

RECREATIONAL ANGLER ATTITUDES AND PREFERENCES IN THE SOUTH ATLANTIC SNAPPER- GROUPER FISHERY



Photo: NOAA Fisheries

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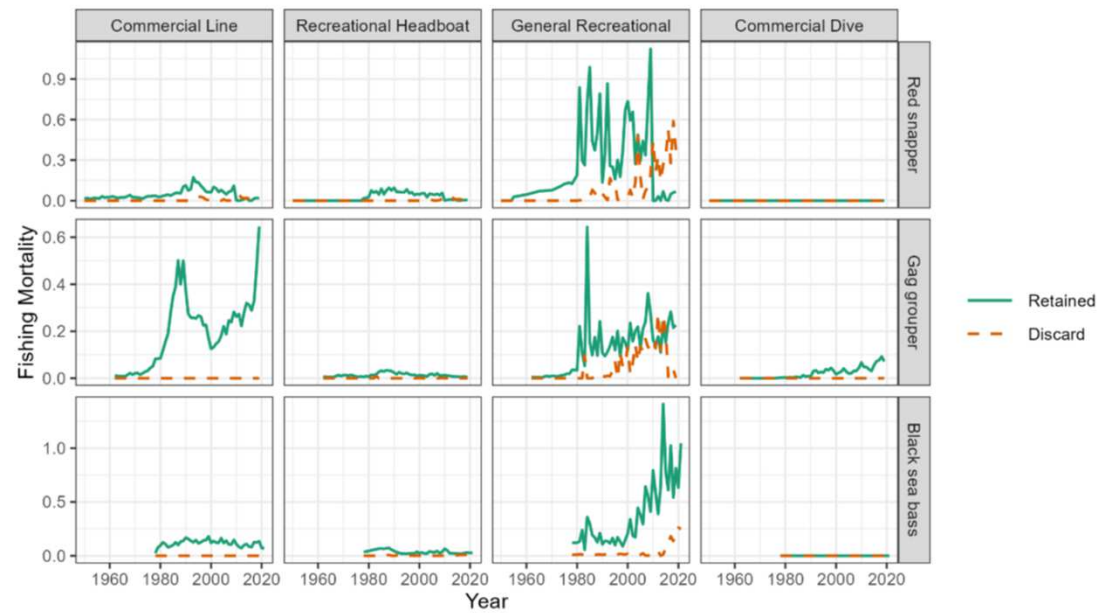
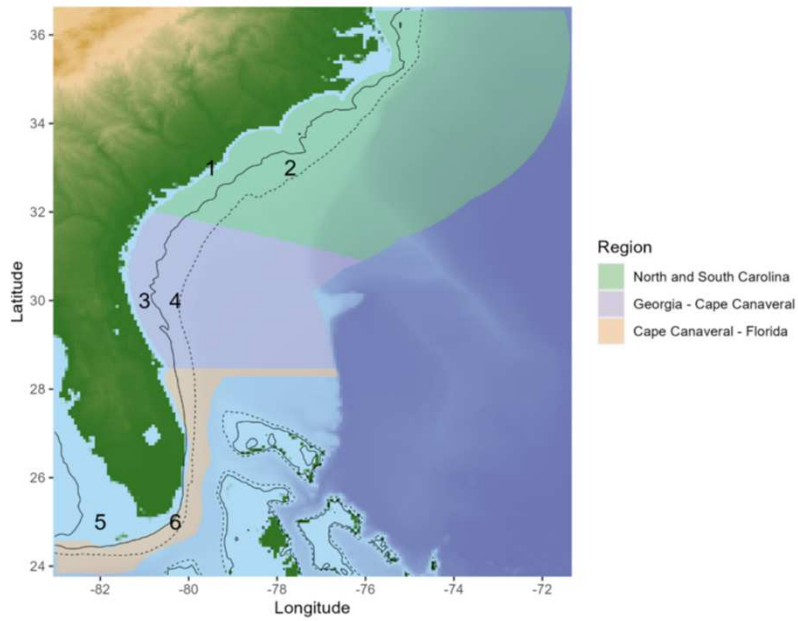
SAFMC Snapper-Grouper MSE

- Council Initiative (2022-), contracted with Blue Matter Science (MSE Modeling) and University of Florida (Situation Assessment; Recreational Angler Attitudes & Preferences)
- Focus on strategies to reduce the number of released fish to improve yield throughout the fishery snapper grouper fishery
- Considering the need for fishery access and resource use while preventing overfishing and rebuilding overfished stocks.
- Opportunity to evaluate different management strategies and their associated biological, social, and economic tradeoffs.



SAFMC Snapper-Grouper MSE

MSE Model



SAFMC Snapper-Grouper MSE

Project: Recreational Angler Attitudes and Preferences in the South Atlantic Snapper Grouper Fishery

Goal

- Gather information on private recreational angler attitudes and preferences to further develop the Snapper Grouper MSE.

Approach

- Stakeholder working group
- Literature review
- Survey of SA recreational reef anglers

Recreational Angler Attitudes and Preferences Project

Stakeholder working group

- Discuss management options in greater (qualitative) detail
- Provide input to survey design and help pre-test survey
- Available to provide feedback on survey results and MSE in future



Chip Collier (for Mike Schmidtke), Daniel Leschorn, Chris Kimrey, Catherine Bruger, David Moss, Martha Guyas, Mark Feagle, Marcel Reichert, Haley Stephens, Jeff Marinko, Jack Cox.

Finding out what anglers think

Incentivized
panel survey

Email survey of
license holders

Public comment
at meetings



Increasing selection bias

Mostly those with high interest or specific opinions respond

Survey Instrument

Frame:

- Population: Marine recreational reef fishers
- Spatial: South Atlantic states (FL, GA, SC, NC)
- Temporal: reef fished in last two years

Implementation:

- Primary: Incentivized panel (respondents get rewarded for participating)
 - Panel addresses response rate concerns and no publicly available contact information for marine recreational fishers in NC, SC, & GA.
 - Panel has some challenges, attempted to address with qualifying questions
- Secondary: Email survey of FL recreational reef permit holders (not incentivized)
 - Challenge is low response rate, even with some geographical targeting
- Initial results focus mostly on panel since this matches desired frame

Survey Instrument Components

Informed consent + background info

- Qualification question to select for “actual” reef fishers

Fishing behavior and experience

- Identification, avidity, target species

Opinions about management strategies and trade-offs

- Overall perceptions of regs and under which conditions they’re acceptable

Discrete choice experiment (DCE)

- Asked about specific levels or current or “more feasible” mgmt. actions
- Species-specific (Red Snapper and Gag Grouper) for logistics

Novel options

- General opinions (no DCE) about other “more novel” mgmt. actions

Demographics

Demographic Information

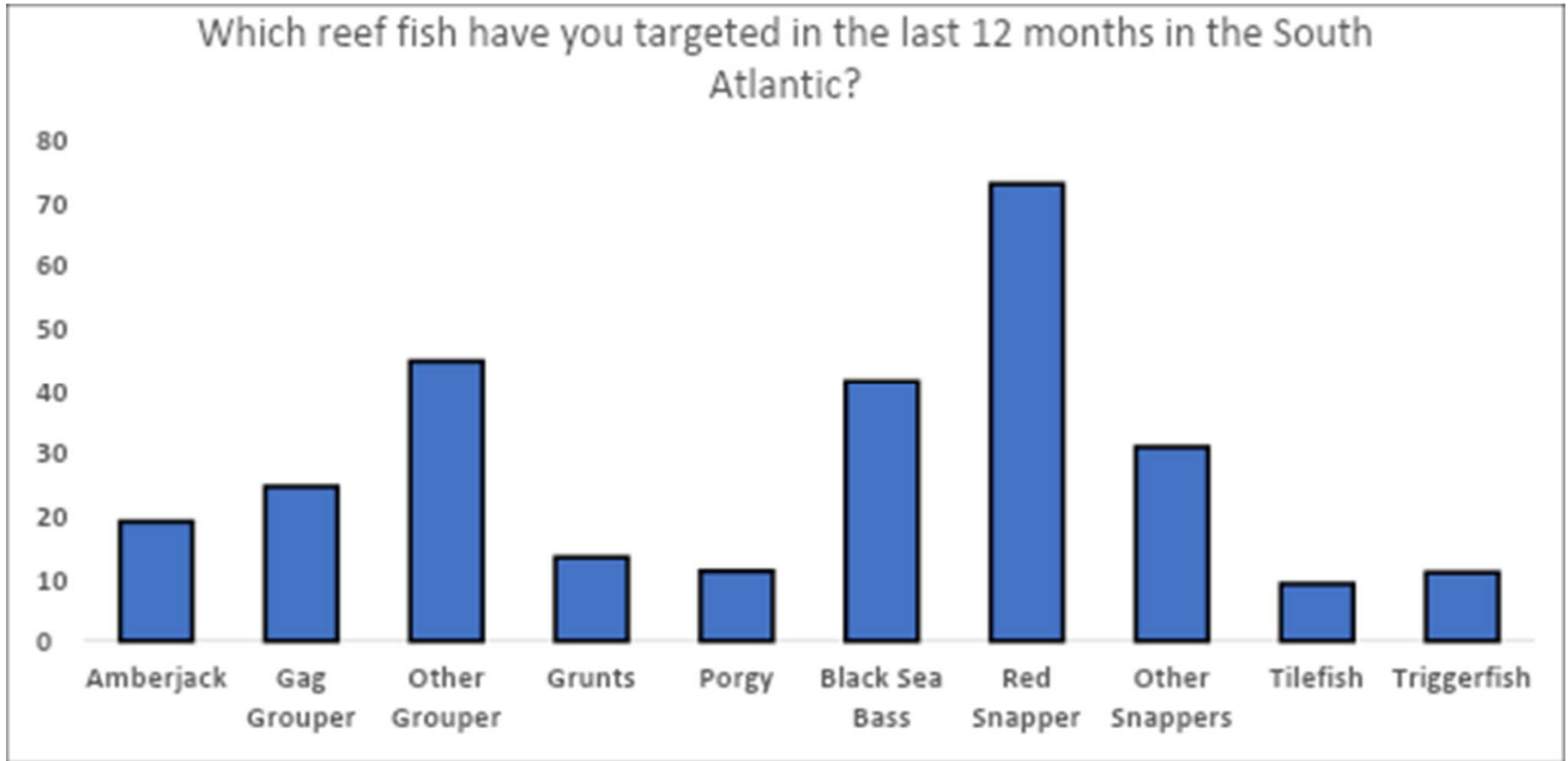
Incentivized Panel (N = 1,936)

Male: 60%
Female: 40%

\$25,000-\$49,999: 26%
\$50,000-\$99,999: 39%
\$100,000-\$199,000: 21%
\$200,000 or more: 4%

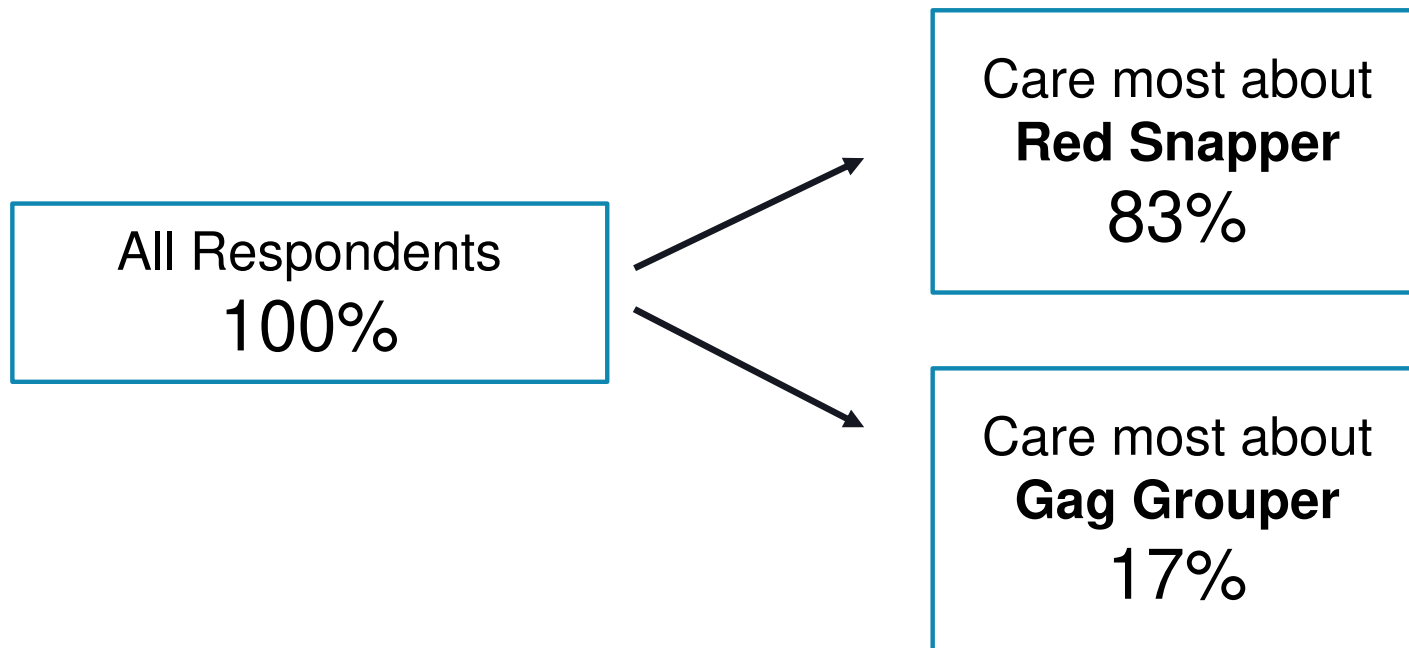
18-34 years: 27%
35-64 years: 62%
Over 65 years: 9%

Florida: 41%
Georgia: 21%
South Carolina: 16%
North Carolina: 22%



(Check all that apply question)

Respondents indicated which species (Red Snapper or Gag Grouper) they most cared about for management and were channeled to the specific DCE for that species



General views on fishing regulations & tradeoffs

Variable	Red Snapper	Gag Grouper
Regulations are necessary to prevent overfishing reef fish populations	4.12 (1.02)	4.11 (1.01)
Stricter reef fish regulations would lead to increased reef fish populations	3.82 (1.00)	3.68 (1.04)
I would rather have less restrictive regulations now, even if they led to it being harder to catch keeper sized reef fish in the next 10 years	2.74 (1.21)	2.58 (1.16)
I would rather have more restrictive regulations in the next 2 years if it led to better reef fishing in the next 10 years	3.81 (1.01)	3.82 (1.02)



Stricter regulations acceptable if they lead me to*....

Variable	Red Snapper (%)	Gag Grouper (%)
Catching more reef fish per trip	56	61
Catching larger reef fish	58	58
Needing to travel shorter distances on the water	46	45
I don't believe stricter regulations would lead to any of these	9	9

*Check all that apply question

Discrete Choice Experiment (DCE)

- Helps us analyze preferences and trade-offs without asking directly
- Participants choose between options with different attributes

Survey DCE

Separate DCEs developed for:

- Red Snapper
- Gag Grouper

Necessary because....:

- Status quo harvest seasons differ dramatically
 - Red Snapper: ~2 days
 - Gag Grouper: ~57 days
- Reasonable attribute levels differ by species
- Respondents first identified: “Which species do you care most about?”
- Survey logic routed respondents to the appropriate DCE

Did include an explicit Optout “I would not fish for species X under either option”

Red Snapper



DCE attributes and levels (Red Snapper)

Harvest Season

- Short (current): 2 days
- Medium: 15 days
- Longer: 60 days

Reef Fish Targeting Closure

- None (current)
- 3 month
- 6 month

Reef Fish Agg Bag

- Unlimited (current*)
- Medium: (5-7 RF)
- High: (10-15 RF)

Mandatory Stopping Rule

- Yes
- No (current)

South Atlantic Reef Fish Permit

- \$0 (current), \$50, \$100, \$150

Survey DCE example (Red Snapper)

Question: Which management option (Option 1 or Option 2) would you **most** prefer?

	Option 1	Option 2
Red Snapper Harvest Season	60 days	15 days
Reef Fish Targeting Closure	6 months	None
Reef Fish Aggregate Bag	7 reef fish (1 RS)	15 reef fish (1 RS)
Mandatory Stopping Rule	Yes	No
South Atl. Reef Fish Permit	\$50	\$0

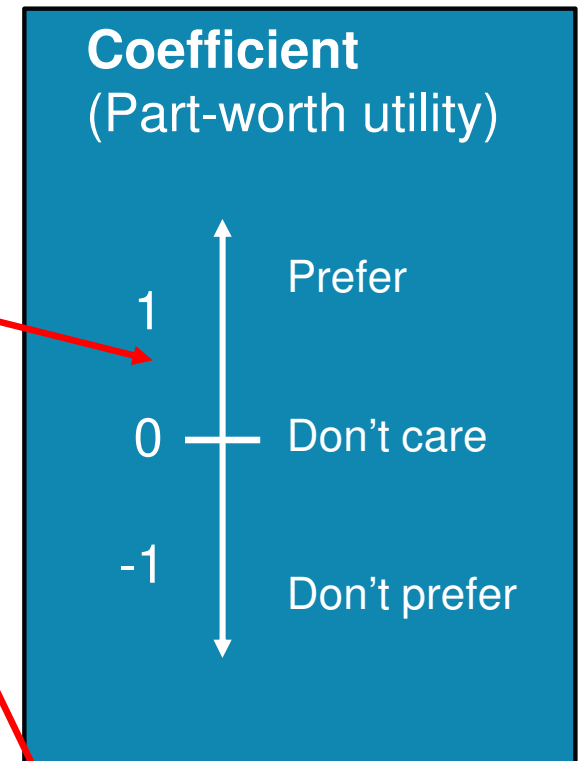
- Option 1
- Option 2
- I would choose to not fish for Red Snapper under either option

Discrete Choice Experiment Results: Red Snapper

Choice	Coefficient
Permit	-0.005***
Harvest Season – 15 day	0.407***
Harvest Season – 30 day	0.596***
Target Closure – 3 month	0.473***
Target Closure – 6 month	0.373***
Agg Bag – 5 to 7	0.008
Agg Bag – 10 to 15	0.119
Mandatory Stopping – Yes	0.079
Optout	-1.508***

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* significant ($p < 0.05$), ** very significant ($p < 0.01$), *** extremely significant ($p < 0.001$)

Latent Class Analysis (LCA)

- Segments respondents into different groups based on their choices in a DCE
- Identifies different preference patterns.

LCA Red Snapper: Latent Class Specific Utilities

Variable	Class 1	Class 2	Class 3
Permit fee	-0.012	-0.011	0.000
Harvest season: 15 days	3.081	-1.642	0.686
Harvest season: 30 days	4.441	-2.313	0.117
Targeting closure: 3 month	-0.384	0.447	1.057
Targeting closure: 6 month	-2.849	1.881	1.892
Agg Bag: 5-7 RF	-0.451	-1.626	1.309
Agg Bag 10-15 RF	1.377	-2.069	-0.165
Mandatory Stopping Rule: Yes	-1.059	0.964	0.232
ASC_Optout	-2.471	-38.060	1.890
CLASS SHARE	42.2%	33.2%	24.5%

LCA Red Snapper: Latent Class Specific Utilities

Class 1 “Harvest-Oriented”

- Prioritizes access and opportunity
 - Value longer seasons and resist effort-restricting rules like closure and mandatory stopping
- Mixed view on agg bag

Class 2 “Conservation-Oriented”

- Favor closures and mandatory stopping rules
- Dislike both aggregate bag options
- Negative utility for longer harvest seasons

Class 3 “Flexible Pragmatists”

- Balanced preferences
- Mix of access and conservation tools
 - Open to moderate controls, like smaller agg bags and closures

LCA Red Snapper: Demographics of Red Snapper classes

Variable	Class 1 (%)	Class 2 (%)	Class 3 (%)	χ^2 (df)
Gender				60.4***(4)
Female	39	41	49	
Male	60	59	51	
Non-Binary	0.5	0.05	0.4	
Income				142.2***(10)
Less than \$25,000	42	42	16	
\$25,001-\$49,999	45	43	11	
\$50,000-\$99,999	46	45	9	
\$100,000-199,999	49	42	9	
\$200,000 or more	54	39	8	

LCA Red Snapper: Demographics of Red Snapper classes

Variable	Class 1 (%)	Class 2 (%)	Class 3 (%)	χ^2 (df)
Age				35.1***(6)
18-34 years	46	45	10	
35-64 years	46	44	10	
65 years +	50	38	12	
State Resident				31.9***(8)
Florida	47	44	10	
Georgia	45	46	10	
South Carolina	48	41	11	
North Carolina	45	43	12	

Novel Options

Harvest tags

- Individual tags needed to harvest fish, but not season, bag, size limits
- Number available dependent on allowable harvest, and anglers might not one
- Allocation would be random and tags wouldn't cost money
- Tags would not cost additional money

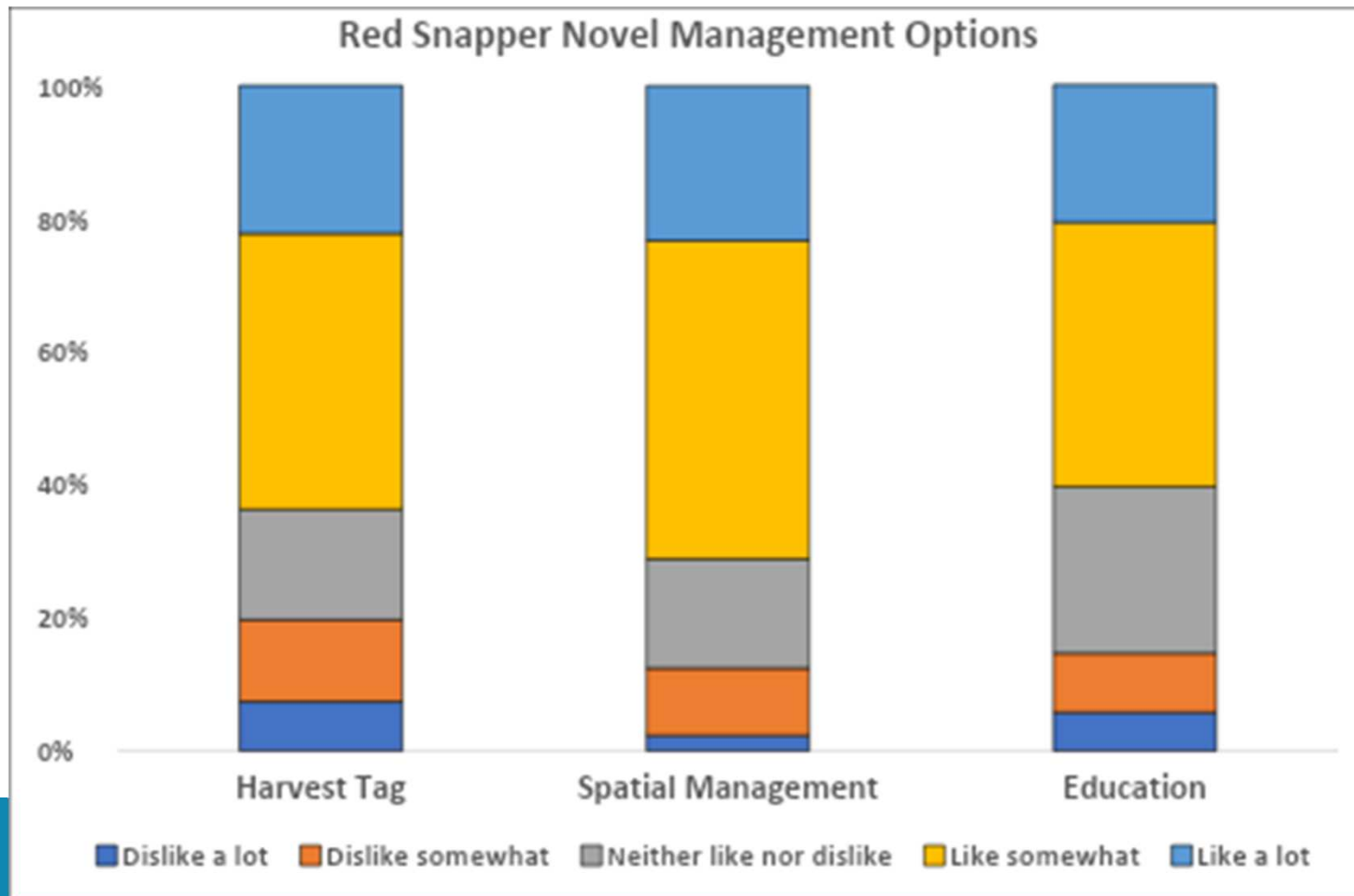
Spatial Closures

- 50% water closed for 9mo, open for 3mo
- 50% water open year-round
- Closed/open areas would rotate yearly

Education requirement

- Passing intensive course required for SA Reef Fish Permit
- Course would teach best C&R and ethical fishing practices
- Cost would be \$25, going to cover instructor & class costs

Like/Dislike for Novel Management Options (Red Snapper)



Gag Grouper



DCE Attributes and Levels: Gag Grouper

Harvest Season

- Shorter: 29 days
- Medium: 57 days
- Longer: 114 days

Reef Fish Targeting Closure

- None
- 3 month
- 6 month

Reef Fish Agg Bag

- Unlimited
- Medium: (5-7 RF)
- High: (10-15 RF)

Mandatory Stopping Rule

- Yes
- No

South Atlantic Reef Fish Permit

- \$0, \$50, \$100, \$150

Discrete Choice Experiment Results: Gag Grouper

Choice	Coefficient
Permit	-0.004*
Harvest Season – 57 day	0.136
Harvest Season – 114 day	0.044
Target Closure – 3 month	0.176
Target Closure – 6 month	-0.091
Agg Bag – 5 to 7	0.172
Agg Bag – 10 to 15	0.269
Mandatory Stopping – Yes	0.197
Optout	-1.78***

LCA Gag Grouper: Latent Class Specific Utilities

Variable	Class 1	Class 2	Class 3
Permit fee	-0.096	-0.005	0.002
Harvest season: 57 days	-0.588	-0.030	0.268
Harvest season: 114 days	-1.363	0.887	0.080
Targeting closure: 3 month	-1.772	0.548	0.064
Targeting closure: 6 month	1.387	0.197	0.001
Agg Bag: 5-7 RF	2.572	-1.017	0.057
Agg Bag 10-15 RF	0.439	-0.053	0.330
Mandatory Stopping Rule: Yes	3.657	1.177	-0.150
ASC_Optout	-10.587	1.415	-2.214
CLASS SHARE	18.7%	13.6%	67.7%

LCA Gag Grouper: Latent Class Specific Utilities

Class 1 “Control Supportive”

- Favor strong management
 - Strongly dislike longer harvest seasons
 - Strong like for mandatory stopping rules
 - Extremely negative opt-out

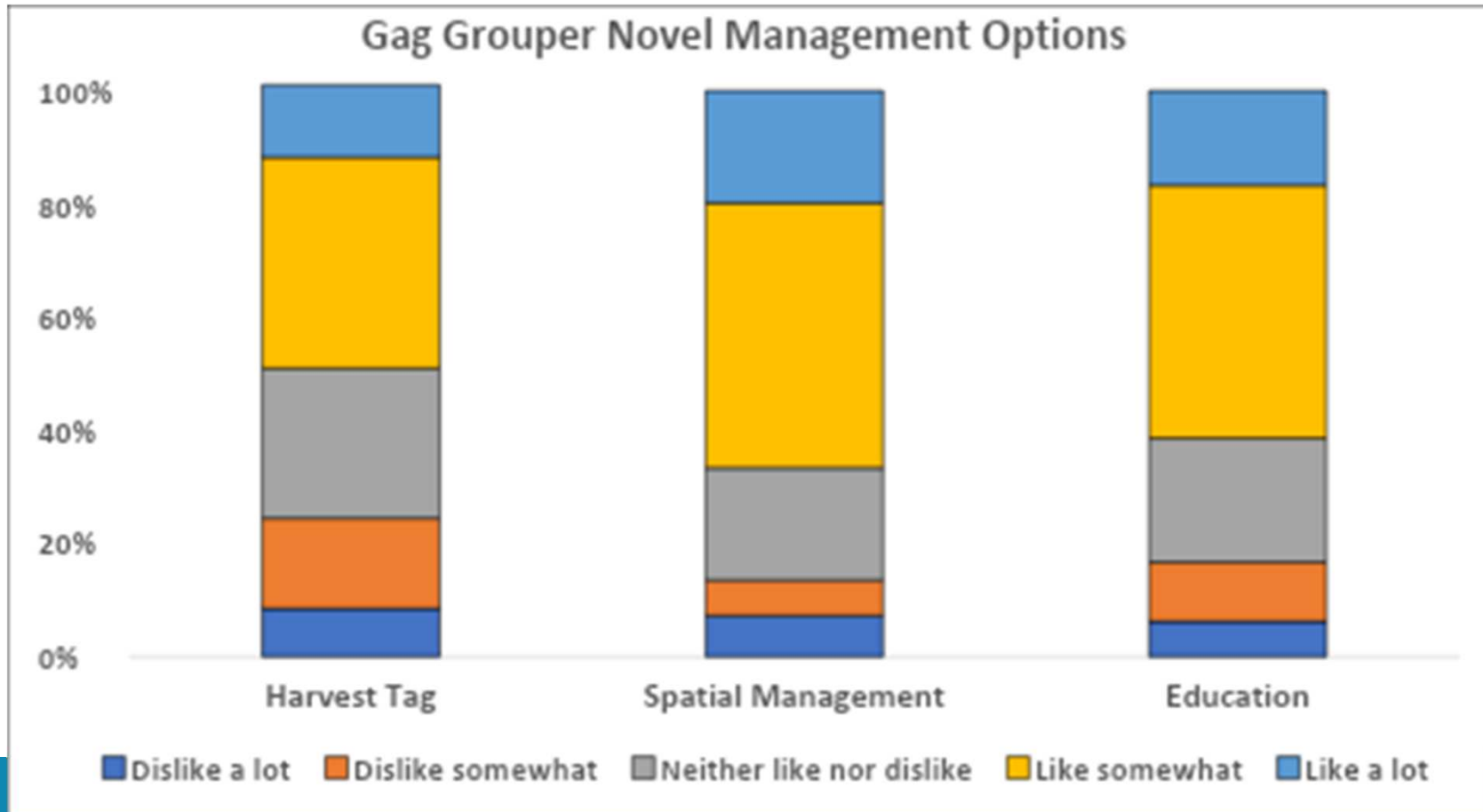
Class 2 “Moderate Conservationists”

- Optout if regulations are overly burdensome or restrict daily catch
- Willing to accept closures and stopping rules

Class 3 “Access- Oriented Pragmatists”

- Flexibility and continued access
- Unlikely to leave the fishery
- Neutral toward targeting closure
- Prefer large agg bags

Like/Dislike for Novel Management Options (Gag Grouper)



Changes in # of trips targeting Red Snapper or Gag Grouper in response to preferred DCE option

	Red Snapper	Gag Grouper
Stop or decrease a lot	11%	12%
Decrease a little	6%	11%
Stay the same	38%	40%
Increase a little	32%	25%
Increase a lot	13%	12%

Results Summary (Panel Survey)

- Most respondents thought regulations were necessary and would prefer regulations that would improve their catch
- Most respondents cared much more about Red Snapper than Gag Grouper
- Red Snapper respondents in three main classes
 - Slightly larger class (42%) wanted longer harvest seasons and few restrictions
 - Smaller class (33%) wanted more restrictions, including targeting closure
 - Classes did not differ much at all by demographic, or general regulations preference
 - Overall classes, DCE showed positive WTP for restrictions, esp. targeting closures
- Most (>50%) Red Snapper respondents liked novel options, especially spatial closures, and few (<20%) disliked novel options
- Gag Grouper responses suffered from small sample size, and had a much larger “no change” class

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Increasing selection bias

Mostly those with high interest or specific opinions respond

Demographic Information

Incentivized Panel (N = 1,936)

Male: 60%
Female: 40%

\$25,000-\$49,999: 26%
\$50,000-\$99,999: 39%
\$100,000-\$199,000: 21%
\$200,000 or more: 4%

18-34 years: 27%
35-64 years: 62%
Over 65 years: 9%

Florida: 41%
Georgia: 21%
South Carolina: 16%
North Carolina: 22%

Email Reef Fish Permits(N = 675)

Male: 88%
Female: 12%

\$25,000-\$49,999: 3 %
\$50,000-\$99,999: 14%
\$100,000-\$199,000: 34%
\$200,000 or more: 29%

18-34 years: 10%
35-64 years: 86%
Over 65 years: 5%

Florida: 100%

Discrete Choice Experiment Comparison Panel vs. Email : Red Snapper

Choice	Panel Coefficient	Email Coefficient
Permit	-0.005***	-0.016***
Harvest Season – 15 day	0.407***	2.214***
Harvest Season – 30 day	0.596***	2.536***
Target Closure – 3 month	0.473***	-0.352
Target Closure – 6 month	0.373***	-0.463*
Agg Bag – 5 to 7	0.008	0.091
Agg Bag – 10 to 15	0.119	0.680**
Mandatory Stopping – Yes	0.079	-0.097
Optout	-1.508***	0.157

Discrete Choice Experiment Comparison Panel vs. Email : Red Snapper

Choice	Panel Coefficient	Email Coefficient	Panel Class 1
Permit	-0.005***	-0.016***	-0.012
Harvest Season – 15 day	0.407***	2.214***	3.081
Harvest Season – 30 day	0.596***	2.536***	4.441
Target Closure – 3 month	0.473***	-0.352	-0.384
Target Closure – 6 month	0.373***	-0.463*	-2.849
Agg Bag – 5 to 7	0.008	0.091	-0.451
Agg Bag – 10 to 15	0.119	0.680**	1.377
Mandatory Stopping – Yes	0.079	-0.097	-1.059
Optout	-1.508***	0.157	-2.471

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Optout	-1.508***	0.157	-2.471

Over-represents Class 1 "Harvest-Oriented"

- Prioritizes access and opportunity

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Management inferences

- There is broad support for restrictive regulations in general
- Split opinions of Red Snapper-focused anglers regarding harvest and targeting closures—overall a preference for longer harvest season and targeting closure, but numerical minority group would strongly dislike the latter.
- Most fishers seem open to and interested in novel reef fish management options, especially spatial closures.
- From these results along: restrictive reef fishing regulations may well increase overall satisfaction IF they improve fishing, but they will also likely be opposed by a sub-group.

Key uncertainties

Should we “trust” panel data?

Panel studies are expected to be most representative of general angler population and *not* favor the most avid or regulation-opposed anglers (who may be more visible in public meetings and/or oversampled in email-based surveys).

Species specific uncertainty

The results we are most confident in are for Red Snapper. There is some indication Gag Group respondents were less interested in or open to change.

DCE surveys have some hypothetical bias

Implications for Snapper-Grouper MSE

- Key information on recreational angler management preferences and responses
- Will help inform scenario development and modeling of angler responses
- Stakeholder WG was formed and remains available for MSE feedback etc.

Thank You!

- Stakeholder Working Group
- All participants in the survey
- SAFMC for funding

