

# Goliath Grouper

Review and Discussion

February 8, 2017

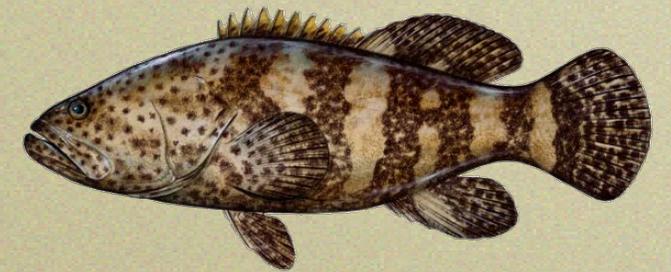
**Florida Fish and Wildlife Conservation Commission**

Division of Marine Fisheries Management and Fish and Wildlife Research Institute

# Background

## Management philosophies for goliath grouper are highly divergent

- Preserve for ecotourism
- Role in the ecosystem
- Concerns about the distribution outside of Florida
- Considered a nuisance species by some
- Desire for limited harvest



# Outline

1. Management history
2. Life history
3. Stock assessment results
4. Recent science and research needs
5. Federal and state waters management
6. Stakeholder perspectives
7. Management options
8. Proposed stakeholder meetings
9. Commission direction requested



# Management History

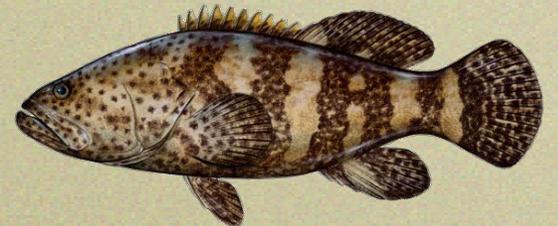
- Managed in state waters by the FWC and federal waters by the Gulf and South Atlantic councils

**During the 1980s:** The popularity of targeting goliath grouper increased and species became overfished

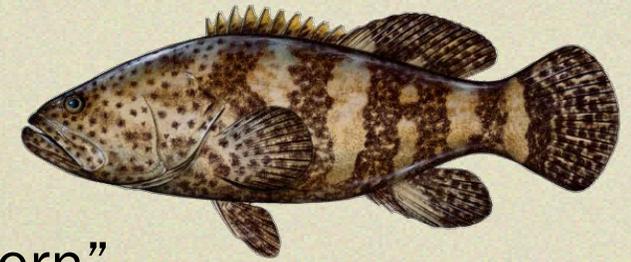
- 1983 - South Atlantic Council prohibited spearing in federal waters
- 1985 - Florida set an 18-inch minimum size limit
- 1986 - Florida added goliath grouper to 5-fish aggregate bag limit
- 1989 - Gulf Council set 50-inch minimum size limit

**1990:** Harvest prohibited in Florida state waters and Gulf and South Atlantic federal waters

**1994:** Listed as critically endangered by the IUCN



# Recent Goliath Grouper History



**2006:** Removed from NOAA Fisheries’ “species of special concern” but still considered “critically endangered” by IUCN

- Some parts of the Caribbean still allow harvest

**2007:** Councils requested that NOAA Fisheries work with FWC to determine how to move goliath grouper beyond the moratorium

- **2013:** Joint Ad Hoc Council Goliath Grouper Committee formed to determine if data were available to conduct a new stock assessment
  - FWC agreed to take the lead on a new assessment and committee dissolved

**2016:** Federal assessment completed and rejected for use in management

- Councils chose to take no action on goliath grouper in federal waters



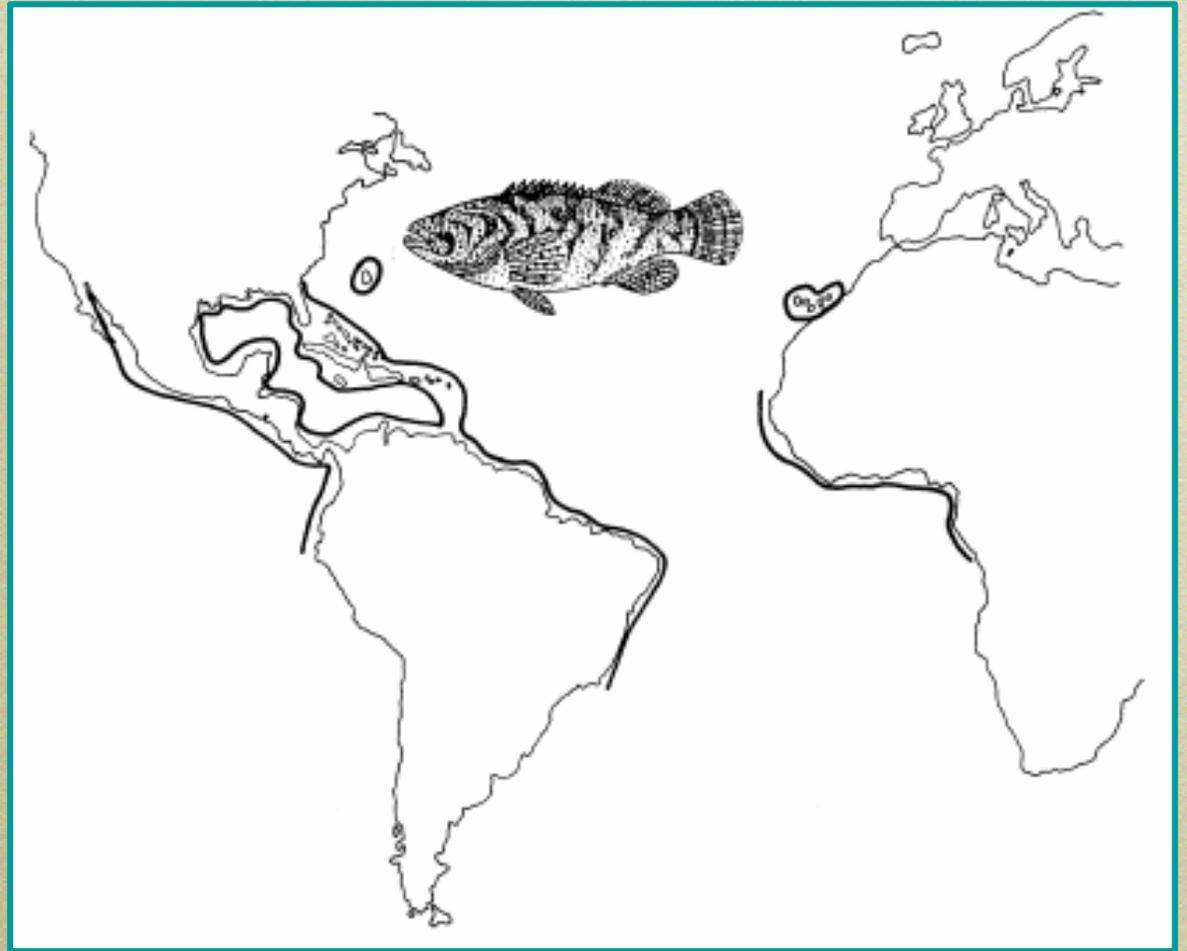
# Background

- Decline caused by a number of factors
  - Popular fishing target
  - Long-lived
  - Declining juvenile habitats
  - Concentrations of goliath grouper occur in places where fishermen congregate
- Councils set a 50% SPR management goal
- Stock assessments conducted in 2004, 2010, and 2016
  - All assessments rejected for use in federal management



# Goliath Grouper Distribution and Biology

- Historically ranged from Florida to Brazil and throughout the Gulf of Mexico and Caribbean
- U.S. population may serve as source of larvae to the wider Caribbean
- Current distribution in U.S. concentrated in S. Florida
- Long-lived (37+ yrs), slow growth
- Late maturity (3-6 yrs)
- Spawning occurs in aggregations from July to Sept.
- Susceptible to large-scale mortality events like red tide and cold-weather kills

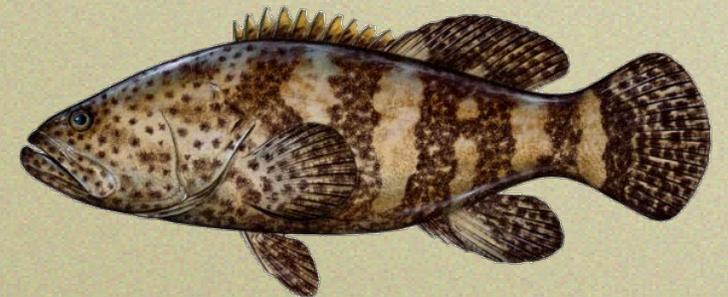


# Goliath Grouper Life History



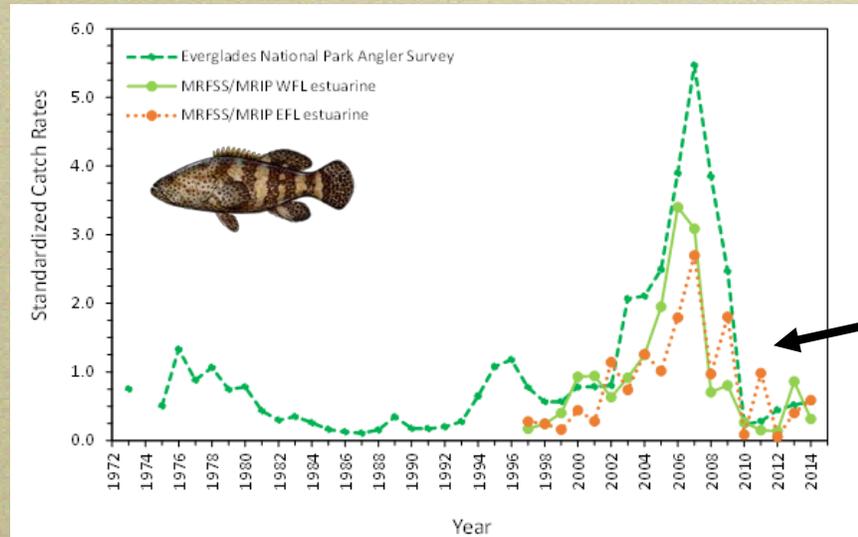
# Goliath Grouper Assessment Challenges

- Goliath grouper lacks the data typically used in standard stock assessments
- Last assessment not accepted by independent review panel
  - 20 years of no landings
  - Historical landings uncertain
  - Unknowns in life history
  - Unable to determine status of fishery
- Assessments can only provide “relative stock status”
  - Evaluate current stock relative to past abundance
  - Only option for data-poor stocks



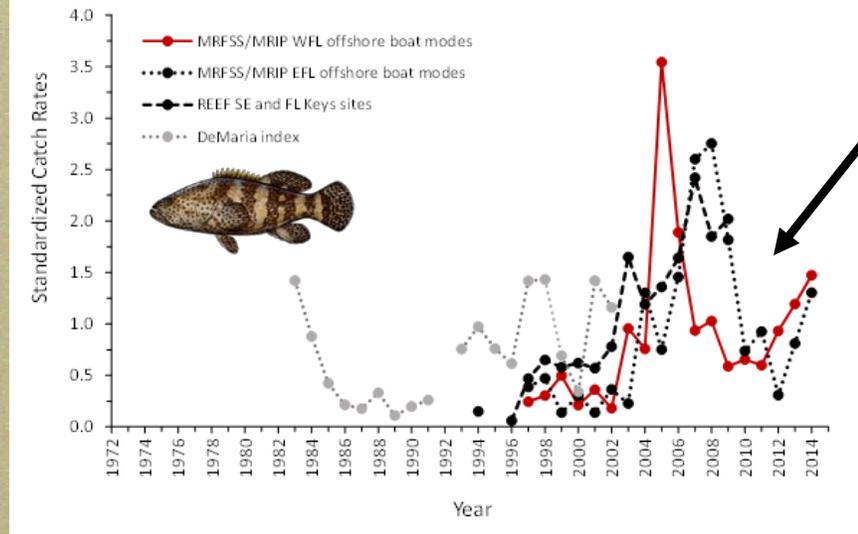
# Goliath Grouper Catch Rates for Different Surveys

Juveniles



The goliath grouper population was severely impacted by the 2010 cold-kill event

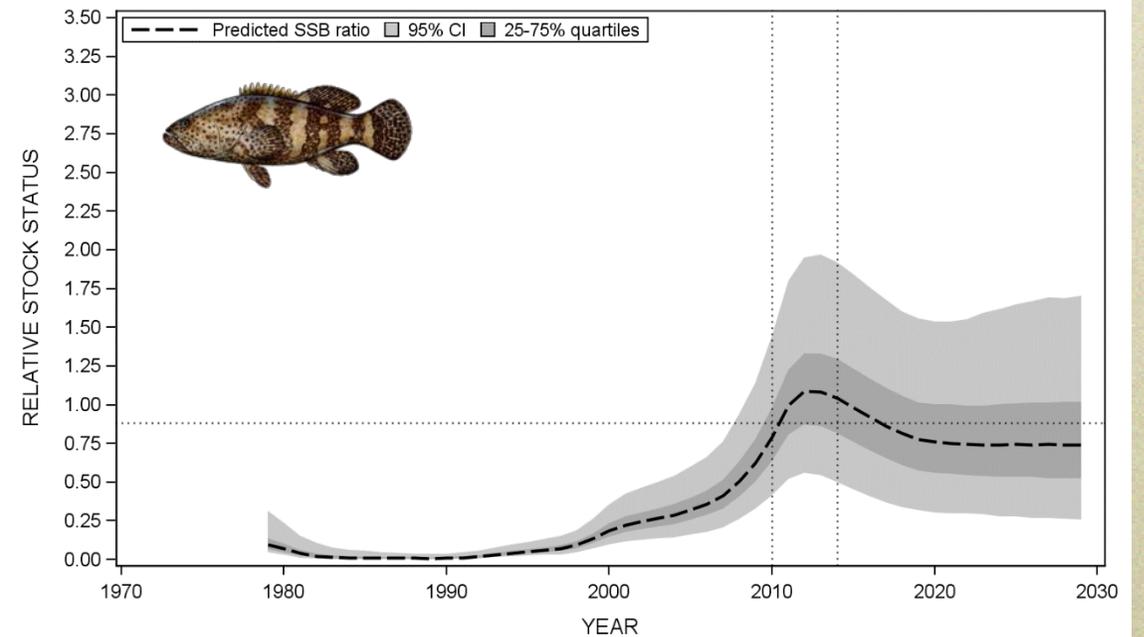
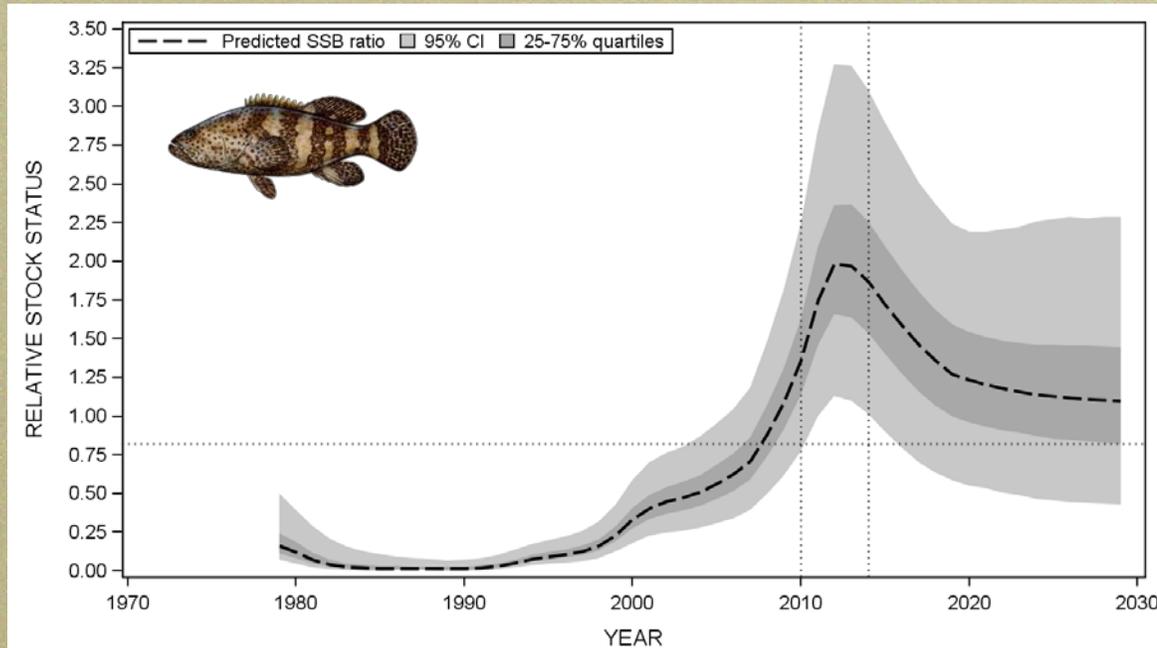
Adults



# Uncertain Maximum Age Contributes to Uncertainty in Stock Status

Stock status for an assumed maximum age of 37 years

Stock status for an assumed maximum age of 56 years



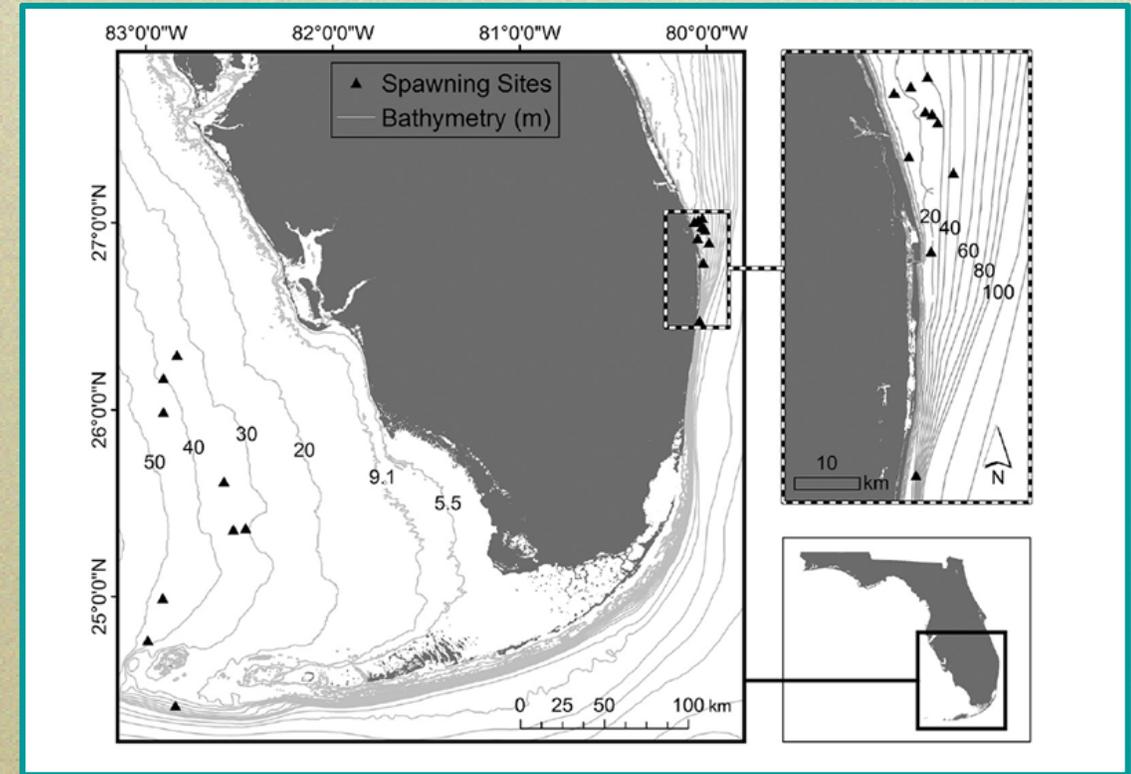
# Goliath Grouper Assessment Summary

- Data gaps prevent the use of standard assessment methods
- Relative assessments require more assumptions
- Available indices of abundance follow similar patterns
- Harvest closure has increased abundance and stock is likely to be recovered in Florida but not throughout their range
- Review panel rejected the assessment, preventing its use in federal management



# Recent Goliath Grouper Spawning Research

- Confirmed spawning aggregation sites identified in south Florida
- SE Florida sites attract fish from long distances (e.g., south GA)
- Indications that goliath grouper might be hermaphroditic
- Fin ray-based aging indicates fish at these sites  $\leq 20$  years old



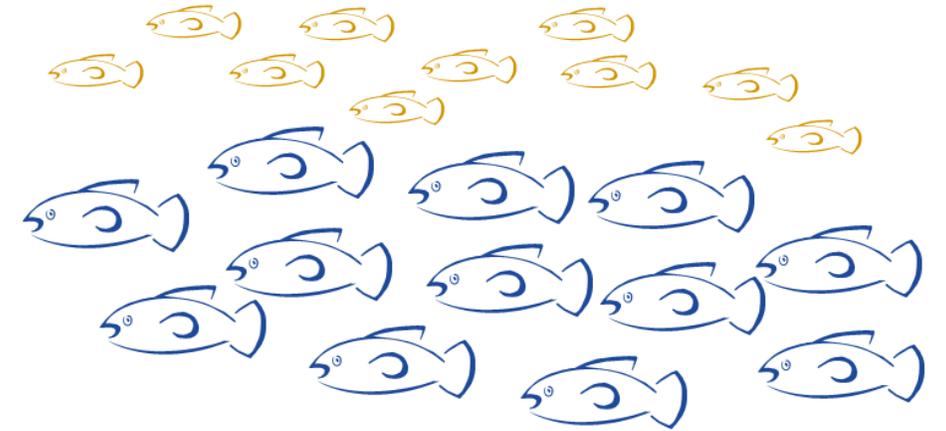
Source: Koenig et al. 2016



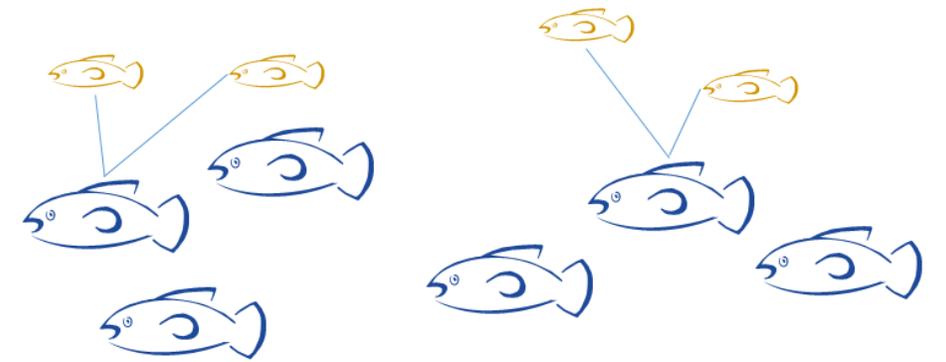
# Potential Use of Genetic Analysis for Population Abundance

- A group of Florida researchers is exploring the use of a novel, non-lethal genetic method to estimate goliath grouper population abundance
- The technique is called 'Close-Kin' analysis
- It uses the proportion of Parent-Offspring-Pairs (POP's) to estimate the number of adults in the population

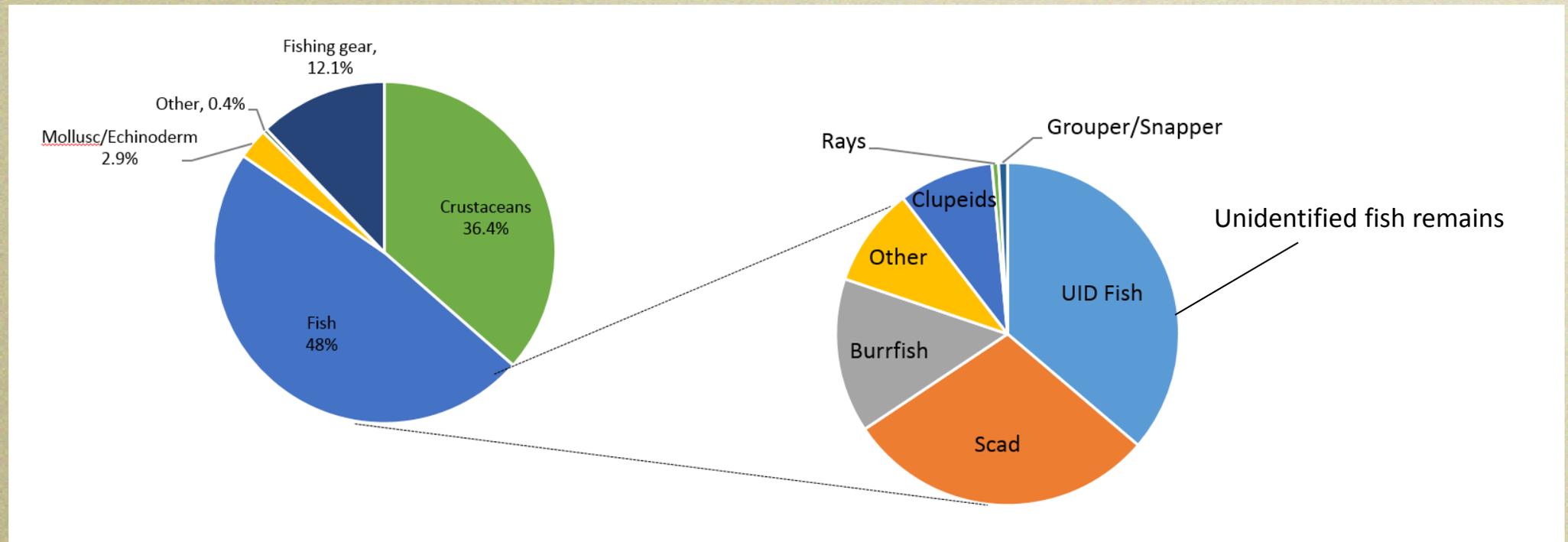
Adults and juveniles in the population



6 adults and 4 juveniles and parent-offspring-pairs



# Goliath Grouper Diet Information



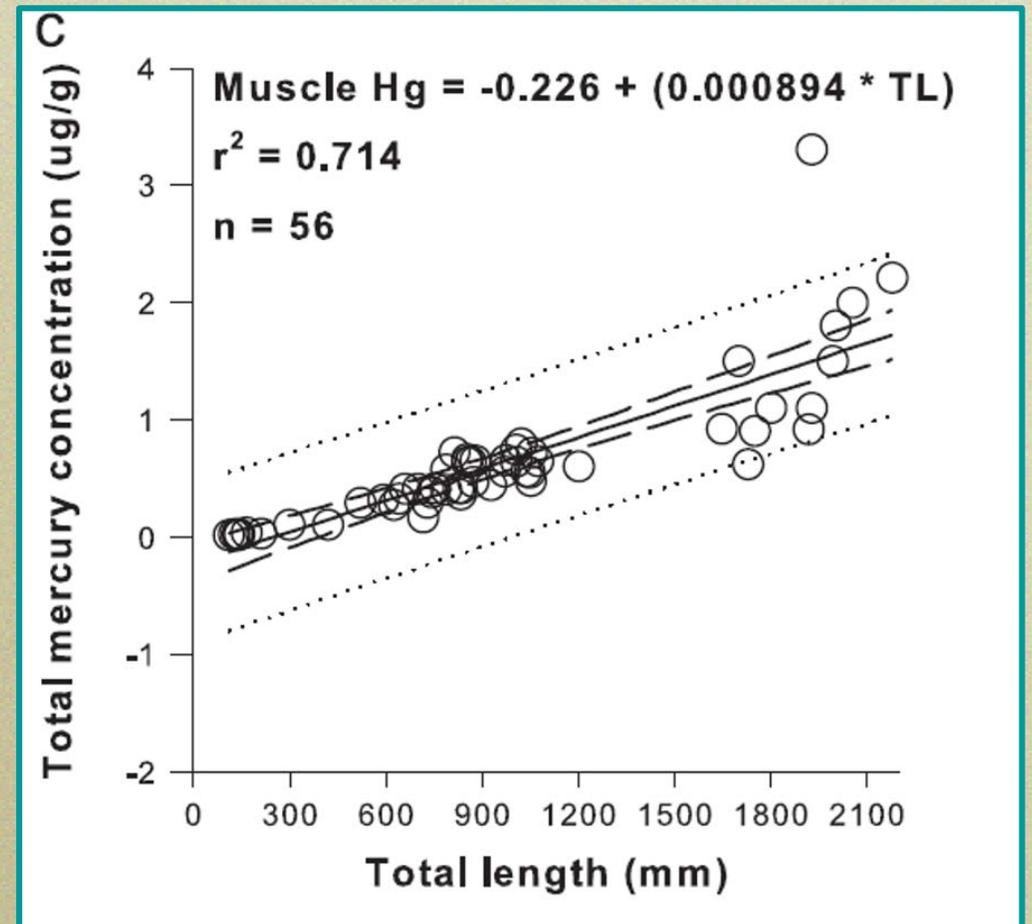
Source: Koenig et al. 2016

- Goliath grouper are opportunistic feeders that consume a variety of benthic crustaceans and bottom fishes
- Most common fishes were bait fish (scad, sardines) and burrfish
- < 1% of diet was grouper or snapper



# Mercury Levels in Goliath Grouper

- Mercury concentrations within the range known to cause direct health effects
- Mercury concentrations higher in larger goliath grouper (fish greater than 4 feet)



Source: Adams and Sonne 2013



# Economic Study on Dive Value

2016 study done by Univ. of Miami on recreational diver willingness to pay for goliath grouper encounters:

- Recreational divers are willing to pay around \$100 for one goliath grouper sighting
- Diver willingness to pay for goliath grouper spawning aggregation sites is almost \$200
- There is high consumer surplus for divers targeting goliath grouper aggregations
- This consumer surplus would diminish with decreases in abundance of goliath grouper



# Research Needs

1. Information on abundance over broader part of the range (i.e., not just from South Florida)
2. Historic and contemporary stock productivity metrics
  - Assessments usually use landings data for this
3. Better information on reproduction
  - Are they hermaphroditic or separate sexes?
4. Age composition
  - Are we getting older fish back in the population?



# Federal and State Waters Management

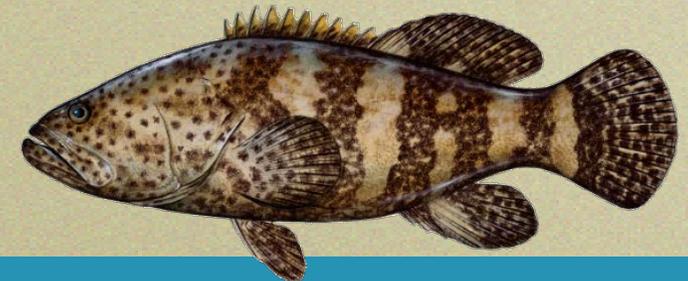


## Council/Federal Waters

- The Acceptable Biological Catch (ABC) is zero
  - Includes state and federal waters
- Councils have no immediate plans to consider a harvest strategy for federal waters
- Unlikely to change without an accepted stock assessment

## State Waters

- FWC can allow harvest in state waters



# Stakeholder Perspectives

## Management philosophies for goliath grouper are highly divergent

- Preserve for ecotourism
- Role in the ecosystem
- Concerns about the distribution outside of Florida
- Considered a nuisance species by some
- Desire for limited harvest



# Stakeholders Perspective Study by UF

Stakeholder experiences and attitudes are diverse, particularly within the recreational fishing groups

- Recreational rod-and-line fishers: Have a positive attitude toward goliath encounters and contribution to biodiversity
  - Very moderately in favor of opening the fishery
- Recreational spearfishers and commercial fishers: View goliath encounters and ecological impacts more negatively
  - More strongly in favor of opening the fishery to harvest
- Sightseeing divers, dive charters and non-fishing conservation organization members: View contribution of goliath to biodiversity as positive
  - Oppose opening of the fishery to harvest



# Two Management Options

- 1) Status quo
- 2) Limited harvest



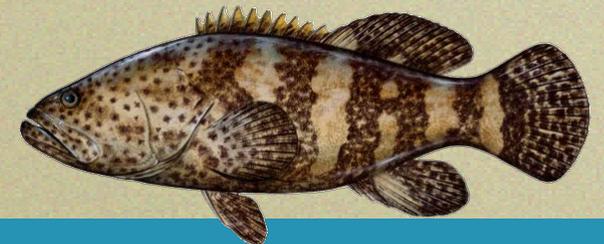
# Status Quo

- Catch-and-release fishing allowed
- No harvest
- Maximize dive viewing opportunities
- Manage for high numbers of large fish
- Optimize ecosystem values



# Research Needs Accomplished

- *Research needs that can/will be achieved by keeping status quo*
- ✓ Information on abundance and distribution (via fisher reports through a smartphone app and collection of fin clips)
- ✓ Information on range expansion
- FWC is developing a smartphone/tablet app to facilitate collection of geo-referenced information on goliath grouper numbers and sizes by Florida fishers and divers



# Limited Harvest

- Provide harvest opportunities
- Not expected to impact stock sustainability
- Minimal impacts to dive community

Goal: Providing harvest opportunities on a recovering species without impacting the rate of recovery



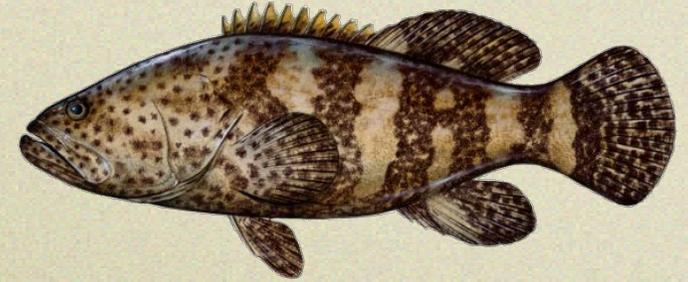
# Research Needs Accomplished

- *Research needs that could be achieved by having a limited harvest*
- ✓ Information on abundance and distribution (via fisher reports through app from fish harvested or observed)
- ✓ Information on ages
- ✓ Additional information on reproductive biology
- FWC is developing a smartphone/tablet app to facilitate collection of geo-referenced information on goliath grouper numbers and sizes by Florida fishers and divers



# Limited Harvest Opportunity Considerations

- State waters
- Could have random draw to choose participants
- If chosen, a fee could be charged
  - Fee could be up to \$300
  - Money from tag could be used for goliath research
  - Could require participants to purchase recreational fishing license
- Recreational harvest tag could be issued
  - Could allow harvest of one fish per tag per person per year
  - 100 tags could be issued annually for 4 years via random drawing
  - Tags could be issued to recreational fishermen who could choose to hire guide
- Participants could be asked to “hail in” when they have a goliath



# Limited Harvest Opportunity Considerations (cont.)

- Suggest **allowable gear**: hook-and-line only
- Suggest **slot limit**: 47 inches to 67 inches
- Suggest open areas that do not encompass spawning aggregations
- Suggest harvest not allowed during spawning months (July – September)
- Suggest no commercial harvest or sale
- Scientific sampling could occur either at check points or via cooler drop offs
- People could use app to report harvest locations as well as non-consumptive divers and anglers can use to report sightings



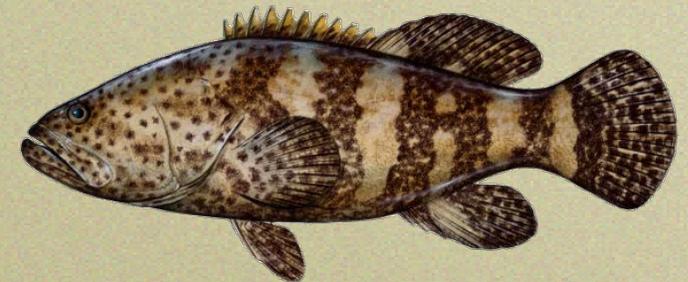
# Proposed Stakeholder Meetings

- If Commission would like to consider limited harvest, then staff suggests stakeholder meetings and outreach to obtain feedback on this topic



# Proposed Timeline if Considering Limited Harvest

- **Today:** Review and discussion
- **Now – August 2017:** Stakeholder meetings and public input gathering
- **July 2017 Commission meeting:** Update on stakeholder input



# Commission Direction Requested

- Staff looking for direction on whether or not to consider limited harvest opportunities for goliath grouper in state waters
  - If directed, staff will proceed with gathering feedback from stakeholders

