Catch and Discard Characterization for the Snapper-Grouper Vertical Hook-and-Line Fishery of the South Atlantic United States

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and

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Who we are

- Private regional non-profit research organization
- Represent commercial seafood and fishing industry
- Virginia to Texas
- Administered over 600 research grants since 1976

Data Collection Objective

- Characterize catch and discards in South Atlantic bandit reel snapper-grouper fishery

Personnel

- Daniel Parshley – Foundation Observer Coordinator

- Frank Helies/Chris Hladis/Phillip Antman/Aaron Swersky/John O'Hern – Foundation Observers

- Lindsey Parker – Foundation South Atlantic Regional Coordinator

- Scott Raborn – Data Analyst

Study Design

- Vessel participation was voluntary and therefore nonrandom
- Observer placement for each sampling trip was randomized among participating vessels
- All observers underwent detailed training prior to deployment
- Vessels were asked to fish under "normal" conditions
- Onboard data collection conducted from January 2007 to May 2016 (on-going)
- 96 trips comprising 592 sea days
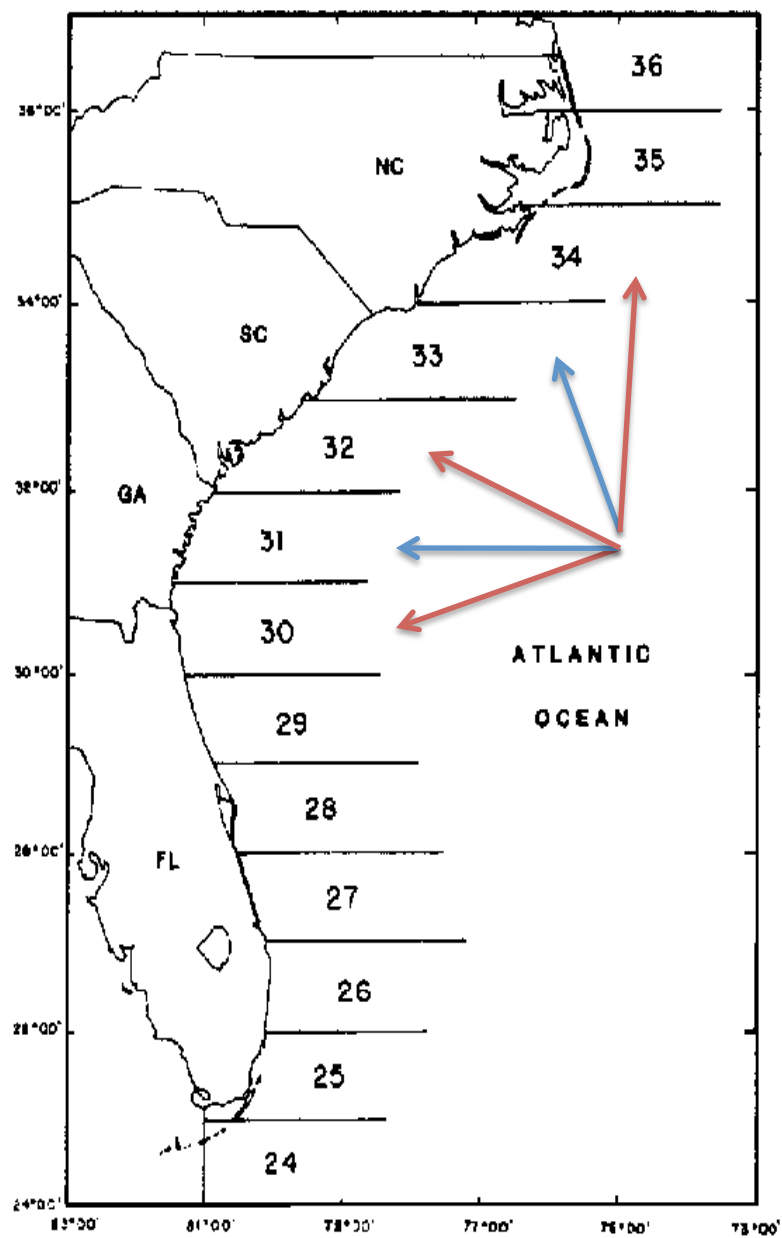
Observer Coverage

- From 2003 to 2007 there were on average 890 vessels per year where at least one pound of snapper-grouper species was landed; 397 vessels landed at least 1,000 pounds

- As of December 2015, there were 499 vessels with unlimited S/G permits

- We sampled 28 different vessels

Data Analysis Objectives

1. Develop a way to accurately quantify effort for the South Atlantic snapper/grouper bandit reel fishery

2. Describe effort across the depth range targeted by this fishery

3. Characterize catch and discards in in terms of CPUE

Objective 1: Quantifying Effort

- Effort estimated as Hook hours (HH)
- Example:
  - 10 HH = 1 hook fished for 10 hours
  - 10 HH = 10 hooks fished for 1 hour
  - 10 HH = 5 hooks fished for 2 hours
  - Etc...

Estimating HH

- HH was estimated for each station—algorithm used:
  - No. of reels being fished (mean=3)
  - Total fishing time (mean=0.6 hrs)
  - No. of reel sets (mean=21)
  - Total number of hooks set (mean=46—about 2 hooks per reel set)
- Mean HH per station = 4 HH

HH versus Actual Fishing Time
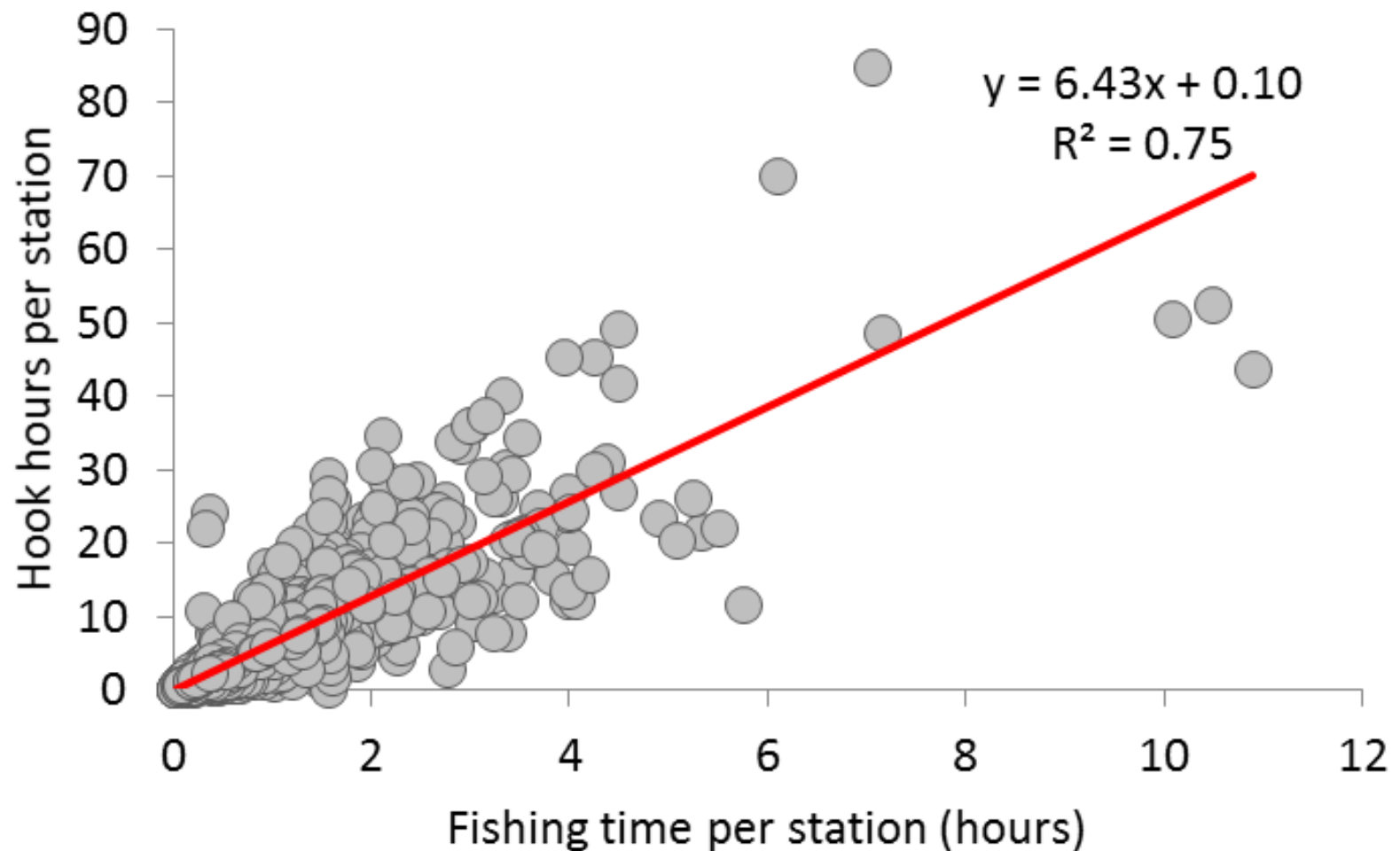
Objective 2: Effort by water depth
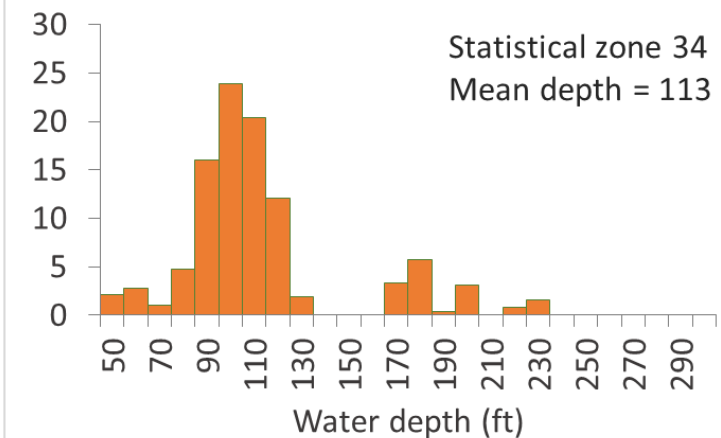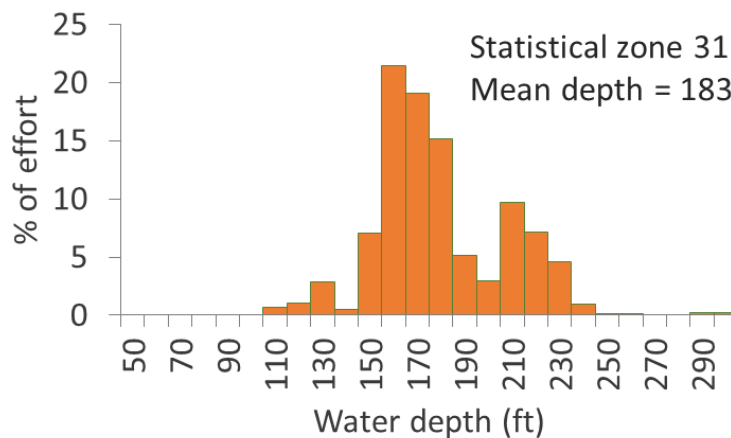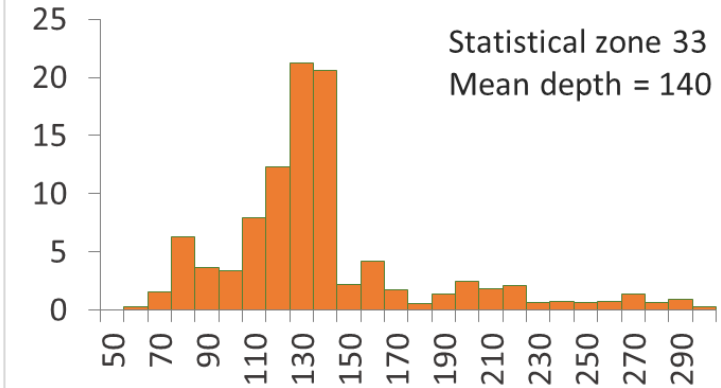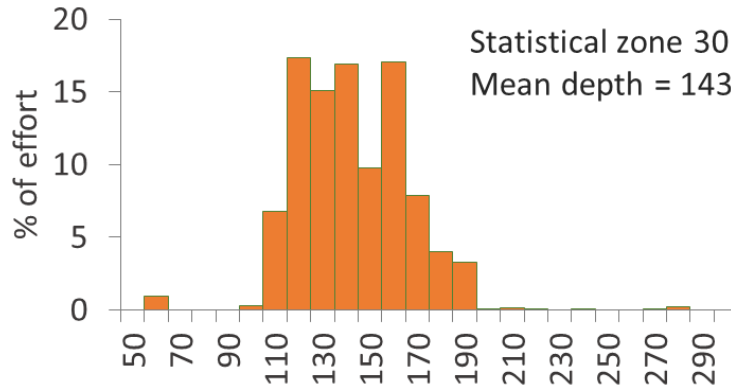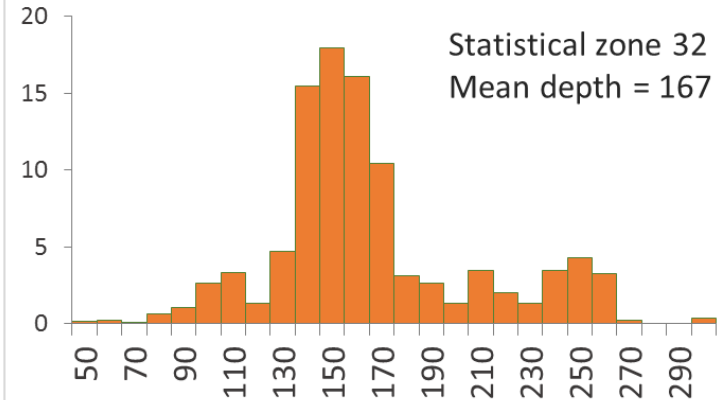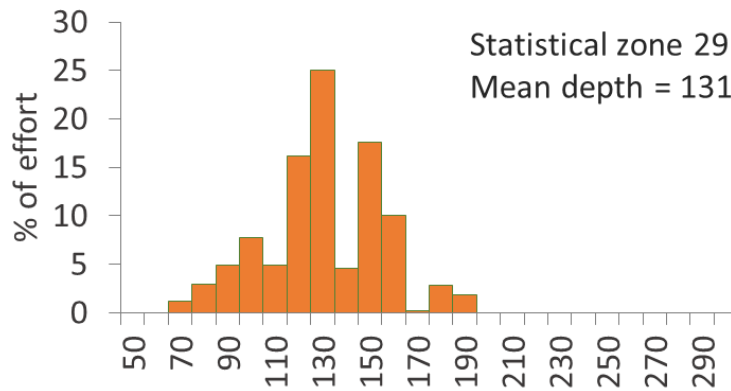
Objective 3: Characterizing catch

- Total catch by species and HH were tabulated for each station within a trip number
- Catch-per-unit-effort (CPUE)= individuals per 10 HH
- CPUE for selected species modeled with negative binomial regression

142 species were caught—total individuals sampled given below

Common	Discards	Kept	Common	Discards	Kept
Porgy, Red	3,056	5,952	Shark, Nurse	14	0
Snapper, Vermilion	2,634	26,051	Shark, Sandbar	13	0
Snapper, Red	985	268	Shark, Smooth Dogfish	13	0
Seabass, Black	688	2,120	**Grouper, Snowy**	10	197
Shark, Atlantic Sharpnose	565	119	Eel, Snapper	8	0
Scamp	549	2,008	Moray, Green	7	0
Tomtate	478	568	Lionfish, Banded	6	0
Amberjack, Greater	328	677	Grouper, Yellowmouth	5	43
Hind, Speckled	190	167	**Grouper, Warsaw**	5	10
Jack, Almaco	188	1,067	Shark, Spinner	5	8
Triggerfish, Gray	174	6,932	Soapfish, Whitespotted	5	2
Remora	141	2	Shark, Dusky	5	2
Gag	140	1,012	Porgy, Knobbed	3	376
Squirrelfish	114	103	Hind, Rock	0	251
Moray, Spotted	86	3	Dolphin	3	198
Seabass, Bank	58	29	Hind, Red (Strawberry Grouper)	0	155
Sharksucker	57	2	Snapper, Silk	0	113
Shark, Tiger	56	0	Triggerfish, Queen	0	100
Bass, Saddle	53	3	Bonito	1	95
Grouper, Red	48	1,098	Runner, Blue	0	75
Pinfish, Spottail	41	72	**Snapper, Gray**	0	74
Rudderfish, Banded	37	504	Mackerel, King	1	71
Shark, Blacktip	35	4	Porgy, Whitebone	1	59
Dogfish, Spiny	31	2	Graysby	4	57
Perch, Sand	28	19	Snapper, Mutton	1	45
Tilefish, Sand	24	73	Pigfish	1	42
Amberjack, Lesser	24	24	**Snapper, Yellowtail**	1	38
Shark, Silky	24	5	Grouper, Yellowfin	0	36
Tattler	17	3	Scad, Round	0	33
Sharks Grouped	17	0	Hogfish	0	32
Grunt, White	15	1,312	Creole-Fish	0	24
Perch, Dwarf Sand	15	12	Grouper, Black	3	23
Barracuda, Great	14	15	Porgy, Jolthead	0	23

Total Catch Composition

Common	2007	2008	2009	2010	2011	2014	2015	2016
Snapper, Vermilion	0.43	0.29	0.51	0.16	0.50	0.10	0.45	0.71
Porgy, Red	0.13	0.17	0.11	0.21	0.14	0.20	0.16	0.08
Triggerfish, Gray	0.09	0.18	0.05	0.36	0.13	0.09	0.10	0.07
Seabass, Black	0.01	0.01	0.04	0.01	0.08	0.19	0.07	0.00
Scamp	0.08	0.10	0.04	0.07	0.01	0.03	0.01	0.00
Grunt, White	0.03	0.01	0.02	0.01	0.03	0.05	0.01	0.00
Snapper, Red	0.02	0.02	0.03	0.01	0.00	0.03	0.03	0.01
Jack, Almaco	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.04
Gag	0.02	0.04	0.01	0.01	0.02	0.07	0.02	0.00
Grouper, Red	0.03	0.05	0.05	0.01	0.01	0.00	0.00	0.00
Tomtate	0.01	0.00	0.01	0.01	0.04	0.02	0.02	0.02
Amberjack, Greater	0.01	0.01	0.01	0.03	0.01	0.10	0.02	0.01
Shark, Atlantic Sharpnose	0.02	0.01	0.02	0.01	0.00	0.03	0.01	0.00
Rudderfish, Banded	0.00	0.00	0.01	0.00	0.01	0.00	0.02	0.01

Discard Catch Composition

Common	2007	2008	2009	2010	2011	2014	2015	2016
Porgy, Red	0.30	0.31	0.33	0.14	0.29	0.07	0.22	0.45
Snapper, Vermilion	0.18	0.18	0.31	0.47	0.26	0.12	0.25	0.21
Snapper, Red	0.08	0.05	0.04	0.04	0.02	0.16	0.17	0.10
Seabass, Black	0.02	0.01	0.04	0.03	0.17	0.10	0.09	0.00
Shark, Atlantic Sharpnose	0.07	0.06	0.07	0.05	0.02	0.13	0.03	0.00
Scamp	0.11	0.12	0.02	0.02	0.00	0.01	0.00	0.00
Tomtate	0.02	0.02	0.05	0.01	0.10	0.00	0.05	0.06
Amberjack, Greater	0.02	0.02	0.01	0.03	0.02	0.07	0.05	0.05
Hind, Speckled	0.04	0.05	0.01	0.02	0.00	0.00	0.00	0.00
Jack, Almaco	0.01	0.00	0.01	0.01	0.01	0.04	0.04	0.00
Triggerfish, Gray	0.01	0.01	0.01	0.01	0.01	0.10	0.02	0.04
Remora	0.00	0.00	0.01	0.02	0.01	0.03	0.03	0.04
Gag	0.01	0.01	0.00	0.00	0.03	0.06	0.00	0.00
Squirrelfish	0.02	0.00	0.01	0.01	0.01	0.00	0.00	0.01

Negative binomial CPUE model

Dependent variables

- Kept catch (includes bait)
- Discarded catch

Independent variables

- Year Categorical
- Trimester Categorical
- Statistical zone Categorical

- Raw catch per station was modeled with HH as an offset
- Model output returns predicted CPUE

Number of stations sampled

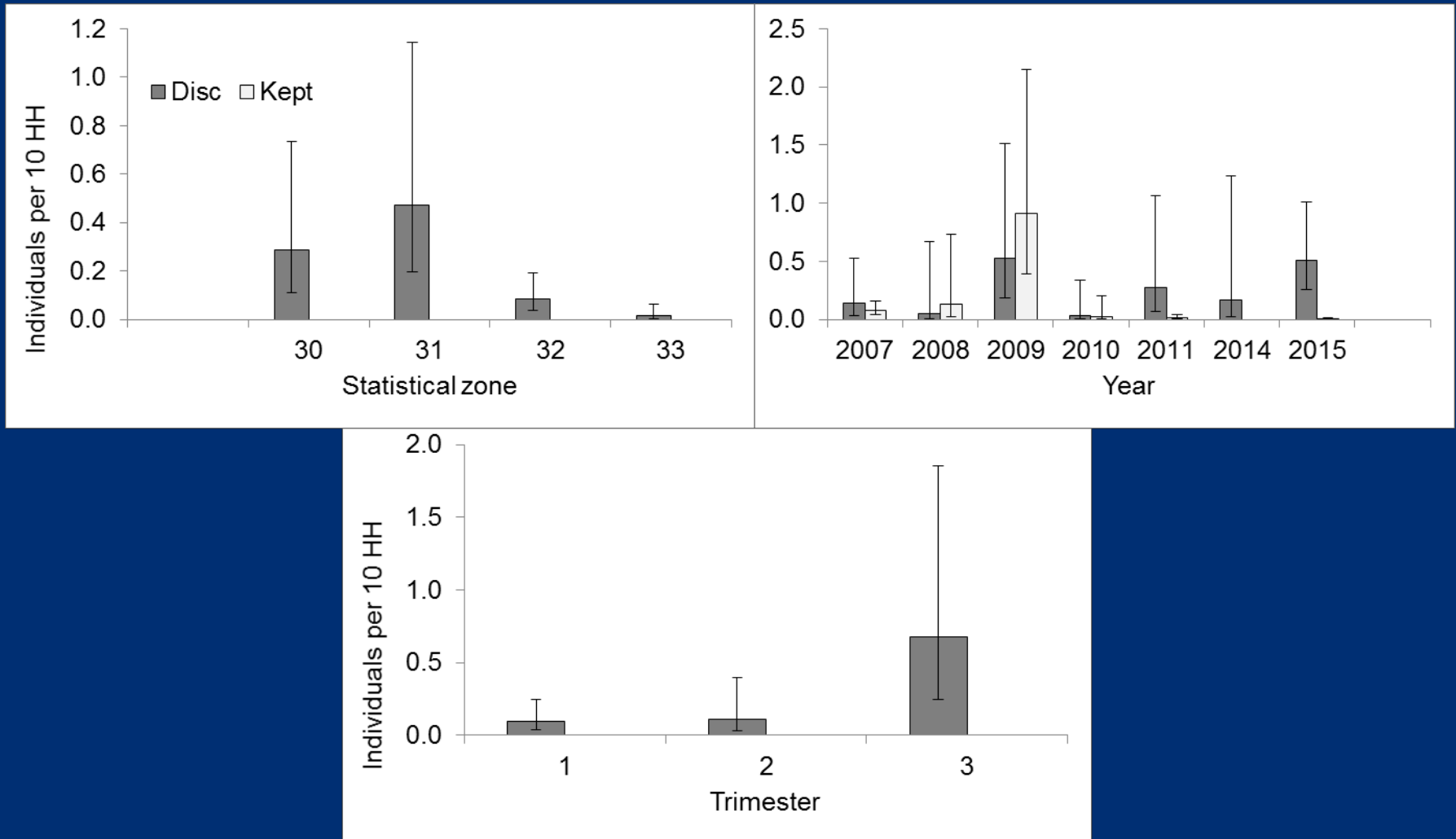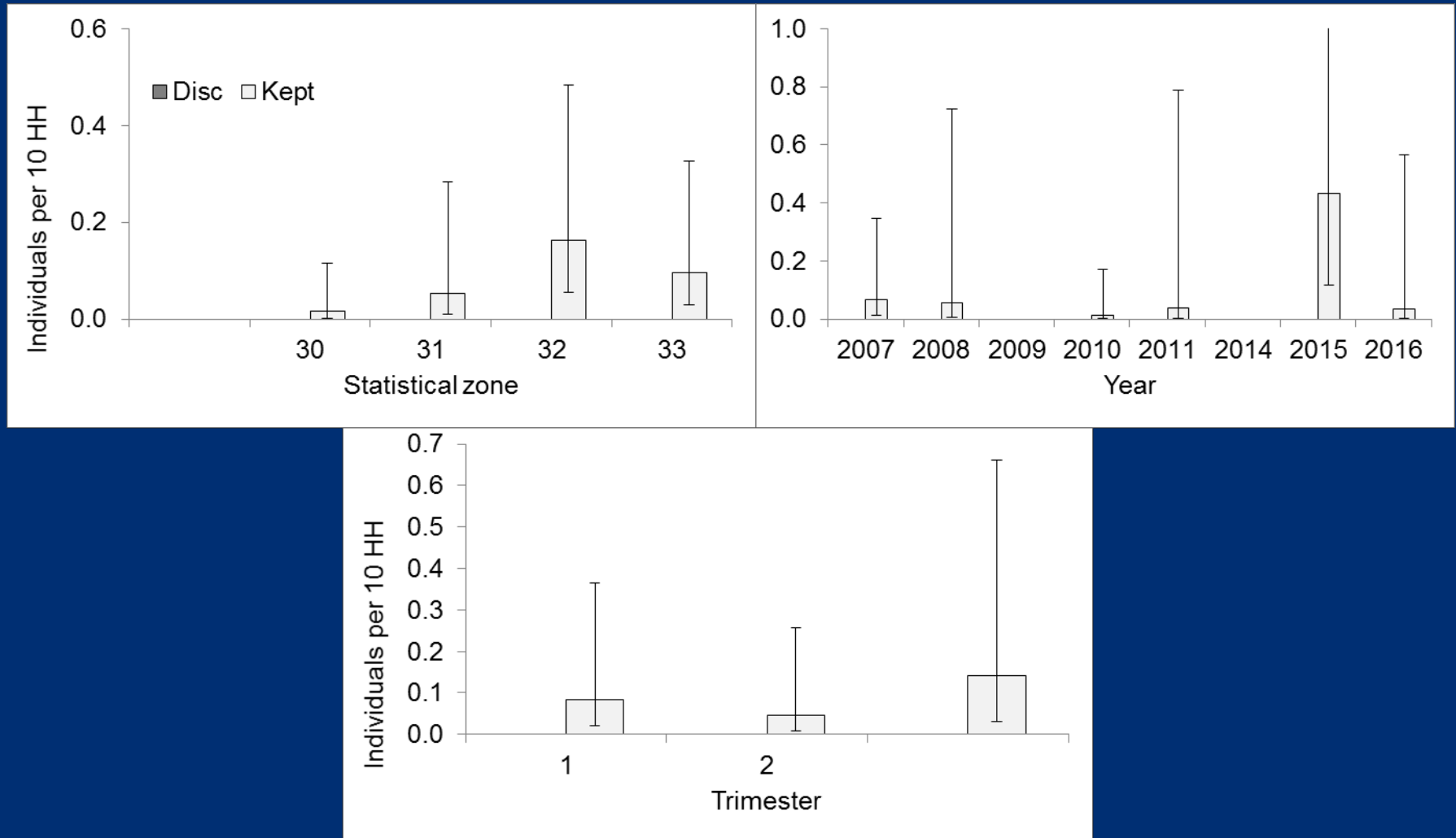| Year	Trimester	Statistical Zone						
		28	29	30	31	32	33	34
2007	1			75	72	382	149	18
	2			135	44	135	306	
	3			246	38	21		
2008	1					74		
	2					52		
	3				3	188		
2009	1			124	40		67	
	2					113	379	
	3							
2010	1							
	2							
	3			55		283	31	
2011	1			10	58		32	16
	2			106	3		102	85
	3						52	
2014	1							
	2							
	3				42	91	86	82
2015	1		66	1	40	47		
	2	6	4	11	170	59	118	
	3		13	15	64	149	1	39
2016	1		14	56	21	69		
	2							
	3							

Vermilion snapper
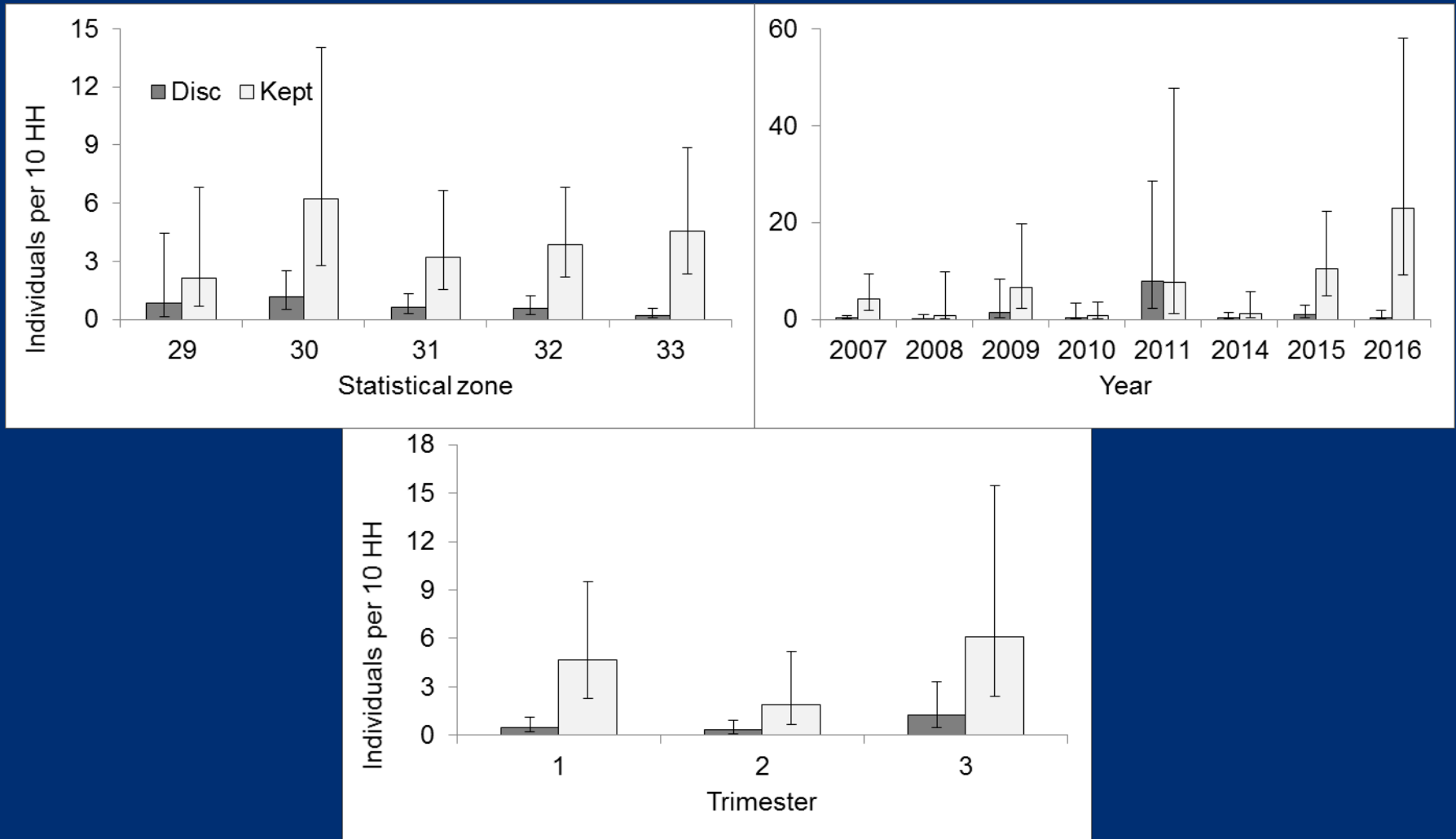
Gag grouper
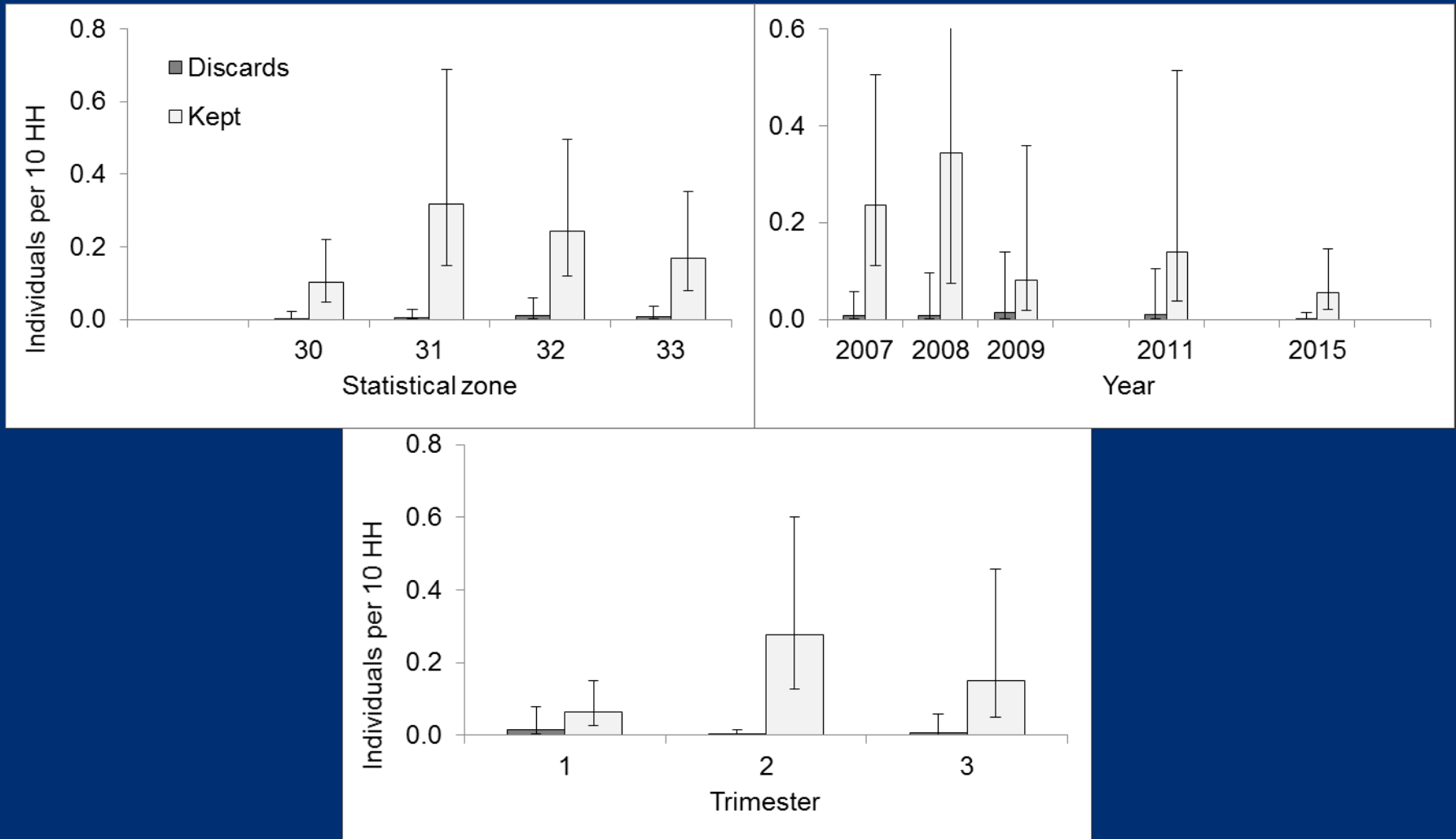
Red snapper

Black seabass

Next Step: estimating discards for the entire fishery

- Need an index of effort available from trip ticket information that can be related to HH

- Total fishery HH must be estimated for each temporal-spatial stratum

- Modeled estimates of discards per HH from observer data can be multiplied by total HH to estimate total discards

Questions?