DRAFT REPORT: Economic Impacts Associated with Fisheries for Species Managed by the South Atlantic Fishery Management Council

Introduction

The South Atlantic Fishery Management Council (South Atlantic Council; SAFMC) is responsible for the management of fisheries for 66 species of finfish and crustaceans[1] occurring in the U.S Exclusive Economic Zone (EEZ). The management jurisdiction of the South Atlantic Council for the majority of these species occurs from the Florida Keys through North Carolina, however there are some exceptions for which this range is expanded. The SAFMC manages king mackerel, Spanish mackerel, and cobia from the Florida Keys through New York as well as dolphin and wahoo from the Florida Keys through Maine. The SAFMC co-manages several species with partners such as the Gulf of Mexico Fishery Management Council, the Atlantic States Marine Fisheries Commission, and multiple state fisheries management agencies.

Recreational and commercial fishing in the South Atlantic Region alone is a multi-billion dollar industry that supports tens of thousands of jobs and billions of dollars in income in the U.S. economy each year (NMFS 2017). Fishing activity for species managed by the South Atlantic Council plays a large role in supporting these annual economic contributions. The following report summarizes the annual estimated economic impacts generated by fishing activity for species managed by the South Atlantic Council. These impacts are characterized in the form of jobs[2], income impacts[3], value-added impacts[4], and sales impacts[5].

Data and Methods

Commercial Fishing Sector

Estimates of the average annual business activity (economic impacts) associated with the commercial harvest of species managed by the South Atlantic Council were derived using the model[6] developed for and applied in NMFS (2017) and calculated using the economic impact tool developed by the National Oceanic and Atmospheric Administration (NOAA) Southeast Regional Office. For the following analysis, the economic multipliers used represent impacts in the U.S. economy. It should be noted that the results provided should be interpreted with some caution and demonstrate the limitations of these types of assessments. The results are based on average economic relationships developed as a seafood product moves down the supply chain through the analysis of many fishing operations that harvest multiple species. Separate models to address individual species are not available, and as a result generic categories have been

[1] See Appendix for a full list of SAFMC managed finfish and crustacean species included in the following analyses.
[2] Full- and part-time jobs.
[3] Represents estimates of wages, salaries, and self-employed income.
[4] Represents estimates of contribution to the gross domestic product (GDP) in a state or region.
[5] Represents estimates of gross business sales. Also known as output impacts.
[6] A detailed description of the input/output model is provided in NMFS (2011).

developed. For example, when examining gag grouper, the results provided by the economic impact tool apply to a general "reef fish" category rather than specifically to gag grouper and a harvester job is "generated" for approximately every $32,000 (2016 dollars) in ex-vessel revenue. The input categories used in the following economic impact analysis for commercial fishing include generic categories for shrimp, crab, lobster, highly migratory species, reef fish, and "all other finfish" where appropriate.

The commercial fishing data used to input into the model includes inflation adjusted average annual ex-vessel revenue (ex-vessel value) derived from all species under the management of the SAFMC. The years examined were from 2014 through 2016. Commercial landings for 2016 are preliminary and will be updated when final data are available. The species included were snapper grouper species, shrimp species (white, brown, pink, and rock), and golden crab landed from North Carolina through the Atlantic Ocean side of Monroe County, Florida (the Florida Keys), with the exception of black sea bass and scup landed North of Hatteras, North Carolina which fall under the jurisdiction of the Mid Atlantic Fishery Management Council. For spiny lobster, all commercial landings from the fishery were included, regardless of where caught, since the species is co-managed with the Gulf of Mexico Fishery Management Council without a jurisdictional ACL. Also included were all commercial landings of Spanish mackerel, king mackerel, and cobia from New York through the Atlantic Ocean side of Monroe County, Florida as well as dolphin and wahoo landings from Maine through the Atlantic Ocean side of Monroe County, Florida. Landings weight and ex-vessel value data were gathered from the Atlantic Coast Cooperative Statistics Program (ACCSP) and last queried on August 11, 2017. Ex-vessel value data were adjusted to 2016 dollars where appropriate using the annual gross domestic product (GDP) implicit price deflator as provided by the U.S. Bureau of Economic Analysis.

Recreational Fishing Sector

Estimates of the average annual business activity (economic impacts) associated with recreational fishing were calculated using the economic impact tool developed by the NOAA Southeast Regional Office, which utilizes average trip-level impact coefficients derived from Fisheries Economics of the United States, 2015 (NMFS 2017) and underlying data provided by the NOAA Office of Science and Technology. Economic impact estimates in 2015 dollars were adjusted to 2016 dollars using the annual GDP implicit price deflator as provided by the U.S. Bureau of Economic Analysis.

The provided economic impact estimates associated with angler trips for species managed by the South Atlantic Council examine the average directed effort from 2014 through 2016. In this case, directed effort is defined as an angler trip that either harvested or listed a specific species as either a primary or secondary target for the trip. The average economic impact coefficients, or multipliers, used in the model are invariant to the "type" of effort and can therefore be directly used to measure the impact of other effort measures such as harvest only trips if desired. The impact coefficients are variable across regions and modes.

The recreational fishing data examined was gathered from the Marine Recreational Fishing Program (MRIP) as last queried on August 11, 2017. Specifically, this includes trips and

landings for all snapper grouper species occurring from North Carolina through Dade County, Florida, with the exception of black sea bass and scup landed North of Hatteras, North Carolina. Also included were recreational data for Spanish mackerel, king mackerel, and cobia from New York through Dade County, Florida as well as recreational data for dolphin and wahoo from Maine through the Atlantic Ocean side of Monroe County, Florida. Due to the jurisdictional boundary that exists in Monroe County, Florida between the South Atlantic and Gulf of Mexico fishery management councils and the method that MRIP employs to estimate effort in the county, only trips and landings for dolphin, wahoo, greater amberjack, mutton snapper, yellowtail snapper, gag grouper, black grouper, red grouper, snowy grouper, and blueline tilefish occurring on the Atlantic Ocean side of Monroe County were included in the following analyses.

It should be noted that the presented business activity focusses on trip expenditures and does not include business activity generated by expenditures on durable goods (ex: boats, rods, reels, apparel, tow vehicles, etc.) that may be used on trips directed towards SAFMC managed species. While aggregate data does exist on durable goods expenditures, they cannot be specifically attributed to a species or group of species since these goods can last multiple years and be utilized in a wide range of other fisheries. These expenditures are not inconsequential, with anglers spending an estimated $4.3 billion on recreational fishing-related durable goods in the South Atlantic Region alone in 2015 (NMFS 2017). Additionally, estimates of the business activity associated with headboat effort are not included in the following analyses. Headboat vessels are not covered under MRIP, so metrics such as directed trips are not available. Also, estimation of the appropriate business activity coefficients for headboat effort has not been conducted. Recreational landings and effort for crustaceans (spiny lobster and shrimp) were also not included in the analyses since non-finfish species are not covered by MRIP. As such, the economic impact estimates provided may be considered a likely lower bound on the economic activity associated with recreational fishing activity directed towards SAFMC managed species.

Both Sectors

For both sectors, commercial fishing activity (measured in pounds landed and ex-vessel value) and recreational fishing activity (measured in pounds landed and effort) occurring in state waters adjacent to the South Atlantic Council's jurisdiction in federal waters was included in the analyses for the appropriate species[7]. Fishing activity for species that occurred in another Council's jurisdiction were excluded. For example, fishing activity for grey triggerfish occurring in the Mid-Atlantic region or Spanish mackerel occurring in the New England region or Gulf of Mexico region were not included in this analysis. The economic impact estimates provided for both sectors are in the form of jobs, income impacts, value-added impacts, and output or sales impacts. These impacts should not be added together since this would result in double counting.

[7] See Appendix for list of species included.

Fishing Activity and Economic Impacts

Commercial Fisheries

Landings

From 2014 through 2016, commercial landings of species managed by the South Atlantic Council averaged approximately 40 million pounds whole weight (ww) with an ex-vessel value of $131 million (2016 dollars) (**Table 1**). Of these landings, the top ten SAMFC managed species ranked by ex-vessel value of commercial landings were spiny lobster, white shrimp, brown shrimp, unclassified shrimp species, king mackerel, yellowtail snapper, Spanish mackerel, vermillion snapper, dolphin, and golden crab (**Table 2**). This group of species accounted for 87% of the total ex-vessel value of landings from species managed by the South Atlantic Council. The top ten SAFMC managed species ranked by weight of commercial landings were white shrimp, brown shrimp, spiny lobster, Spanish mackerel, unclassified shrimp species, king mackerel, yellowtail snapper, dolphin, vermillion snapper, and greater amberjack (**Table 2**). These group of species accounted for 85% of the total weight of landings from species managed by the South Atlantic Council. A similar ranking of finfish species only can be seen in **Table 3**.

Economic Impacts

The commercial harvest and subsequent sales and consumption of seafood generates economic activity as fishermen expend funds to harvest the seafood and consumers spend money on goods and services, such as seafood served during a restaurant visit. These expenditures spur additional economic activity in the region(s) where the harvest and purchases are made, such as supporting jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of locally or regionally caught seafood for purchase, consumers would likely spend their money on substitute goods and services. As a result, the economic impact analysis presented represents a distributional analysis; that is, it shows how economic effects may be distributed through regional markets and should not be interpreted to represent the net impacts if these species were not available for harvest or purchase.

In total, the examined average annual commercial landings from species managed by the South Atlantic Council supported an estimated 17,000 jobs, $462.5 million in income, $662.3 million in value added impacts, and $1.3 billion in business sales in the U.S. economy (2016 dollars) (**Table 4**). Approximately 27% of these economic impacts were attributed to landings of finfish species, with 3% attributed to landings of golden crab and rock shrimp, 30% to landings of spiny lobster, and the remaining 40% to landings of white shrimp, brown shrimp, pink shrimp, and mixed shrimp species.

Table 1. Average annual commercial landings of species managed by the South Atlantic Council, 2014-2016*.

Species Category	Species Grouping	Pounds (ww)	Ex-Vessel Value (2016 dollars)
Finfish	Snapper Grouper[1]	7,113,169	$21,228,106
	Coastal Migratory Pelagics[1]	5,686,422	$10,332,772
	Dolphin Wahoo[1]	1,082,573	$3,215,434
	Total Finfish	13,882,164	$34,776,312
Crustaceans	Spiny Lobster	4,484,799	$40,328,526
	Golden Crab	708,800	$2,442,168
	Rock Shrimp	580,382	$1,203,542
	Other Shrimp[2]	20,251,216	$52,115,853
	Total Crustacean	26,025,197	$96,090,090
All Species	Total All Species	39,907,362	$130,866,402

Source: Landings and ex-vessel value estimates from the ACCSP database as queried on August 11, 2017.
*2016 landings are preliminary. Final landings will be incorporated when available.
[1]See Appendix for list of species within grouping.
[2]Includes landings of white shrimp, brown shrimp, pink shrimp, and unclassified shrimp species.

Table 2. Top ten species managed by the South Atlantic Council ranked by ex-vessel value and weight of commercial landings, average from 2014-2016*.

Top Ten Species by Ex-Vessel Value	
Species	**Ex-Vessel Value (2016 Dollars)**
Spiny Lobster	$40,328,526
White Shrimp	$29,634,588
Brown Shrimp	$12,137,682
Unclassified Shrimp Species[1]	$8,212,738
King Mackerel	$6,154,266
Yellowtail Snapper	$5,466,799
Spanish Mackerel	$3,734,873
Vermillion Snapper	$3,175,041
Dolphin	$2,994,056
Golden Crab	$2,442,168

Top Ten Species by Weight	
Species	**Pounds Landed (ww)**
White Shrimp	10,544,429
Brown Shrimp	6,029,272
Spiny Lobster	4,484,799
Spanish Mackerel	3,018,966
Unclassified Shrimp Species[1]	2,934,289
King Mackerel	2,520,961
Yellowtail Snapper	1,752,051
Dolphin	1,022,784
Vermillion Snapper	901,741
Greater Amberjack	900,518

Source: Landings and ex-vessel value estimates from the ACCSP database as queried on August 11, 2017.
*2016 landings are preliminary. Final landings will be incorporated when available.
[1]Species not specified.

Table 3. Top ten finfish species managed by the South Atlantic Council ranked by ex-vessel value and weight of commercial landings, average from 2014-2016*.

Top Ten Finfish Species by Ex-Vessel Value	
Species	**Ex-Vessel Value (2016 Dollars)**
King Mackerel	$6,154,266
Yellowtail Snapper	$5,466,799
Spanish Mackerel	$3,734,873
Vermillion Snapper	$3,175,041
Dolphin	$2,994,056
Golden Tilefish	$2,165,308
Gag Grouper	$1,612,972
Black Sea Bass	$1,429,997
Greater Amberjack	$1,370,252
Wreckfish	$1,074,092

Top Ten Finfish Species by Weight	
Species	**Pounds Landed (ww)**
Spanish Mackerel	3,018,966
King Mackerel	2,520,961
Yellowtail Snapper	1,752,051
Dolphin	1,022,784
Vermillion Snapper	901,741
Greater Amberjack	900,518
Golden Tilefish	659,183
Black Sea Bass	505,458
Gag Grouper	330,612
Wreckfish	291,827

Source: Landings and ex-vessel value estimates from the ACCSP database as queried on August 11, 2017.
*2016 landings are preliminary. Final landings will be incorporated when available.

Table 4. Average annual economic impacts (2014 through 2016*) associated with the commercial harvest of species managed by the South Atlantic Council. All monetary estimates are in 2016 dollars.

Species Category	Sector	Jobs	Income Impacts (thousands of dollars)	Value Added Impacts (thousands of dollars)	Sales Impacts (thousands of dollars)
Finfish	Harvesting Sector[2]	1,082	$30,247	$46,697	$91,464
	Other Sectors[3]	3,541	$95,957	$131,952	$253,801
	Total	4,623	$126,204	$178,649	$345,265
Golden Crab and Rock Shrimp	Harvesting Sector	116	$3,225	$5,083	$9,707
	Other Sectors	371	$9,956	$13,683	$26,287
	Total	487	$13,181	$18,766	$35,994
Spiny Lobster	Harvesting Sector	1,034	$29,898	$51,245	$111,025
	Other Sectors	4,106	$111,276	$153,018	$294,321
	Total	5,140	$141,174	$204,263	$405,346
Other Shrimp[1]	Harvesting Sector	1,358	$39,353	$64,931	$141,370
	Other Sectors	5,449	$142,568	$195,675	$375,016
	Total	6,807	$181,921	$260,606	$516,386
All Species	Harvesting Sector	3,590	$102,722	$167,956	$353,566
	Other Sectors	13,467	$359,758	$494,328	$949,425
	Total	17,057	$462,480	$662,284	$1,302,991

Source: Ex-vessel value estimates from the ACCSP database as queried on August 11, 2017; economic impacts calculated with tool developed by NMFS SERO using the model developed for and applied in NMFS (2017).

*2016 landings are preliminary. Final landings will be incorporated when available.
[1]Includes landings of white shrimp, brown shrimp, pink shrimp, and unclassified shrimp species.
[2]Harvesting sector encompasses commercial fishermen involved in the harvest and landing of a species.
[3]Other sectors include primary seafood dealers and processors, secondary wholesalers and distributions, grocers, and restaurants.

Recreational Fisheries

Fishing Effort and Landings

The South Atlantic recreational sector is comprised of the private and for-hire modes. The private mode includes anglers fishing from shore (all land-based structures) and private or rental vessels. The for-hire mode is composed of charter boats and headboats (also called party boats). Charter boats generally carry fewer passengers and charge a fee on an entire vessel basis, whereas headboats carry more passengers and payment is typically per person. The type of service, from a vessel- or passenger-size perspective, affects the flexibility to search different fishing locations during the course of a trip and target different species since larger concentrations of fish are often required to satisfy larger groups of anglers. Data for headboats are not included in the following analyses or tables for reasons previously explained in the Data and Methods section.

On average from 2014 through 2016, recreational anglers took approximately 1.3 million trips that harvested and 3 million directed trips annually for species managed by the South Atlantic Council (**Table 5**). Of these trips, the top ten SAFMC managed species ranked by the number of directed trips were dolphin, Spanish mackerel, king mackerel, gray snapper, cobia, yellowtail snapper, black seabass, mutton snapper, wahoo, and gray triggerfish (**Table 6**). The top ten SAFMC managed species ranked by the number of harvest only trips were dolphin, Spanish mackerel, gray snapper, yellowtail snapper, mutton snapper, king mackerel, black sea bass, gray triggerfish, white grunt, and Atlantic spadefish (**Table 6**). Regardless of the type of trip examined, the private/rental vessel mode saw the most effort followed by the shore based trips and charter trips. The one exception being shore based, harvest-only trips occurring in the New England and Mid-Atlantic regions, where shore was the least prevalent mode.

During the timeframe examined, anglers annually landed approximately 19.6 million pounds of species managed by the South Atlantic Council (**Table 5**). The highest recreational landings were attributed to dolphin, followed by cobia, king mackerel, wahoo, Spanish mackerel, greater amberjack, yellowtail snapper, gray snapper, mutton snapper, and red snapper (**Table 7**). Overall, these ten species accounted for 78% of the total recreational landings for species managed by the SAFMC.

E*conomic Impacts*

Recreational fishing generates economic impacts (business activity) as anglers expend funds on various goods and services used in recreational fishing including bait, groceries, fuel, and charter fees. These expenditures spur additional business activity in the region(s) where the purchases are made, such as supporting jobs in bait and tackle stores, marinas, lure manufacturers, and fishing charter businesses. In the absence of the opportunity to fish, the

expendable income would presumably be spent on other goods and services and these expenditures could similarly generate economic impacts. As such, the analyses presented represent a distributional analysis, showing how economic effects may be distributed through regional markets but should not be interpreted to represent the net impacts if these species were not available to anglers.

In total, the examined directed recreational fishing trips for species managed by the South Atlantic Council supported an estimated 3,598 jobs, $167.9 million in income, $276.9 million in value added impacts, and $532 million in business sales annually in the U.S. economy (2016 dollars) (**Table 8**). As noted in the Data and Methods section, all of these impacts could be attributed to finfish species. Approximately 5% of the economic impacts could be attributed to fishing activity occurring in the Mid-Atlantic and New England Regions, with the remaining 95% to fishing activity occurring in the South Atlantic Region.

Table 5. Angler effort and recreational landings by mode and by region for species managed by the South Atlantic Council, average 2014-2016.

Region	Mode[1]	Directed Trips[2]	Harvest Only Trips[3]	Pounds Harvested (ww)
New England and Mid Atlantic	Charter	13,946	10,762	173,558
	Private/Rental Vessel	181,116	66,032	1,845,893
	Shore	24,632	48	10,123
	All Modes	219,695	76,842	2,029,574
South Atlantic	Charter	236,855	157,770	5,257,555
	Private/Rental Vessel	1,828,467	841,831	11,388,742
	Shore	640,938	265,624	934,157
	All Modes	2,706,260	1,265,225	17,580,454
Total Atlantic	Charter	250,801	168,532	5,431,113
	Private/Rental Vessel	2,009,583	907,863	13,234,635
	Shore	665,570	265,672	944,280
	All Modes	2,925,954	1,342,067	19,610,028

Source: MRIP database as queried on August 11, 2017.

[1]Headboat data are unavailable for harvest only or directed trips under the MRIP program.

[2]Directed trips include the number of individual angler trips, regardless of duration, where the intercepted angler indicated that at least one species managed by the SAFMC was the primary or secondary target for the trip or at least one of these species was harvested.

[3]Harvest only trips include the number of individual angler trips, regardless of duration, where at least one species managed by the SAFMC was harvested.

Table 6. Top ten species managed by the South Atlantic Council ranked by directed and harvest only recreational fishing trips, average from 2014-2016.

Top Ten Species by Directed Trips	
Species	**Directed Trips[1,3]**
Dolphin	938,251
Spanish Mackerel	866,158
King Mackerel	474,676
Gray Snapper	444,020
Cobia	417,566
Yellowtail Snapper	352,616
Black Sea Bass	203,718
Mutton Snapper	163,440
Wahoo	96,688
Gray Triggerfish	84,595

Top Ten Species by Harvest Only Trips	
Species	**Harvest Only Trips[2,3]**
Dolphin	263,867
Spanish Mackerel	235,665
Gray Snapper	229,879
Yellowtail Snapper	147,134
Mutton Snapper	91,843
King Mackerel	89,681
Black Sea Bass	70,058
Gray Triggerfish	58,990
White Grunt	57,351
Atlantic Spadefish	54,542

Source: MRIP database as queried on August 11, 2017.

[1]Directed trips include the number of individual angler trips, regardless of duration, where the intercepted angler indicated that at least one species managed by the SAFMC was the primary or secondary target for the trip or at least one of these species was harvested.

[2]Harvest only trips include the number of individual angler trips, regardless of duration, where at least one species managed by the SAFMC was harvested.

[3]Trips are not additive across species, since multiple species may be harvested or targeted on the same trip.

Table 7. Top ten species managed by the South Atlantic Council ranked by weight of recreational landings, average from 2014-2016.

Top Ten Species by Weight	
Species	**Pounds (ww)**
Dolphin	6,537,000
Cobia	1,662,074
King Mackerel	1,455,438
Wahoo	1,282,298
Spanish Mackerel	1,054,063
Greater Amberjack	1,040,608
Yellowtail Snapper	792,158
Gray Snapper	604,224
Mutton Snapper	536,164
Red Snapper	355,073

Source: MRIP database as queried on August 11, 2017.

Table 8. Average annual economic impacts (2014 through 2016) associated with recreational fishing on directed trips for species managed by the South Atlantic Council. All monetary estimates are in 2016 dollars.

Region	Mode[1]	Jobs	Income Impacts (thousands of dollars)	Value Added Impacts (thousands of dollars)	Sales Impacts (thousands of dollars)
New England and Mid Atlantic	Charter	37	$1,800	$2,790	$5,208
	Private/Rental Vessel	130	$5,914	$10,443	$20,896
	Shore	14	$571	$985	$1,876
	All Modes	180	$8,285	$14,218	$27,979
South Atlantic	Charter	1,717	$84,349	$130,750	$244,030
	Private/Rental Vessel	1,136	$51,696	$91,283	$182,649
	Shore	565	$23,529	$40,605	$77,344
	All Modes	3,418	$159,574	$262,638	$504,023
Total Atlantic	Charter	1,753	$86,149	$133,540	$249,237
	Private/Rental Vessel	1,266	$57,610	$101,726	$203,545
	Shore	579	$24,100	$41,590	$79,220
	All Modes	3,598	$167,859	$276,856	$532,002

Source: Economic impacts calculated with tool developed by NMFS SERO using NMFS (2017) and underlying data provided by the NOAA Office of Science and Technology.
[1]Headboat data are unavailable for directed trips under the MRIP program.

Conclusion

While there is some double counting in simply adding commercial and recreational economic impacts together, given the likely underestimates inherent in calculating recreational fishing economic impacts[8], it is reasonable to conclude that the combined recreational and commercial components of fisheries for species managed by the South Atlantic Council support upwards of 20,000 jobs, $630 million in income, $939 million in valued added impacts, and $1.8 billion in business sales (2016 dollars) in the U.S. economy annually. These economic impacts are especially important for many of the coastal communities where this fishing activity occurs. Continued responsible long-term management of these fisheries resources is highly important in leading to sustained economic activity well into the future.

[8] See Data and Methods Section

References:

NMFS. 2011. A Users Guide to the National and Coastal State I/O Model. 2011. www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf (Accessed February 2016).

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Appendix. List of SAFMC managed finfish and crustacean species.

Species Grouping	Species
Snapper Grouper	almaco jack atlantic spadefish banded rudderfish bar jack black grouper black sea bass blackfin snapper blueline tilefish cobia coney cubera snapper dolphin Gag golden tilefish goliath grouper gray snapper gray triggerfish graysby greater amberjack hogfish jolthead porgy king mackerel knobbed porgy lane snapper lesser amberjack margate misty grouper mutton snapper nassau grouper queen snapper red grouper red hind red porgy

Species Grouping	Species
Snapper Grouper	red snapper rock hind sailors choice sand tilefish saucereye porgy scamp scup silk snapper snowy grouper spanish mackerel speckled hind tomtate vermilion snapper wahoo warsaw grouper white grunt whitebone porgy wreckfish yellowedge grouper yellowfin grouper yellowmouth grouper yellowtail snapper
Coastal Migratory Pelagics	king mackerel cobia spanish mackerel
Dolphin Wahoo	dolphin wahoo
Spiny Lobster	spiny lobster
Golden Crab	golden crab
Shrimp	brown shrimp pink shrimp rock shrimp white shrimp