

SEDAR 94: Florida Hogfish

Review Workshop

Introduction



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Brief Life History Overview

- Tropical reef species associated with coral reef areas in the western north Atlantic Ocean, Gulf of America, and Caribbean Sea
 - From the Carolinas south to northern coast of Brazil. In U.S. continental waters, most abundant in the eastern Gulf of America and FL Keys
 - Populations from U.S. waters are currently believed to belong to three genetically distinct stocks
- Juveniles settle nearshore in seagrass beds and shallow reefs with ontogenetic migration to nearshore/offshore hard-bottom habitats and reef habitats
- Protogynous hermaphrodites that form harems. Protracted spawning with peaks from December through April
- Feeds during day for benthic invertebrates, such as crabs and mollusks



Aquamaps Kaschner 2010

Distribution picture



Brief Fishery Characteristics

- Recreationally and commercially sought species with commercial harvest records back as early as 1927 (Bradshaw 2025, DW-06)
 - Primarily spearfishing and hook & line gears
 - Developing Recreational HL fishery on the WFS since ~2010
- Neutral or curious nature make it more susceptible to capture by spearfishing.
 - Selection/preference of larger males results in top-down size-selective fishing mortality with truncated size and age structure in more heavily fished areas (McBride and Richardson 2007).



Guinness World Record

<https://www.guinnessworldrecords.com/world-records/446487-first-underwater-colour-photo>

- The first color photograph ever taken underwater was of a Hogfish in the Florida Keys, during 1926
 - *National Geographic* photographer Charles Martin and Dr. William Longley.
- Charles Martin used a specially designed waterproof camera housing, the scene was around 15 m deep (49 ft), and was illuminated with highly explosive magnesium flash powder ignited on a raft on the surface of the water.



SEDAR 94: Florida Hogfish

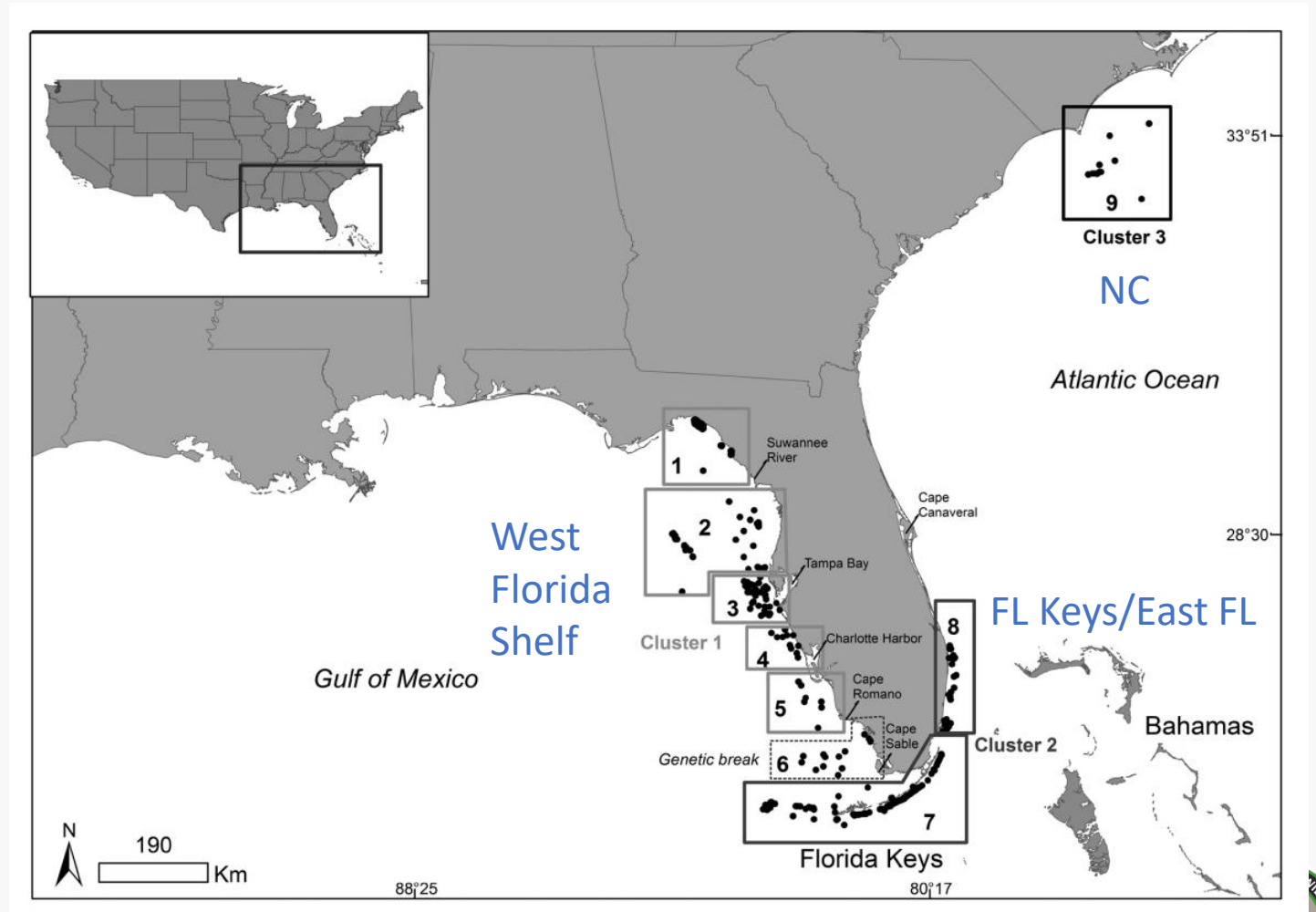
Spatial Demographics



Genetics

Seyoum et al. (2015)

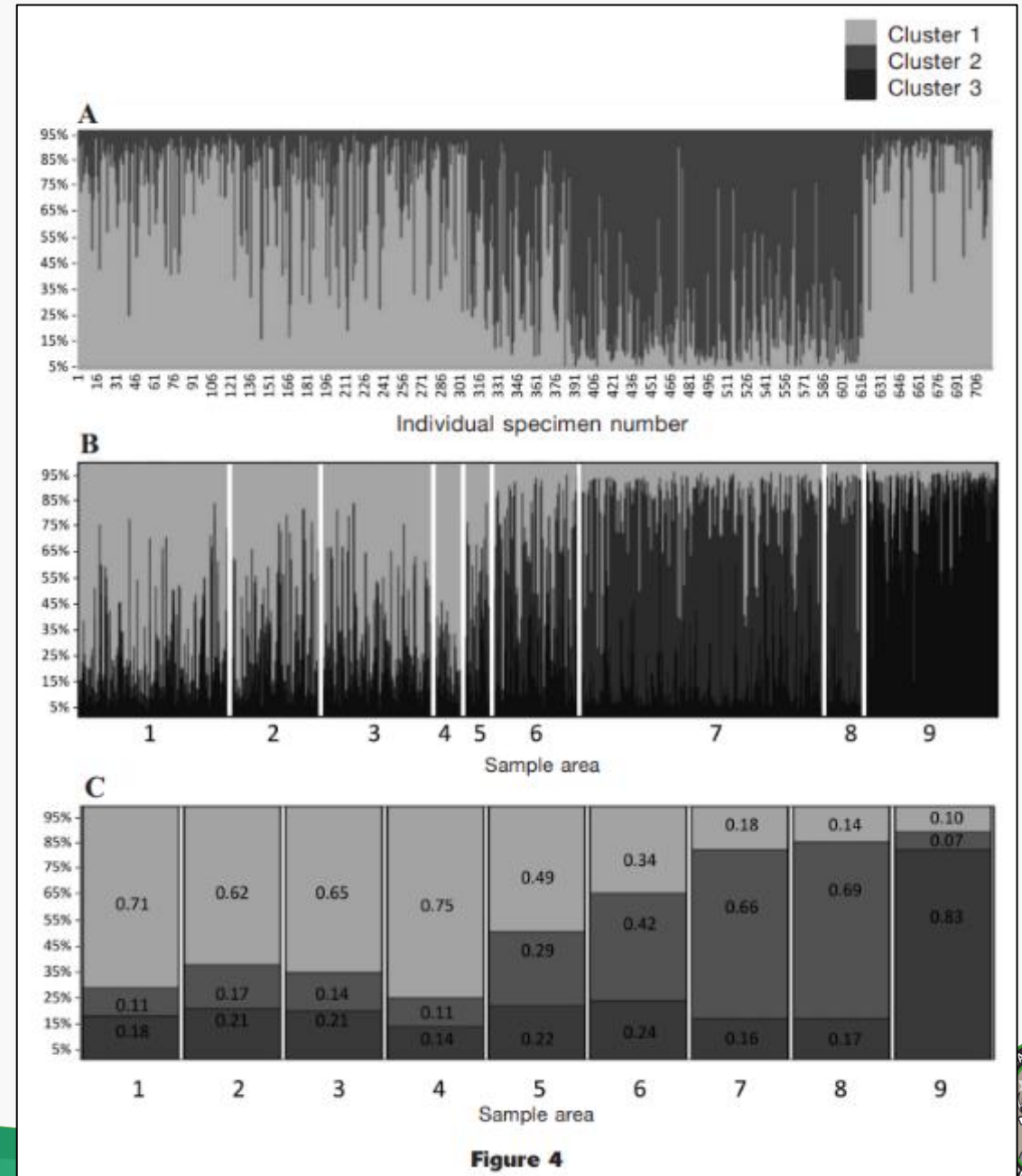
- N = 719 fish
 - Nov 2005 – Aug 2013
 - NW Florida – North Carolina
 - Genetic data: microsatellite loci
-
- Sampling gap between SE FL and NC
 - Unclear where the genetic break lies
 - Assume Hogfish off NE FL are same stock as SE FL



Seyoum et al. (2015)

- Results

- “The results of this study indicate the existence of at least 3 genetically distinct hogfish stocks in the southeastern United States: the eastern Gulf of Mexico, south Florida and the Florida Keys, and the Carolinas.”
- Effective Population Size (N_e) estimates indicate similar sizes for WFS and KEYS and 3x smaller for NC



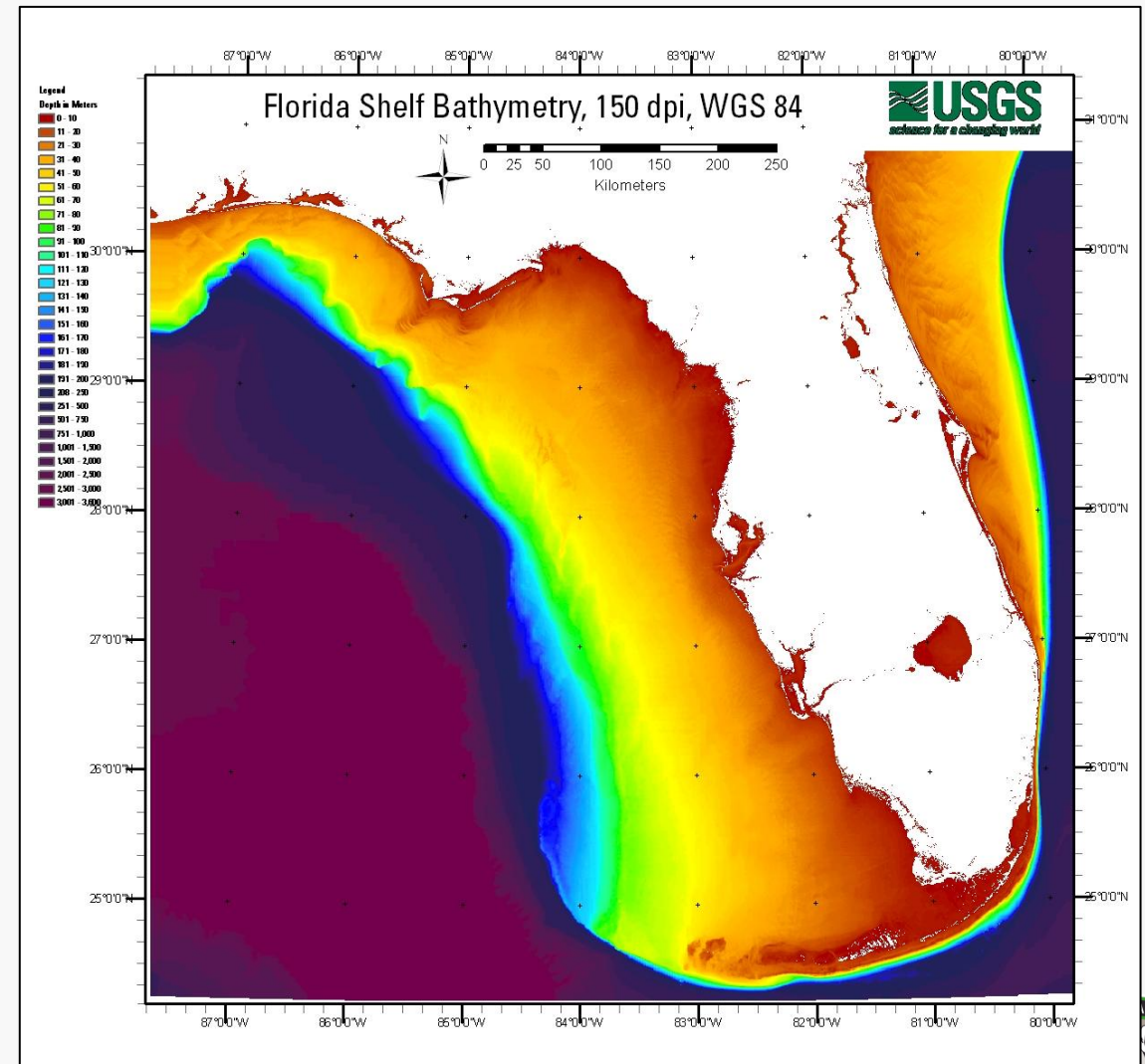
Seyoum et al. (2015)

- In the southeastern US, the stock structure of Hogfish more closely resemble the stock structure of inshore and nearshore fishes than that of offshore reef fishes or large coastal pelagic fishes.
- Strong genetic differences between the Gulf and Atlantic coasts of Florida are known for several estuarine and nearshore marine fishes,
 - E.g., common snook, red drum, and spotted seatrout.
 - Strong genetic and phenotypic differences between Gulf and Atlantic coasts of Florida recognized for the shelf-dwelling reef fish black sea bass.



Spatial Demographics: Florida Bathymetry

- Florida Reef Tract
 - Largely ~30 m depths or less (red) with steep drop off into deeper waters
 - Fisheries concentrated in these areas
- Contrast to West Florida Shelf with more widely available offshore habitat
 - >30 m (orange-yellow-green)
 - Fisheries historically operate more nearshore but offshore effort has been expanding
- Atlantic shelf widens towards FL-GA border
 - Increased offshore habitat (orange-yellow)

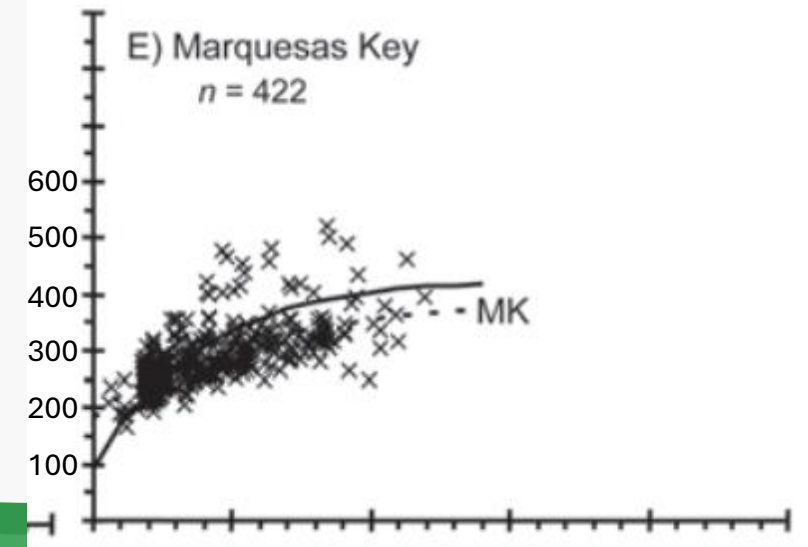
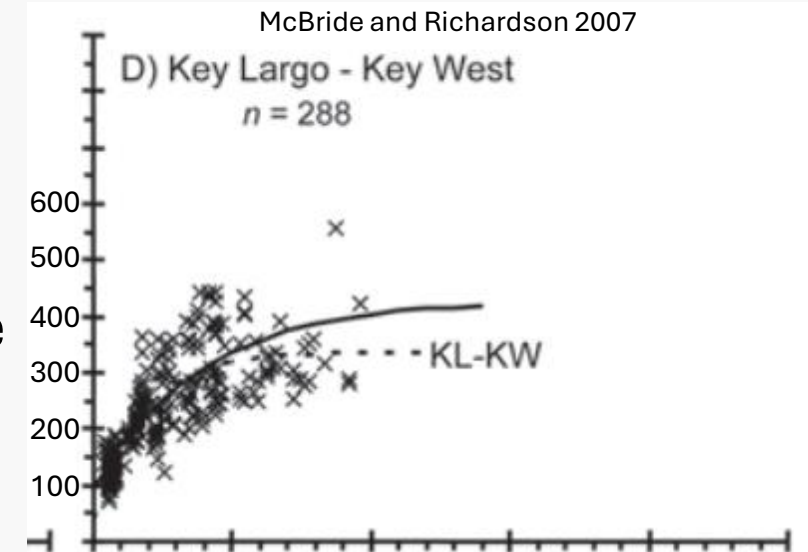
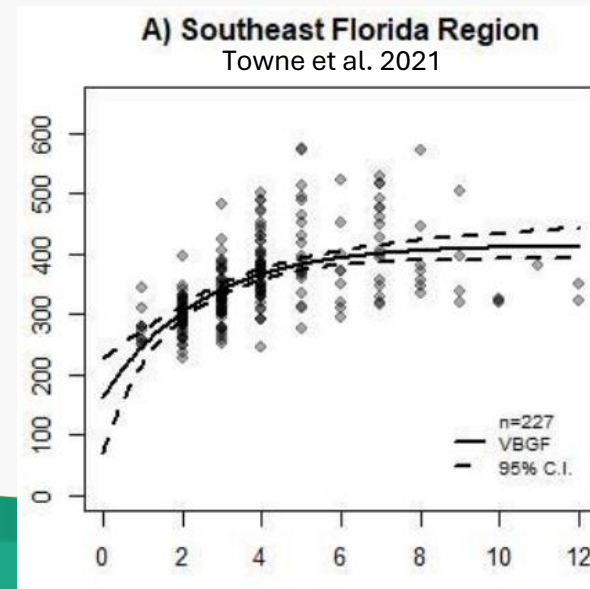
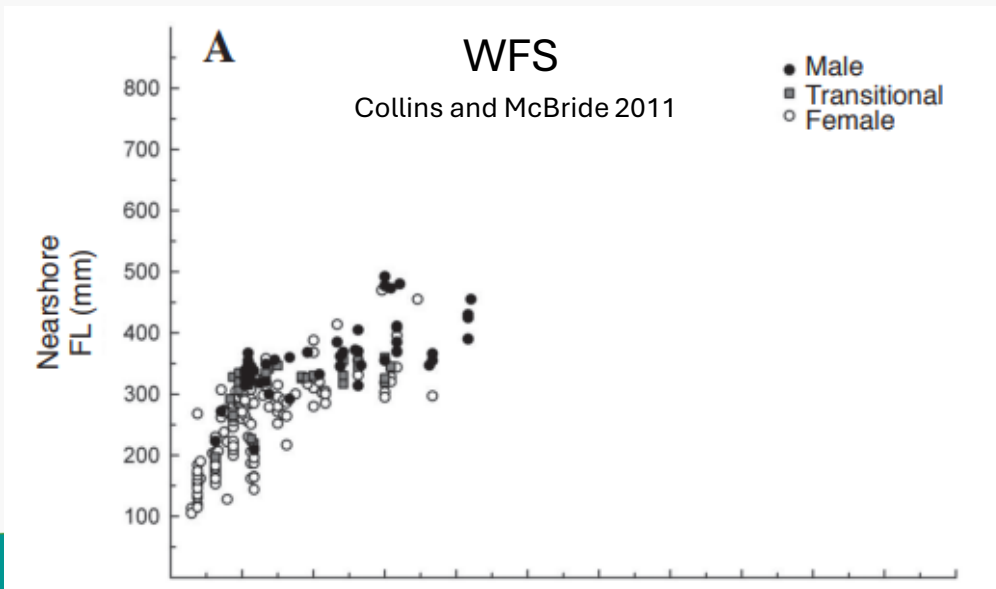


Robbins et al. 2007. Cartographic Production for the Florida Shelf Habitat (FLaSH) Map Study: Generation of Surface Grids, Contours, and KMZ files.

Florida Bathymetry: Nearshore vs. Offshore

Common ground:

- Length-at-age in nearshore waters look similar (truncated) for WFS and FL Keys
 - Collins and McBride (2011), McBride and Richardson (2007), Towne et al. (2021)
- Fishing pressures within FL largely highest in nearshore waters
 - Hogfish densities also highest nearshore
 - e.g., WFS; Collins and McBride (2011), Klimek and Switzer (2025)



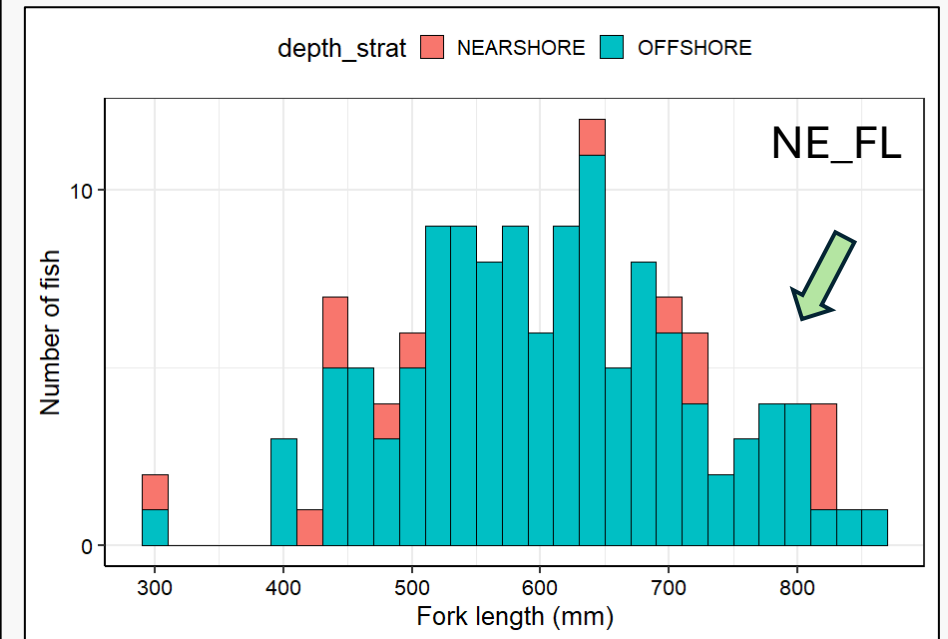
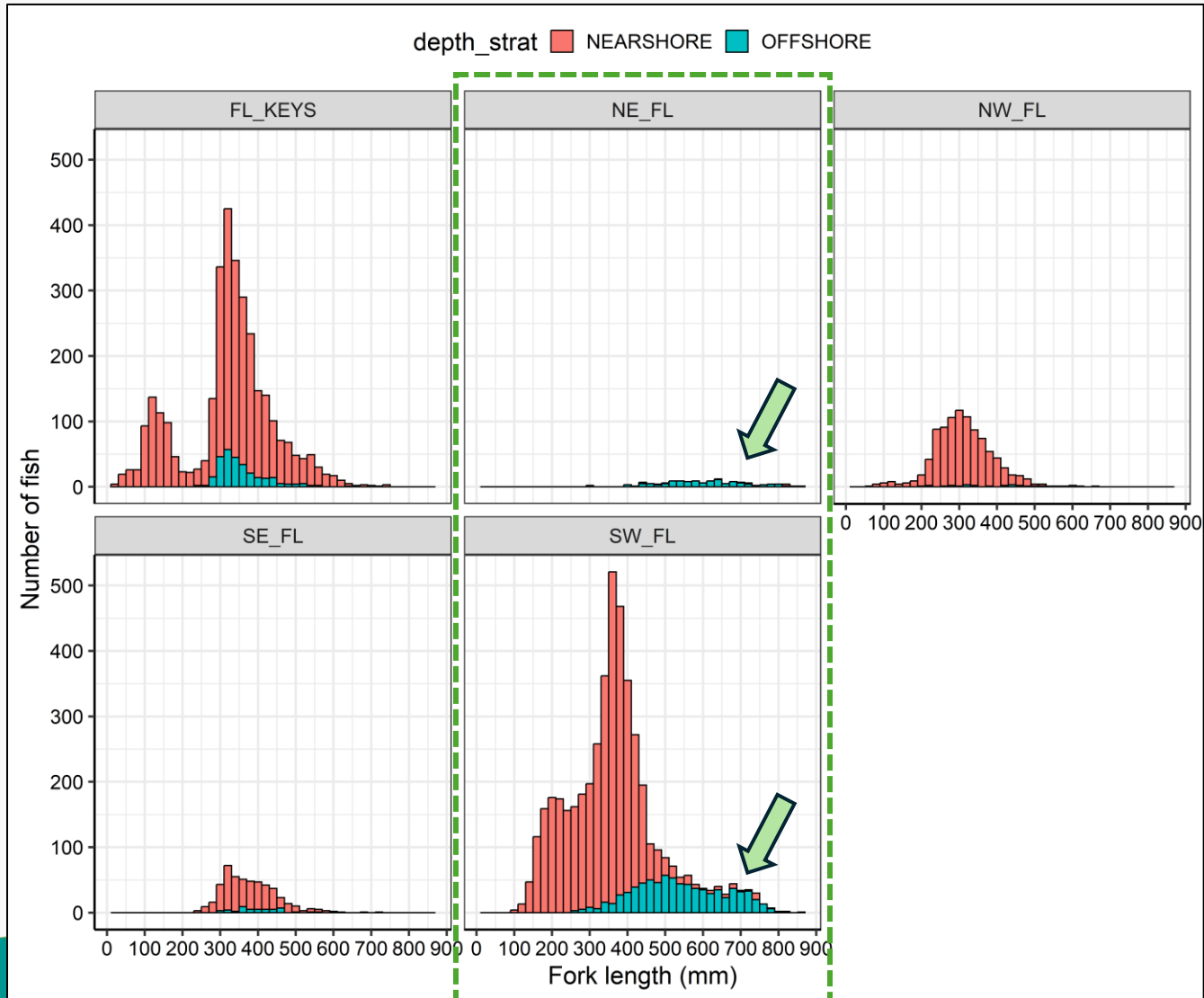
Florida Bathymetry: Nearshore vs. Offshore

Common ground:

- Offshore waters may be acting as a *de facto* refuge for faster growing and largest fish (Collins and McBride 2011)
 - Greater offshore habitat availability on the much wider WFS
 - Larger and older fish observed, but also ages 1-2 subadults
 - In the FL Keys and SE FL, no widespread offshore habitat area
 - Limited 'refuge' from elevated fishing pressures
 - Larger fish observed in areas protected from fishing and greater access to deeper shelf habitat (e.g., Dry Tortugas area)
 - Shelf widens again off NE FL with more available offshore habitat
 - TIP length samples show larger hogfish from offshore waters collected (No age samples)
 - Historically, fishing pressure greatly reduced offshore due to time/resources
 - Has been shifting in the recreational fishery and will likely continue



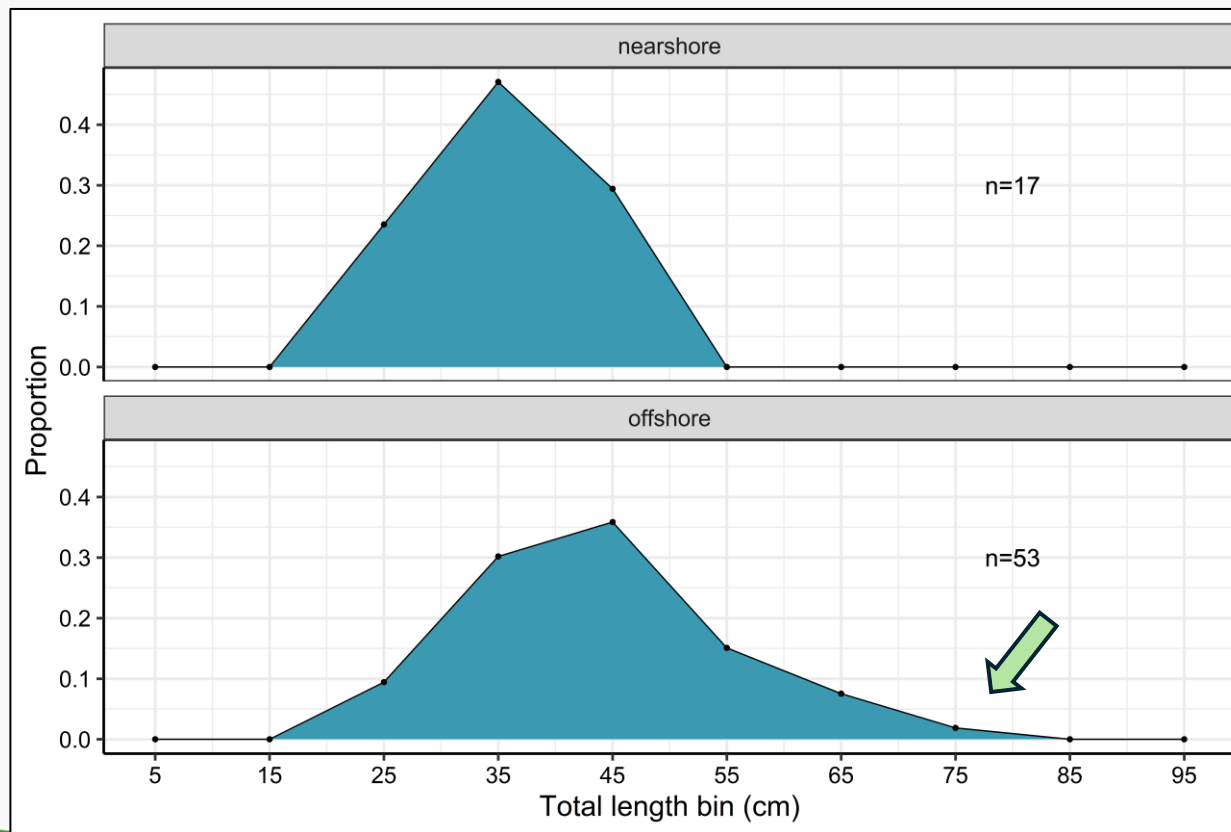
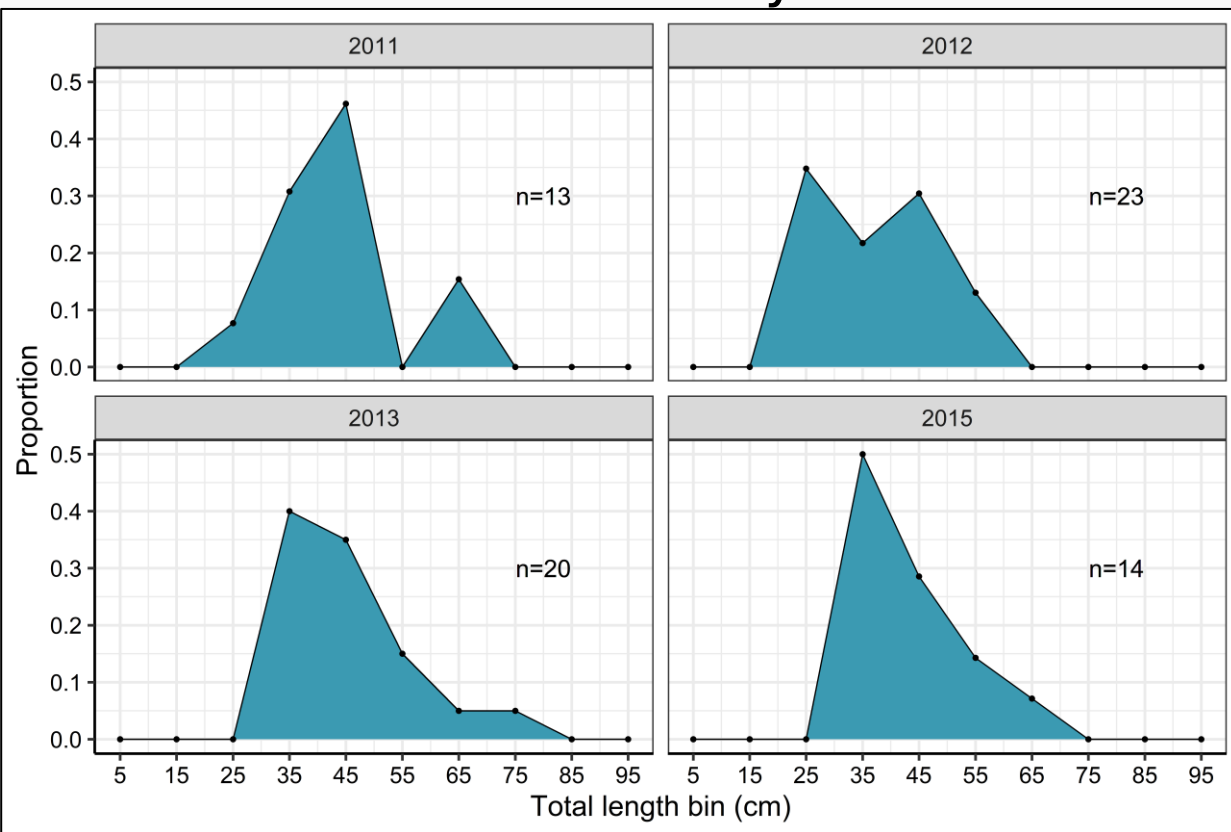
Florida Bathymetry: Nearshore vs. Offshore



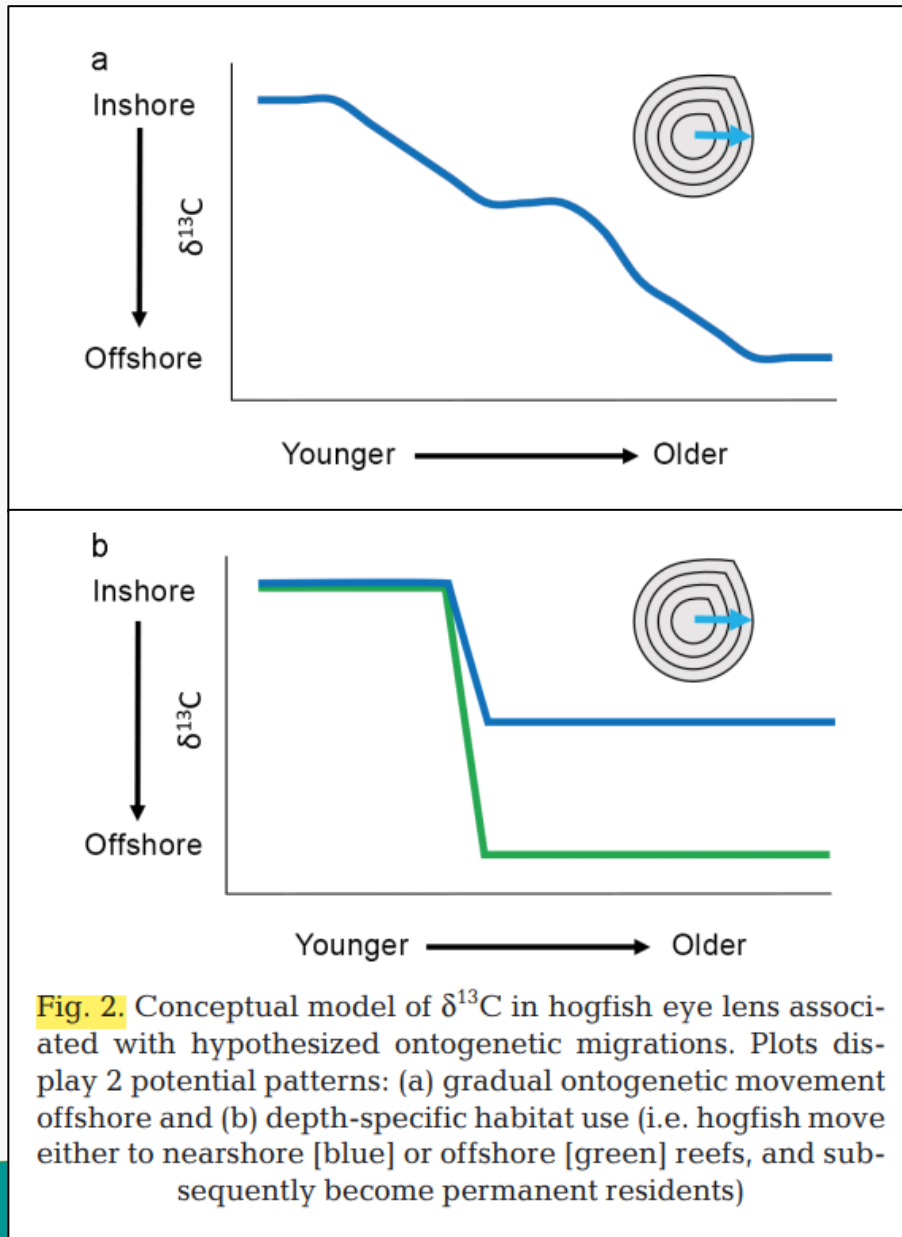
Florida Bathymetry: Nearshore vs. Offshore

Riley's Hump Tortugas South Conservation area (from R. Muñoz, SEFSC)

- Diver survey (similar to RVC) in nearshore and offshore depths
- 70 fish measured in 4 years

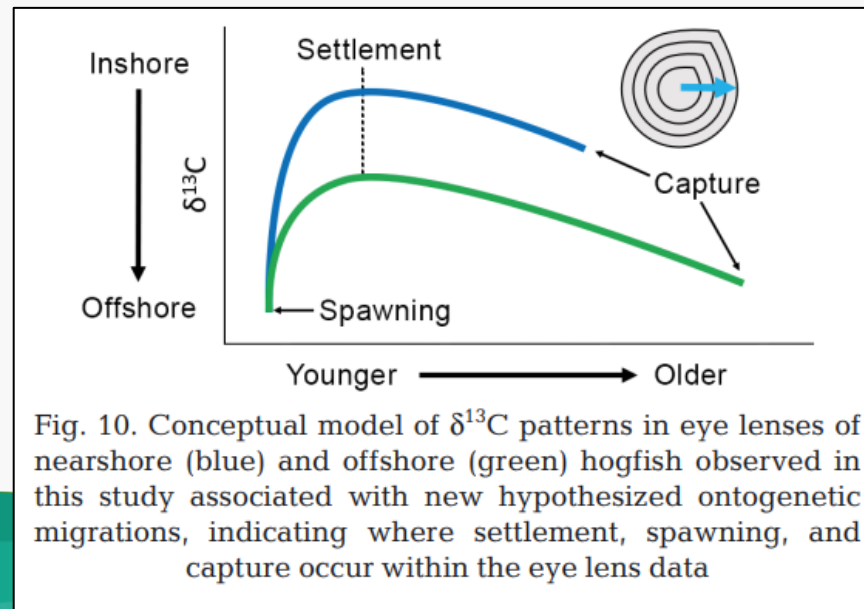


Ontogenetic linkages



Faletti and Stallings (2021)

- Ontogenetic linkages between nearshore and offshore fish habitats using stable isotope analysis on the WFS
- N = 27 fish (eye lenses)
- “Adult hogfish in deeper habitats likely inhabited deeper juvenile habitats (i.e. nearshore reefs), while adult hogfish inhabiting shallower adult habitats likely used shallower juvenile habitats” (i.e. estuaries, seagrass beds)
- Agreement in Big Bend region (ECK) as most used juvenile habitat



SEDAR 94: Florida Hogfish Management History



Assessment History

SEDAR 37 (2014) and S37 Update (2016)

- Conducted in Stock Synthesis v3.24

WFS (Update): 1986 – 2016	FL KEYS/EFL: 1986 – 2012	GA/NC: 1986 – 2012
5 fleets: - Commercial spear (dome) - Commercial hook-and-line (flat-top) - Commercial trap (dome) - Recreational spear (dome) - Recreational hook-and-line (dome)	5 fleets: - Commercial spear (dome) - Commercial hook-and-line (flat-top) - Commercial trap (flat-top) - Recreational spear (dome) - Recreational hook-and-line (dome)	4 fleets: - Commercial spear (flat-top) - Commercial hook-and-line (flat-top) - Commercial trap (flat-top) - Recreational hook-and-line (flat-top)
8 IOAs 4 FD – Selectivity linked to fleets 4 FI – Dome shaped selectivity	6 IOAs 4 FD – Selectivity linked to fleets 2 FI: RVC Tortugas (flat-top), RVC FL Keys (dome)	1 IOA 1 FD – selectivity linked to fleets
Notes: Evidence of misspecification via strong retrospective pattern	Notes: - Life history based on WFS - Evidence of misspecification via ASPM diagnostic	Notes: - Life history based on WFS - Serial autocorrelation in index residuals - Evidence of misspecification via strong retrospective pattern

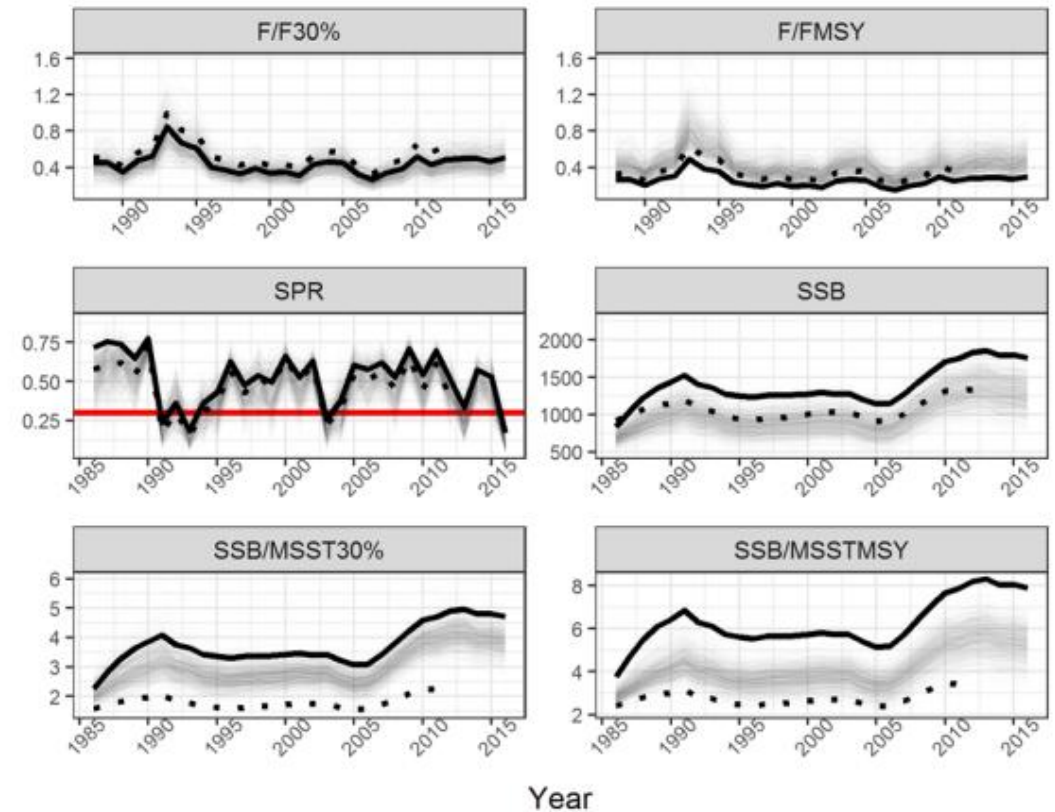
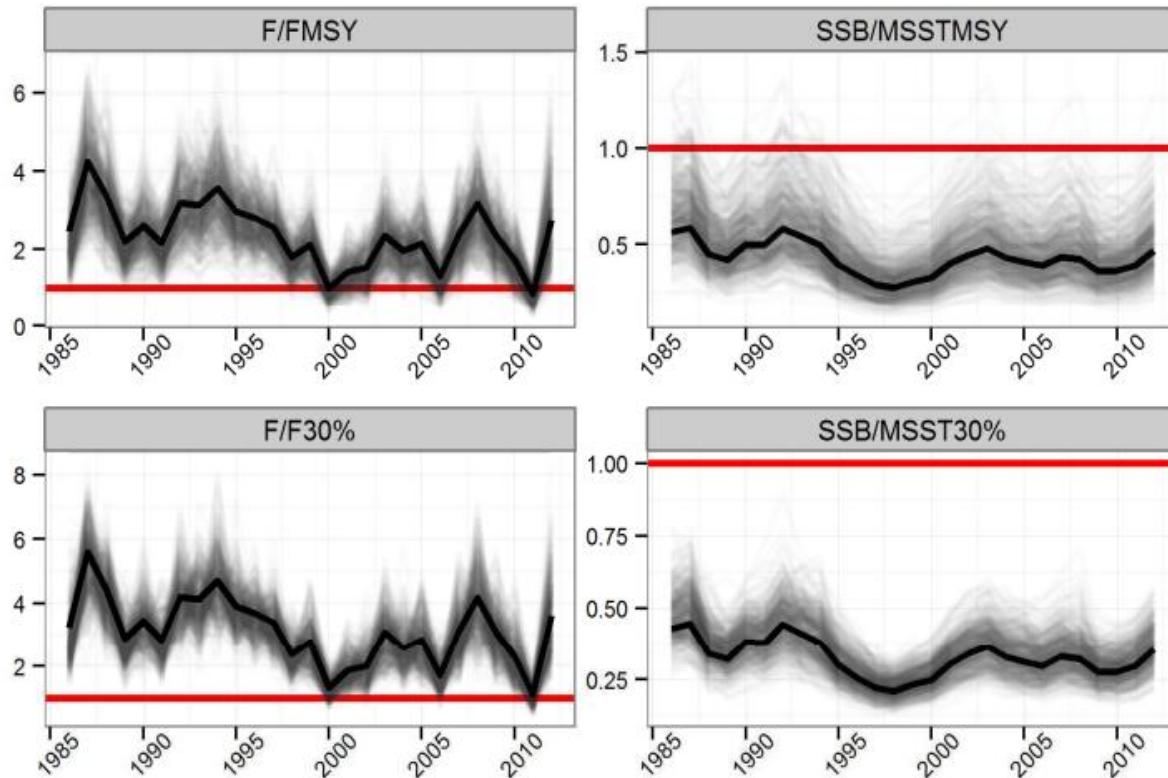


SEDAR 37 Stock Status



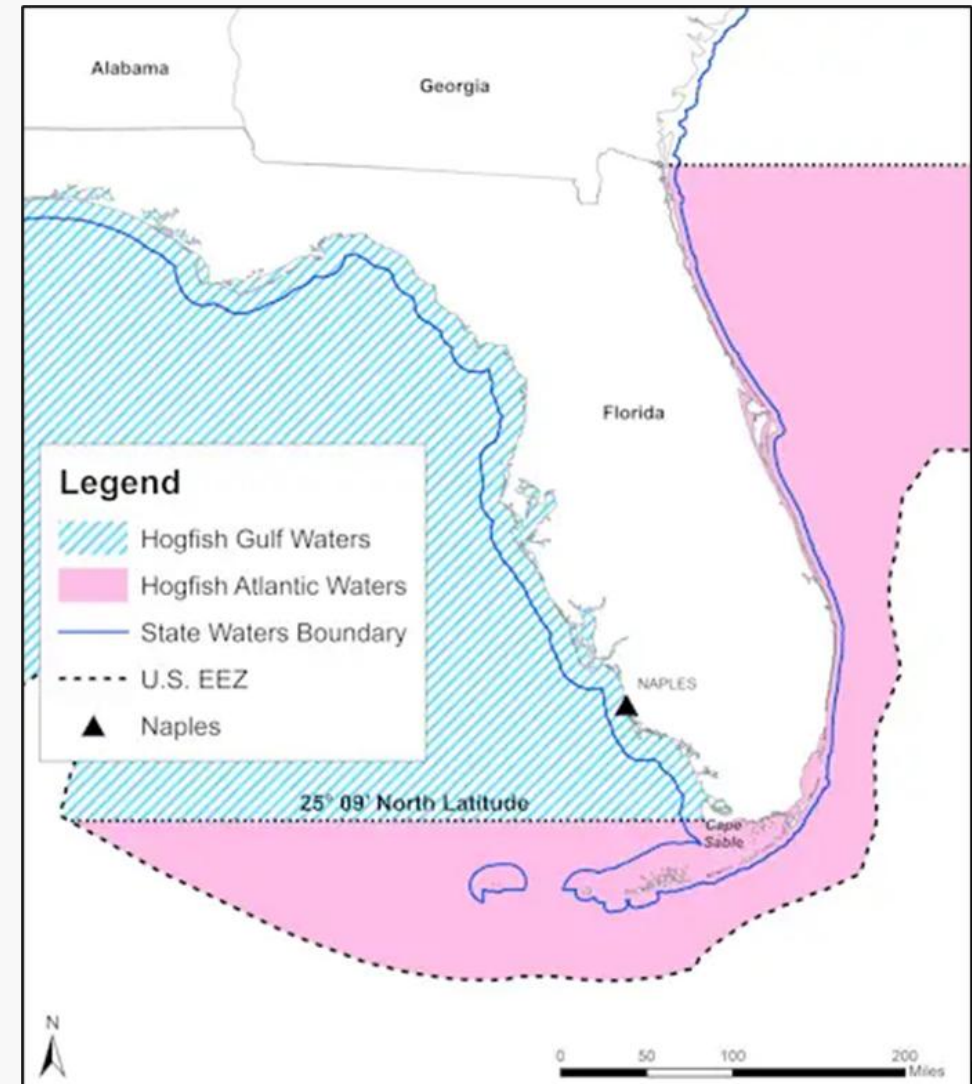
SEDAR 37 (2013)
Florida Keys/East FL
Overfished
Undergoing overfishing

SEDAR 37U (2017)
West Florida Shelf
Not overfished
Not undergoing overfishing



SAFMC Snapper Grouper Amendment 37

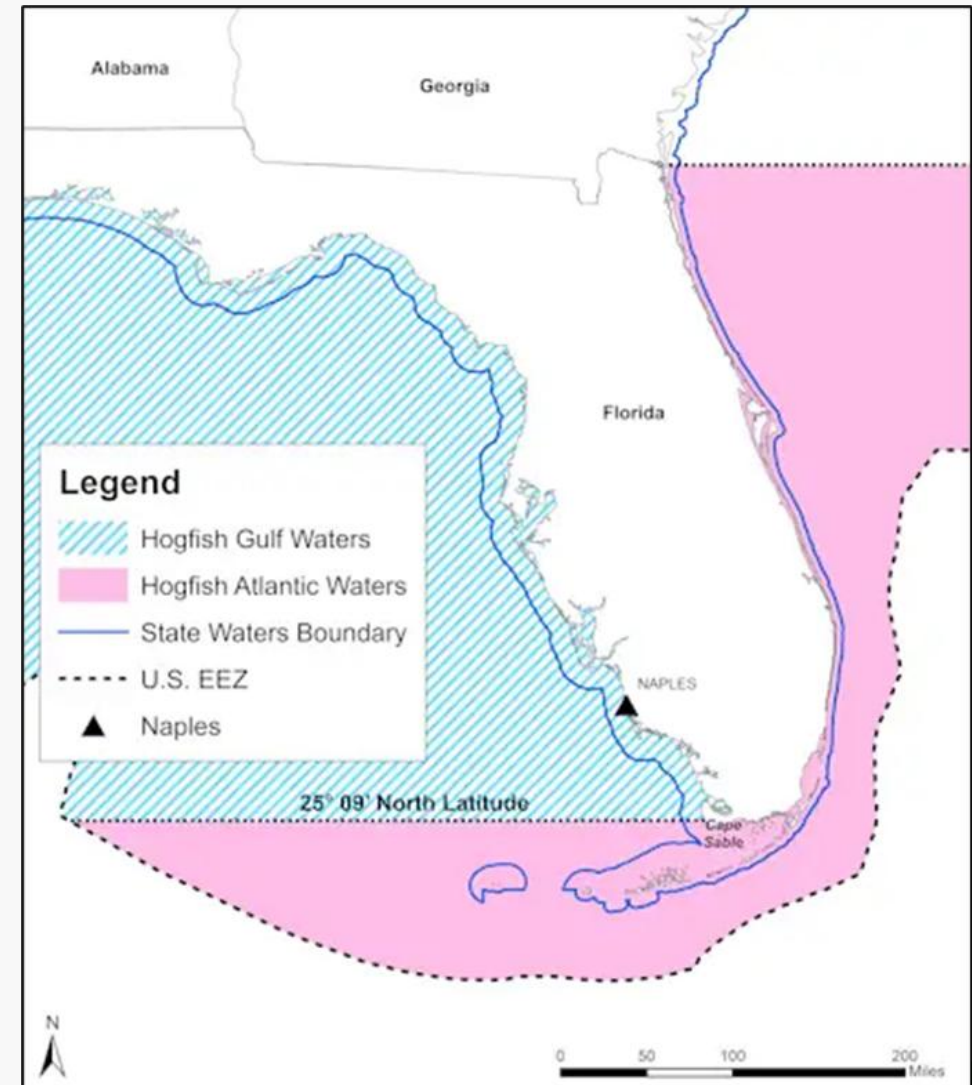
- Implemented Aug 14, 2017
- **Stock boundary for Gulf/Atlantic**
 - 25 degrees 9 min N Lat (Cape Sable).
- $MSY = F_{30\%SPR}$
- $MSST = 75\%$ of SSB_{MSY}
- Increased min. size from 12" FL to 16" FL
 - 14" FL in Gulf (RF Amend. 43; 8/24/17)
- Modified Rec bag limit: 1/p/d.
- Established a Rec season: May – Oct.
- Established OY and ACL
 - 10yr rebuild plan for FLK/EFL stock



Current Stock Management

Fishery Management Units

- Florida Keys/East Florida stock managed by the South Atlantic Fishery Management Council (SAFMC)
- West Florida Shelf stock managed by the Gulf Council (Gulf).
- FL FWC participates in management within its state waters



Size Limit History

South Atlantic Federal (3 – 200 Miles)

- 12” (305 mm) FL (01/1995 – 08/2017)
- 16” (406 mm) FL (08/2017 – present)

Gulf Federal (10 – 200 Miles)

- 12” (305 mm) FL (11/1999 – 08/2017)
- 14” (356 mm) FL (08/2017 – present)

FL State Waters South Atlantic (0 – 3 Miles) & Gulf (0 – 10 Miles)

- 12” (305mm) FL (07/1994 – 08/2017)
- 16” FL in Atlantic, 14” FL in Gulf (08/2017 – present)



Trip Limit History – Federal and FL State Waters

South Atlantic

Commercial

- 25 lbs. ww per boat per day
(08/2017 – present)

Recreational

- 5 fish per person per day (07/1994 – 08/2017 [FL], 05/1995 – 08/2017 [SA])
- Open May 1 – Oct. 31: 1 fish per person per day (08/2017 – present)

Gulf

Commercial

- None

Recreational

- 5 fish per person per day
(11/1999 – present)



Fishery/Spatial Closures in Florida

WFS

- Madison-Swanson (6/2004 – present)
 - Fishing prohibited
- The Edges (7/2009 – present)
 - Fishing prohibited Jan 1 – Apr 30
- Steamboat Lumps (6/2004 – present)
 - Fishing prohibited
- Pulley Ridge (1/2006 – present)
 - Bottom gears prohibited

Florida Keys

- Riley's Hump (2/1994 – 8/2002)
 - Fishing prohibited May 1 – Jun 30
- Tortugas Reserves (8/2002 – present)
 - Fishing prohibited

FL State Waters

- Western Dry Rocks
 - April 1 – July 31 (4/2021 – present)



Thank You!

