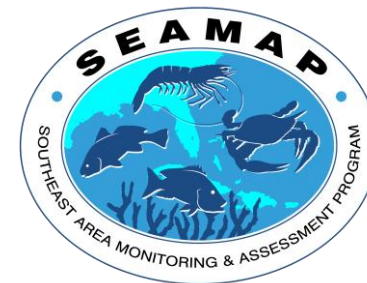


Gulf – Fishery Independent Survey of Habitat and Ecosystem Resources (G-FISHER): Application to Assessment and Management

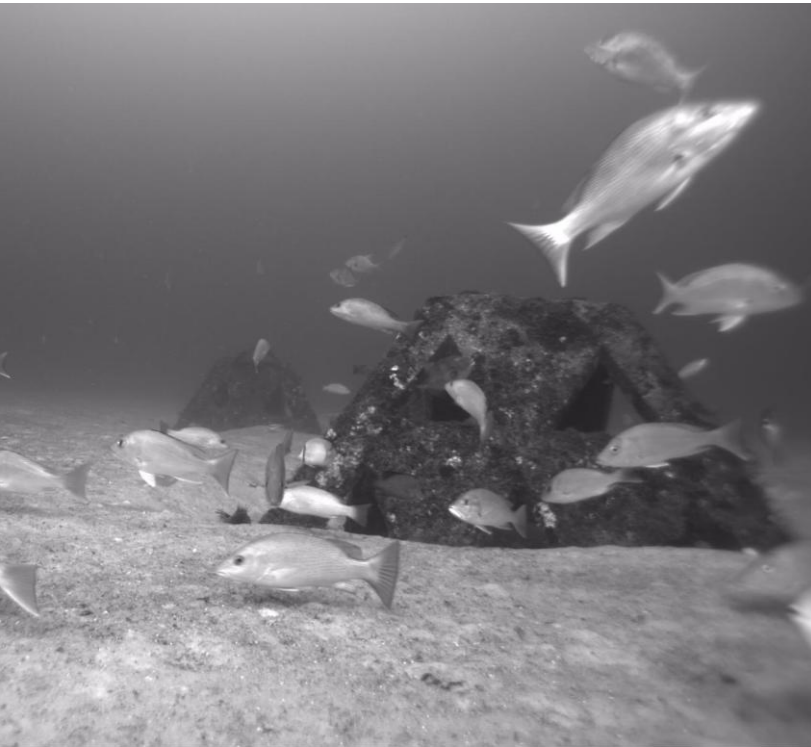
Ted Switzer, Matt Campbell, Kate Overly, Kelsey Martin, Justin Lewis,
Heather Christiansen, Mandy Tyler-Jedlund, Taj Knapp, Sean Keenan

Gulf Council – August 25, 2026



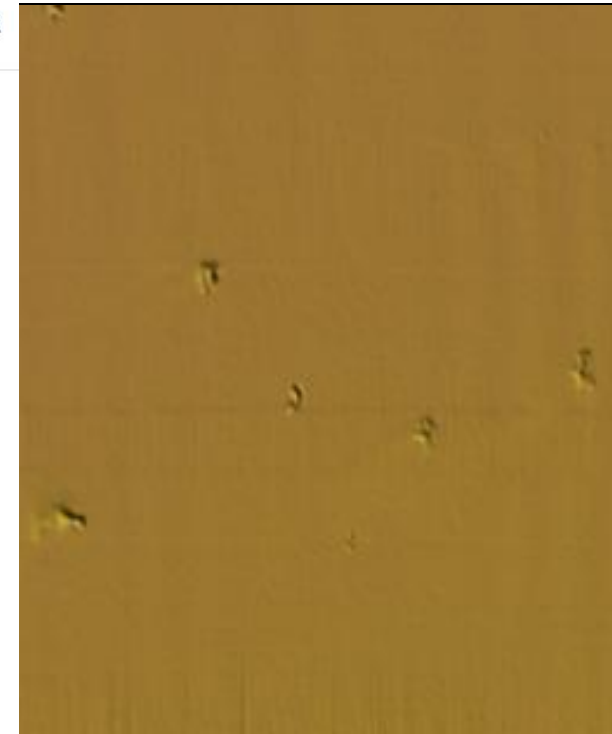
Goals / Objectives of G-FISHER

- Provide annual, Gulf-wide estimates of relative abundance and size composition of reef fish assemblages on natural and artificial reef habitats in support of current and emerging fisheries assessment and management needs

A screenshot of the NOAA RESTORE Science Program website. The header includes the NOAA logo, the text "RESTORE SCIENCE PROGRAM", and navigation links for "About", "Projects", "Funding Opportunities", "Resources", and a search icon. The main content area is titled "Reef Fish Survey" and contains the following text:

Full Title: Optimization and expansion of Gulf-wide video survey efforts to better characterize temporal and spatial variability in reef fish assemblages in response to drivers at multiple scales: The G-FISHER (Gulf Fishery Independent Survey of Habitat and Ecosystem Resources) program

This project combines habitat and water quality information with three integrated reef fish surveys to improve stock assessments of important fisheries by producing the most comprehensive database available for Gulf reef-fish abundance, size, and community composition.

Below the text is a black and white underwater photograph of a fish swimming over a sandy seabed with some vegetation. Navigation arrows are visible on the left and right sides of the image.

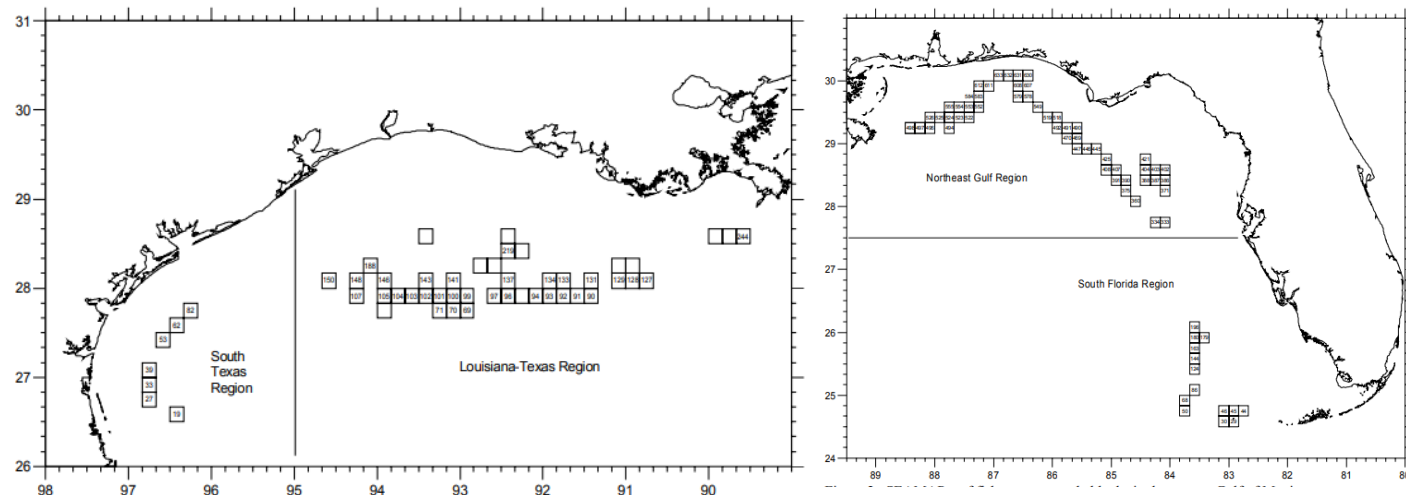
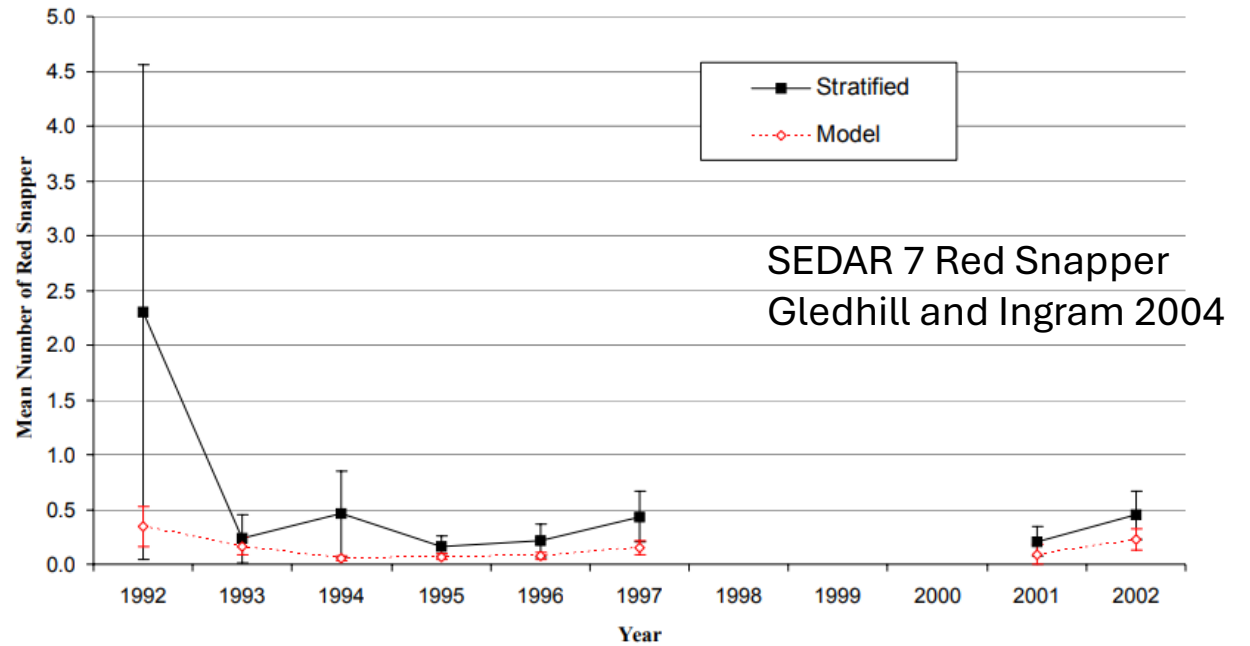


- 1980s trap survey
- Cameras to assess fish behavior
-> camera survey (1992)

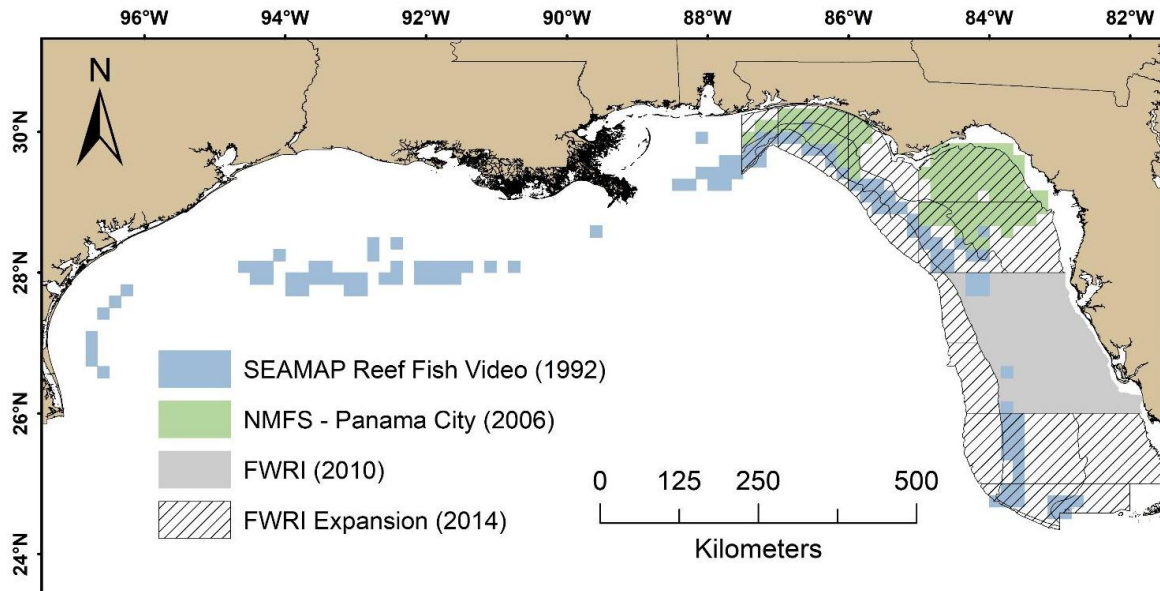
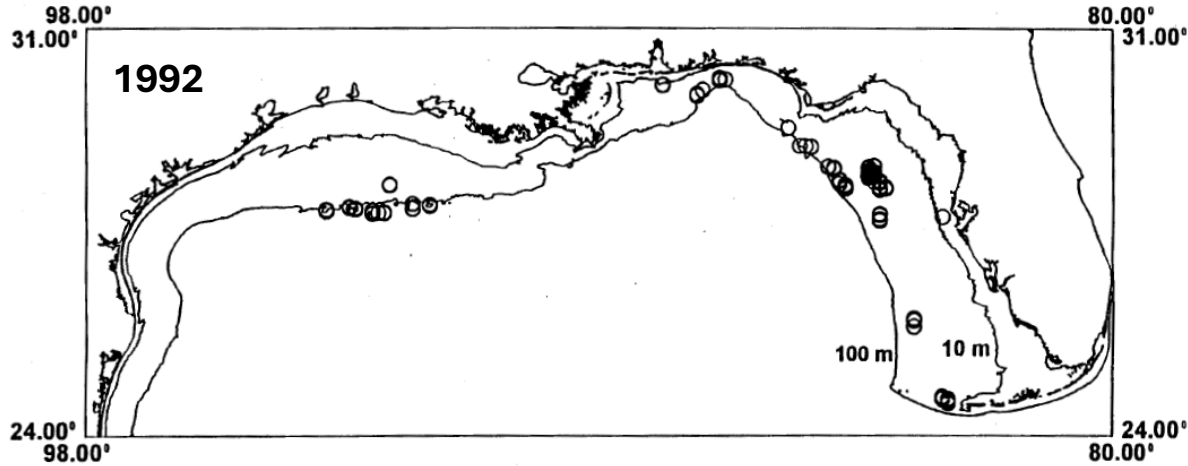
'The survey (i.e. SEAMAP RFV) could be considerably improved by increasing the sampling frame, especially along the Florida shelf. This would require more detailed bathymetric information on reef structure than is currently available.'

2008 - SEFSC Program Review

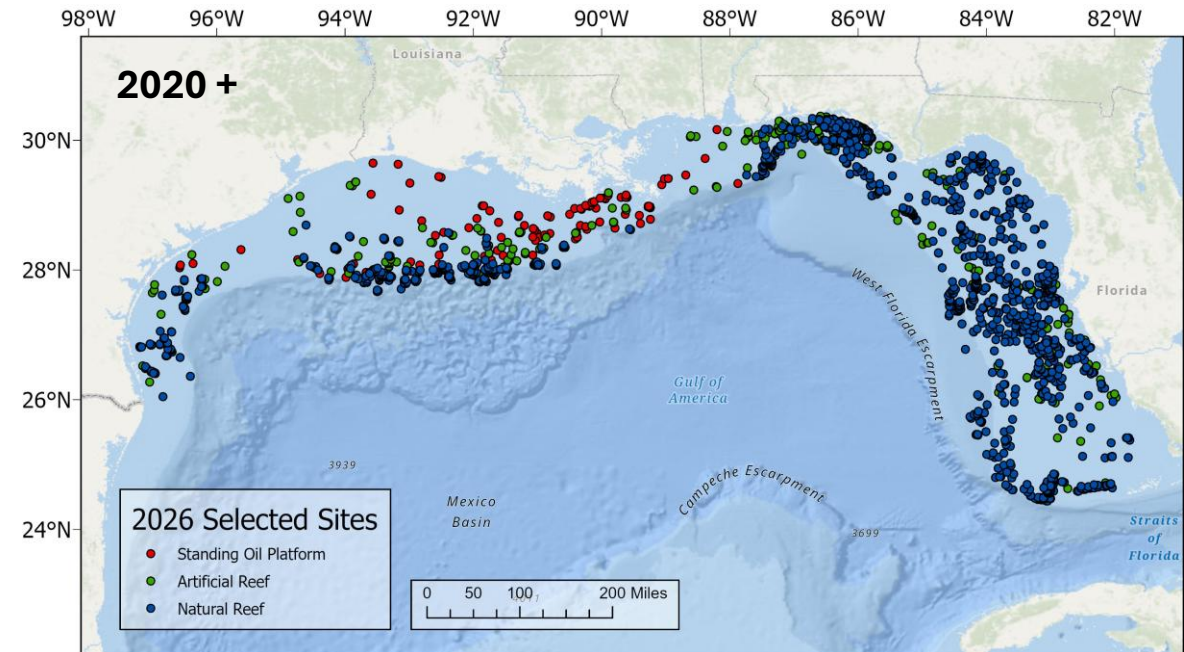
Survey Origins



Survey Expansion



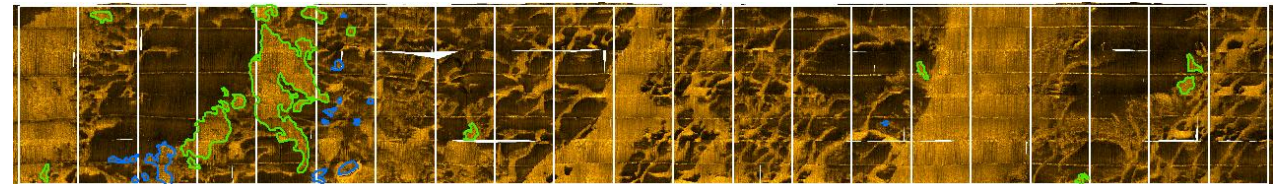
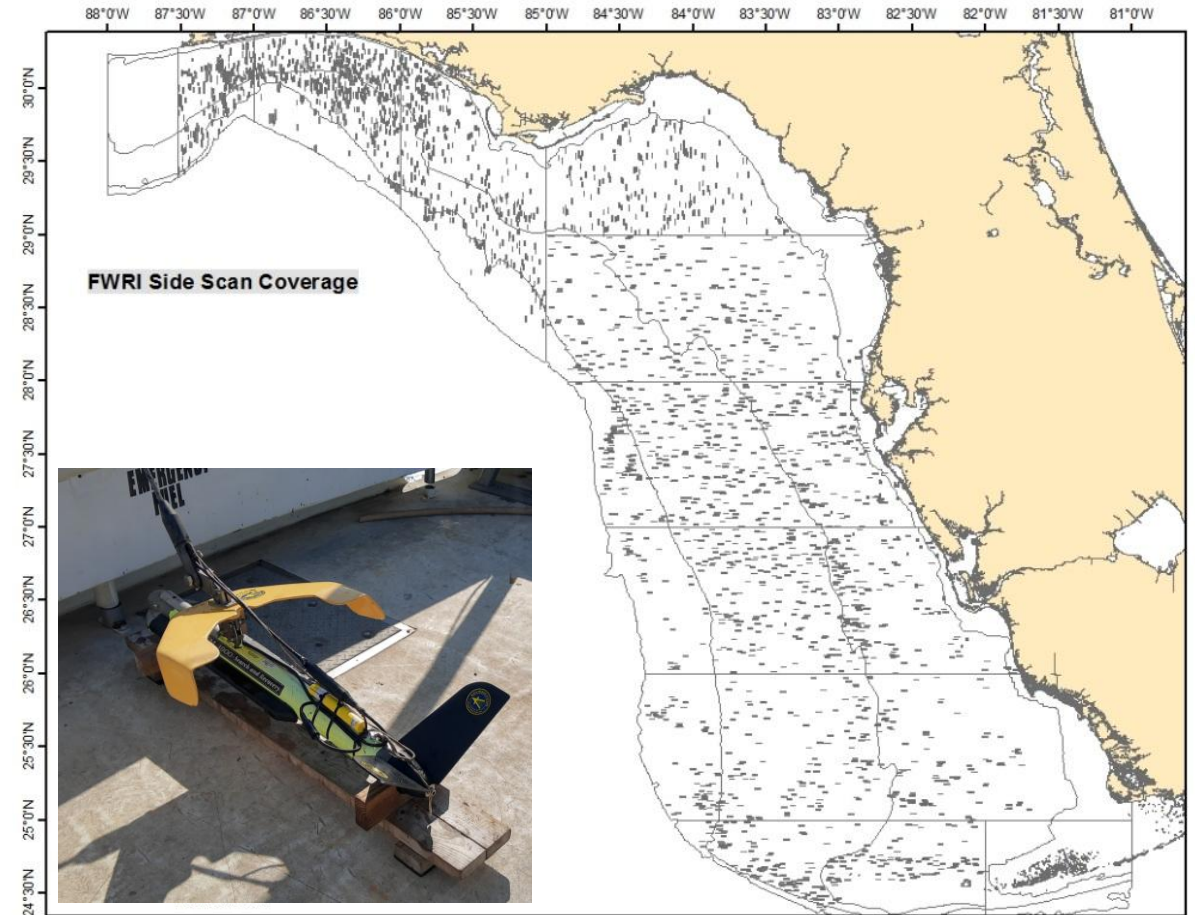
- Independent surveys, but generally consistent technology / protocols
- Fully integrated as G-FISHER in 2020



Habitat Mapping

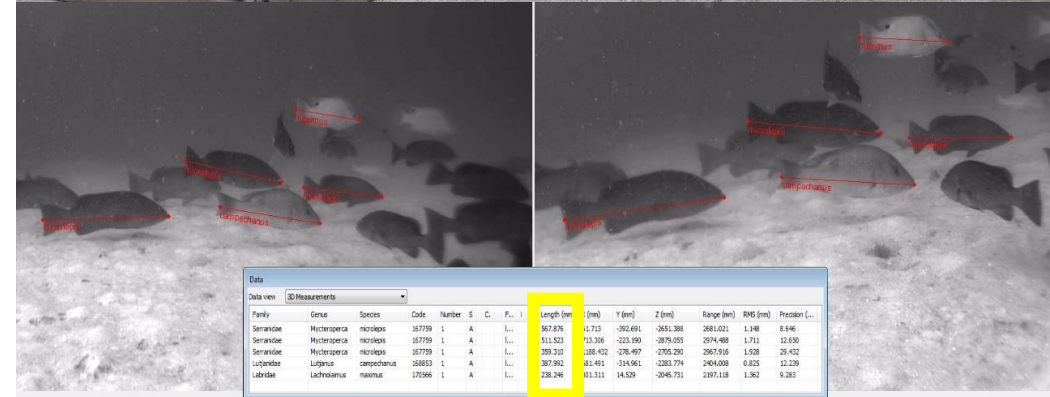
- Randomized mapping
- Standardized classification
- Representative assessment of habitat coverage / composition

ORIGIN	HABITAT CLASS	ORIGIN	HABITAT CLASS
Geologic	Boulder/Boulder Field	Anthropogenic	Aircraft
	Escarpment		Cable
	Fragmented Hard Bottom		Construction Materials
	Fracture		Dredged Channel
	Flat Hard Bottom		Chicken Coop
	Ledge		Dredge Deposit
	Mixed Hard Bottom		Military Tanks
	Potholes		Marine Wreckage
	Pinnacle		Oil Platform Materials
	Pavement		Pipeline Area
	Rubble Field		Reef Modules
	Spring/Sink Hole		Rock Piles
	Unknown Natural		Tires
Unknown	Unknown Natural		Unknown Reef material
ORIGIN	HABITAT CLASS		Other Vehicles
Biogenic	Aggregate Coral Reef		Large vessel/barge
	Aggregation of Patch Reefs		Small Vessel
	Individual Patch Reef		
	Reef Rubble		
	Spur and Groove		

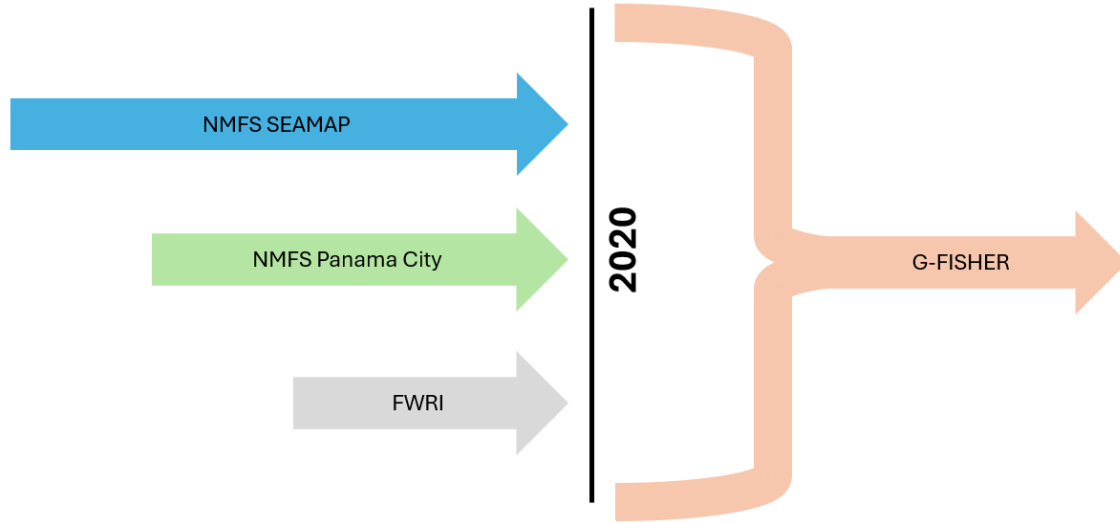


Video Survey

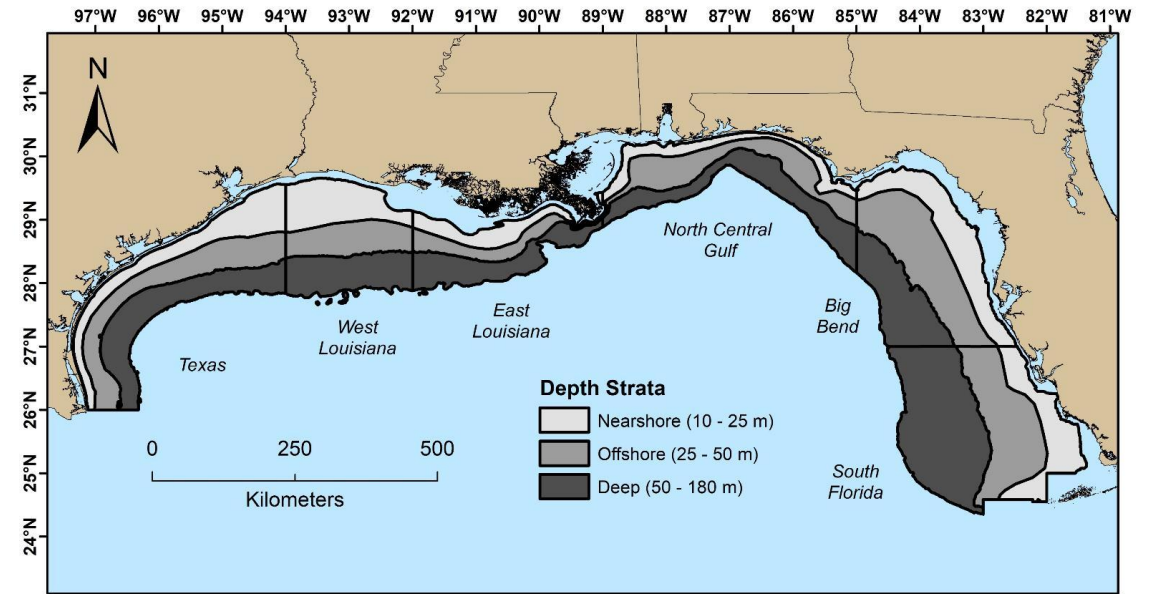
- Stationary stereo-baited remote underwater video (S-BRUV) arrays:
 - Baited with Atlantic mackerel / squid
 - 20 minutes of video annotated for fish (MaxN)
 - Stereo measurements
 - Habitat metrics quantified



Transition to G-FISHER

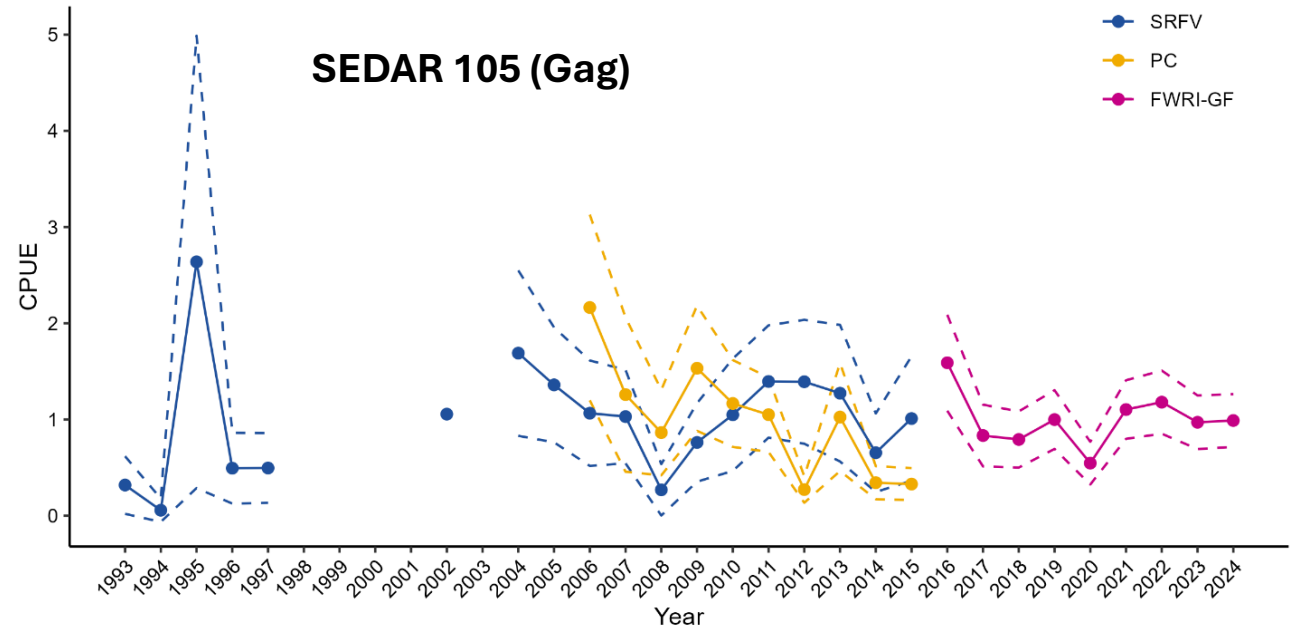


- Increased sampling intensity
- Inclusion of artificial reef habitats
- Stratified-random design (space / habitat)

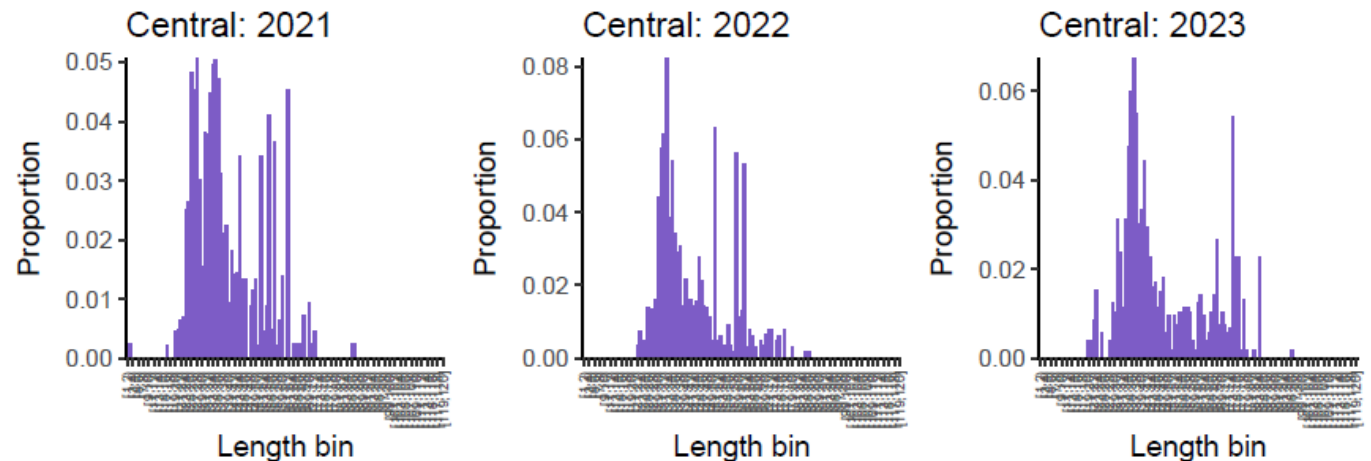


Data Provision

- Data needs:
 - Stock assessment
 - Interim analyses
 - Other Council requests
- Time series:
 - Relative abundance
 - Size composition
- Data use:
 - 38+ assessments (+ interims)
 - 20 species

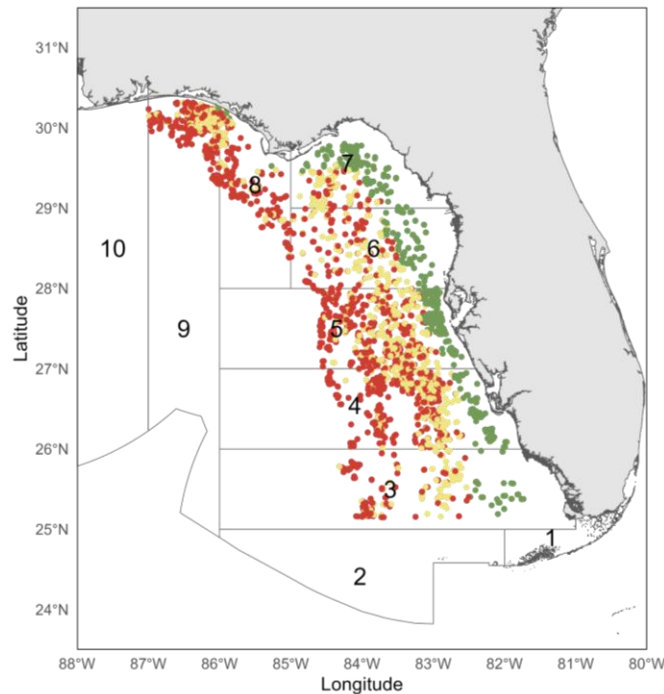
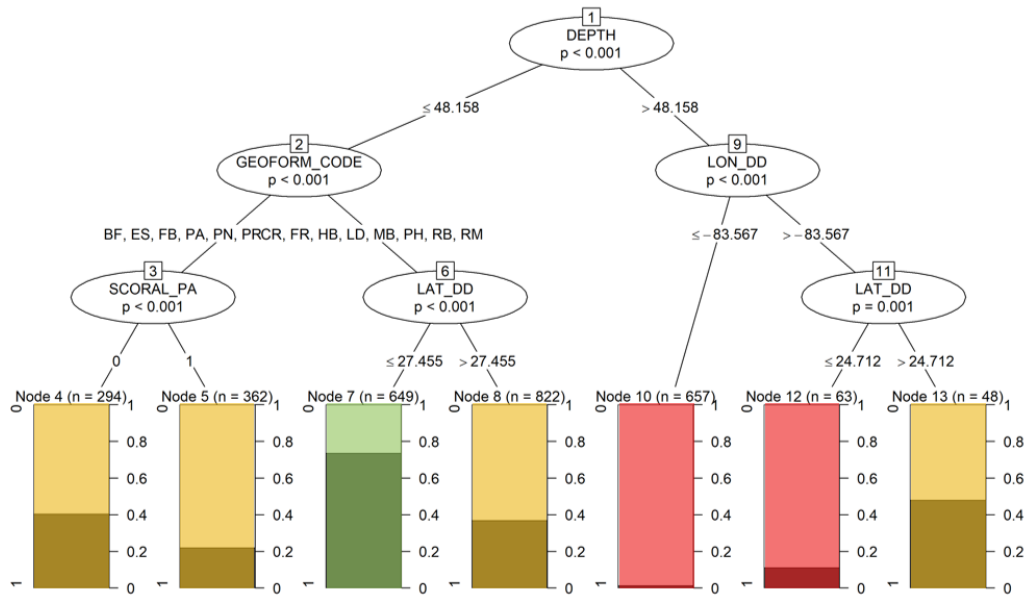


SEDAR 98 (Red Snapper)



Analytical Approach

- Account for survey expansion / design differences:
- Post-stratification analyses
- Weighted average (survey coverage / strata composition)



Proportion Positive

- High
- Medium
- Low

Area/Strata Weighting



SEAMAP



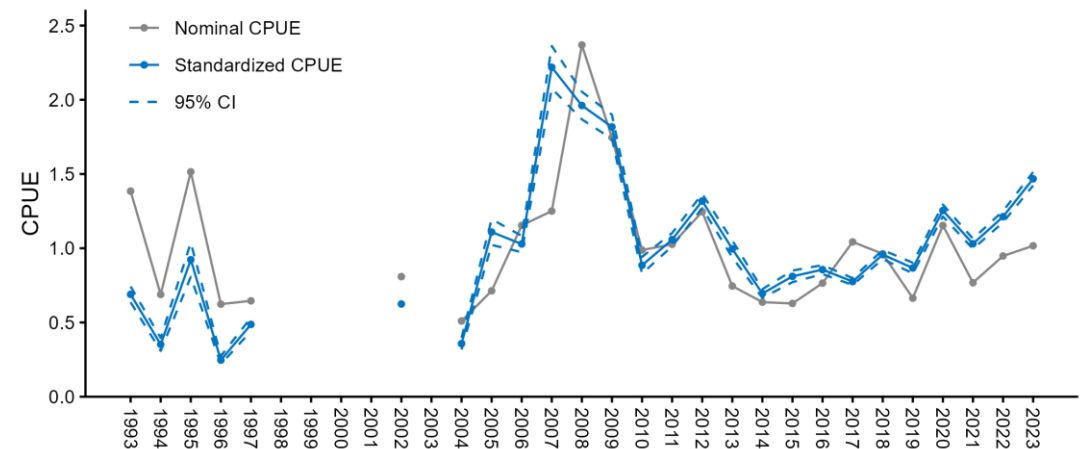
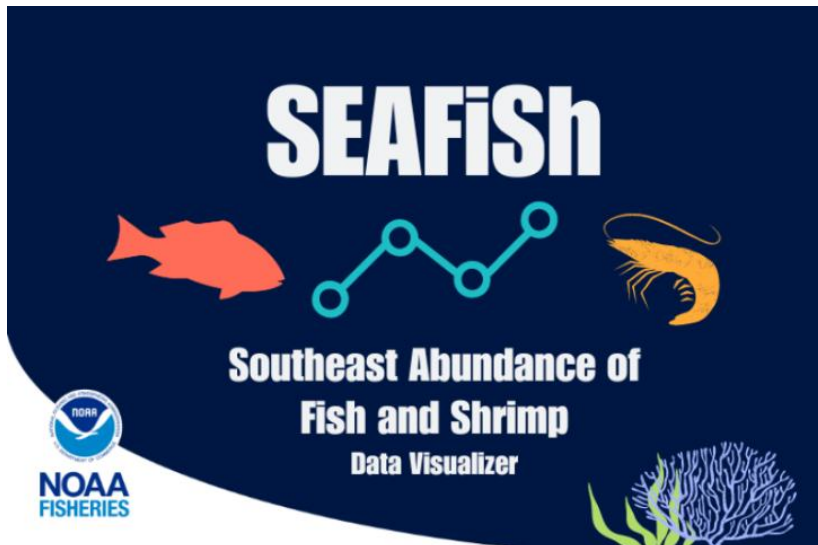
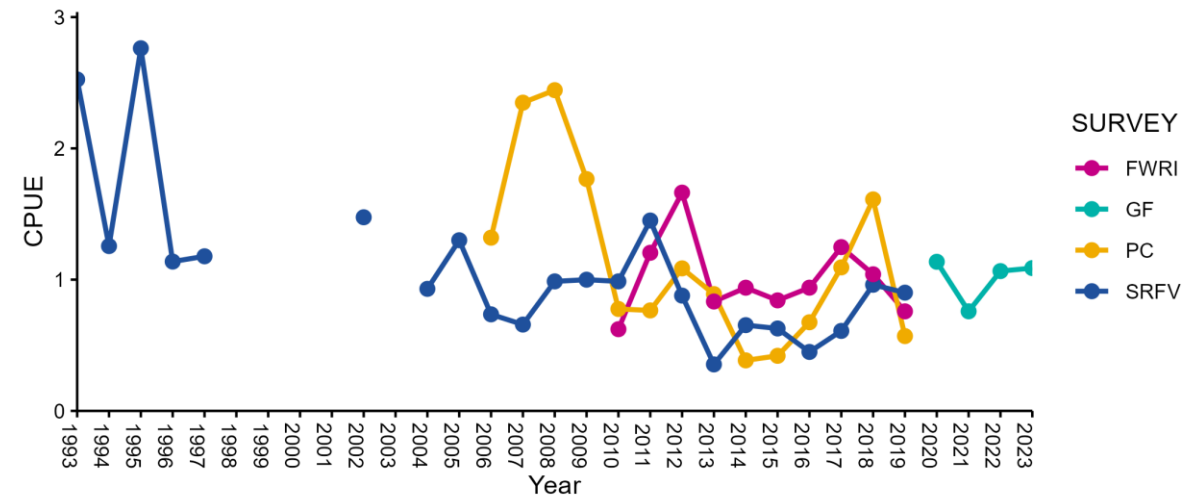
NMFS PC



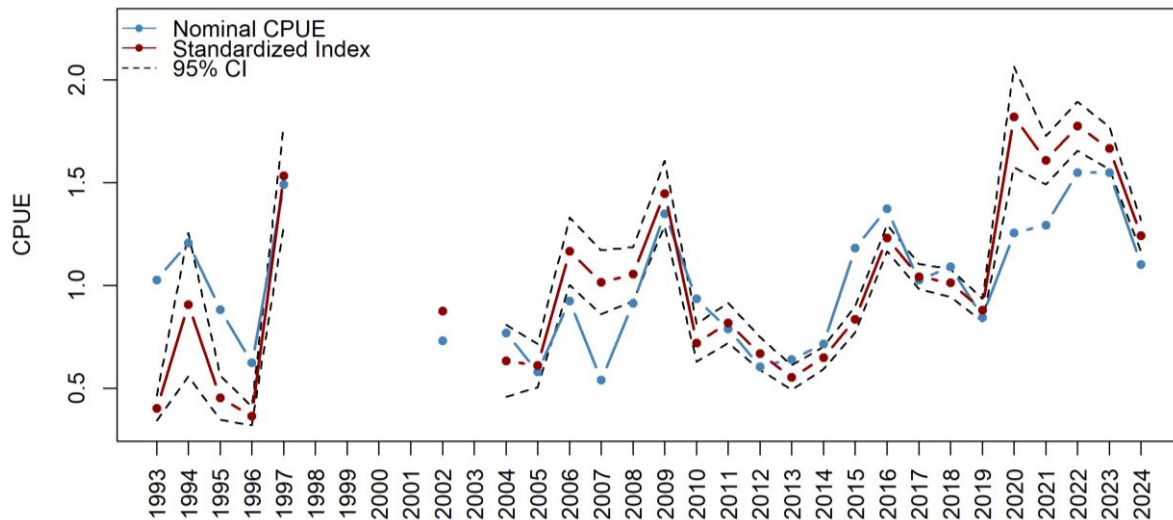
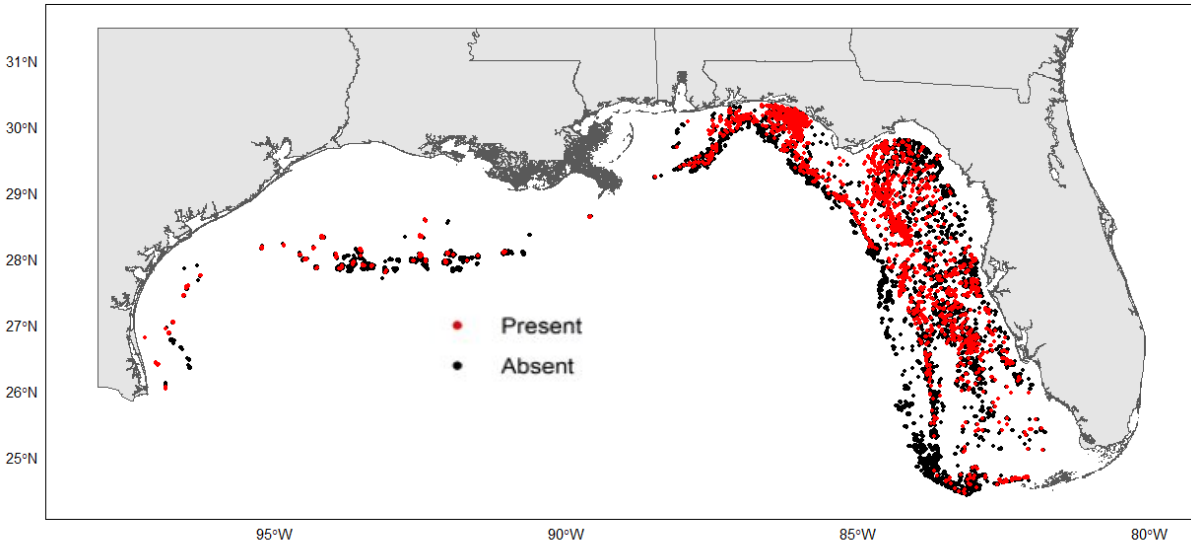
FWRI

Analytical Approach

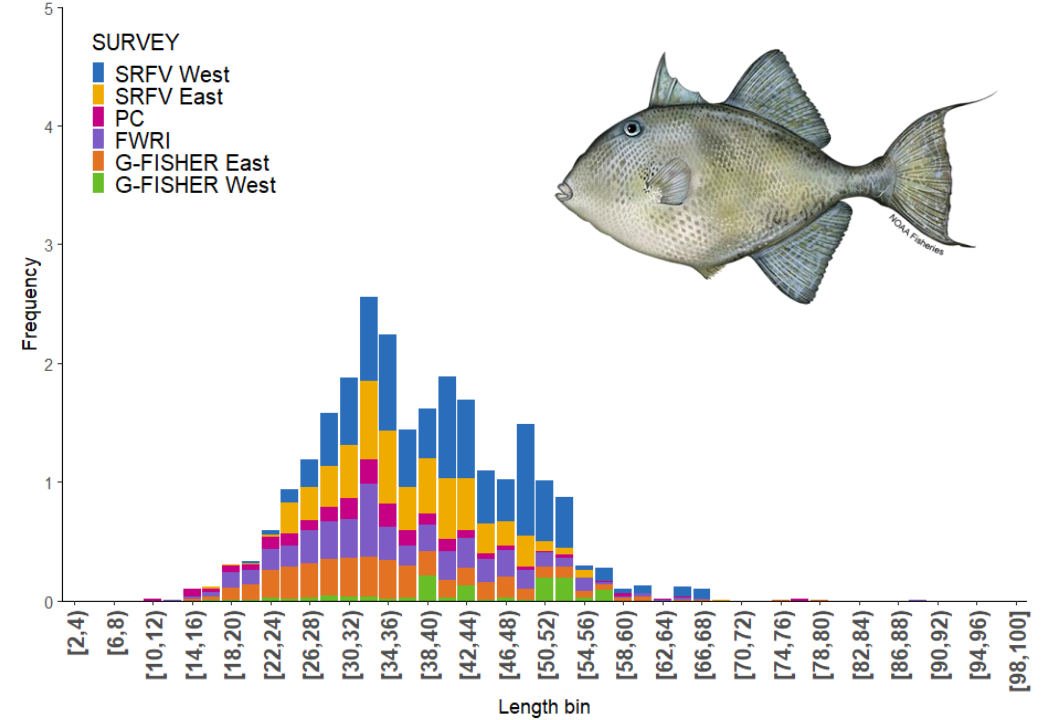
- Standardized approach, but tailored to each species:
 - Stock ID
 - Distribution
 - Habitat associations
- Data used / length of time series varies



Gray Triggerfish (SEDAR 100)

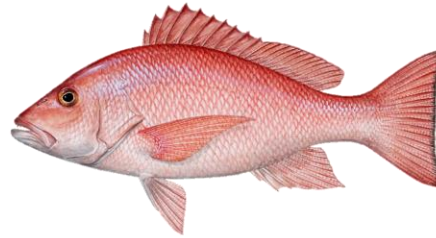
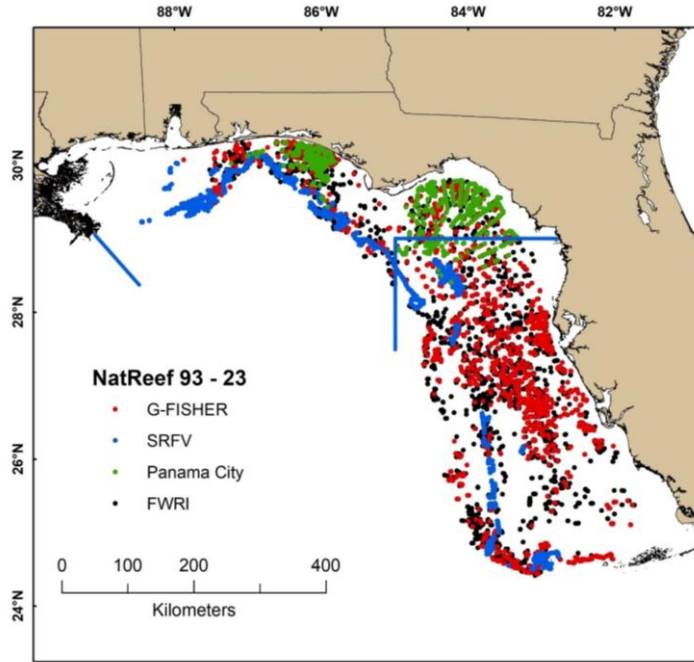


GOA - Weighted: 1993-2024

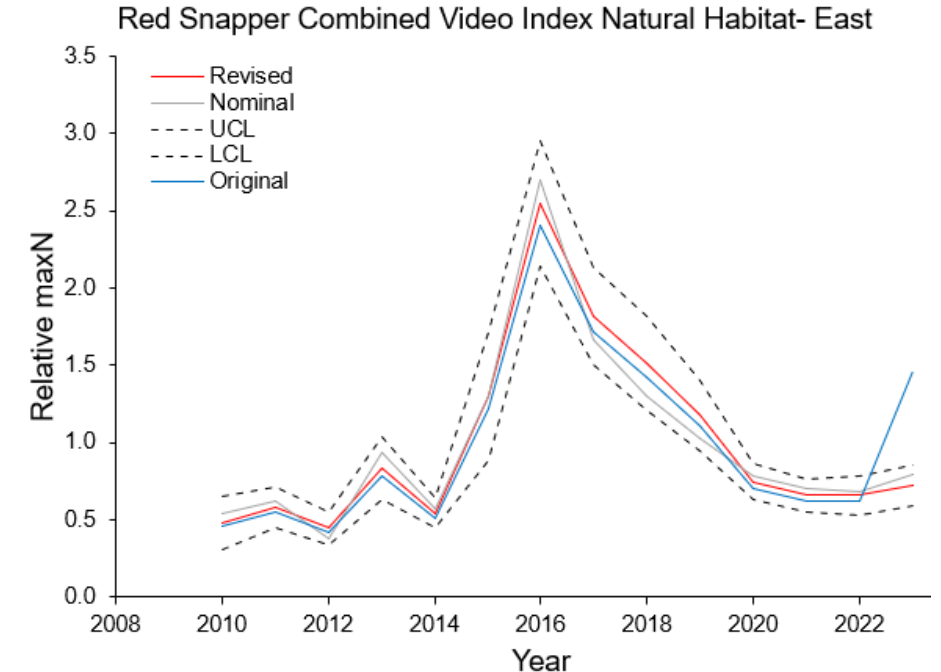
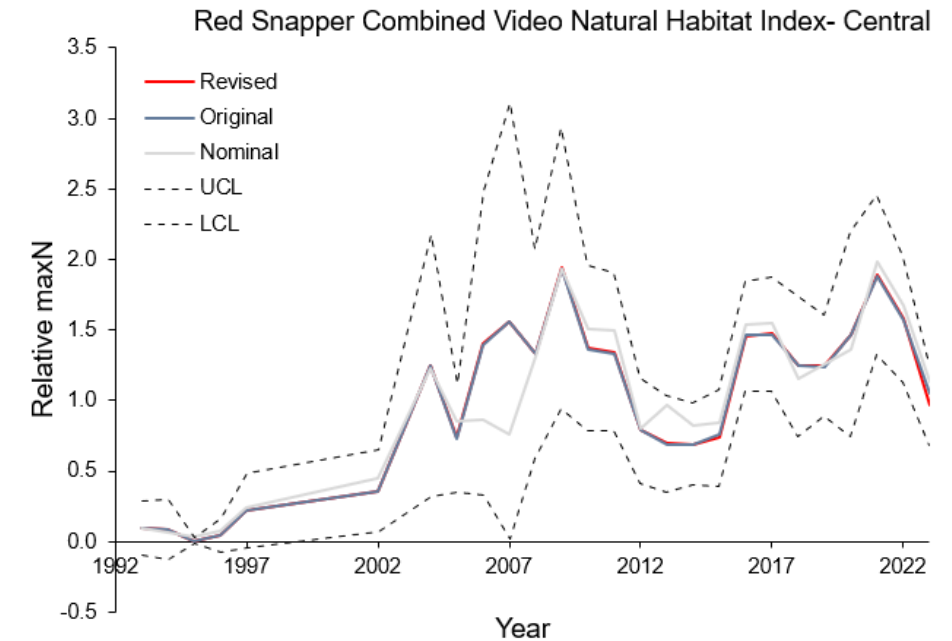


- Gulf-wide
- Full time series
- Natural reefs only

Red Snapper (SEDAR 98)

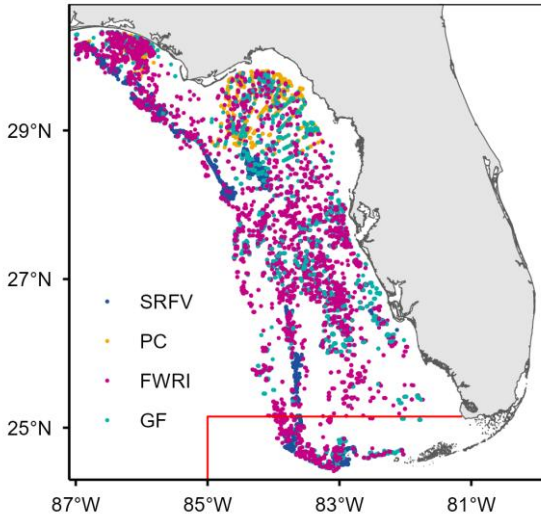


- Three stocks
- East truncated (limited historical coverage) but others full time series
- Natural reefs only (artificial reef recommendations)

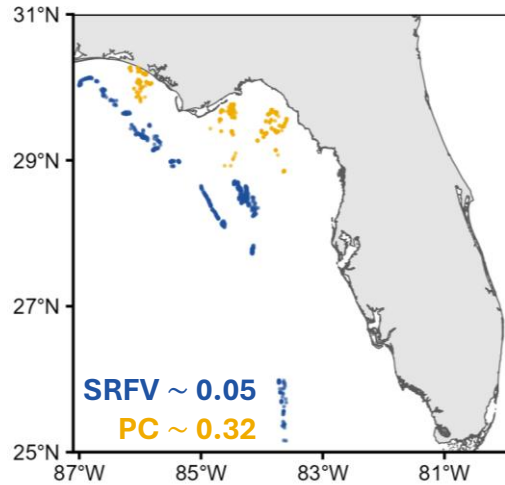


Hogfish (SEDAR 94)

Survey effort



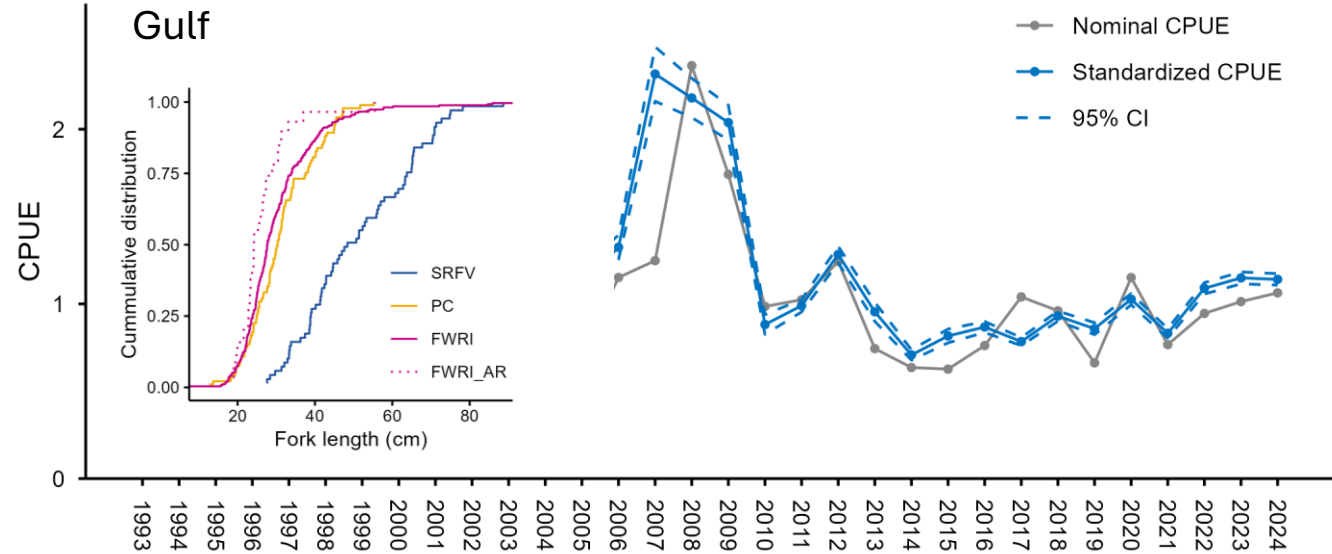
2006-2009



SRFV ~ 0.05

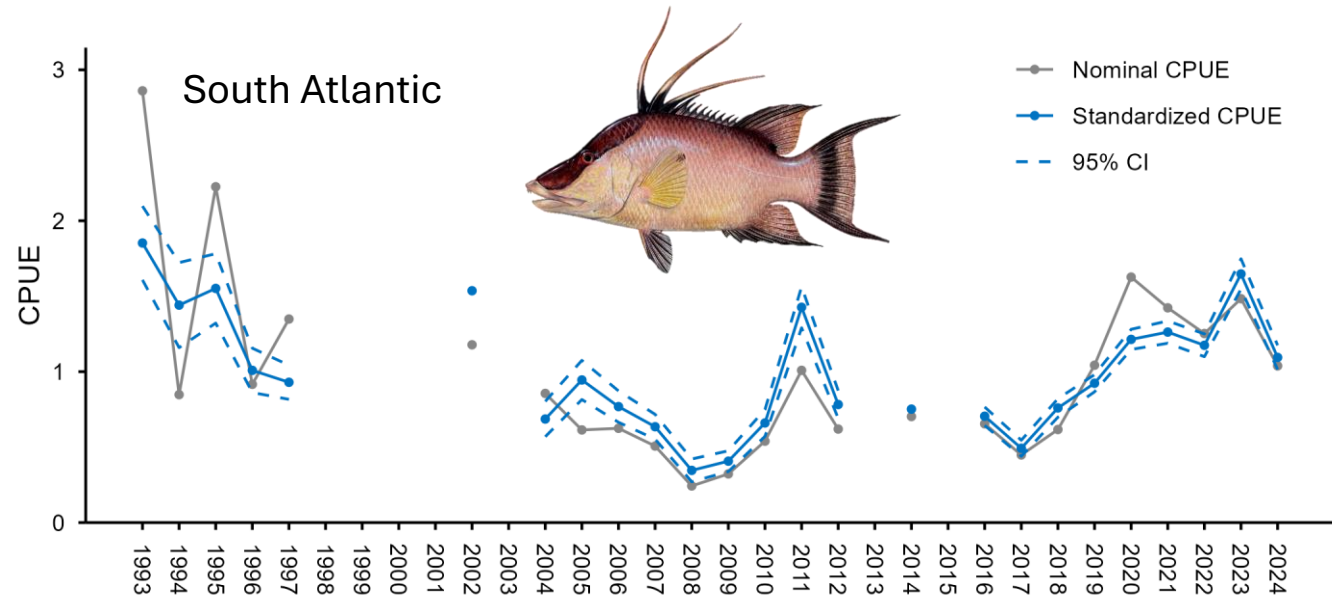
PC ~ 0.32

Gulf



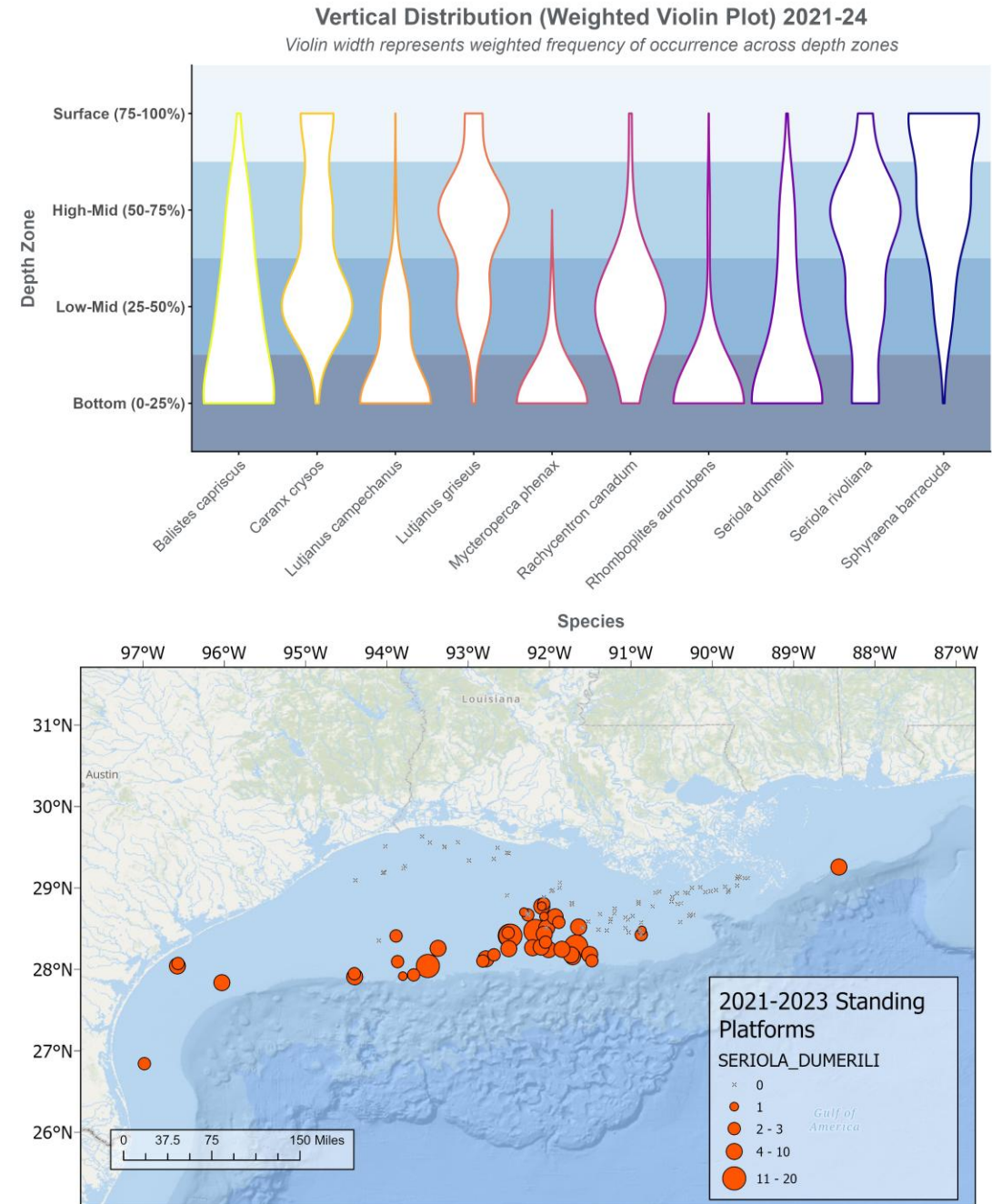
- Both Gulf and South Atlantic
- Gulf:
 - Truncated (change in selectivity)
 - Both natural and artificial reefs
- South Atlantic:
 - Full time series
 - Natural reefs only

South Atlantic



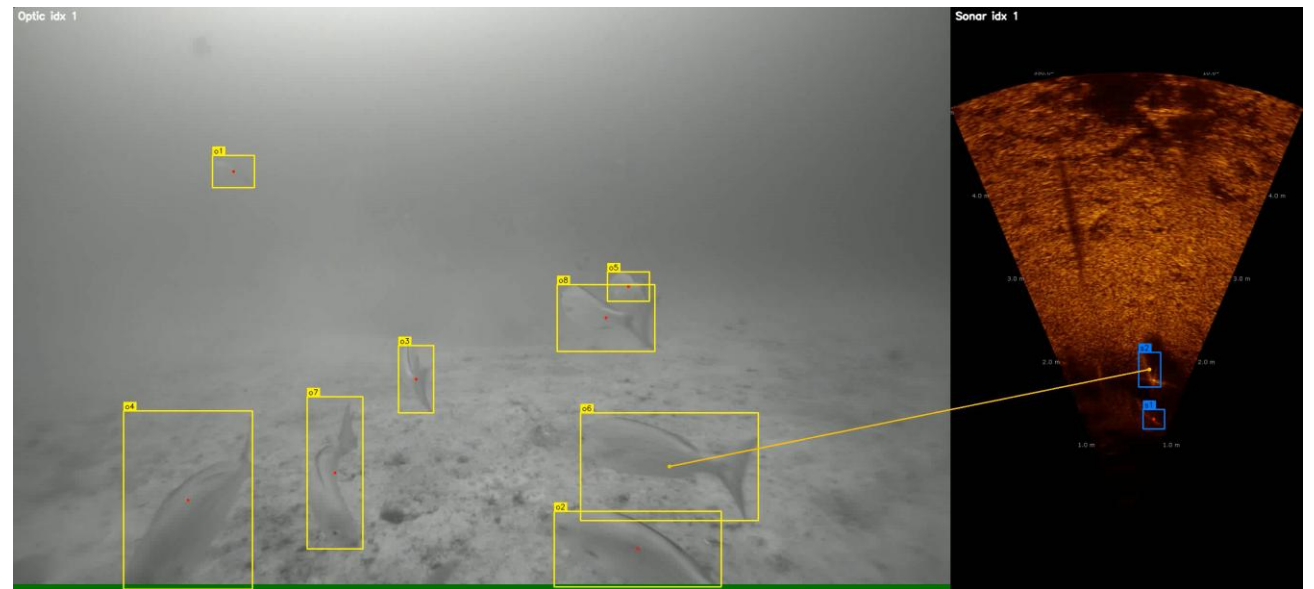
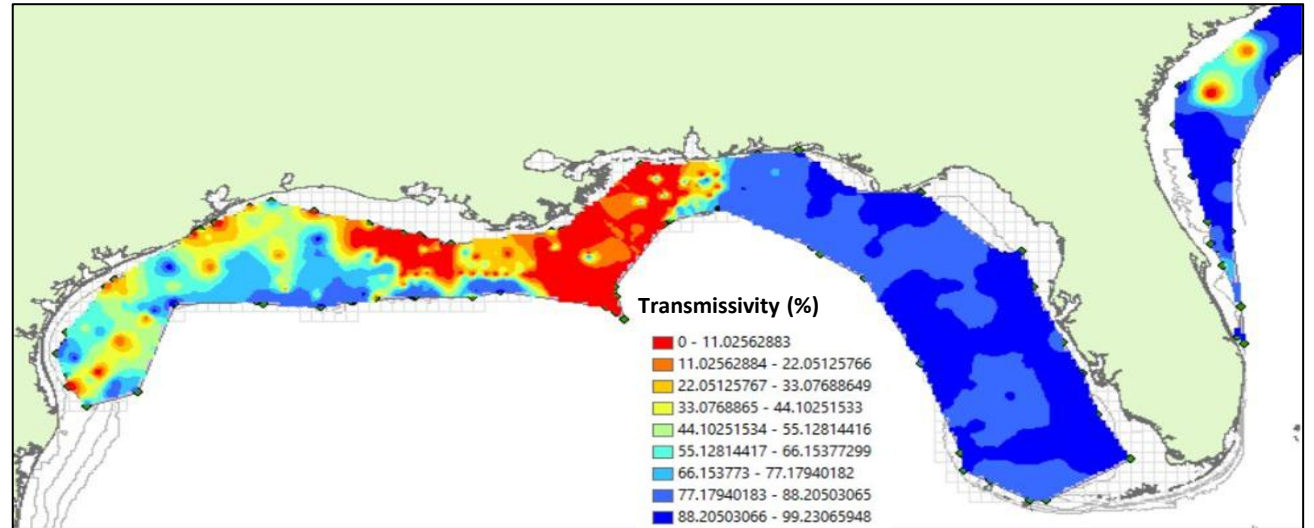
Platform Sampling

- Unique habitat – integrated video transect approach (full water column)
- Design / annotation protocols fit within G-FISHER framework
- Short time series – evaluating integration into index (how to weight)



Optical Survey Limitations

- Visibility problematic in western Gulf
- Influences utility of optical survey data:
 - Limited FOV – can account for
 - Unusable video problematic
- Evaluating approaches:
 - Acoustics / acoustic cameras
 - Environmental DNA (eDNA)



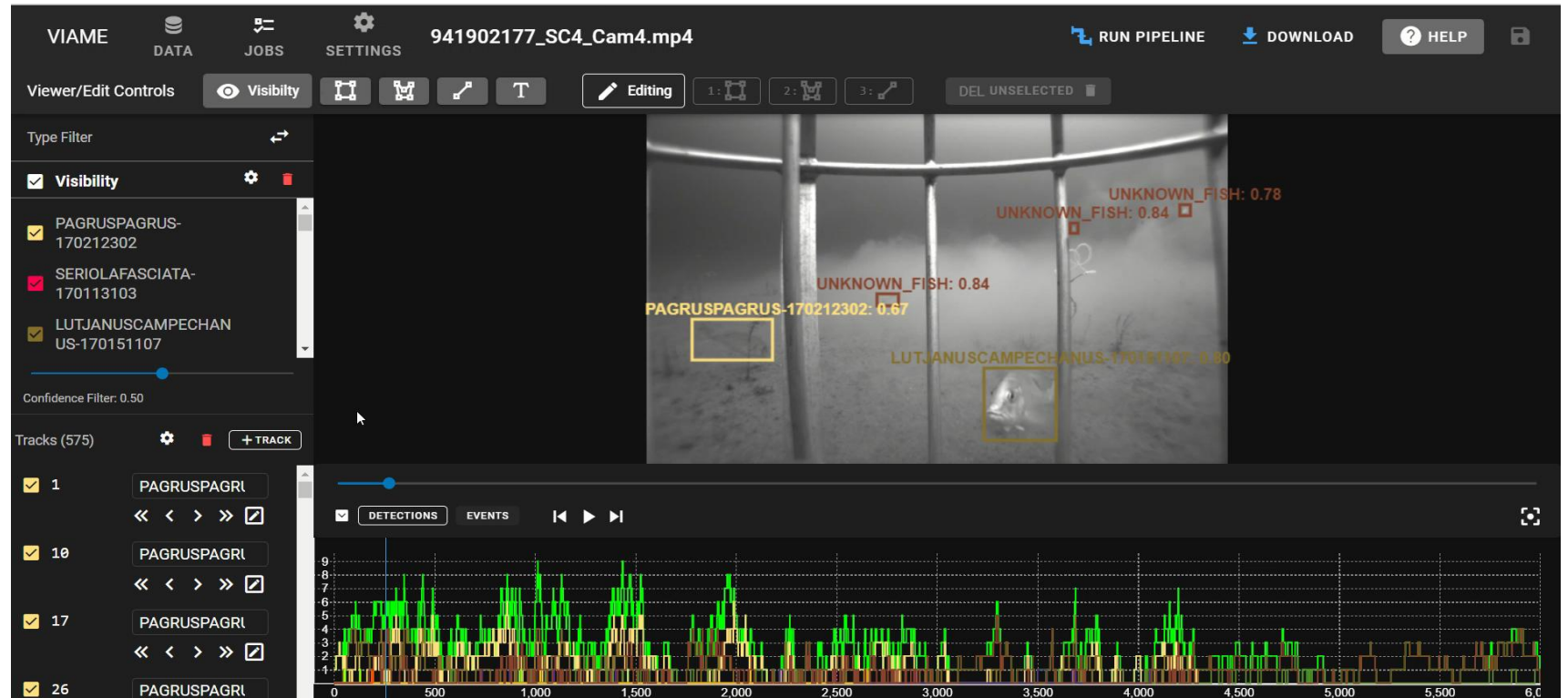
Data Timeliness

Last Collection
Aug/Sep 2025

Manual Video Annotation (10,000+ Hours)

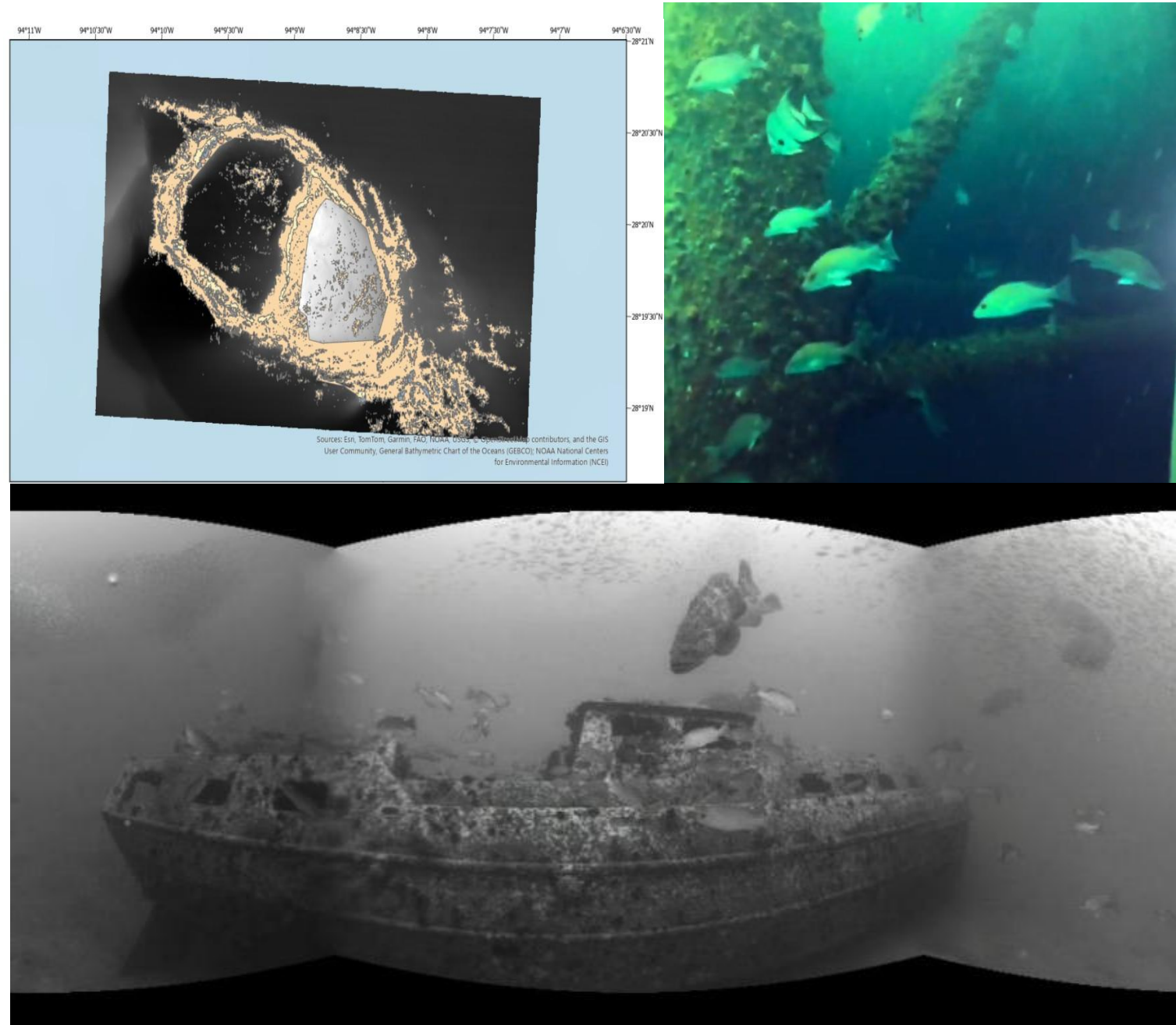
Final Data
November 2026

- Video annotation is labor intensive!
- ~ 15-month lag between survey completion and data availability
- Aim to streamline with AI/ML (protocols under development)

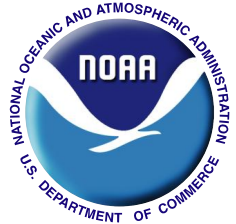
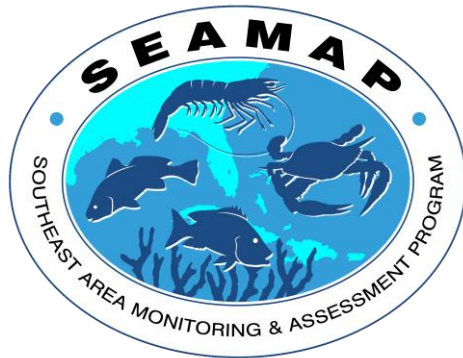
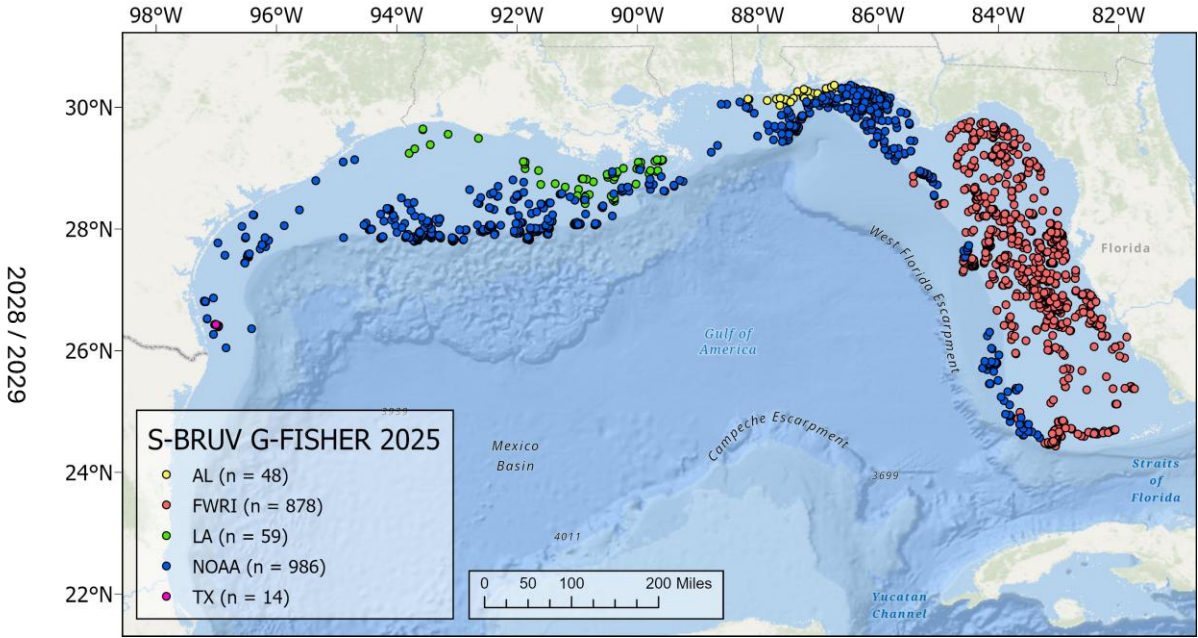
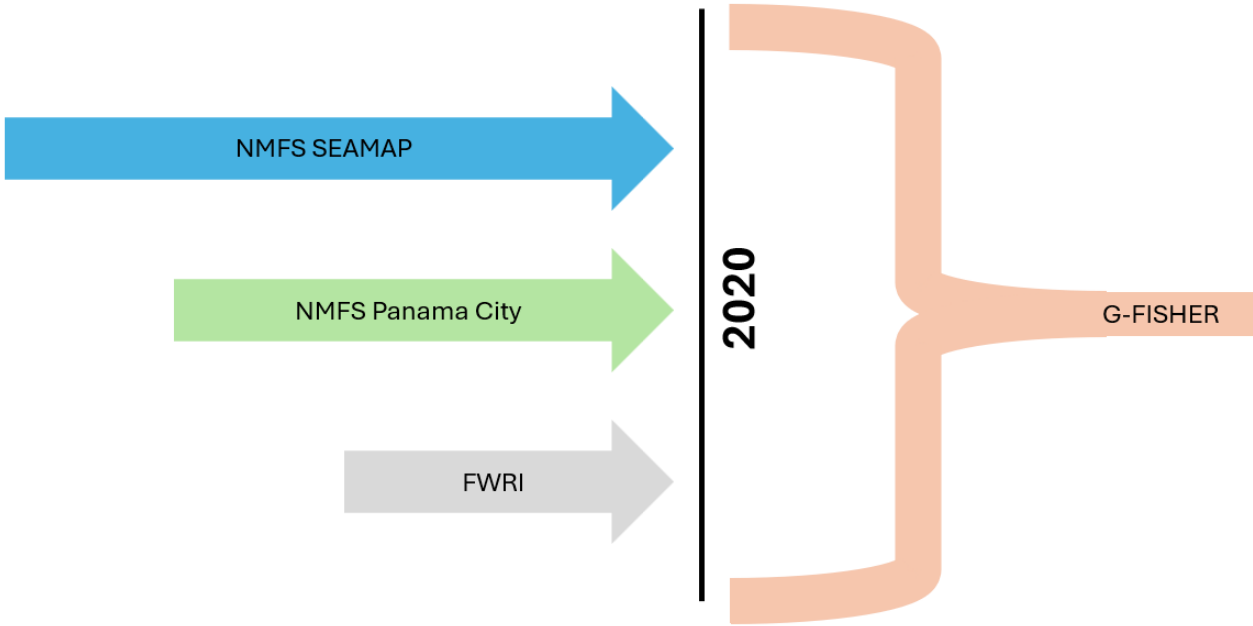


Conclusions

- G-FISHER highly successful:
 - Statistically robust design
 - Strong collaborative team
- Critical source of fishery independent data for most managed reef fishes
- Some limitations, but solutions in the works:
 - Analytical
 - Technological



Future of G-FISHER?





G-FISHER StoryMap



Questions?