Spatial distribution and occurrence of red snapper, *Lutjanus campechanus*, sampled off the Louisiana coast during nearshore trawl sampling efforts

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SEDAR31-DW16

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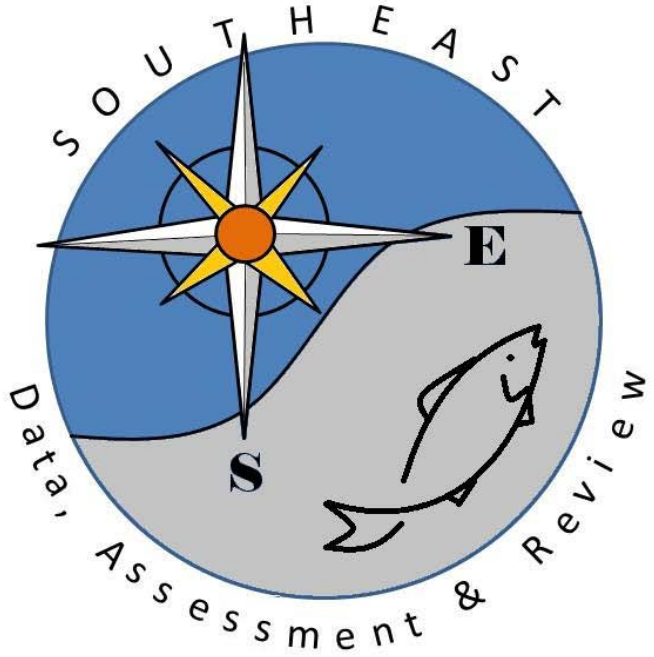

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SEDAR31 – Adriance and Sweda

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ABSTRACT

The nearshore waters of the Gulf of Mexico within the 5-40 fathom contour comprise the habitat of many of Louisiana's commercially and recreationally important marine species such as brown and white shrimp, red drum, red snapper, Gulf menhaden and many others. The Louisiana Department of Wildlife and Fisheries (LDWF) conducts a stratified random nearshore groundfish trawl survey to collect fishery-independent monitoring and assessment information essential to the management of Louisiana's Gulf of Mexico fisheries resources. LDWF nearshore groundfish sampling efforts utilize 42 foot semi-balloon trawl gear consistent with SouthEast Area Monitoring and Assessment Program (SEAMAP) protocols. During sampling efforts from April 2011 through June 2012, 351 locations were sampled resulting in 1,350 red snapper. Slightly more than half of all red snapper sampled were from the 15, 20, and 25 fathom depth strata (51.9%). The 5 fathom depth zone did account for 19.3% of all red snapper sampled, however 246 of the 261 red snapper from this depth zone were sampled from one station. Average size of red snapper sampled increased with depth and the smallest individuals , mean total lengths between 100 and 150mm, were sampled from a mean depth of 10.8 fathoms or less. Red snapper were distributed throughout the sampling are with distinct concentrations off of the Mississippi River Delta area and the Sabine Bank area.

METHODS

Sampling Locations

Protocols and methods are determined for sampling waters near shore to the Louisiana coastline. Nearshore waters are divided into three zones: the Western Zone, the Central Zone, and the Eastern Zone. The geographic boundries of each zone are listed below:

Eastern Zone: 88°00.00' - 89°59.59'
Central Zone: 90°00.00' - 91°59.59'
Western Zone: 92°00.00' - 93° 59.59'

Each zone is demarcated by four sampling corridors corresponding to 30-minute longitudinal intervals within the zone boundaries. One longitudinal transect is selected at random within each of the sampling corridors. A different zone is sampled monthly, such that each zone is sampled quarterly during the year. During one year, a total of 48 transects will be sampled. Samples are collected at each of eight depth strata along a transect line. Depth strata occur at increments of five fathoms. The first depth strata occurs at five fathoms along the transect line and the last depth strata occurs at 40 fathoms. Thus, the total number of samples collected in a given year is 384 (48 transects x 8 depth strata).

Biological Sampling

Trawl surveys conducted by LDWF Fisheries Research Laboratory biologists collect information on shrimp and groundfish abundance and distribution with a standard SEAMAP 42ft semi-balloon trawl (specifications in Appendix I). One 30-minute tow is conducted at or near three knots on the seafloor at each of the depth strata within a corridor. All individuals captured by the trawl are identified to species and counted. A random subsample of 50 individuals for each species are measured for total length and weighed.

Environmental Data Collection

Measurements of water characteristics include water temperature, salinity, dissolved oxygen, chlorophyll, Secchi disc depth, and Forel-Ule color. Sampling depths will occur at the surface, mid-water, and bottom. Water measurements and samples will be taken in conjunction with each biological sample. A CTD (Conductivity-Salinity-Temperature-Depth meter) is used to collect electronic data and rosette bottles for water collection.

RESULTS AND DISCUSSION

During nearshore sampling crusies conducted by LDWF, red snapper were recorded in 183 of 351 30-minute trawl samples taken from April 2011 through June 2012 in water depths between 5 and 40 fathoms (Figure 1). A total of 1,350 red snapper were collected in all trawl samples (Figure 2). In samples that were positive for red snapper , catch rates that varied from 1 to 246 red snapper per trawl (Figure 3). The largest sample of 246 red snapper was collected from one trawl sample near the mouth of the Mississippi River in 6.9 fathoms. Averages of 3.85 red snapper per tow were sampled from the 351 total stations; while an average of 7.38 red snapper per tow was recorded from the 183 samples containing red snapper. The number of red snapper sampled by depth zone varied from 40 individuals from the 40 fathom zone to 367 individuals from the 20 fathom zone (Figure 4). The 5 fathom zone comprised 19.3% of all snapper sampled, while the remaining 10, 15, 20, 25, 30, 35 and 40 fathom zones represented 8.2%, 10.5%, 28.7%, 12.6%, 9.1%, 8.5% and 3.0% of the red snappers sampled, respectively. Mean total lengths of red snapper sampled increased with depth while the smallest individuals, those below 150mm, were sampled from mean depths of 10.8 fathoms or less (Figure 5). During LDWF nearshore cruises from April 2011 through June 2012 a total of 1,117 red snapper were measured to total length. The majority of red snapper measured (88%) in LDWF nearshore cruises, when separated into size groups of < 150mm (age 0 to 1), 151mm to 300mm (juvenile), and >301mm (adult), comprised the age 0 to 1 and juvenile red snapper size groups (Figure 6).

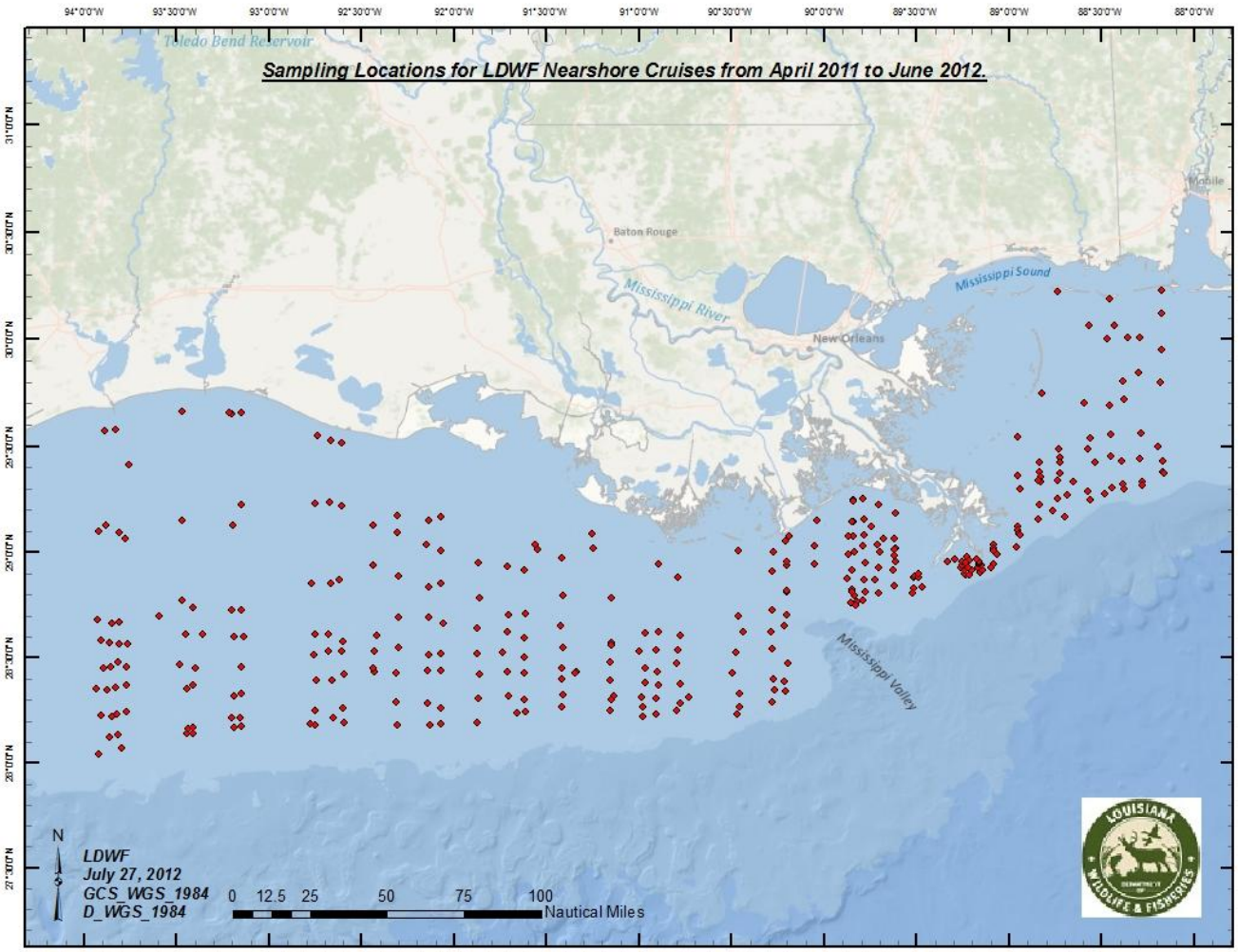

Figure 1. Locations sampled during (n=353) LDWF nearshore trawling efforts from April 2011 through June 2012. Sampling locations extend from the western shore of Mobile Bay to the western shore of Sabine Lake in 5-40 fathoms.

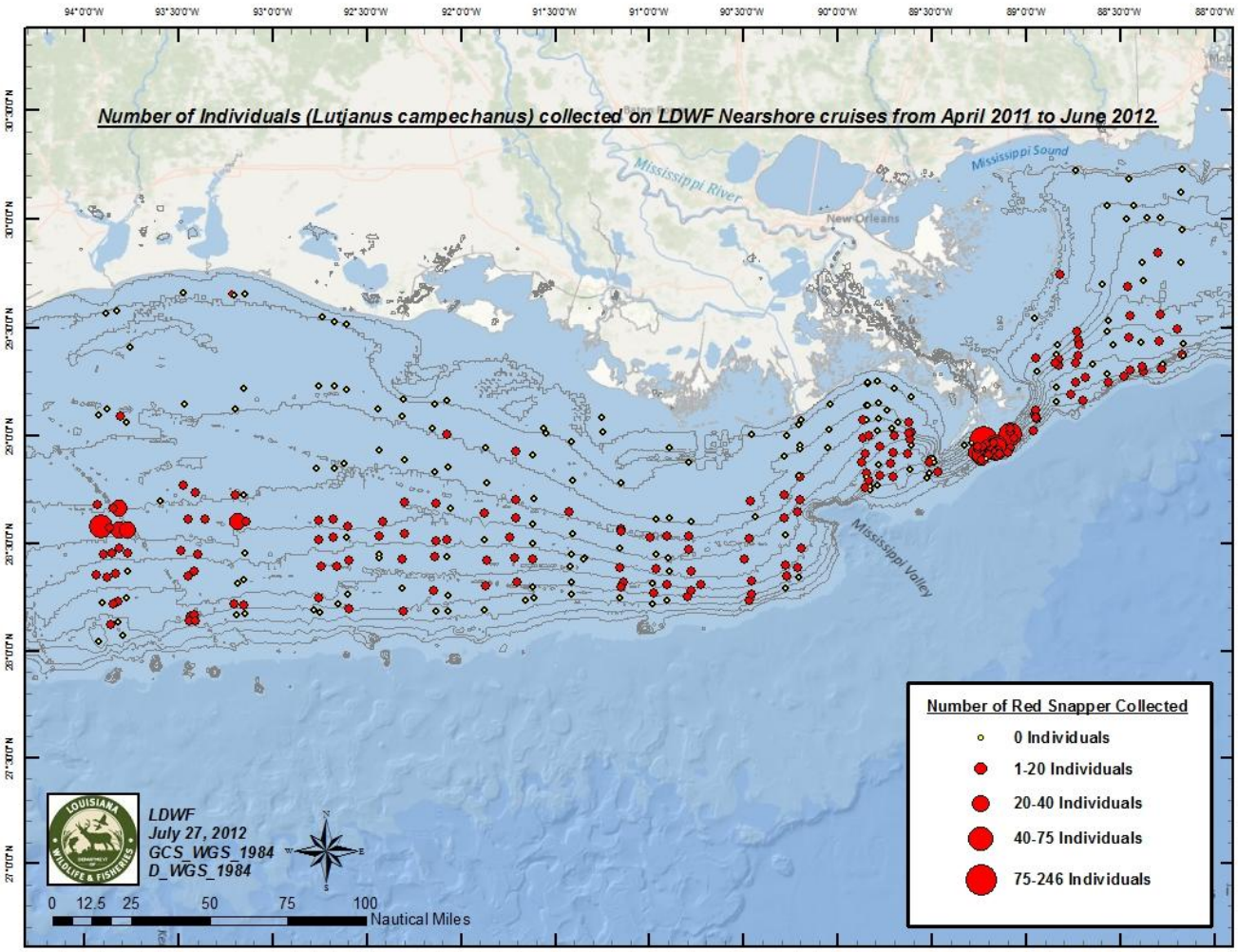

Figure 2. Red Snapper Abundance (n=1,350) in LDWF nearshore trawl sampling efforts from April 2011 through June 2012.

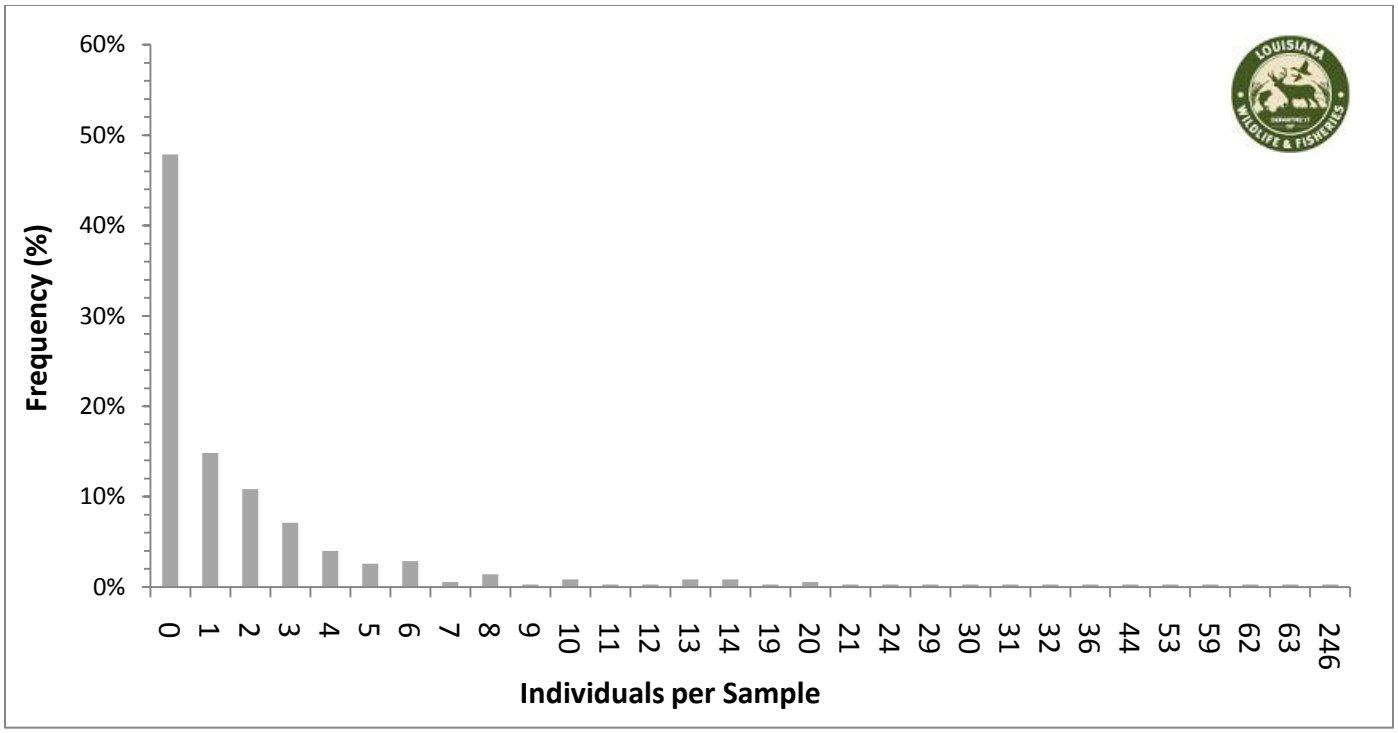

Figure 3. Percent frequency of red snapper (*Lutjanus campechanus*) caught per trawl sample (n=353) in LDWF nearshore trawl sampling from April 2011 through June 2012.

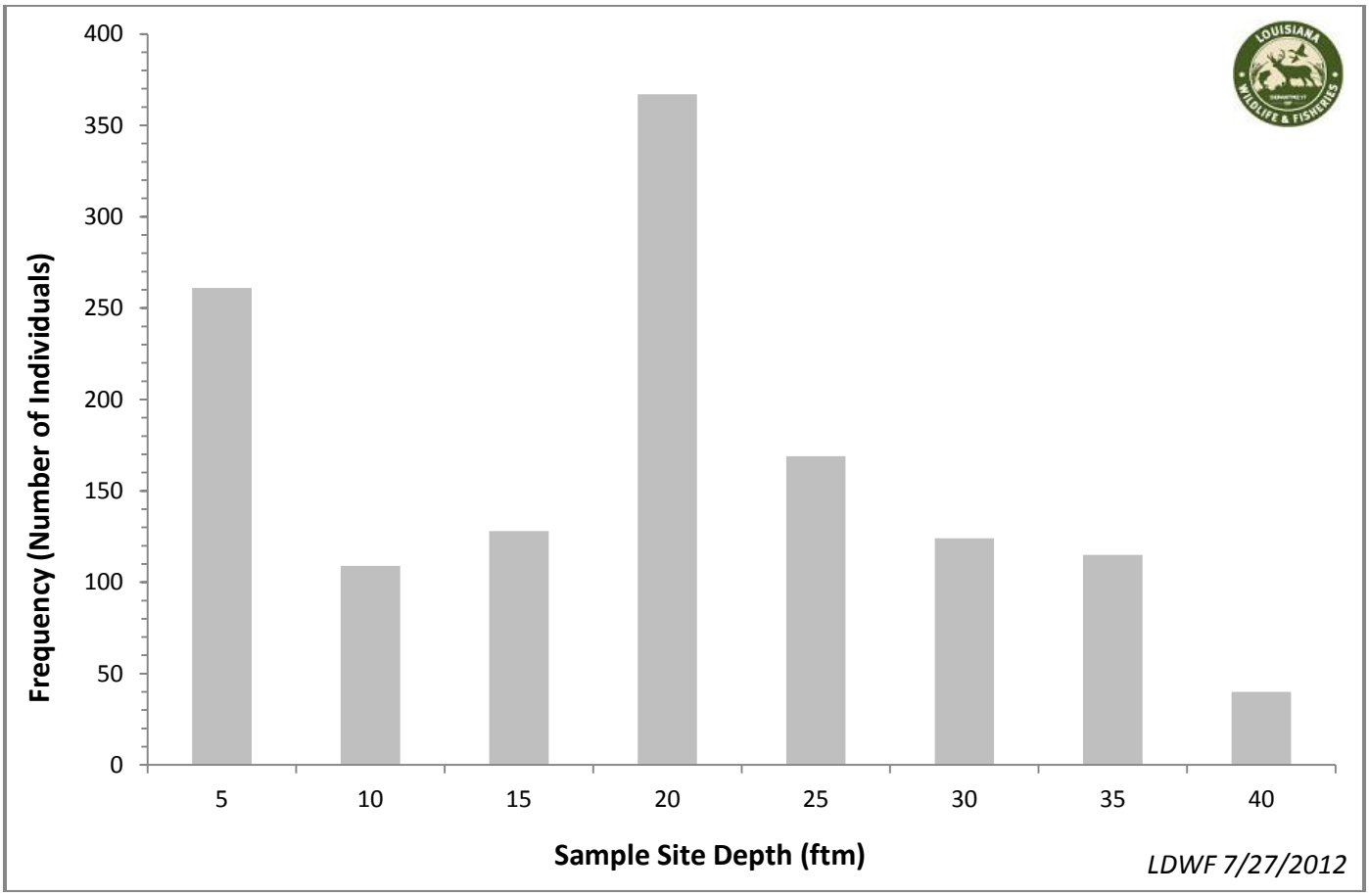

Figure 4. Frequency of red snapper (n=1,350) (*Lutjanus campechanus*) by depth (ftm) intervals during 2011-2012 LDWF nearshore cruises. One 5 fathom trawl sample yielded 246 individuals.

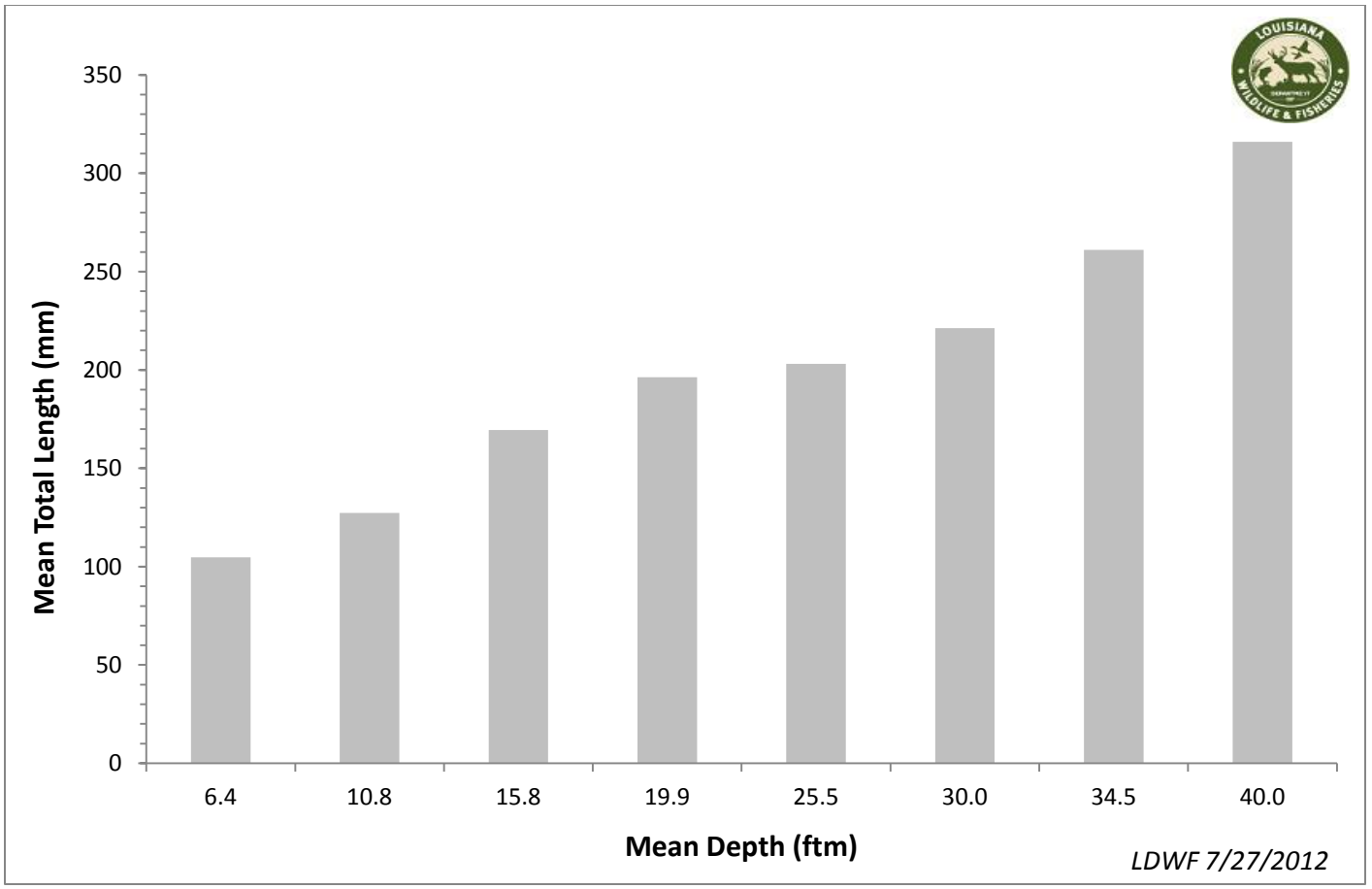

Figure 5. Mean total length in millimeters of red snapper (n=1,117) (*Lutjanus campechanus*) collected during 2011-2012 LDWF nearshore cruises based on average depth of sampling locations within the depth zones sampled.

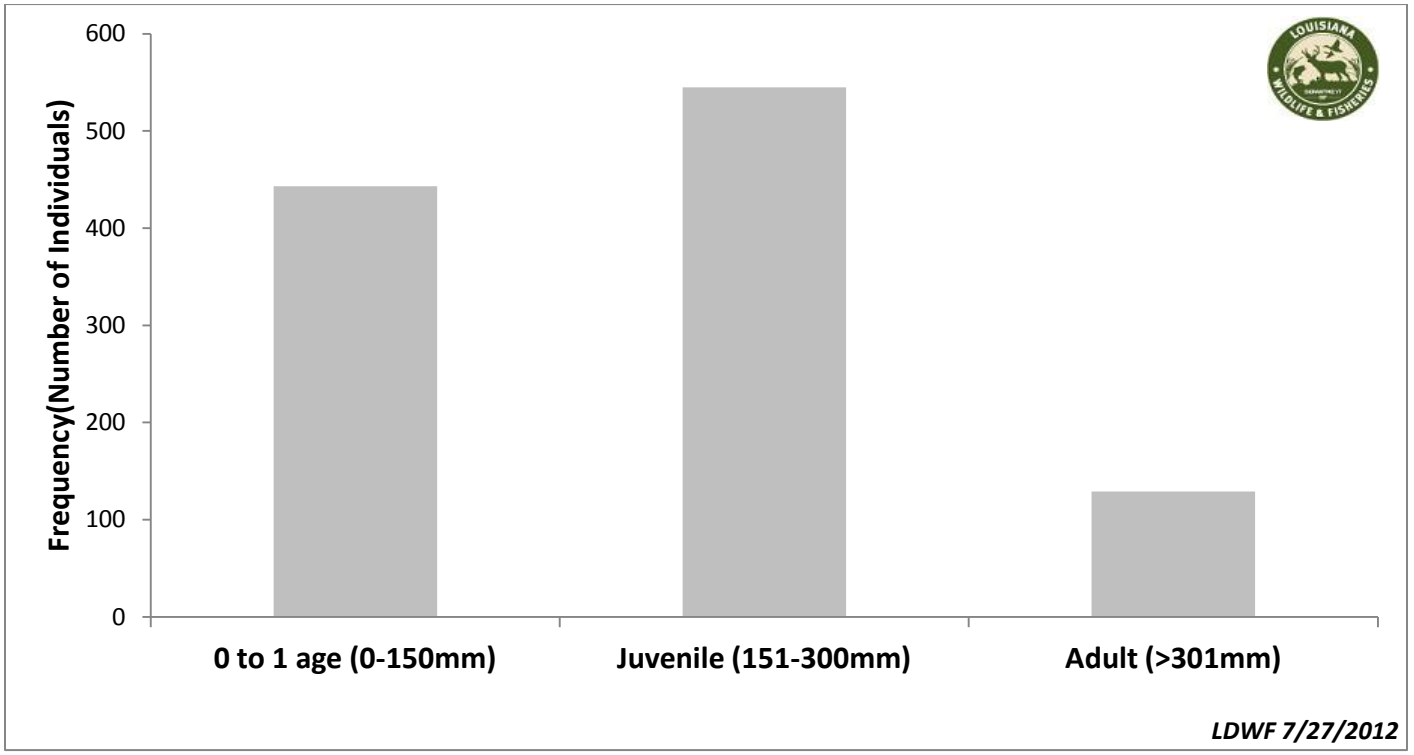

Figure 6. Number of red snapper (n=1,117) (*Lutjanus campechanus*) collected during 2011-2012 LDWF nearshore cruised based on size classes.

Appendix I

TRAWL AND GEAR SPECIFICATIONS

Biological sampling is conducted with a 42' semi-balloon trawl with 8'x 40" chain doors towed at 2.5 knots.

Trawl Specifications:

• Webbing (Nylon): Bosom, wings and comers - 2" stretched x #18 twine. Intermediate - 1-1/2" stretched x #24 twine.

• Codend - 1-5/8" stretched x #42 twine w/1/4" x 2"galvanized rings.

• Chaffing gear - 3-1/2" stretched x #90 polyethylene60 x 40.

• Hanging Cable: Headrope and footrope - 9/16" diameter (6x6) polyethylene cover stainless steel combination net rope.

• Leglines - 6 ft with heavy duty wire rope thimbles.

• Weight: Loop chain - 1/4" galvanized chain, 16 links per loop, tied every foot. 67.8 ft of chain needed 48.13 lb.

• Mud Rollers: 17 mud rollers on a separate line (1/2" polypropylene) tied every 3 feet, with 3" of slack (top of roller to bottom of footrope).

• Floatation: Floats - 6- 3"x4" spongex floats spaced 5 ft apart, across the middle of the headrope.

• Lazyline: 25 fathoms of 3/4" polydacron. Purse rope - 3/4" polydacron 16 ft. long.

• Net Treatment: Green plastic net coat.

Total Trawl Twine Area:

• 240.2794 sq. ft.

Door Specifications:

• Length and Height 8’40"

• Chain - 1/2" proof coil chain

• Swivels - 1/2"

• Bolts - 5/16"

• Planking - 5/4 yellow pine, Grade 1

• Stiffeners - 4"x4"

• Uprights - 2"x10"

• Shoe - 1"x6" stock

• Lift pads in center

• Bonded and bolted

• Doors have 23-1/2" bridle (tow point to door face)

Total Door Surface Area:

• 53.2 sq. ft. (per set)

Tickler Chain Specifications:

• Type - Standard free tickler

• Size - 1/4" galvanized chain

• Length - 42" shorter than the footrope including the

• leglines = 58.6' = 41.6 lb.

Bridle Specifications:

• Wire Type - 6x19 strand marine lube

• Diameter - 9/16"

• Length - 30 fathoms left and 30 fathoms right with a thimble on each end