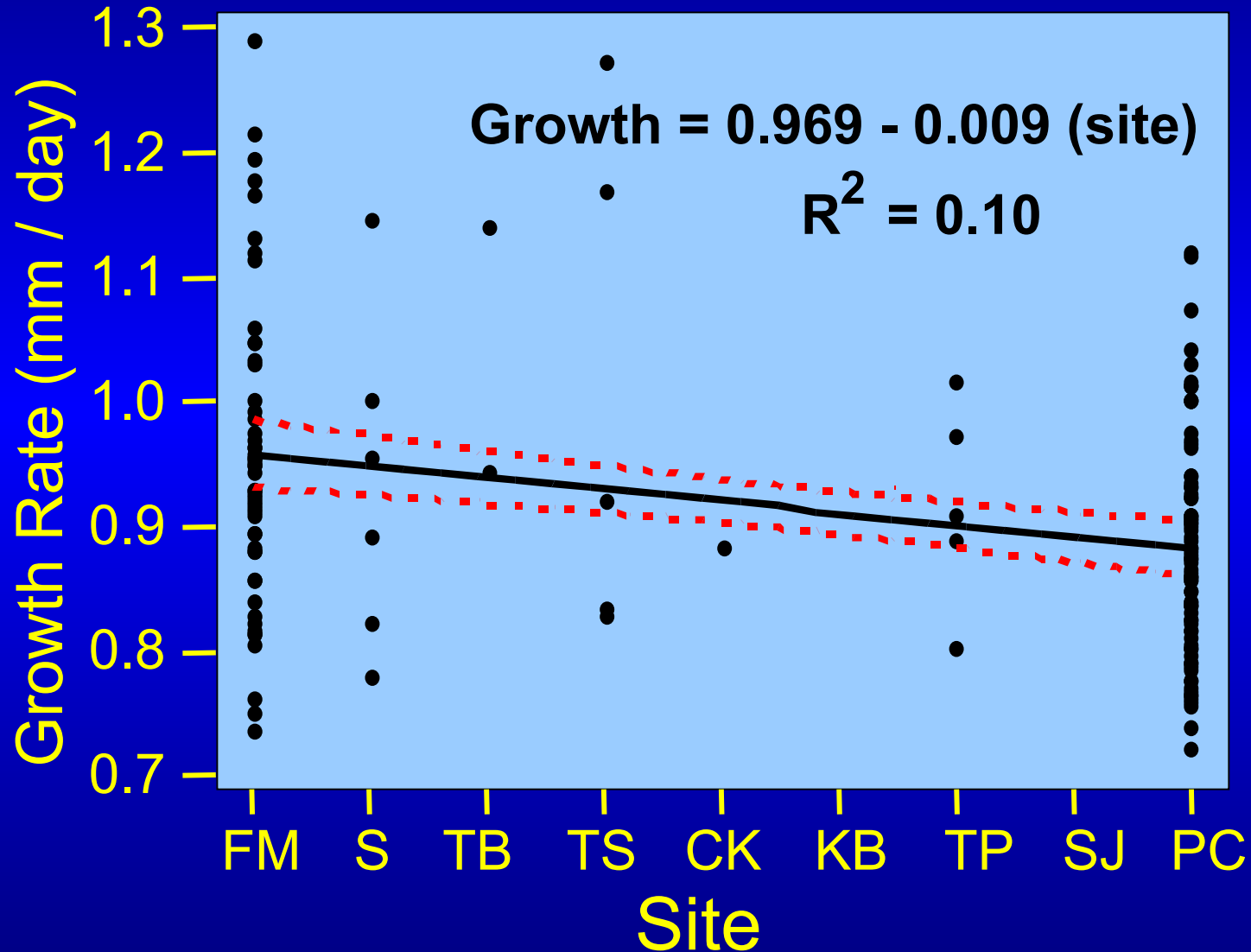
Growth Rate

Lane Snapper - Panama City



Site Effect on Growth Rate

Ft. Myers - Panama City



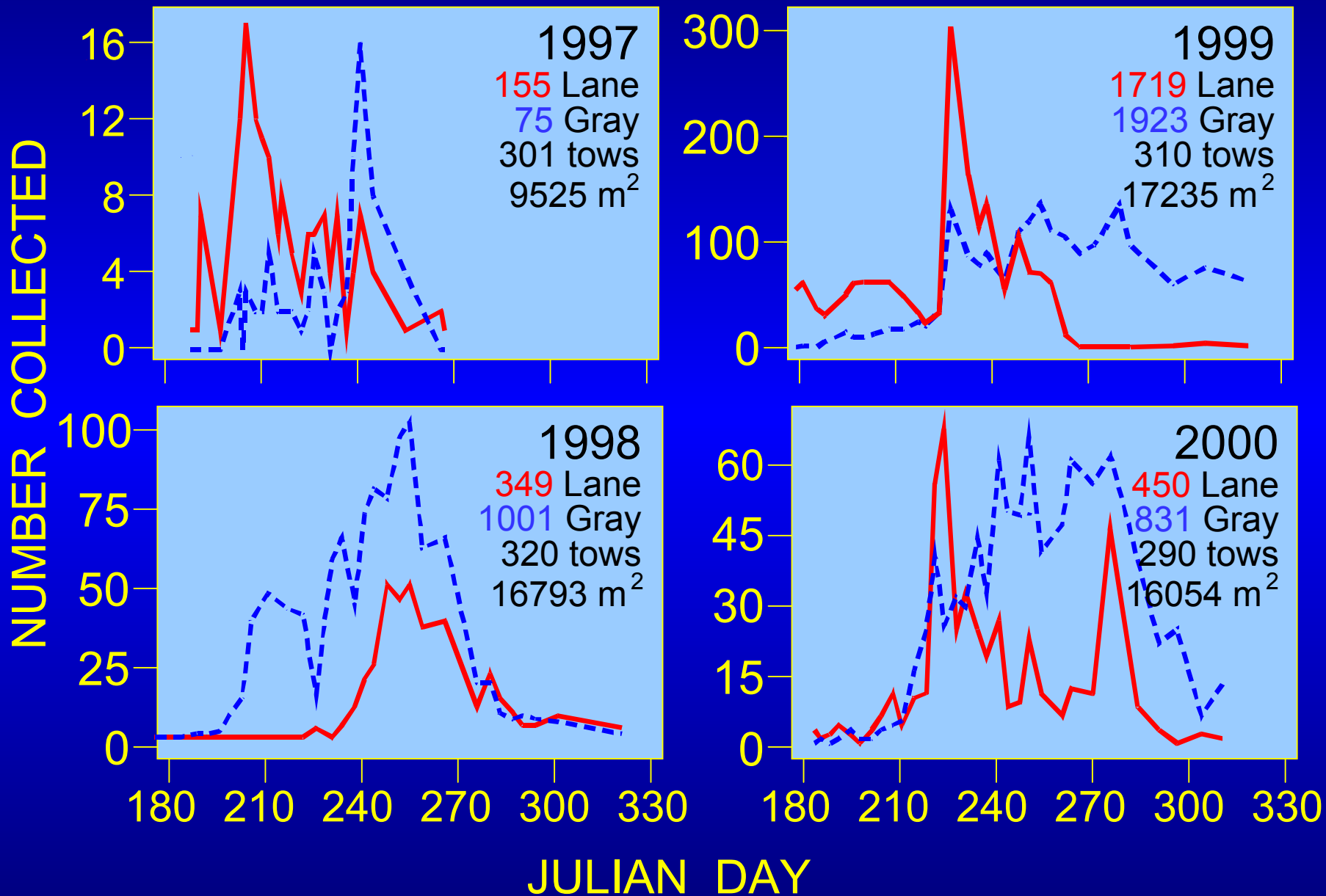
Juvenile Reef Fish Sampling Area

St. Andrew Bay
Bay County, FL



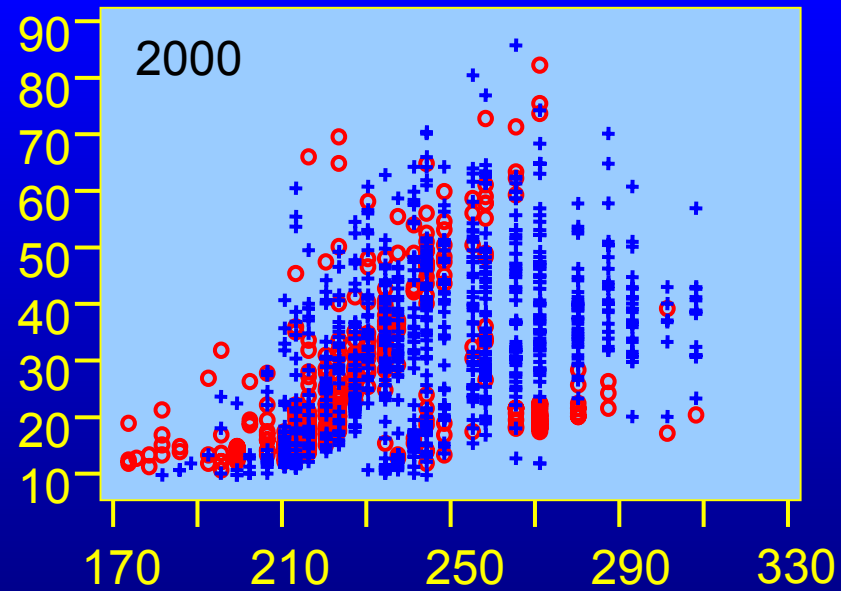
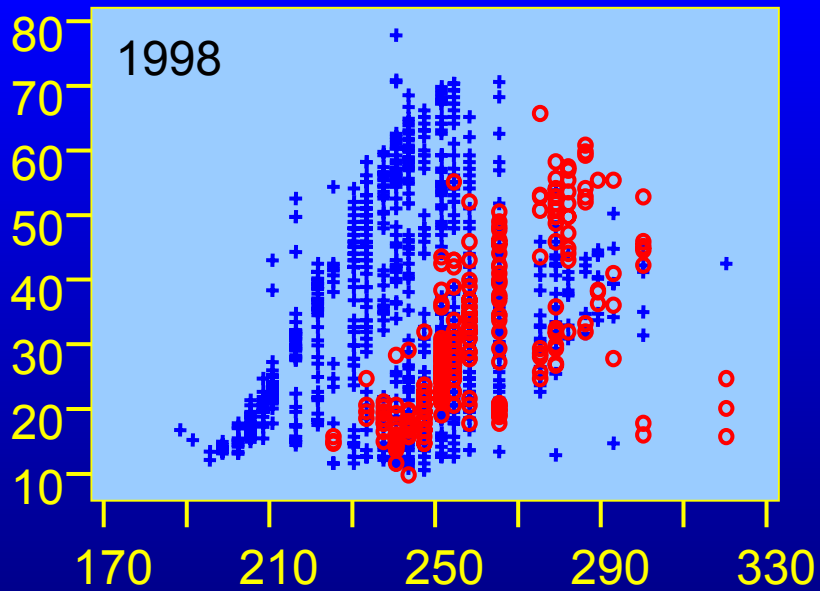
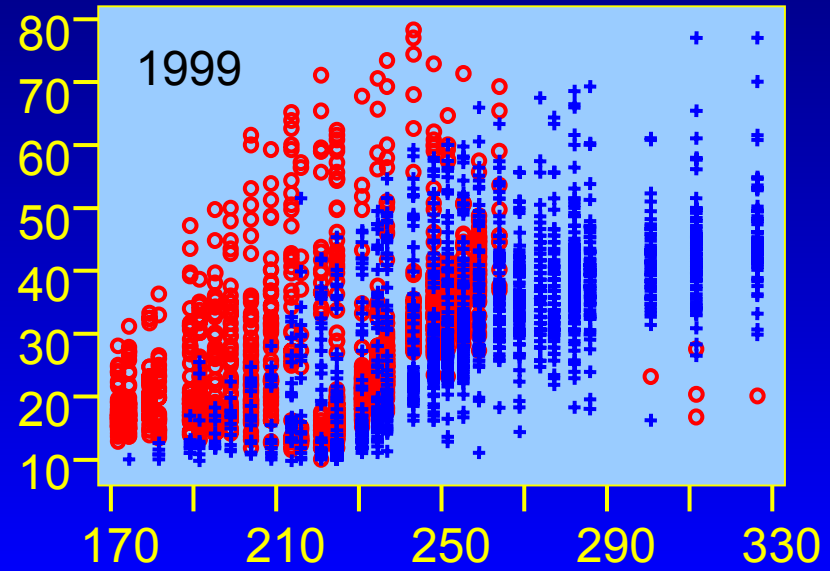
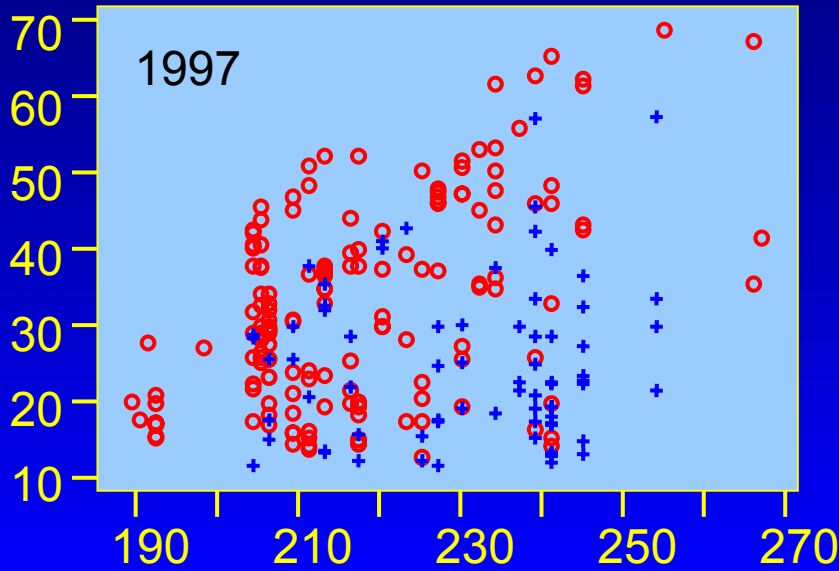
JUVENILE SNAPPER COLLECTED BY DAY

St. Andrew Bay, FL



LENGTH ON DAY JUVENILE SNAPPER STANDARD

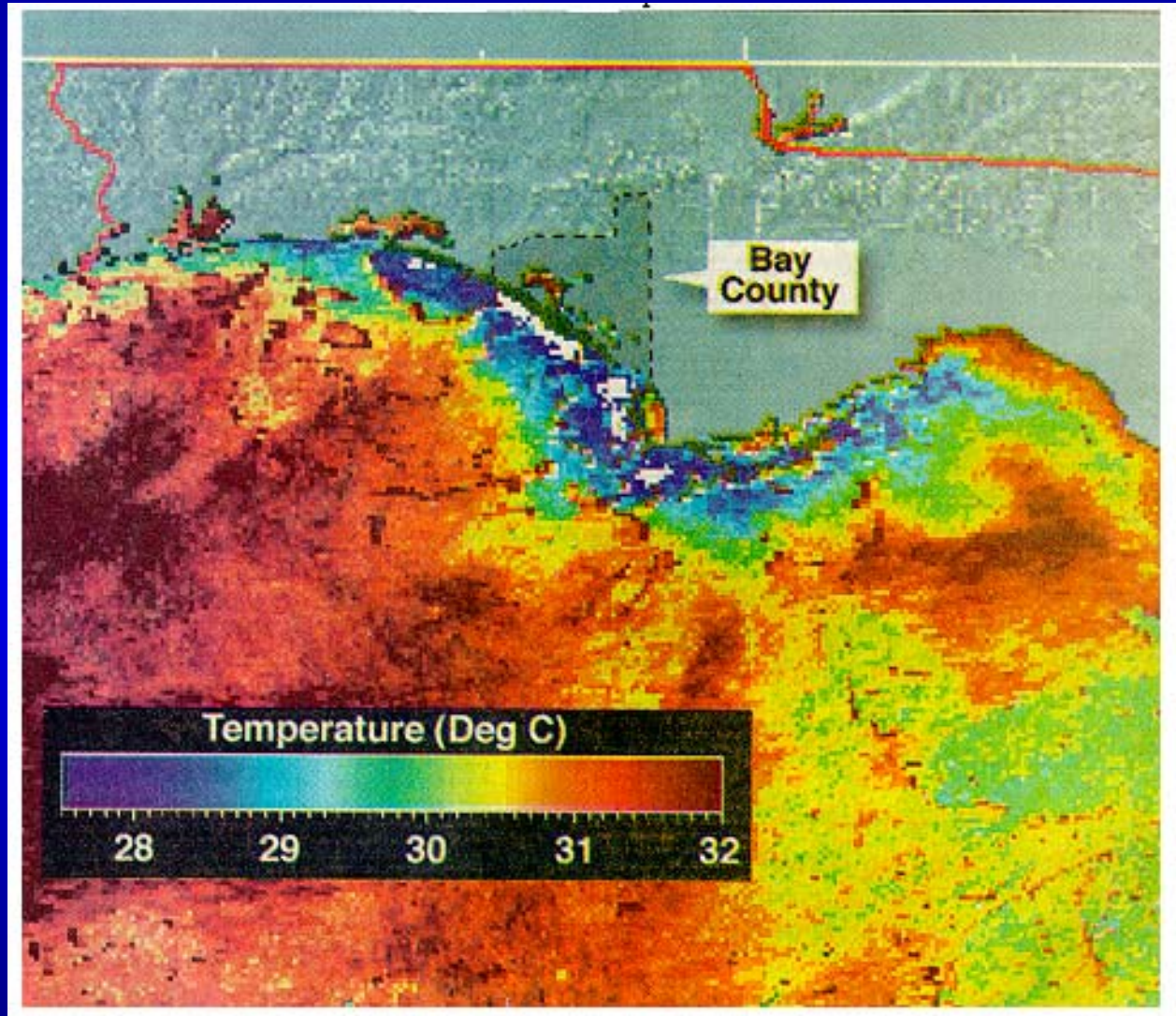
STANDARD LENGTH (mm)



JULIAN DAY

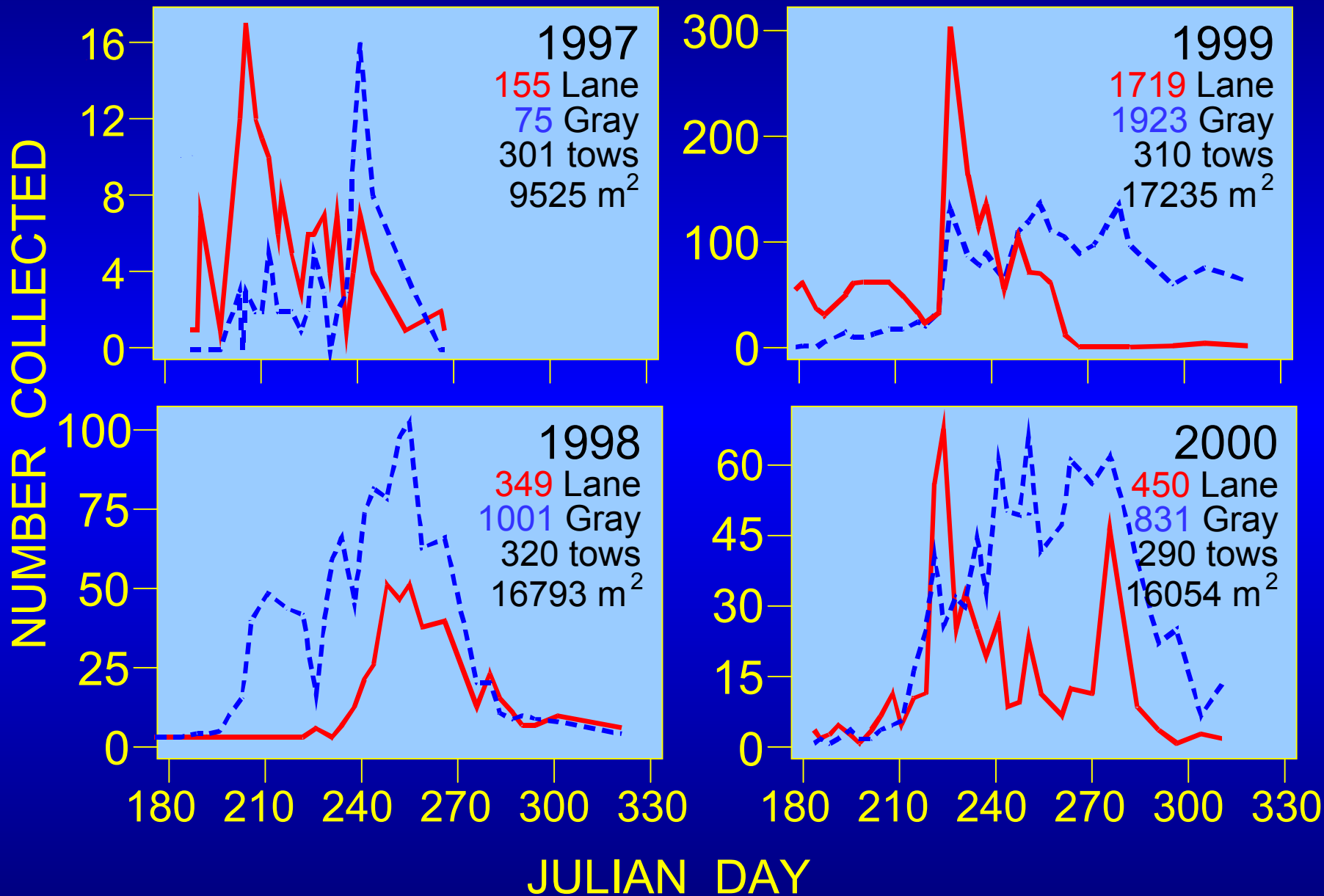
Spring 1998 Upwelling Event off Northwest Florida

Sea Surface Temperature



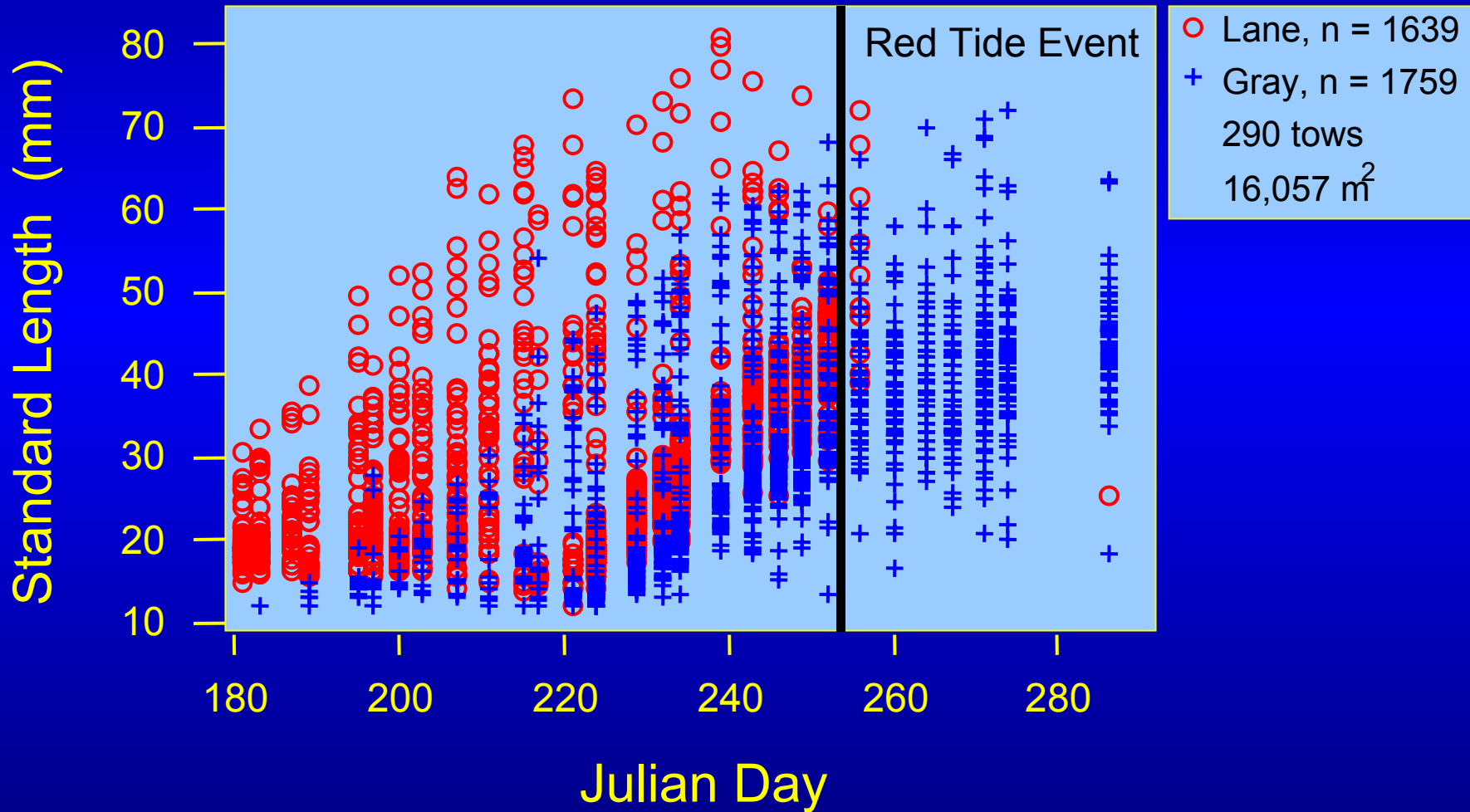
JUVENILE SNAPPER COLLECTED BY DAY

St. Andrew Bay, FL

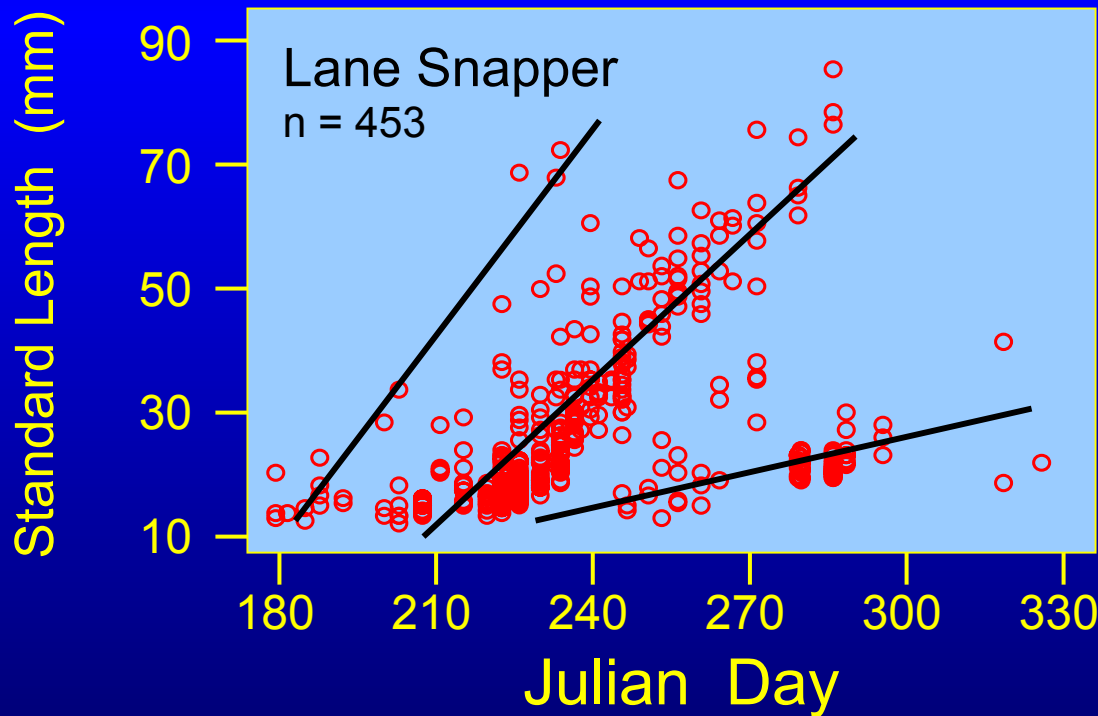
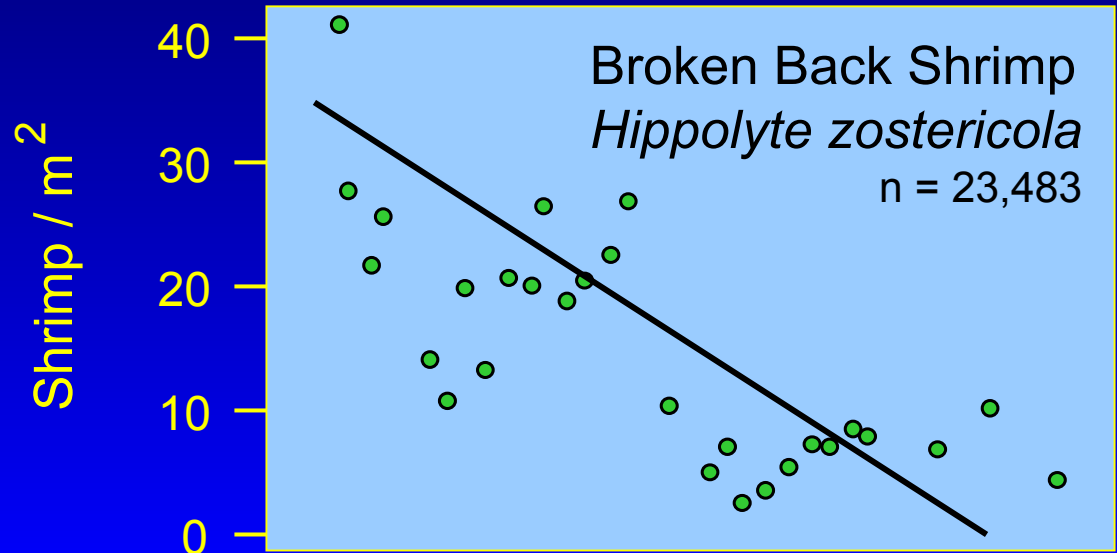


1999 Juvenile Snapper

St. Andrew Bay, June 30 - Oct 13



Predator Prey Relationship



2000

St. Andrew Bay

Hydrology

Flood Tide

St. Andrew Bay
Bay County, FL



Jewfish (Goliath Grouper)



Epinephelus itajara

Scamp



Mycteroperca phenax

REGULATORY CONSIDERATIONS FOR PROJECTS IMPACTING COASTAL ECOSYSTEMS

- Which species are present?
- Seasonal or continuous presence?
- Which life stage?
- Hydrology
- Availability of alternative habitat
- Impact on prey species
- Juvenile surveys offer impact assessment tool
 - Minimal cost
 - True measure of habitat suitability

