APPENDICES FOR TOPIC REPORT 3

Biological Resources

APPENDIX A-1

ICHTHYOPLANKTON ASSESSMENT MODEL METHODOLOGY AND RESULTS FOR THE BIENVILLE OFFSHORE ENERGY TERMINAL DEEPWATER PORT LICENSE APPLICATION

This addendum was prepared in response to comments from the National Oceanic and Atmospheric Administration's National Marine Fisheries Service on the September 2005 draft of Appendix A-1

Addendum

(December 30, 2005)

To Appendix A-1
Ichthyoplankton Assessment Model Methodology and Results for the Bienville Offshore Energy Terminal Deepwater Port License Application

Appendix A-1 contains the original methodology used by the Bienville Offshore Energy Terminal (BOET). The appendix utilizes the Hanisko method, consistent with other liquefied natural gas (LNG) terminal applications, which calls for the inclusion of South East Area Monitoring and Assessment Program (SEAMAP) sampling stations within a 30-minute block around the proposed location, plus one additional block to either side. Unique to BOET is the determination of ichthyoplankton based on both the summer and winter SEAMAP data, whereas analysis for other LNG terminals uses only the summer data and extrapolates the yearly data. Many species of fish spawn during the summer season, causing inflated densities of fish eggs and larvae when compared to the winter densities. Therefore, both seasons of data were used for the ichthyoplankton assessment at BOET to more accurately determine the densities of ichthyoplankton in the BOET vicinity, despite the methodology being inconsistent with the approach for other projects.

The Ichthyoplankton Assessment Model was presented to NMFS during an unofficial consultation. During the consultation, it was suggested that the Hanisko method be altered slightly, rotating the blocks 20 degrees and orienting them along the water depth contours that are similar to those in the BOET vicinity. Turning the block would effectively exclude water depths that are either much shallower or much deeper that the proposed Project. Another suggestion from NMFS was exclusion of the winter data set in order to be consistent with the methodology for other LNG terminals. Based on these two suggestions, another ichthyoplankton assessment was made, which is included in the Biological Resources Report as Appendix A-2.

Table of Contents

List of Attachments

List of Tables

List of Figures

List of Acronyms

BOET	Bienville Offshore Energy Terminal
CI	confidence interval
ft	foot or feet
GOM	Gulf of Mexico
km	kilometer(s)
LCL	lower confidence limit
LDWF	Louisiana Department of Wildlife and Fisheries
LNG	liquefied natural gas
m	meter(s)
m^3	cubic meter(s)
MARAD	Maritime Administration
mgd	million gallons per day
mi	mile(s)
mm	millimeter
NMFS	National Oceanic and Atmospheric Administration's National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
SEAMAP	South East Area Monitoring and Assessment Program
STV	shell-and-tube vaporization
Terminal	Bienville Offshore Energy Terminal
UCL	upper confidence limit
USCG	U.S. Coast Guard
ZSIOP	Sea Fisheries Institute, Plankton Sorting and Identification Center

A-1.0 ICTHYOPLANKTON ASSESSMENT MODEL METHODOLOGY AND RESULTS FOR THE BIENVILLE OFFSHORE ENERGY TERMINAL DEEPWATER PORT LICENSE APPLICATION

A-1.1 Introduction

This appendix provides ichthyoplankton larvae densities and estimates of impingement and entrainment levels associated with the seawater intake of the Bienville Offshore Energy Terminal (BOET or Terminal) for selected fish species in the Gulf of Mexico (GOM). The proposed Terminal is located 62.6 statute miles (mi) (101 kilometers [km]) off the Alabama coast in approximately 450 feet (ft) (137 meters [m]) of water. Seawater will be used to vaporize the liquefied natural gas (LNG) using open-loop shell-and-tube vaporization (STV) technology. The maximum daily intake volume is estimated to be approximately 127 million gallons per day (mgd) (480,747 cubic meters [m^3]/day).

Analyses within this appendix are based on the formal publication of the Gulf Landings Final Environmental Impact Statement (USCG and MARAD 2004), as modified by U.S. Coast Guard (USCG) and Maritime Administration (MARAD) (USCG 2005). Appendix G of that document describes the framework and details of an Ichthyoplankton Assessment Model that expressed the impingement and entrainment losses in terms of age-1 equivalents and of equivalent yields relative to commercial and recreational fisheries. The referenced model is the approach required by the USCG for LNG assessments and is the format adhered to in this document for ichthyoplankton.

Entrainment analyses of previous LNG facilities (USCG and MARAD 2005a, USCG and MARAD 2005b) have addressed key invertebrate species of commercial value in the GOM: brown shrimp (*Farfantepenaeus aztecus* = *Penaeus aztecus*), white shrimp (*Litopenaeus setiferus* = *Penaeus setiferus*), and blue crab (*Calanectes sapidus*). Due to the water depth at BOET, entrainment of these invertebrate species is likely to be negligible. Within the GOM, the National Oceanic and Atmospheric Administration (NOAA) (1985) lists the coastal range of white shrimp as from the shore out to water depths of 40 m (131 ft) but most abundant in waters shallower than 30 m (98 ft). Blue crab range from the shore out to depths of 90 m (295 ft) but are most common inside 35 m (115 ft). The proposed Terminal is well outside the range of both species. Brown shrimp range from the shore out to depths of 110 m (361 ft) but are most abundant between 30 and 55 m (98 and 180 ft) (NOAA 1985). BOET will lie at the extreme seaward edge of brown shrimp habitat and well outside coastal areas of high abundance. Accordingly, entrainment estimates for these invertebrate species are not addressed in this appendix.

In this document, we first describe the Southeast Area Monitoring and Assessment Program (SEAMAP) ichthyoplankton sampling, the descriptions of the boundary polygon used to delineate the study area, and the specific approaches used to analyze the SEAMAP data for fish egg and larval densities. We then describe the density values obtained. These densities are used in conjunction with the maximum daily intake volume (approximately 127 mgd or 480,747m^3/day) to estimate potential levels of annual impingement and entrainment losses overall and for target species.

The base case scenario uses the maximum daily intake flow, the mean density estimates, and the estimated life history parameters (e.g., mortality and stage duration) from USCG and MARAD (2005).

A-1.2 Ichthyoplankton Data Selection and Management

Below is a description of the SEAMAP ichthyoplankton studies, a description of the BOET vicinity study area, and a description of the procedures used to calculate fish egg and larval densities from the SEAMAP collections taken in the defined study region. Figures A-1-1 and A-1-2 show the BOET study area with summer or winter sampling stations, respectively.

A-1.2.1 The SEAMAP Program

Ichthyoplankton sampling has been conducted in the GOM as part of SEAMAP (Rester et al. 2000) since 1982. The sampling is conducted at standard stations that are located at 48 km (30 mi) or ½-degree intervals comprising a fixed, systematic grid across the Gulf. Occasionally, samples are taken at non-standard locations, or stations are moved to avoid navigational hazards. Samples are taken upon arrival at a station regardless of time of day. Sampling cruises are routinely made during summer and fall (June–November), with fewer data collected during winter and spring (December–May). July and September are typically the focal months of these surveys. The SEAMAP data represent fish eggs and larvae only; they do not include other taxa (e.g., shrimp).

Lyczkowski-Shultz et al. (2004) reported that the sampling gear and methodology used for SEAMAP ichthyoplankton surveys follow Kramer et al. (1972), Smith and Richardson (1977), and Posgay and Marck (1980). A 61-centimeter bongo net fitted with 0.333-millimeter (mm) mesh is fished in an oblique tow path to a maximum depth of 200 m or to 2–5 m off the bottom at depths less than 200 m. A mechanical flow meter is mounted off-center in the mouth of each bongo net to record the volume of water filtered. Volume filtered varies between ~20 to 600 m^3, but is typically 30 to 40 m^3 at the shallowest stations and 300 to 400 m^3 at the deepest stations. These data provide density estimates (i.e., the number of larvae or eggs per m^3). In addition to the bongo net sampling, a single or double 2- by 1-m pipe-frame neuston net fitted with 0.947-mm mesh is towed at the surface with the frame half submerged for 10 minutes. These data yield catch-per-unit effort rather than density indices.

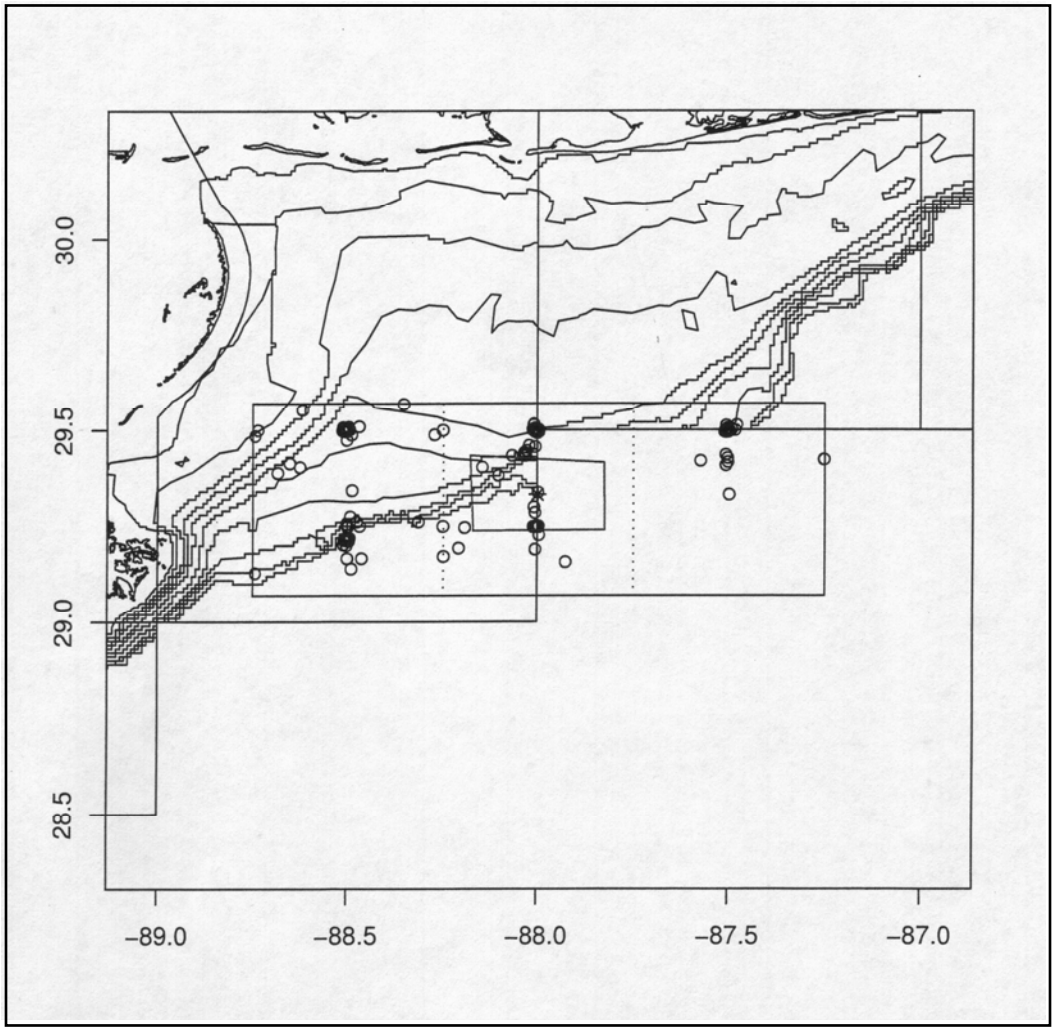


Figure A-1-1. Proposed Project Study Area with Summer Sampling Stations

Notes: The bold-bordered polygon denotes the area within which the proposed Terminal will be located. The three large squares separated by dashed vertical lines denote 30-minute SEAMAP sampling blocks. Circles show the location of the ichthyoplankton sampling sites. Depth contours are in 5-fathom increments.

Source: Adapted from SEAMAP data, located in Attachment 2.

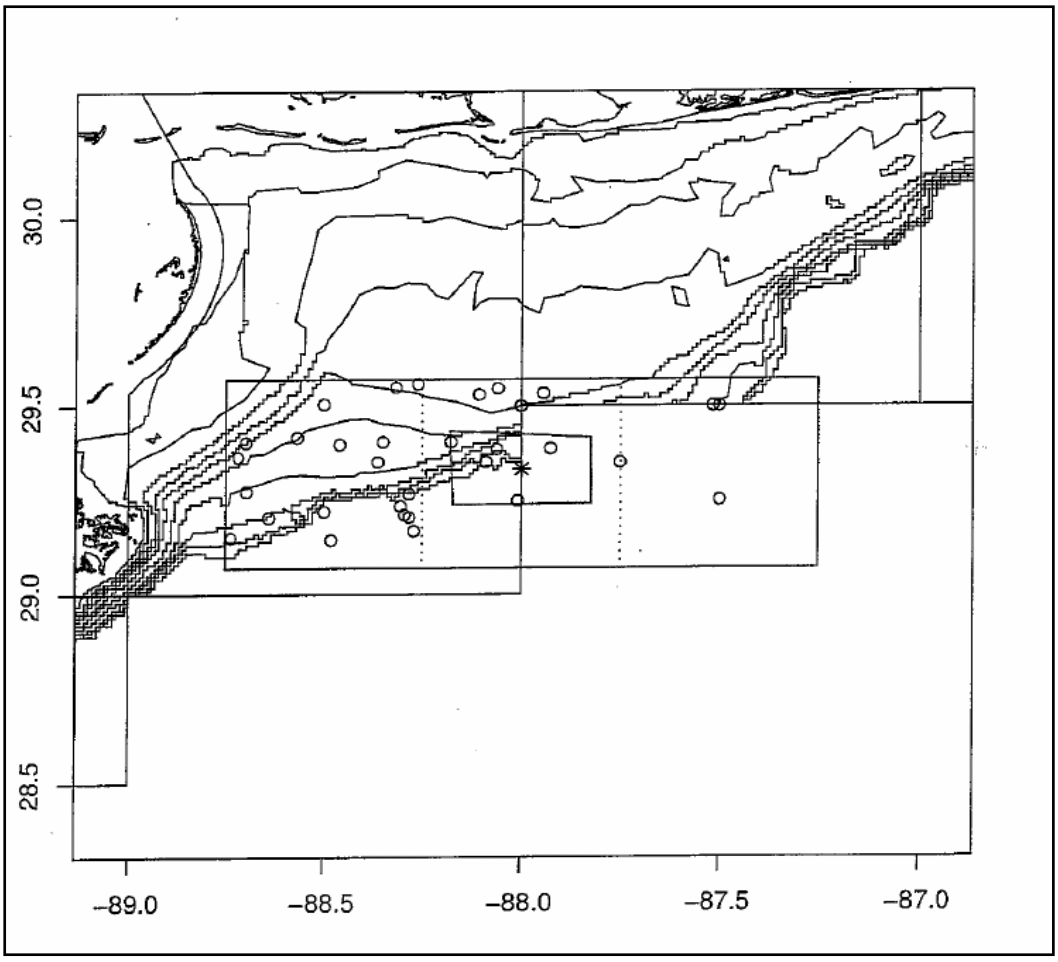


Figure A-1-2. Proposed Project Study Area with Winter Sampling Stations

Notes: The bold-bordered polygon denotes the area within which the proposed Terminal will be located. The three large squares separated by dashed vertical lines denote 30-minute SEAMAP sampling blocks. Circles show the location of the ichthyoplankton sampling sites. Depth contours are in 5-fathom increments.

Source: Adapted from SEAMAP data, located in Attachment 3.

Catches from bongo nets are standardized to account for sampling effort (i.e., volume filtered) and then expressed as a number of larvae under 10 m^2 of sea surface (Lyczkowski-Shultz et al. 2004). This is accomplished by dividing the number of larvae of each taxon caught in a sample by the volume of water filtered during the tow, and then multiplying the resultant by the maximum depth of the tow in meters and the factor 10. For our purposes, the density estimate (number/m^3) is the value of interest.

Initial processing of SEAMAP plankton samples is carried out at the Sea Fisheries Institute, Plankton Sorting and Identification Center (ZSIOP) in Szczecin, Poland and the Louisiana Department of Wildlife and Fisheries (LDWF) (Lyczkowski-Shultz et al. 2004). Vials of eggs and identified larvae, plankton displacement volumes, total egg counts, and counts and length measurements of identified larvae are sent to the SEAMAP Archive at the Florida Marine Research Institute in St. Petersburg, Florida. These data are entered into the SEAMAP database and specimens are curated and loaned to interested scientists. Data files containing specimen identifications and lengths are sent to the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) Mississippi laboratories, where these data are combined with field collection data and edited according to established SEAMAP editing routines. SEAMAP survey data currently are maintained in dBase file structures, but conversion to an Oracle-based system is underway.

A-1.2.2 Boundary Polygon

At the NMFS/Industry LNG Issues Workshop held in Pascagoula, Mississippi, David Hanisko (NMFS Pascagoula) provided an assessment of relative ichthyoplankton density levels for the western GOM, summarized by 30-minute blocks (see Figures A-1-1 and A-1-2). These data reflect an onshore/offshore gradient in density but show similar densities occur along isobaths. Mr. Hanisko suggested one objective approach for defining study area polygons would be simply to use the data from the 30-minute box in which the project occurred, plus one additional block to either side. This approach is used for subsequent analyses.

BOET provided the boundary polygon defining the area within which the proposed facility will be sited (Figures A-1-1 and A-1-2). The area selected was defined by four corner coordinates: 29.43° N, 88.18º W (NW corner); 29.42° N, 87.82º W (NE corner); 29.24° N, 87.82º W (SE corner); and 29.24° N, 88.17º W (SW corner). The center point of this area served as the center point for the initial 30-minute SEAMAP grid. The 30-minute SEAMAP grids immediately west and east of the initial grid completed the polygon. This final polygon was bordered north and south by latitudes 29.57° N and 29.07º N, and east and west by longitudes 87.25° W and 88.75º W.

A-1.2.3 SEAMAP Analyses

A detailed description of methods for analyzing the SEAMAP ichthyoplankton data is provided in Attachment 1. These descriptions identify the three SEAMAP data files (STATCARD, ICHSTRWK, and ICHSARWK) that are used together to estimate fish larvae and egg densities, and the relevant fields within each data file. It should be noted that the SEAMAP data files are

more-or-less continually being updated (e.g., adding the next year's results, receipt of new laboratory analysis results from ZSIOP and LDWF, and corrections of errors). Consequently, it is important to state the name of the data file being used in a given analysis. The results in this paper use the file named "Ichthyoplankton_09_02_2004_ascii.zip" as provided by David Hanisko, NMFS, Pascagoula Laboratory, Mississippi. This file was updated and corrected on 2-3 December 2004.

The STATCARD describes when and where sampling operations took place. The ICHSTRWK data file contains gear code information, volumes filtered, and all of the egg data. The ICHSARWK dataset provides data about individual taxa. As described in Attachment 1, STATCARD and ICHSTRWK can be merged based on three fields (cruise number, vessel, and Pascagoula Station Number). The sample number field is required to merge these data with the ICHSARWK data file.

Further details on the steps or sequence of steps used in the analyses are provided in Attachment 1. A section called "Analysis Constraints" describes the rectangle drawn around the proposed Project site as shown in Figures A-1-1 and A-1-2. Samples taken within the rectangle are considered representative of the ichthyoplankton densities that might be encountered at BOET. Data from stations outside the rectangle were eliminated from the analysis.

A-1.3 Ichthyoplankton Densities

The fish egg and larvae density calculations obtained for the proposed Project site are described below. These densities are based on either the summer (June through November, 1982–2002) or winter (December through May, 1982–2001) sampling periods (Attachments 2 and 3, respectively) to show seasonal differences. An average value of the two sampling periods will be used to determine annual values, beginning in Section A-1.4 of this appendix.

A-1.3.1 Summer Density and Taxa Composition

A total of 200 samples of larval fish were analyzed from sampling stations occupied within the rectangular boundary box Figure A-1-1). A total of 114 samples from the same stations provided data from which to evaluate the presence and density of fish eggs. Overall, the density of fish larvae averaged 2.983 larvae/m^3 (95% confidence interval [CI]: 2.392 to 3.575) whereas the density of fish eggs averaged 1.586 eggs/m^3, with the 95% CI ranging from 1.166 to 2.006. Densities of larvae were highest in June and November, while fish egg densities were similar throughout the entire sampling period (Figure A-1-3).

A total of 293 taxa were represented in the larvae data. Only 18 of these taxa comprised 1 percent or more of the total abundance (Table A-1-1). Collectively, representatives of these 18 taxa comprised almost 80 percent of the total number of specimens taken.

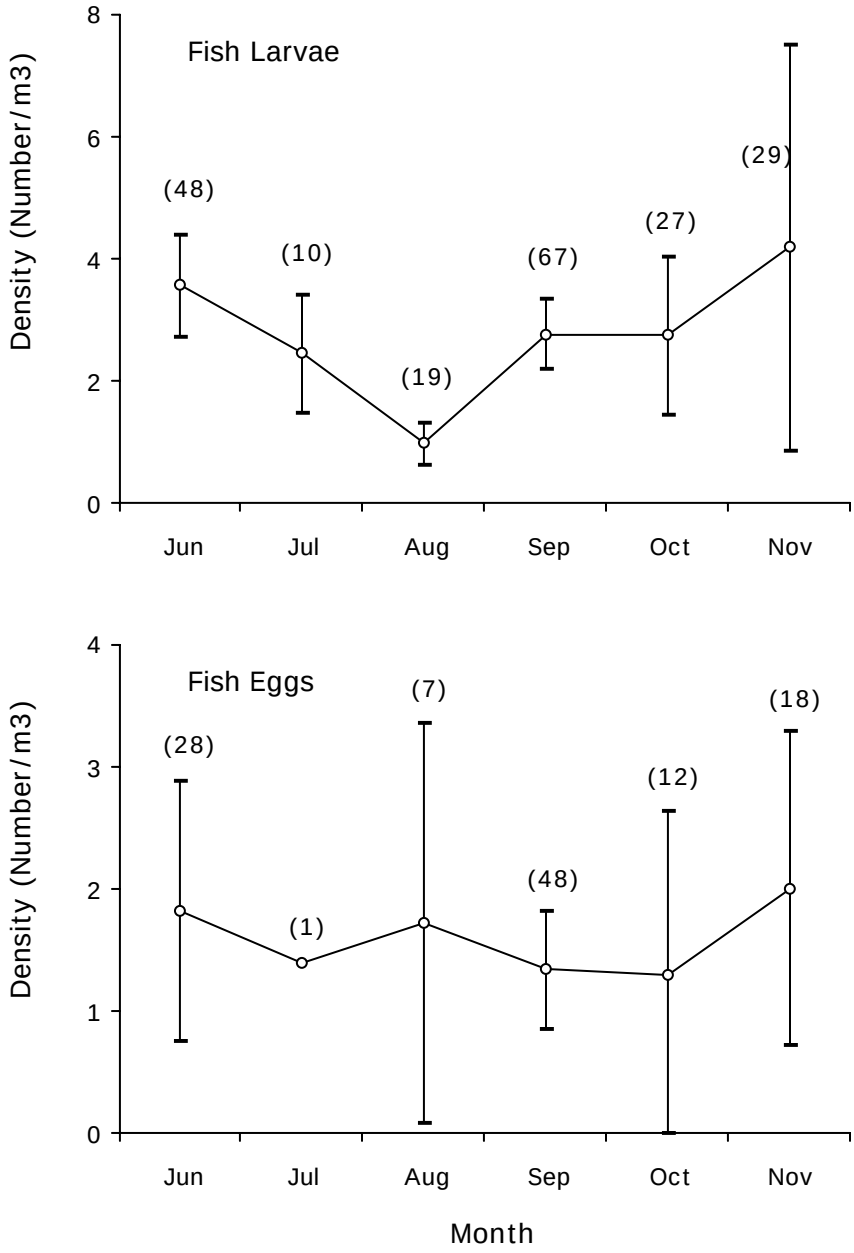


Figure A-1-3. Monthly Density (± 95% Confidence Interval) of Fish Larvae and Eggs at the Proposed Site during Summer Collection

Note: Numbers in parentheses indicate sample size.

Source: Adapted from SEAMAP data, located in Attachment 2.

Table A-1-1. Larval Fish Taxa Represented in Summer Data by 1 Percent or More of the Total Larval Fish Density

Name	Mean Density (number per cubic meter)	Percent Total Density
Anchovy Family		
Engraulidae	0.36976	12.40
Codlet Genus		
Bregmaceros spp.	0.31604	10.59
Menhaden Genus		
Brevoortia spp.	0.24942	8.36
Goby Family		
Gobiidae	0.23374	7.84
Lizardfish Family		
Synodontidae	0.18725	6.28
Lanternfish Genus		
Unid. Fish	0.14020	4.70
Diaphus ssp.	0.12919	4.33
Cusk-Eel Family		
Ophidiidae	0.11739	3.94
Atlantic Croaker		
Micropogonias undulatus	0.10218	3.43
Sole Genus		
Symphurus spp.	0.09848	3.30
Herring Order		
Clupeiformes	0.08329	2.79
Spot		
Leiostomus xanthrus	0.06124	2.05
Lefteye Flounder Genus		
Syacium spp.	0.06061	2.03
Wrasse Family		
Labridae	0.05585	1.87
Eel Order		
Anguilliformes	0.04887	1.64
Lefteye Flounder Family		
Bothidae	0.04628	1.55
Lanternfish Family		
Myctophidae	0.03416	1.15
Snake Eel Family		
Ophichthidae	0.03174	1.06
Sum	2.36570	79.31
Total larval density	2.98300	

Source: Adapted from SEAMAP data, located in Attachment 2.

A-1.3.2 Winter Density and Taxa Composition

A total of 35 larval fish samples were collected and analyzed from the winter SEAMAP stations. Fourteen of those samples also allowed for an analysis of fish egg density. The overall density of fish larvae during the winter collecting period averaged 1.787 larvae/m³ (95% CI: 0.960 to 2.614). The density of fish eggs during this period averaged 3.583 eggs/m³ with the 95% CI ranging from 1.330 to 5.836 (Figure A-1-4). The presence of larvae during winter was variable, with the highest density in March. Egg densities were very low in December and January but increased significantly during March.

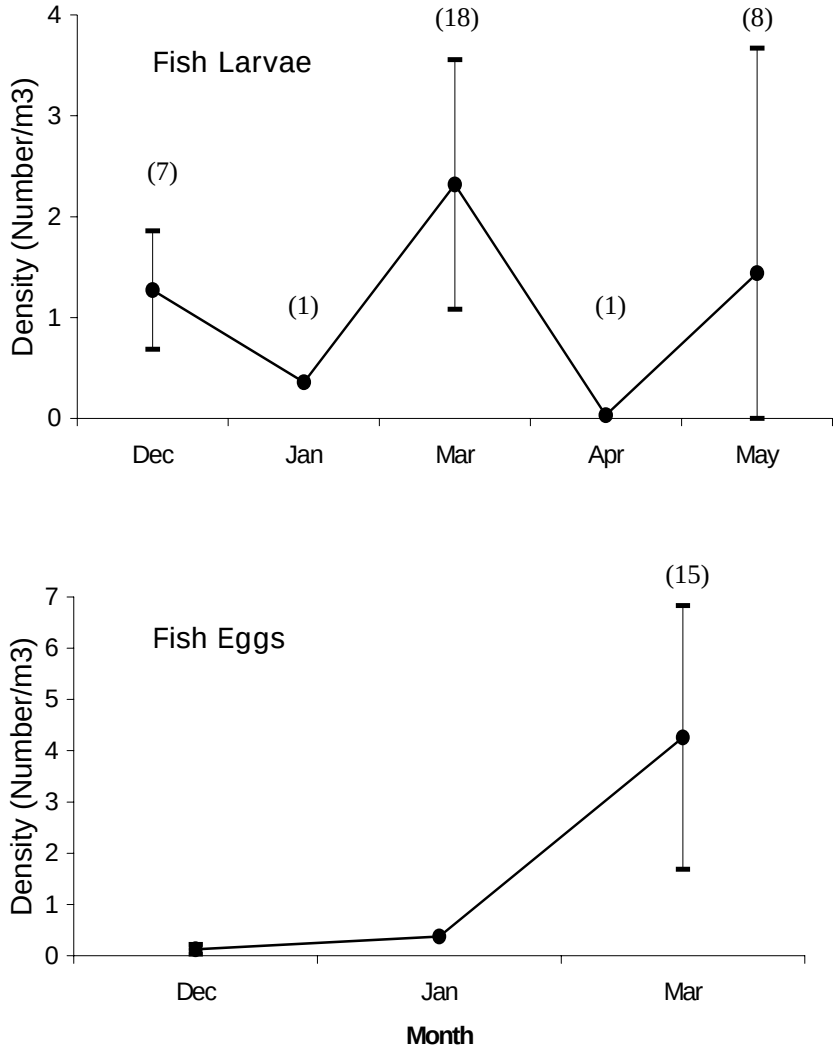


Figure A-1-4. Monthly Density (± 95% Confidence Interval) of Fish Larvae and Eggs at the Proposed Site during Winter Collection

Note: Numbers in parentheses indicate sample size.

Source: Adapted from SEAMAP data, located in Attachment 3.

A total of 133 taxa were represented in the winter larvae data (Attachment 3). Fifteen taxa comprised more than 1 percent of the total larval density. These taxa combined exceeded 86 percent of the number of specimen taken during the winter sampling (Table A-1-2).

Table A-1-2. Larval Fish Taxa Represented in Winter Data by 1 Percent or More of the Total Larval Fish Density

Name	Mean Density (number per cubic meter)	Percent of Total Density
Gulf Menhaden		
Brevoortia patronus	0.60595	33.91
Menhaden genus		
Brevoortia spp.	0.19990	11.19
Codlet genus		
Bregmaceros spp.	0.11159	6.24
Spot		
Leiostomus xanthurus	0.10096	5.65
Goby family		
Gobiidae	0.09335	5.22
Anchovy family		
Engraulidae	0.08551	4.78
Lanternfish family		
Myctophidae	0.07314	4.09
Round herring		
Etrumeus teres	0.05784	3.24
Lanternfish genus		
Diaphus spp.	0.03957	2.21
Codlet family		
Bregmacerotidae	0.03443	1.93
Drum family		
Sciaenidae	0.03131	1.75
Lizardfish family		
Synodontidae	0.02970	1.66
Sole genus		
Symphurus spp.	0.02821	1.58
Cusk-Eel family		
Unid. Fish	0.02746	1.54
Ophidiidae	0.01966	1.10
Sum	1.53858	86.10
Total larval density	1.78700	-----

A-1.4 Calculation of Potential Entrainment Estimates

The potential entrainment of larvae and eggs was obtained by multiplying the observed densities, times the daily maximum intake volume, times the days of exposure. Net extrusion effects were

accounted for by multiplying the observed densities by a factor of 3. Seasonal considerations were not taken into account for eggs, following USCG and MARAD (2004). A mean annual estimate also was made for fish larvae (all taxa combined). However, as will be described below, seasonal considerations are taken into account for the larval stages of concern as identified above.

A-1.4.1 Annual Estimates

The annual estimates of impingement and entrainment of fish eggs and larvae at the facility are the sum of the summer and winter entrainment estimates **(**Table A-1-3). These seasonal estimates are calculated by multiplying the adjusted (times 3) mean densities (and the adjusted upper and lower CIs) by the daily maximum intake volume (480,747 m^3/day), times the period of exposure (183 days for the summer period and 182 days for the winter period).

Table A-1-3. Estimate of Fish Eggs and Larvae Entrained and Impinged by the Facility Each Year

	Lower 95% Confidence Interval	Mean	Upper 95% Confidence Interval
Fish eggs	656,851,357	1,359,087,153	2,061,322,949
Fish larvae	883,309,154	1,256,369,307	1,629,693,389

These estimates include two assumptions in addition to the net extrusion adjustment factor. These additional assumptions include (1) that the depth-integrated samples reflect the densities that will be encountered at the depth of the intake location, and (2) that exposure will occur over the entire year. Neither of these assumptions are expected to be necessarily true.

A-1.4.2 Larval and Egg Estimates for Species of Concern

Consistent with USCG and MARAD (2004), as amended by USCG and MARAD (USCG 2005) the key fish species of concern were red drum (*Sciaenops ocellatus*), red snapper (*Lutjanus campechanus*), Gulf menhaden (*Brevoortia patronus*), and bay anchovy (*Anchoa mitchilli*). Spawning months for the four taxa of concern are shown in Table A-1-4. Spawning of red drum and red snapper occur during the summer SEAMAP sampling period. Spawning of clupeids and engraulids occurs over a greater portion of the year.

Larval densities from the raw SEAMAP data (Attachments 2 and 3) were multiplied by 3 to account for net extrusion (Table A-1-5). Those adjusted densities were then multiplied by the daily intake volume (480,747 m^3) and by the number of days of the respective sampling period, which was 183 days for the summer period, and 182 days for the winter period (Table A-1-6).

Table A-1-4. Seasonal Patterns for the Four Species of Concern

Species	Seasonal Occurrence and Peak Months	Duration of Exposure (months)
Engraulidae	Jan, Feb, **MAR, APR, MAY, JUN, JUL, AUG, SEP**, Oct, Nov, Dec	12[a]
Clupeiformes	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	12[a]
Red snapper	**JUN, JUL, AUG**, Sep	4[b]
Red drum	**SEP, OCT**	2[c]

Notes: Abbreviations represent month of the year larvae occur. Bold abbreviations represent seasonal peaks in abundance based on referenced citations.

Sources: [a] Ditty et al. 1988, [b] Schrippa and Legault 1999, and [c] Comyns (1997).

Table A-1-5. Larval Density Estimates for the Two Periods (number per cubic meter)

Species	Associated Taxa in SEAMAP Data	June–November			December–May		
		LCL	Mean	UCL	LCL	Mean	UCL
Bay anchovy	All anchovies	0.79944	1.35298	1.82182	0	0.26542	0.53164
Gulf menhaden	*Brevoortia patronus*	0.05606	0.92258	2.37556	0.00114	1.86915	3.83908
Red drum	*Sciaenops ocellatus*	0.00118	0.00791	0.01464	0	0	0
Red snapper	*Lutjanus campechanus*	0.00254	0.00630	0.01005	0	0	0

Note: Values are based on SEAMAP ichthyoplankton densities times a correction factor of 3.

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Table A-1-6. Larval Entrainment for the Two Periods (number)

Species	Associated Taxa in SEAMAP Data	June–November			December–May		
		LCL	Mean	UCL	LCL	Mean	UCL
Bay anchovy	All anchovies	70,331,947	119,030,932	160,277,429	0	23,222,764	46,516,557
Gulf menhaden	*Brevoortia patronus*	4,931,658	81,165,531	208,994,233	99,753	163,543,087	335,904,000
Red drum	*Sciaenops ocellatus*	103,494	695,678	1,287,862	0	0	0
Red snapper	*Lutjanus campechanus*	223,764	554,007	884,251	0	0	0

Note: Values are derived by multiplying the densities in Table A-1-5, times the maximum daily intake volume (480,747 m^3), times the number of days in each period.

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Because eggs are not identified to species, species-specific egg entrainment (Table A-1-7) was determined by first calculating the ratio of eggs to larvae from the SEAMAP data. Each density was adjusted for net extrusion (multiplied by 3), multiplied by the maximum daily intake of water (480,747 m^3), and multiplied again by the number of days in its respective period. This

yielded estimates of larvae and egg entrainment for the average, upper confidence limit (UCL) and lower confidence limit (LCL) cases from which the egg/larvae ratio was determined. Egg/larvae ratios were multiplied times the larval entrainment for each species in each entrainment scenario (average, LCL, and UCL) to yield the projected egg entrainment for each species (Table A-1-8).

Table A-1-7. Total Larval and Egg Density Estimates (number per cubic meter)

Stage	Multiple	June–November			December–May		
		LCL	Mean	UCL	LCL	Mean	UCL
Larvae	Density	2.392	2.983	3.575	0.960	1.787	2.614
	x 3	7.176	8.949	10.725	2.880	5.361	7.842
	x 480,747 m^3/day	3,449,840	4,302,205	5,156,012	1,384,551	2,577,285	3,770,018
	x days in period	631,320,806	787,303,497	943,550,118	251,988,348	469,065,809	686,143,271
Eggs	Density	1.166	1.586	2.006	1.330	3.583	5.836
	x 3	3.498	4.758	6.018	3.990	10.749	17.508
	x 480,747 m^3/day	1,681,653	2,287,394	2,893,135	1,918,181	5,167,550	8,416,918
	x days in period	307,742,500	418,593,143	529,443,787	349,108,856	940,494,010	1,531,879,163
Eggs/larvae ratio		0.4875	0.5317	0.5611	1.3854	2.0050	2.2326

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Table A-1-8. Projected Egg Entrainment by Species(number)

Species	Associated Taxa in SEAMAP Data	June–November			December–May		
		LCL	Mean	UCL	LCL	Mean	UCL
Bay anchovy	All anchovies	34,283,884	63,286,308	89,934,692	0	46,562,488	103,852,573
Gulf menhaden	*Brevoortia patronus*	2,403,977	43,154,051	117,270,610	138,200	327,909,838	749,937,162
Red drum	*Sciaenops ocellatus*	50,449	369,878	722,644	0	0	0
Red snapper	*Lutjanus campechanus*	109,076	294,554	496,170	0	0	0

Note: Values are derived by multiplying larval entrainment by species from Table A-1-6 times the egg/to larvae ratio for each entrainment scenario from Table A-1-9.

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Annual entrainment values for larvae and eggs (Tables A-1-9 and A-1-10, respectively) were calculated by adding the periodic larvae/egg entrainment values (Tables A-1-6 and A-1-8, respectively) from a specific entrainment scenario of the summer period to the value of the same scenario of the winter period.

Table A-1-9. Annual Larval Entrainment (number)

Species	Associated Taxa in SEAMAP Data	Annual		
		LCL	Mean	UCL
Bay anchovy	*All anchovies*	70,331,947	142,253,696	206,793,986
Gulf menhaden	*Brevoortia patronus*	5,031,412	244,708,618	544,898,233
Red drum	*Sciaenops ocellatus*	103,494	695,678	1,287,862
Red snapper	*Lutjanus campechanus*	223,764	554,007	884,251

Note: Values are calculated by the sum of both periods from Table A-1-6.

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Table A-1-10. Annual Egg Entrainment (number)

Species	Associated Taxa in SEAMAP Data	Annual		
		LCL	Mean	UCL
Bay anchovy	*All anchovies*	34,283,884	109,848,796	193,787,264
Gulf menhaden	*Brevoortia patronus*	2,542,177	371,063,888	867,207,773
Red drum	*Sciaenops ocellatus*	50,449	369,878	722,644
Red snapper	*Lutjanus campechanus*	109,076	294,554	496,170

Note: Values are calculated by the sum of both periods from Table A-1-8.

LCL = Lower confidence limit.
UCL = Upper confidence limit.

A-1.4.3 Calculation of Key Species Entrainment Estimates

In the SEAMAP data, not all larvae can be identified to species level. Some larvae are identified only to Order, Family, Genus, or simply as unidentified fish larvae. Estimating densities for specific species of concern from higher taxonomic levels was accomplished by the methods described in USCG and MARAD (2004). Using density estimates, higher taxa that might possibly contain the species of concern were identified. Beginning with the highest taxon that represents a species of concern, densities of all lower taxa were summed. The proportion of the species of concern then was calculated by dividing the density for the species of concern by the summed larval density for all taxon in that category. The density of the highest taxon was then multiplied by the proportion of the species of concern to yield the estimated larval density of the species of concern potentially contained within the higher taxa.

For example, three identified taxa in the overall species list could contain red drum: unidentified fish, Perciformes, and Sciaenidae. To obtain an estimate of red drum contained within the unidentified fish category, the density of red drum was divided by the summed densities of all taxa, excluding unidentified fish. For the SEAMAP data, red drum density ($0.001127/m^3$) was 0.047 percent of total larvae density ($2.385/m^3$) excluding unidentified fish ($0.083832/m^3$). Thus, 0.047 percent ($0.000040/m^3$) of unidentified fish density was estimated to consist of red drum.

The same calculations were applied to the taxa Perciformes and Sciaenidae. It was estimated that Perciformes and Sciaenidae comprised 0.532 percent (0.000446/m^3) and 0.998 percent (0.000828/m^3) of unidentified fish, respectively.

For Perciformes, the density of red drum was divided by the sum of all 127 taxa within the Order Perciformes (excluding Perciformes). In this case, red drum density (0.001127/m^3) was 0.23 percent of the summed Perciformes densities (0.496145/m^3), and thus 0.23 percent of the taxon Perciformes was considered to be red drum. For this calculation, however, two sources of Perciformes density are considered: the density of Perciformes from the SEAMAP data (0.012678/m^3), and the density of Perciformes estimated to be within the unidentified fish taxa calculated above (0.000446/m^3). Total Perciformes density was 0.013123/m^3, of which 0.23 percent (0.000030/m^3) was estimated to be red drum. Applying the same method, it was estimated that Sciaenidae comprised 4.75 percent (0.000623/m^3) of total Perciformes.

For Sciaenidae, the density of red drum was divided by the sum of all 13 Sciaenidae taxa within the SEAMAP listing, excluding Sciaenidae itself. In this case, red drum density (0.001127/m^3) was 0.72 percent of the summed Sciaenidae density (0.155730/m^3); thus, 0.72 percent of the taxon Sciaenidae was considered to be red drum throughout the entire database. For this calculation, three sources of Sciaenidae density were considered: the density of Sciaenidae from the SEAMAP data (0.023567/m^3), the density of Sciaenidae estimated to be within the unidentified fish taxa (0.000828/m^3), and the density of Sciaenidae estimated to be within total Perciformes (0.000623/m^3). Given these densities, total Sciaenidae density was 0.025019. Red drum was estimated to be 0.72 percent (0.000181/m^3) of total Sciaenidae density.

Because there are no other *Sciaenops* genera other than *ocellatus*, there was no need to estimate the number of red drum within the taxon *Sciaenops* spp. For snapper, however, the species *L. campechanus*, *L. griseus* (gray snapper), and *Lutjanus* spp. were identified within the SEAMAP database. In this case, the taxon *Lutjanus* spp. was incorporated into the hierarchy of calculations described above to determine the percentage and density of red snapper within *Lutjanus* spp.

Total red drum density was thus calculated by summing densities from all seven sources:

- SEAMAP red drum density,
- Estimated red drum density within SEAMAP Sciaenidae density,
- Estimated red drum density within SEAMAP Perciformes density,
- Estimated red drum density within SEAMAP unidentified fish density,
- Estimated Perciformes density within SEAMAP unidentified fish density,
- Estimated Sciaenidae density within SEAMAP unidentified fish density, and
- Estimated Sciaenidae density within SEAMAP Perciformes density.

The same protocol was used to estimate the total densities of red snapper, Gulf menhaden and anchovies. Because anchovies (Engraulidae) are not fished either commercially or recreationally, impact concerns center on this group's contribution as forage fish in the GOM. Because all Engraulidae contribute to the food web, all species within the family can be considered forage fish. Four Engraulidae taxa were identified within the SEAMAP database:

Engraulidae, *Anchoa* spp., *A. hepsetus* (striped anchovy), and *Engraulis eurystole* (silver anchovy). Densities for each taxon were summed to provide an overall cumulative density for anchovies.

A-1.5 Ichthyoplankton Assessment Model Methods

A USCG consultant, e^2M, developed an Ichthyoplankton Assessment Model for specific taxa in association with the proposed Gulf Landing LNG facility (USCG and MARAD 2004). USCG has instructed that this model be used without change in the assessment process for new LNG projects so that impact assessments among projects will be comparable. In this section, we apply the USCG and MARAD (2004) model as amended by USCG and MARAD (USCG 2004) to the same taxa treated in the Gulf Landing Final Environmental Impact Statement. The model involves calculating age-1 equivalents and equivalent yield for the taxa of concern, based on the entrainment estimates and life history characteristics of the taxa.

The equivalent yield analysis begins with the larval impacts associated with open-loop vaporization, expressed as the number of age-1 fish the eggs and larvae would have become had they not been entrained. The commercial and/or recreational yield that these fish would have represented over time is estimated and expressed as the equivalent yield. The equivalent yield represents the yield available to the fishery but does not represent excess fishing pressure on the fishery, as has been stated previously (e^2M's January 21, 2005 recommendation to the Gulf Landing's Administrative Record). Excess fishing pressure is relevant only to that portion of the stock that is commercially/recreationally exploited. For example, if the equivalent yield of a stock is 1,000 pounds and the commercial yield is 10,000 pounds, the equivalent yield does not represent 10 percent of landings. It represents only 1,000 pounds that would have been available to, but not necessarily harvested by, the fishery. If a fishery takes 5 percent of the total GOM stock or some regional component thereof, then only 5 percent of the equivalent yield (50 pounds in this example) would represent additional fishing pressure. Only that proportion of equivalent yield that corresponds to the exploited proportion of the harvested stock is relevant to impact assessment.

A-1.5.1 Life History Tables

Calculations of both age-1 equivalents (Attachment 4) and equivalent yield (Attachment 5) use stage-specific mortality rates to project the number of entrained eggs and larvae that otherwise would have been expected to survive to age-1 or would have been caught in a commercial or recreational fishery. The two critical life history values of importance for estimating age-1 equivalents and equivalent yield are daily instantaneous mortality rates for identified stages and duration in days for each stage (e.g., USCG and MARAD 2004 Table G-13, as amended). Total mortality per stage is the product of daily instantaneous mortality and stage duration. Calculating total natural mortality is a prerequisite for estimating both age-1 equivalents and equivalent yield.

To address variability in recruitment, the critical life histories are determined for three separate scenarios: (1) a base mortality case, (2) a low mortality case, and (3) a high mortality case. The

base mortality case provides estimates of daily mortality and stage duration, based on average values provided in the scientific literature (e.g., USCG and MARAD 2004 Appendix G, Table G-13, as amended). In the low mortality case, critical values are based on low or lower end estimates of mortality provided in the scientific literature (e.g., USCG and MARAD 2004 Table G-13, as amended), whereas high mortality critical values are determined from high or higher end estimates (e.g., USCG and MARAD 2004 Table G-13, as amended).

Three additional critical life history values are required for calculating the equivalent yield of taxa that are commercially or recreationally fished: (1) the natural mortality rate per stage for individuals age-1 and older, (2) the fishing mortality rate per stage for individuals age-1 and older, and (3) the weight at median age of death per stage for individuals age-1 and older (e.g., USCG and MARAD 2004 Table G-16, as amended). Within individual taxa, these critical values remain constant regardless of whether it is the base, low, or high mortality case for stages younger than age-1. It is assumed that fish age-1 and older are not subject to entrainment and therefore parameter values are independent of the entrainment process.

Critical life history values used in this assessment for BOET (shown in Attachment 5) were taken directly from tables provided in USCG and MARAD (2004): red drum (Table G-13), red snapper (Table G-58), Gulf menhaden (Table G-42), and bay anchovy (Table G-34). As discussed above, the densities of all anchovy taxa were summed to provide a cumulative density. The life history data for the bay anchovy therefore were used as a surrogate for all anchovies. The exception to the USCG and MARAD (2004) life history data was that the stage durations for the red snapper Juvenile 1 stage high and low mortality cases were reversed: 10 days for the high mortality case and 31 days for the low mortality case (Table G-58). These durations should have been 31 days for the high mortality case and 10 days for the low mortality case (USCG and MARAD 2005b). Our analysis conformed to the latter designations.

A-1.5.2 Age-1 Equivalent and Equivalent Yield Analysis

The variables and parameters used to calculate the number of age-1 equivalents are detailed in Section 3.2 of USCG and MARAD (2004) as amended by USCG and MARAD (USCG 2005). For this report, a tabular equivalent yield model was provided by e^2M and USCG.

A-1.5.3 Sensitivity Analyses

To address variability in recruitment, low and high ranges of mortality and entrainment were compared in order to assess differences in extreme ranges in entrainment loss relative to the base scenario as per USCG and MARAD (2004). These analyses are presented in summary tables, along with summaries of age-1 equivalent and equivalent yield analysis. The upper extreme estimate is for UCL entrainment and low stage mortality. In such a case there would be maximum entrainment and minimum natural mortality, which would result in the highest proportionate loss of fish due to entrainment or the highest losses in terms of age-1 equivalents and equivalent yield. The converse would be for the LCL entrainment and high natural mortality scenario. Under high natural mortality, most of the entrained fish would have been lost anyway

thereby minimizing the loss attributed to entrainment. Both scenarios are considered extreme and unlikely (USCG and MARAD 2004).

Five other cases represent a range of entrainment alternatives that are more likely to occur than the previous cases. Three of those cases used basic life history parameters and either average entrainment, UCL entrainment, or LCL entrainment. The final two cases used either high or low larval mortality but used basic life history parameters for all other stages. The entrainment losses from these seven cases represent the average, maximum, and minimum losses that might occur given the inherent variability in the SEAMAP data.

A-1.6 Model Results

The following section shows a summary of the age-1 equivalent results (Attachment 3) and of the equivalent yield analysis (Attachment 4) for the species of concern. Each scenario shown indicates the likelihood of occurrence, the estimate of age-1 equivalents lost, and the number of pounds that the lost age-1 equivalents would equate to.

A-1.6.1 Red Drum

Using the average entrainment estimates and base case life history values, it is estimated that 695,678 red drum larvae (see Table A-1-9) and 369,878 eggs (see Table A-1-10) would be entrained. Approximately 86 percent of the entrainment estimate is based on SEAMAP density data specific for red drum, while 14 percent of the total red drum density was derived from the taxa unidentified fish, Perciformes, and Sciaenidae. In this case, 659 age-1 equivalents are represented and would have had an equivalent yield of 2,346 pounds (Table A-1-11).

Table A-1-11. Summary of Sensitivity Analysis for Red Drum

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost	Total Biomass of Age-1 Fish Lost (pounds)
Basic life history/average entrainment	Average	659	2,346
Base life history (low larval mortality)/average entrainment	Likely	3,192	11,369
Base life history (high larval mortality)/average entrainment	Likely	134	476
Basic life history/UCL entrainment	Likely	1,231	4,383
Basic life history/LCL entrainment	Likely	97	344
Low stage mortality/UCL entrainment	Unlikely	7,906	28,159
High stage mortality/LCL entrainment	Unlikely	6	20

LCL = Lower confidence limit.
UCL = Upper confidence limit.

If we assume the low mortality life history scenario and use the UCL for the entrainment estimate, 7,906 age-1 equivalents are represented, with an equivalent yield of 28,159 pounds. In this unlikely scenario, estimated take of age-1 equivalents and the resulting equivalent yield estimate would be more than an order of magnitude higher than the base case estimate.

A-1.6.2 Red Snapper

Assuming mean density, total entrainment was estimated at 554,007 red snapper larvae (see Table A-1-9) and 294,554 eggs (see Table A-1-10). Only 14 percent of the red snapper density estimates are derived directly from red snapper SEAMAP data. Red snapper density values also were derived from the taxa Lutjanidae (21 percent) and *Lutjanus* sp. (64 percent), with the remaining 1 percent coming from unidentified fish and Perciformes. The base case/average entrainment estimate of 235 age-1 equivalents would represent an equivalent yield of 277 pounds (see Table A-1-12). Under the extreme low mortality/UCL entrainment scenario, age-1 equivalent and equivalent yield values are estimated to be 14,516 fish—representing 17,157 pounds of red snapper. Conversely, using high mortality/LCL entrainment estimates, age-1 equivalent and equivalent yield estimates would be much lower than base case at 4 fish—with an equivalent yield of 4 pounds. Among the four likely scenarios, red snapper age-1 equivalent estimates range from 35 to 1,282 fish which would be equivalent to increasing the fishery harvest by 41 to 1,516 pounds.

Table A-1-12. Summary of Sensitivity Analysis for Red Snapper

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost	Total Biomass of Age-1 Fish Lost (pounds)
Basic life history/average entrainment	Average	235	277
Base life history (low larval mortality)/average entrainment	Likely	1,282	1,516
Base life history (high larval mortality)/average entrainment	Likely	35	41
Basic life history/UCL entrainment	Likely	378	447
Basic life history/LCL entrainment	Likely	93	110
Low stage mortality/UCL entrainment	Unlikely	14,516	17,157
High stage mortality/LCL entrainment	Unlikely	4	4

LCL = Lower confidence limit.
UCL = Upper confidence limit.

A-1.6.3 Gulf Menhaden

For the mean entrainment base mortality case, total larval entrainment was estimated at 244,708,618 Gulf menhaden larvae (Table A-1-9) and 371,063,888 eggs (Table A-1-10). Only 0.3 percent of the entrainment estimate is based on Gulf menhaden density reported directly in the SEAMAP data. Over 97 percent of Gulf menhaden density was derived from the density of *Brevoortia* spp.: from *Brevoortia* spp. itself (65.1 percent), from *Brevoortia* spp. within Clupeidae (14.8 percent), and from *Brevoortia* spp. within Clupeiformes (17.6 percent).

The base case entrainment levels converted to 260,134 age-1 equivalents, representing an equivalent yield of 20,623 pounds of fish (Table A-1-13). For the extreme low mortality/UCL entrainment scenario, the age-1 equivalent entrainment estimate would increase to 1,380,627 fish—representing 109,456 pounds of menhaden. At the other extreme (high mortality/LCL entrainment), 1,911 age-1 equivalents would be represented, which would be equivalent to increasing the fishing harvest by 152 pounds. For the four likely scenarios, age-1 equivalent

values would range from 4,718 to 628,258 menhaden—representing fishing harvest increases ranging from 374 to 49,808 pounds.

Table A-1-13. Summary of Sensitivity Analysis for Gulf Menhaden

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost	Total Biomass of Age-1 Fish Lost (pounds)
Basic life history/average entrainment	Average	260,134	20,623
Base life history (low larval mortality)/average entrainment	Likely	628,258	49,808
Base life history (high larval mortality)/average entrainment	Likely	119,789	9,497
Basic life history/UCL entrainment	Likely	584,320	46,325
Basic life history/LCL entrainment	Likely	4,718	374
Low stage mortality/UCL entrainment	Unlikely	1,380,627	109,456
High stage mortality/LCL entrainment	Unlikely	1,911	152

LCL = Lower confidence limit.
UCL = Upper confidence limit.

A-1.6.4 Anchovy

As anchovies are not fished, we provide age-1 equivalent values but do not calculate equivalent yield losses. For the mean entrainment base mortality case, total entrainment was estimated at 142,253,696 anchovy larvae (Table A-1-9) and 109,848,796 eggs (Table A-1-10). In terms of age-1 equivalents, the expected loss to the system would be 84,510 fish (Table A-1-14). For the extreme low mortality/UCL entrainment scenario, age-1 equivalent losses would increase to 568,317 fish. At the other extreme high mortality/LCL entrainment case, losses would be 2,137 age-1 anchovies. For the four likely scenarios, anchovy loss could range from a low of 36,014 up to a high of 368,434 fish.

Table A-1-14. Summary of Sensitivity Analysis for Anchovies

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost
Basic life history/average entrainment	Average	84,510
Base life history (low larval mortality)/average entrainment	Likely	368,434
Base life history (high larval mortality)/average entrainment	Likely	36,014
Basic life history/UCL entrainment	Likely	127,247
Basic life history/LCL entrainment	Likely	39,201
Low stage mortality/UCL entrainment	Unlikely	568,317
High stage mortality/LCL entrainment	Unlikely	2,137

LCL = Lower confidence limit.
UCL = Upper confidence limit.

A-1.7 Summary

The estimates of equivalent yields (pounds) are compared to the GOM landings for the same species to provide a basis for determining impacts and significance levels. For example, if the equivalent yield of a stock is 1,000 pounds and the commercial yield is 10,000 pounds, the equivalent yield does not represent 10 percent of landings. It represents only 1,000 pounds that would have been available to, but not necessarily harvested by, the fishery. If a fishery takes 5 percent of the total GOM stock or some regional component thereof, then only 5 percent of the equivalent yield (50 pounds in this example) would actually represent additional fishing pressure. Only that proportion of equivalent yield that corresponds to the exploited proportion of the harvested stock is relevant to impact assessment. Three of the key species for which complete life history data were tabulated are harvested from the Gulf: red drum, red snapper, and Gulf menhaden (USCG and MARAD 2004). Age-1 equivalent losses of anchovies also were compared to the estimated GOM population of small pelagic forage fish.

A-1.7.1 Proposed Project Area

For red drum, equivalent yield is compared to 14-year average landings data for the GOM as a whole and for the states of Louisiana, Alabama, and Mississippi (Table A-1-15). Under base mortality and average entrainment conditions, fishing stress would be increased by about 0.02 percent relative to the 14-year Gulf harvest average. On an individual state basis, the equivalent increase in harvest ranges from 0.03 to 0.55 percent of the average 14-year landings. Among the four likely scenarios, the greatest equivalent yield estimate of 11,369 pounds of red drum would be for the low larval mortality/average entrainment case. This equates to a 0.1 percent increase in the 14-year landings average across the Gulf and increases of 2.66 percent, 2.43 percent, and 0.14 percent in the annual landings for Alabama, Mississippi, and Louisiana, respectively. Under the extreme low stage mortality/UCL entrainment case, the equivalent yield estimate of 28,159 pounds of drum equates to a 0.25 percent increase in Gulf landings and 6.59 percent, 6.02 percent, and 0.36 percent increases above the landings for Alabama, Mississippi, and Louisiana respectively.

For red snapper, the worst-case low stage mortality/UCL entrainment scenario resulted in an annual equivalent yield estimate that would increase GOM fishing pressure compared to the 14-year landings average by about 0.23 percent (Table A-1-16). Of the more likely scenarios, the low larval mortality/average entrainment case yielded the highest increase at 0.02 percent above GOM landings. The other three cases resulted in increases of 0.01 percent or less. Based on the average likelihood scenario, the equivalent yield of 235 pounds of red snapper equated to only a 0.00004 percent increase in the 14-year landings average.

Table A-1-15. Sensitivity Analysis for Age-1 Equivalents and Equivalent Yields for Red Drum

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost	Total Equivalent Fishery Yield (pounds)	Equivalent Increase in 14-Year Average Gulf Harvest (percent)	Equivalent Increase in 14-Year Average Alabama Harvest (percent)	Equivalent Increase in 14-Year Average Mississippi Harvest (percent)	Equivalent Increase in 14-Year Average Louisiana Harvest (percent)
Basic life history/average entrainment	Average	659	2,346	0.02	0.55	0.50	0.03
Base life history (low larval mortality)/average entrainment	Likely	3,192	11,369	0.10	2.66	2.43	0.14
Base life history (high larval mortality)/average entrainment	Likely	134	476	0.00	0.11	0.10	0.01
Basic life history/UCL entrainment	Likely	1,231	4,383	0.04	1.03	0.94	0.06
Basic life history/LCL entrainment	Likely	97	344	0.00	0.08	0.07	0.00
Low stage mortality/UCL entrainment	Unlikely	7,906	28,159	0.25	6.59	6.02	0.36
High stage mortality/LCL entrainment	Unlikely	6	20	0.00	0.00	0.00	0.00

Note: Equivalent yields are compared with the 14-year landings average in the Gulf of Mexico (11,155,190 pounds), Alabama (427,360 pounds), Mississippi (467,613 pounds) and Louisiana (7,876,165 pounds).

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Sources: USCG and MARAD 2004; landings values from NMFS 2005.

Table A-1-16. Sensitivity Analysis for Age-1 Equivalents and Equivalent Yields for Red Snapper

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost	Total Equivalent Fishery Yield (pounds)	Equivalent Increase in 14-Year Average Gulf Harvest (percent)
Basic life history/average entrainment	Average	235	277	0.00
Base life history (low larval mortality)/average entrainment	Likely	1,282	1,516	0.02
Base life history (high larval mortality)/average entrainment	Likely	35	41	0.00
Basic life history/UCL entrainment	Likely	378	447	0.01
Basic life history/LCL entrainment	Likely	93	110	0.00
Low stage mortality/UCL entrainment	Unlikely	14,516	17,157	0.23
High stage mortality/LCL entrainment	Unlikely	4	4	0.00

Note: Equivalent yields are compared with the 14-year landings mean in the Gulf of Mexico (7,430,576 pounds).

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Sources: SEDAR 7 AW11.3; landings values from NMFS 2005.

Although the loss of Gulf menhaden at BOET is much higher than that of either red drum or red snapper, the estimated average increase in fishing pressure for Gulf menhaden would be about 0.002 percent of the over 1 billion pounds landed from the GOM (Table A-1-17). This scenario represents an even smaller amount of loss in the forage fish population of the GOM (0.000028 percent). This level of impact is likely to be viewed as a minor adverse impact. Of the four likely scenarios, the loss of age-1 equivalents ranges from 4,718 to 628,258 fish, representing an equivalent yield of from 374 to 49,808 pounds of fish.

Age-1 equivalent losses for anchovies were compared to the estimated number of forage fish in the GOM (Table A-1-18). A rough estimate of 0.0063273 pound per GOM forage fish (USCG 2004) was divided into an estimate of total biomass for small pelagic species in the Gulf of 5,844,454,571 pounds (USCG 2005) to derive a population estimate. Given the estimated 923,688,551,357 small pelagic fish in the Gulf, even the worst-case low stage mortality/UCL entrainment estimate of 568,317 Age-1 equivalent losses represents only 0.000062 percent of the population.

Table A-1-17. Sensitivity Analysis for Age-1 Equivalents and Equivalent Yields for Gulf Menhaden

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost	Total Equivalent Fishery Yield (pounds)	Equivalent Increase in 14-year average Gulf Harvest (percent)	Percent of Forage Fish Population
Basic life history/average entrainment	Average	260,134	20,623	0.001668	0.000028
Base life history (low larval mortality)/average entrainment	Likely	628,258	49,808	0.004029	0.000068
Base life history (high larval mortality)/average entrainment	Likely	119,789	9,497	0.000768	0.000013
Basic life history/UCL entrainment	Likely	584,320	46,325	0.003747	0.000063
Basic life history/LCL entrainment	Likely	4,718	374	0.000030	0.000001
Low stage mortality/UCL entrainment	Unlikely	1,380,627	109,456	0.008853	0.000149
High stage mortality/LCL entrainment	Unlikely	1,911	152	0.000012	0.000000

Note: Equivalent yields are compared with the 14-year landings mean (1,236,346,359 pounds). Age-1 equivalents are compared to the estimated number of forage fish in the Gulf of Mexico (923,688,551,357) as derived from the total Gulf biomass estimates and an assumed per fish weight of 0.0063273 pound.

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Sources: USCG and MARAD 2004.

Table A-1-18. Sensitivity Analysis for Age-1 Equivalent Losses for Anchovies

Estimate	Likelihood of Occurrence	Number of Age-1 Fish Lost	Percent of forage fish population
Basic life history/average entrainment	Average	84,510	0.000009
Base life history (low larval mortality)/average entrainment	Likely	368,434	0.000040
Base life history (high larval mortality)/average entrainment	Likely	36,014	0.000004
Basic life history/UCL entrainment	Likely	127,124	0.000014
Basic life history/LCL entrainment	Likely	39,201	0.000004
Low stage mortality/UCL entrainment	Unlikely	568,317	0.000062
High stage mortality/LCL entrainment	Unlikely	2,137	0.000000

Note: Losses are compared to estimated total number of forage fish in the Gulf of Mexico (923,688,551,357) as derived from the total Gulf biomass estimates and an assumed per fish weight of 0.0063273 pound.

LCL = Lower confidence limit.
UCL = Upper confidence limit.

Sources: USCG and MARAD 2004.

A-1.7.2 Gulf-Wide

With regard to larval and egg entrainment, the BOET has two characteristics that distinguish it from the other proposed or existing deepwater ports in the GOM. Those characteristics are the distance of the Terminal from land (62.6 mi or 100.7 km) and the standing depth of the water (approximately 450 ft or 137 m). The more productive areas within the ocean are closer to land due to nutrient run-off and freshwater input, among other factors. BOET benefits from its placement in an area with a relatively low density of fish eggs and larvae (see Table A-1-19).

Of the seven existing or proposed deepwater ports northern GOM, BOET has the lowest annual entrainment of fish eggs and larvae with the exception of Gulf Gateway, which is also in deeper water (91 m or 298 ft) and even further from shore (187 km or 116 mi). Individual species loss of age-1 equivalents due to entrainment varies between the deepwater ports; however, BOET remains at the low end of the scale. With regard to the key species, BOET accounts for only 0.05 percent of the Gulf menhaden, 0.01 percent of the red snapper, and 0.02 percent of the red drum age-1 equivalents lost in the GOM annually.

Table A-1-19. Comparison of Fish Egg and Larval Densities and Entrainment and Equivalent Yield Loss with Respect to Proposed or Existing Ports within the Gulf of Mexico

Deepwater Port	Egg Density per Million Gallons of Seawater (3,785 m^3)[a]	Larval Density per Million Gallons of Seawater (3,785 m^3)[a]	Annual Egg Entrainment (millions)[b]	Annual Larval Entrainment (millions)[b]	Gulf Menhaden Equivalent Yield Lost Annually (pounds)	Red Snapper Equivalent Yield Lost Annually (pounds)	Red Drum Equivalent Yield Lost Annually (pounds)
Deepwater Ports of the Northeastern GOM							
BOET[c]	9,783	9,028	1,359	1,256	20,623	277	2,346
Compass Port[d]	17,471	25,457	2,602	3,792	224,164	673	25,657
MPEH[e]	8,235	11,005	1,623	2,169	14,010	370	4008
Deepwater Ports of the Northwestern GOM							
Beacon Port[f]	13,806	17,730	2,532	3,252	2,581	16,016	NA
Gulf Landing[g]	15,658	35,389	2,332	5,270	8,327	723	100,985
Port Pelican[h]	11,587	22,067	2,238	4,262	65,833	1,946	1,183
Gulf Gateway[i]	5,027	10,523	284	595	35,485	1,049	638
Regional Estimated Cumulative Entrainment Summary							
Northeastern GOM	11,830	15,163	5,584	7,217	258,797	1,320	32,011
Northwestern GOM	10,757	21,427	7,386	13,379	112,226	19,734	102,806
Total GOM	11,294	18,743	12,970	20,596	371,023	21,054	134,817

m^3 = Cubic meter(s).

[a] Egg and larval densities are based on SEAMAP data (except where noted) and do not reflect the x3 multiplier that the model applies to these data to compensate for sampling gear inefficiency.

[b] Annual entrainment estimates do include the x3 multiplier to correct for sampling gear inefficiency.

[c] Numbers were calculated using proposed throughput.

[d] Source: USCG and MARAD 2005b.

[e] Source: USCG and MARAD 2005c.

[f] Source: ConocoPhillips 2005.

[g] Source: USCG and MARAD 2004.

[h] Source: USCG and MARAD 2003a.

[i] Source: USCG and MARAD 2003b. Estimates of equivalent yield loss are flow-weighted using Pearl Crossing results.

A-1.8 References

Comyns 1997 — Comyns, B. C. 1997. Growth and Mortality of Fish Larvae in the Northcentral Gulf of Mexico and Implications to Recruitment. Doctoral Dissertation. Louisiana State University. Baton Rouge, LA.

ConocoPhillips 2005 — ConocoPhillips. 2005. Beacon Port LLC Deepwater Port Act License Application. (Docket No. USCG-2005-21232.) Submitted to United States Coast Guard. January. Houston, TX.

Ditty 1986 — Ditty, J. G. 1986. Ichthyoplankton in Neritic Waters of the Northern Gulf of Mexico off Louisiana: Composition, Relative Abundance, and Seasonality. Fishery Bulletin 84(4):935–946.

Ditty et al. 1988 — Ditty, J. G., G. G. Zieke, and R. F. Shaw. 1988. Seasonality and Depth Distribution of Larval Fishes in the Northern Gulf of Mexico above 26°00'N. Fishery Bulletin 86:811–823.

Hernandez et al. 2002 — Hernandez, F. J., R. F. Shaw, J. S. Cope, J. G. Ditty, M. C. Benfield, and T. Farooqi. 2002. Across-Shelf Larval, Postlarval, and Juveniles Fishes Collected at Offshore Oil and Gas Platforms and a Coastal Rock Jetty West of the Mississippi River Delta. (OCS Study MMS 2001-077.) Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA.

Kramer et al. 1972 — Kramer, D., M. J. Kalin, E. G. Stevens, J. R. Thrailkill, and J. R. Zweifel. 1972. Collecting and Processing Data on Fish Eggs and Larvae in the California Current Region. Technical Report. (National Marine Fisheries Circular 370.) National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 38 pages.

Lyczkowski-Shultz et al. 2004. — Lyczkowski-Shultz, J., D. S. Hanisko, and G. W. Ingram, Jr. 2004. The Potential for Incorporating a Larval Index of Abundance for Stock Assessment of Red Snapper, *Lutjanus campechanus*. (Report SEDAR7-DW14.) National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 10 pages.

Posgay and Marak 1980 — Posgay, J. A. and R. R. Marak. 1980. The MARMAP Bongo Zooplankton Samplers. Journal of Northwestern Atlantic Fisheries Science 1:9–99.

Rester et al. 2000 — Rester, J. K., N. Sanders, Jr., D. S. Hanisko, and B. Pellegrin (eds.). 2000. Seamap Environmental and Biological Atlas of the Gulf of Mexico, 1998. (No. 75.) Gulf States Marine Fisheries Commission. Ocean Springs, MS.

Rooker et al. 2004 — Rooker, J. R., A. M. Landry, Jr., B. W. Geary, and J. A. Harper. 2004. Assessment of a Shell **B**ank and Associated Substrates as a Necessary Habitat of Post-Settlement Red Snapper. Estuarine Coastal and Shelf Science 59:653–661.

Schirripa and Legault 1999 — Schirripa, M. J. and C. M. Legault. 1999. Status of the Red Snapper in U.S. Waters of the Gulf of Mexico. Updated through 1998. (SFD-99/00-75.) Southeast Fisheries Science Center, Sustainable Fisheries Division Contribution. 86 pages plus appendices.

Shaw et al. 1985 — Shaw, R. F., J. H. Cowan, Jr., and T. L. Tillman. 1985. Distribution and Density of *Brevoortia patronus* (Gulf Menhaden) Eggs and Larvae in the Continental Shelf Waters of Western Louisiana. Bulletin of Marine Science 36(1):9–103.

Shaw et al. 2002 — Shaw, R. F., D. C. Lindquist, M. C. Benfield, T. Farooqi, and J. T. Plunket. 2002. Offshore Petroleum Platforms: Functional Significance for Larval Fish across Longitudinal and Latitudinal Gradients. (OCS Study MMS 2002-077.) Prepared by the Coastal Fisheries Institute, Louisiana State University, Baton Rouge, LA. Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. 107 pages.

Smith and Richardson 1977 — Smith, P. E. and S. L. Richardson (eds.). 1977. Standard Techniques for Pelagic Fish Egg and Larvae Surveys. (FAO Fisheries Technical Paper 175.)

NOAA 1985 — National Oceanic and Atmospheric Administration. 1985. Gulf of Mexico Coastal and Ocean Zones Strategic Assessment: Data Atlas. National Ocean Service.

USCG and MARAD 2003a — U.S. Coast Guard and U.S. Maritime Administration. 2003a. Port Pelican Final Environmental Impact Statement. (Docket No. USCG-2002-14134.) Washington, DC.

USCG and MARAD 2003b — U.S. Coast Guard and U.S. Maritime Administration. 2003b. Final Environmental Assessment of the El Paso Energy Bridge Gulf of Mexico LLC Deepwater Port License Application. (Docket No. USCG-2002-14134.) August. Washington, DC.

USCG and MARAD 2004 — U.S. Coast Guard and U.S. Maritime Administration. 2004. Final Environmental Impact Statement for the Gulf Landing LLC Deepwater Port License Application. Appendix G: Ichthyoplankton Assessment Model Methodology and Results for the Gulf Landing LLC Deepwater Port License Application Environmental Impact Statement. (Docket No. USCG-2004-16860.) Prepared by e2m. November. Washington, DC.

USCG and MARAD 2005a — U.S. Coast Guard and U.S. Maritime Administration. 2005a. Draft Environmental Impact Statement for the Pearl Crossing LNG Project. (Docket No. USCG-2004-18474.) April. Washington, DC.

USCG and MARAD 2005b — U.S. Coast Guard and U.S. Maritime Administration. 2005b. Draft Environmental Impact Statement for the Compass Port LNG Project. (Docket No. USCG-2004-17659.) Washington, DC.

USCG and MARAD 2005c — U.S. Coast Guard and U.S. Maritime Administration. 2005c. Errata for the Main Pass Energy Hub Project. (Docket No. USCG-2004-17696.) July. Washington, DC.

USCG 2005 — U.S. Coast Guard. 2005. Errata to the Gulf Landing Environmental Impact Statement. (Docket No. USCG-2004-76860-90.) February. Washington, DC.

APPENDIX A-1

ATTACHMENT 1

SEAMAP ANALYSIS METHODS

Methods Used for Analyzing SEAMAP Fish Larvae and Egg Data

LGL Ecological Research Associates, Inc.
1410 Cavitt Street
Bryan, Texas 77801

Updated: December 3, 2004

Datasets

The database used for these analyses came from NMFS, Pascaguola, dated 9/2/04 in the file Ichthyoplankton_09_02_2004_ascii.zip. It included ascii versions of the 3 SEAMAP datasets, which are used together to analyze fish larvae and egg catch rates:

- STATCARD. This dataset contains when and where sampling operations take place. Fields relevant to these analyses include (note underscores "_" in field names have been replace by periods "."):

    1. CRUISE.NO
    2. VESSEL
    3. P.STA.NO
    4. S.LATD
    5. S.LATM
    6. S.LOND
    7. S.LONM
    8. S.STA.NO
    9. MO.DAY.YR

- ICHSTRWK. This dataset contains information on the plankton samples taken at each station. It contains all of the egg data. Fields relevant to these analyses are listed below.

    1. CRUISE.NO
    2. VESSEL
    3. P.STA.NO
    4. SAMPLE.NO
    5. GEAR.CODE
    6. MESH.CODE
    7. VOL.FILT
    8. NO.EGGS
    9. EGGS.ALIQU

- ICHSARWK. This is the individual taxa dataset. It contains information on each individual fish larvae taxa collected in each sample. Relevant fields are listed below.

    1. CRUISE.NO
    2. VESSEL

3. P.STA.NO
4. SAMPLE.NO
5. SAMP.STAT
6. TAXONOMIC
7. BIOCODE
8. MEAS
9. NOT.MEAS
10. ALIQUOT

Merging Datasets

The STATCARD and ICHSTRWK datasets can be merged based on 3 fields, CRUISE.NO,VESSEL, and P.STA.NO. To further merge the resulting set with the ICHSAR set, the SAMPLE.NO field must be included in the merge key.

Analysis Steps

The STATCARD dataset, with its station time and place information is the core dataset for these analyses. The dataset is read into a database file (R data.frame), where the station latitude and longitude values are converted to decimal degrees, and the sample date is used to create variables for sampling month and year. Next, the ICHSTRWK dataset is read into a database file (R data.frame), and restricted to records with GEAR.CODE equal to 1 and MESH.CODE equal to 3, which represent the .333m mesh, 60 cm Bongo net. At this time we also convert the value for VOL.FILT from -9 to NA, to adjust for differences in handling of missing data. The NO.EGGS variable is also adjusted by the size of the EGGS.ALIQU variable, multiplying subsampled aliquots by the appropriate value to set them equal to 1/1 aliquots.

Analysis Constraints. Station data are restricted to a NMFS selected rectangle around the proposed site, with the -88.75 and -87.75 degree longitude lines making the vertical sides, and the 29.75 and 30.25 degree latitude lines making the horizontal sides. All stations that were on or inside of the rectangle were included. Data were further restricted to samples taken between the months of June and November, inclusive. Data from vessel 23 were eliminated from the data set per David Hanisko, NMFS, personal communication on 12/2/04. These data were inconsistent, and did not seem to be readily correctable.

Data Adjustments. VOL.FILT values for CRUISE.NO 138, VESSEL 4, P.STA.NO 39626 and 39642 were adjusted from 1 and 969 to 79 and 183. This adjustment was a correction scheduled to be made to the database that was not included in the version used in these analyses.

Dataset joins. At this point the station and ichstr datasets were merged using the fields CRUISE.NO, VESSEL, and P.STA.NO as the merge key.

Egg CPUE. Number of eggs per cubic meter of water filtered (Egg.cpue) are calculated for each sample in the combined station-ichstr dataset where the VOL.FILT variable is greater than zero. The mean Egg.cpue and 2 standard errors are then calculated to produce the mean value with upper and lower confidence intervals. Where the NO.EGGS variable is equal to zero and the EGG.ALIQU variable is not one of the valid values, the record is changed to NA. Also, where the NO.EGGS equals 200 this is a sampling protocol error and the value should be changed to NA, (personal communications from David Hanisko, 11/04).

Preparing the Fish Larvae dataset. The ICHSARWK dataset is read into a database file (R data.frame), and is restricted to records containing a SAMP.STAT (sample status) value of either 1 or 2 (the only values valid for quantative analysis and summaries, David Hanisko, NMFS, pers. comm.). The variables MEAS and NOT.MEAS are adjusted to zero values where the value in the record is -9, then they are added together to create the total count variable, which is then adjusted by the ALIQUOT variable factor to represent a whole sample. This database table is then merged with the station-ichstr dataset using the four variables, CRUISE.NO, VESSEL, P.STA.NO, and SAMPLE.NO as the merge key.

Fish Larvae Summary Values. Total fish larvae catch for each sample is aggregated, and divided by the sample VOL.FILT variable to create the sample catch per cubic meter of water filtered (Fish.cpue). Then the mean Fish.cpue and 2 standard errors are calculated to produce the mean value with upper and lower confidence intervals, both by month of sampling, and for the overall period.

Fish Larvae Individual Taxa Catch Rates. Calculating the catch per cubic meter of water filtered for each taxa caught at anytime in the included samples requires construction of a matrix with one record for each taxa for each sampling record (total size of matrix will be number stations X number of taxa). This dataset is then merged with the dataset created above (station-ichstr-ichsar, which represents taxa actually caught at each sampling station), and all records with missing values are set to a value of zero. The catch rate per cubic meter of water filtered (Taxa.cpue) can now be calculated for each taxa for each station. These data can be summarized to produce the mean cpue for each taxa along with standard errors, so that upper and lower confidence intervals can be provided.

APPENDIX A-1

ATTACHMENT 2

BOET SUMMER SEAMAP POLYGON DATA

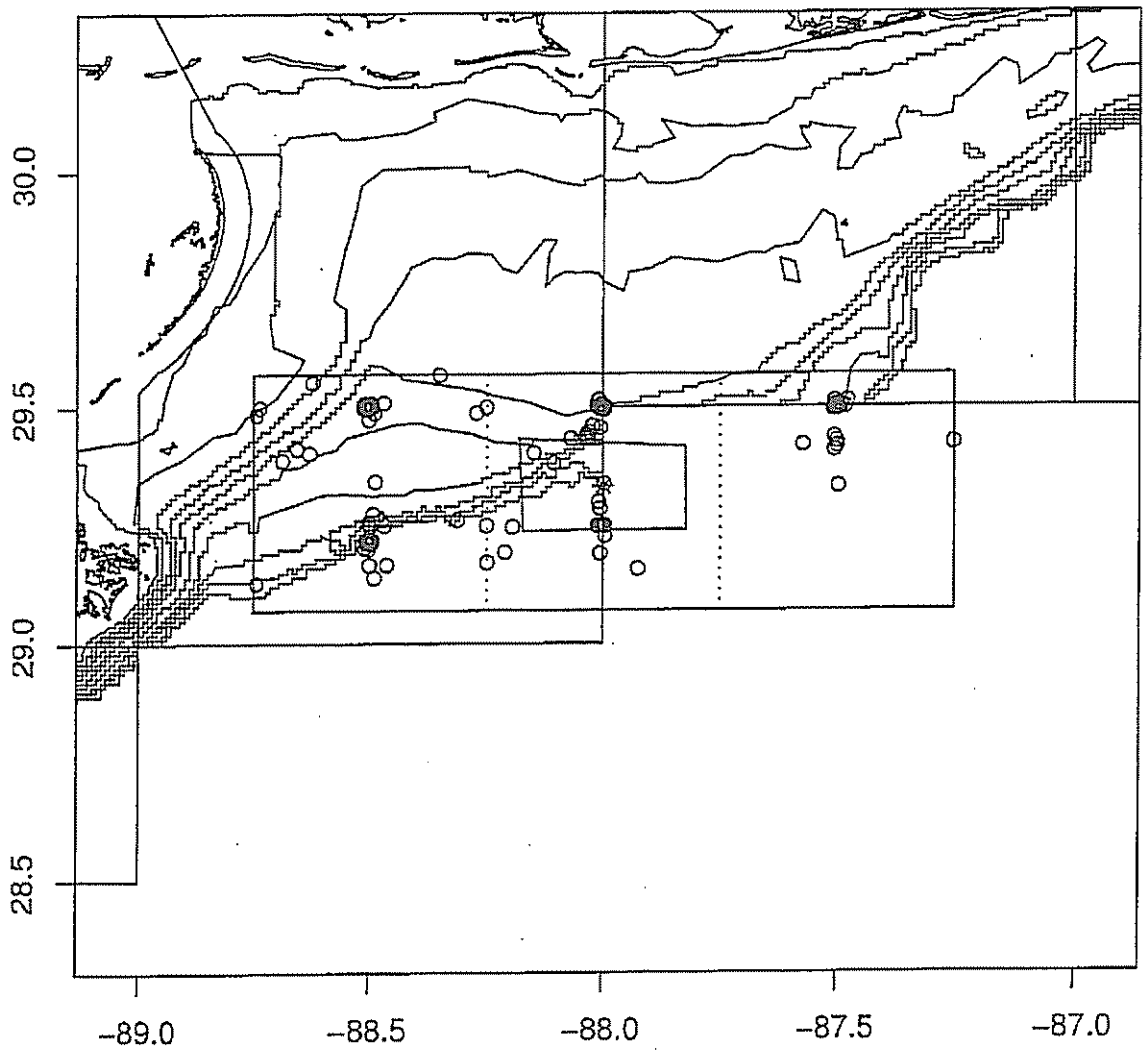


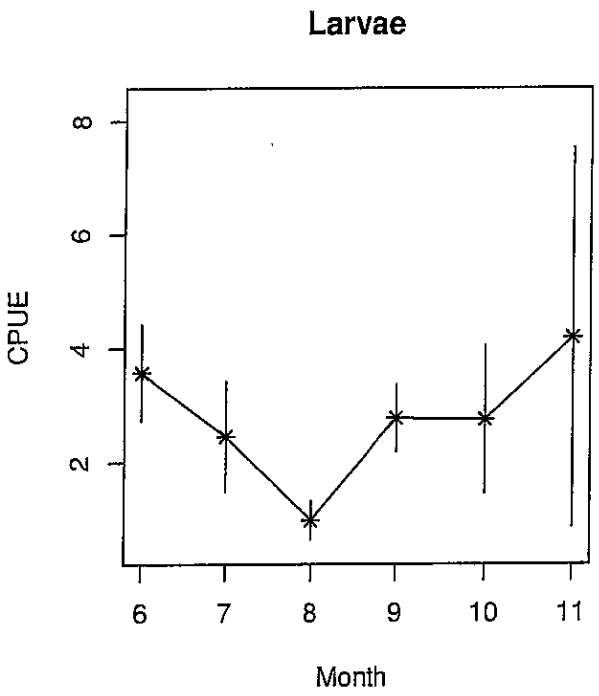
Figure 1. The Proposed Project Study Area with Summer Sampling Stations. The bold-bordered polygon denotes the area within which the proposed Terminal will be located. The three large squares separated by dashed vertical lines denote 30 minute SEAMAP sampling blocks. Circles show the location of the ichthyoplankton sampling sites. Depth contours are in 5-fathom increments.

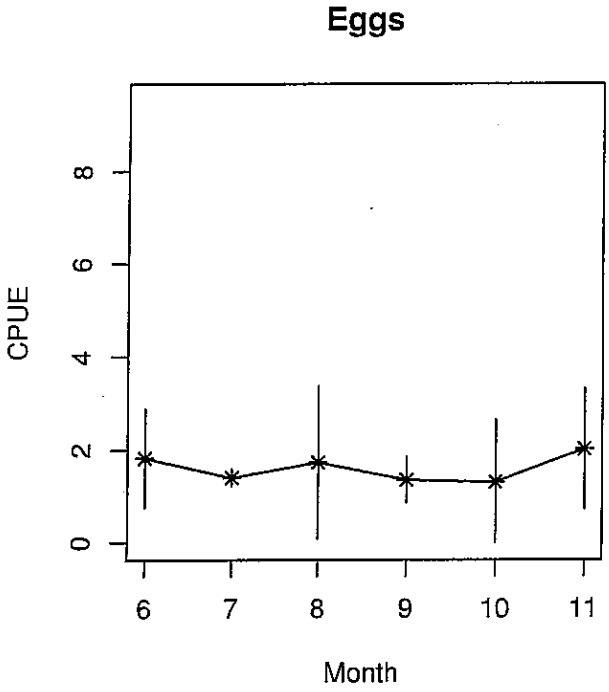
	setName	meancat	se	lcl	ucl	gmeancat	gmcount	gmse	gmlcl	gmucl
1	6	3.576	0.420	2.737	4.416	3.272	48	0.440	2.392	4.153
11	7	2.458	0.478	1.503	3.413	2.588	10	0.507	1.574	3.602
12	8	0.982	0.167	0.649	1.316	0.790	19	0.116	0.559	1.021
13	9	2.776	0.292	2.193	3.360	2.304	67	0.247	1.811	2.797
14	10	2.751	0.645	1.462	4.040	2.520	27	0.574	1.371	3.668
15	11	4.189	1.662	0.866	7.512	2.753	29	0.849	1.055	4.450
7	0	2.983	0.296	2.392	3.575	2.371	200	0.190	1.991	2.751

Table 1: Monthly Fish Larvae Statistics

	MO	eggcpue	se	egglen	lcl	ucl
1	6	1.821	0.531	28	0.759	2.884
2	7	1.398		1		
3	8	1.724	0.818	7	0.089	3.360
4	9	1.345	0.242	48	0.862	1.829
5	10	1.300	0.668	12	0.000	2.636
6	11	2.011	0.645	18	0.721	3.301
11	0	1.586	0.210	114	1.166	2.006

Table 2: Number Eggs per cubic meter


Larvae
CPUE
2
4
6
8
6
7
8
9
10
11
Month


Eggs
CPUE
0
2
4
6
8
6
7
8
9
10
11
Month

	CRUISE.NO	VESSEL	P.STA.NO	SAMPLE.NO	MO	DAY	YR	latdd	londd	cpue
1	184	4	50874	10076	11	18	1989	29.488	−88.488	2.8841
2	184	4	50889	10079	11	19	1989	29.500	−88.000	3.3711
3	891	17	17006	10082	6	10	1989	29.503	−88.005	9.9500
4	891	17	17024	10085	7	9	1989	29.498	−88.000	2.1194
5	891	17	17004	10096	6	10	1989	29.502	−87.499	4.4167
6	891	17	17017	10099	7	8	1989	29.498	−88.503	3.0190
7	892	17	17050	10111	9	18	1989	29.474	−88.501	1.5948
8	893	17	17012	10123	11	19	1989	29.500	−88.500	5.4331
9	190	4	51844	12027	9	6	1990	29.248	−87.997	0.4645
10	190	4	51846	12031	9	7	1990	29.501	−88.001	3.2500
11	190	4	51852	12043	9	7	1990	29.498	−88.498	6.8600
12	191	4	52280	12337	11	17	1990	29.442	−88.033	0.9804
13	191	4	52282	12340	11	17	1990	29.403	−88.623	4.7245
14	195	4	53322	13084	7	13	1991	29.497	−88.007	2.8298
15	901	17	17001	13256	6	9	1990	29.499	−88.501	4.3462
16	914	28	135	13459	9	18	1991	29.252	−88.000	0.4713
17	914	28	164	13545	9	26	1991	29.503	−88.002	3.4464
18	914	28	165	13549	9	26	1991	29.500	−88.500	1.9231
19	911	17	17014	13671	6	15	1991	29.500	−88.501	13.5731
20	197	4	53627	13784	11	16	1991	29.497	−88.505	2.3398
21	197	4	53632	13787	11	17	1991	29.493	−88.000	1.2596
22	200	4	54020	14674	6	14	1992	29.499	−88.001	5.7480
23	922	17	17029	14797	6	14	1992	29.500	−88.500	1.8974
24	925	28	86	14998	9	18	1992	29.513	−87.477	2.7986
25	925	28	96	15004	9	18	1992	29.498	−87.998	9.7683
26	925	28	97	15007	9	18	1992	29.248	−87.998	0.9021
27	925	28	112	15010	9	19	1992	29.215	−88.502	1.2500
28	925	28	113	15013	9	19	1992	29.502	−88.498	3.4900
29	831	17	17010	1652	6	8	1983	29.500	−88.000	3.3249
30	831	17	17011	1655	6	8	1983	29.500	−88.250	2.9799
31	205	4	55103	16563	6	20	1993	29.503	−88.004	1.6301
32	831	17	17013	1658	6	8	1983	29.500	−88.500	1.4491
33	831	17	17021	1664	6	9	1983	29.500	−88.733	2.7488
34	936	28	28129	17152	9	26	1993	29.500	−88.500	1.2525
35	936	28	28130	17155	9	26	1993	29.218	−88.501	1.9750
36	936	28	28144	17158	9	27	1993	29.502	−88.000	1.6893
37	936	28	28145	17161	9	27	1993	29.251	−88.002	4.0425
38	936	28	28162	17188	9	29	1993	29.498	−87.496	6.4556
39	208	4	55363	17297	11	14	1993	29.493	−87.999	0.9615
40	932	17	17016	17417	6	12	1993	29.508	−88.496	4.1591
41	935	17	17020	17504	11	2	1993	29.502	−88.501	0.7697
42	210	4	8	18395	6	17	1994	29.500	−87.999	3.1000
43	946	28	28087	18717	9	23	1994	29.500	−88.498	2.4717
44	946	28	28088	18720	9	24	1994	29.217	−88.500	1.4505
45	946	28	28089	18723	9	24	1994	29.252	−88.000	0.4644

Table 1: Stations Matched

1

	CRUISE.NO	VESSEL	P.STA.NO	SAMPLE.NO	MO	DAY	YR	latdd	londd	cpue
46	946	28	28090	18726	9	24	1994	29.498	−88.000	1.9574
47	946	28	28091	18729	9	24	1994	29.498	−87.500	0.5813
48	941	17	17013	18909	6	12	1994	29.500	−88.500	2.2727
49	135	4	39241	1905	6	8	1983	29.502	−88.005	9.4091
50	214	4	239	19062	11	11	1994	29.510	−88.468	4.1081
51	214	4	286	19077	11	20	1994	29.500	−88.001	2.7544
52	135	4	39242	1908	6	8	1983	29.501	−88.510	1.1588
53	135	4	39255	1911	6	9	1983	29.514	−88.009	2.7455
54	955	28	28073	20479	9	17	1995	29.215	−88.503	1.3558
55	955	28	28074	20482	9	17	1995	29.250	−88.001	0.7855
56	955	28	28075	20485	9	18	1995	29.496	−87.508	0.4872
57	951	17	17012	20685	6	10	1995	29.500	−88.504	8.9690
58	221	4	10	21380	6	15	1996	29.500	−87.999	2.0920
59	961	17	17009	21443	6	7	1996	29.500	−88.500	6.4815
60	965	28	28051	21674	9	13	1996	29.215	−88.504	3.7778
61	965	28	28052	21677	9	13	1996	29.249	−88.010	0.7508
62	965	28	28053	21680	9	14	1996	29.495	−87.504	3.1832
63	965	28	28054	21683	9	14	1996	29.502	−87.995	1.8571
64	965	28	28055	21686	9	14	1996	29.499	−88.507	6.0000
65	963	17	17022	21822	10	24	1996	29.499	−88.504	3.5463
66	224	4	261	22055	11	21	1996	29.495	−88.000	9.3619
67	224	4	262	22058	11	21	1996	29.251	−88.004	0.3366
68	224	4	263	22061	11	21	1996	29.250	−88.467	1.0496
69	971	17	17015	22379	6	7	1997	29.500	−88.501	1.7163
70	225	4	4205	22938	6	9	1997	29.338	−87.998	3.7216
71	226	4	3	22966	6	14	1997	29.501	−88.001	8.7879
72	975	28	28051	23259	9	15	1997	29.217	−88.500	2.2332
73	975	28	28052	23262	9	15	1997	29.249	−88.002	0.9910
74	975	28	28053	23265	9	15	1997	29.501	−87.501	3.8879
75	975	28	28054	23268	9	15	1997	29.500	−88.000	4.8056
76	975	28	28055	23271	9	16	1997	29.501	−88.496	5.3333
77	973	17	17019	23538	11	10	1997	29.502	−88.499	3.7131
78	229	4	242	23757	11	18	1997	29.495	−88.002	49.4286
79	229	4	245	23760	11	18	1997	29.262	−88.474	3.9774
80	981	17	17015	24295	6	28	1998	29.503	−88.501	1.3438
81	981	63	63030	24471	9	22	1998	29.211	−88.496	2.9352
82	981	63	63031	24475	9	22	1998	29.249	−88.007	1.9207
83	981	63	63032	24479	9	22	1998	29.500	−88.502	5.1077
84	981	63	63041	24511	9	24	1998	29.501	−87.504	3.5528
85	981	63	63042	24515	9	24	1998	29.501	−88.012	2.1313
86	146	4	41303	2504	8	3	1984	29.500	−88.250	2.5735
87	146	4	41304	2507	8	3	1984	29.250	−88.250	0.7734
88	146	4	41309	2522	8	3	1984	29.250	−88.500	0.7817
89	146	4	41310	2525	8	4	1984	29.500	−88.500	1.1222
90	991	17	17013	25354	6	12	1999	29.500	−88.501	0.6989

Table 2: Stations Matched

	CRUISE.NO	VESSEL	P.STA.NO	SAMPLE.NO	MO	DAY	YR	latdd	londd	cpue
91	235	4	5	25381	6	16	1999	29.497	−88.004	2.8125
92	993	17	17002	25486	9	9	1999	29.512	−87.504	2.0115
93	993	17	17005	25495	9	10	1999	29.505	−88.005	2.7791
94	993	17	17008	25504	9	10	1999	29.507	−88.510	0.7395
95	992	63	63068	25742	9	15	1999	29.220	−88.494	0.7613
96	992	63	63069	25745	9	15	1999	29.503	−88.497	11.6069
97	992	63	63072	25753	9	16	1999	29.500	−87.999	1.7471
98	992	63	63075	25762	9	22	1999	29.495	−87.499	2.1655
99	992	63	63118	25890	9	29	1999	29.250	−87.999	0.9809
100	995	17	17027	25913	10	25	1999	29.500	−88.498	0.9350
101	237	4	265	26047	11	19	1999	29.194	−88.209	0.2332
102	237	4	272	26050	11	20	1999	29.433	−88.030	0.8478
103	237	4	262	26056	11	19	1999	29.256	−88.501	2.3008
104	240	4	9	26596	6	14	2000	29.503	−88.003	4.4375
105	1	17	17005	26747	6	24	2000	29.505	−88.503	4.0632
106	242	4	4068	26953	9	19	2000	29.217	−88.502	2.6667
107	242	4	4069	26956	9	20	2000	29.499	−88.499	10.9565
108	242	4	4072	26965	9	20	2000	29.502	−87.999	1.7821
109	242	4	4073	26968	9	20	2000	29.251	−87.996	1.0390
110	242	4	4074	26971	9	20	2000	29.497	−87.502	5.8655
111	2	17	17002	27132	10	13	2000	29.499	−88.512	3.5083
112	2	17	17006	27144	10	14	2000	29.501	−88.000	2.2603
113	2	17	17009	27153	10	15	2000	29.500	−87.501	2.2857
114	3	17	17007	27165	10	20	2000	29.500	−88.501	16.3423
115	243	4	240	27291	11	15	2000	29.434	−88.037	1.9907
116	243	4	247	27294	11	16	2000	29.214	−88.508	1.6108
117	246	4	4	27939	6	13	2001	29.500	−88.009	5.1429
118	12	17	17019	28023	6	10	2001	29.502	−88.498	4.1319
119	15	63	63067	28223	9	11	2001	29.218	−88.499	0.8166
120	15	63	63068	28226	9	11	2001	29.501	−88.497	4.8846
121	15	63	63071	28235	9	11	2001	29.498	−87.999	2.3356
122	15	63	63080	28255	9	16	2001	29.498	−87.499	1.2713
123	16	63	226	28644	11	12	2001	29.215	−88.498	1.1139
124	16	63	229	28647	11	12	2001	29.499	−87.998	1.2254
125	14	17	17008	28653	10	19	2001	29.501	−88.499	9.6281
126	146	4	41424	2871	8	21	1984	29.500	−88.000	2.6184
127	146	4	41427	2880	8	21	1984	29.500	−87.500	0.8750
128	22	17	17024	29204	6	9	2002	29.505	−88.499	2.1935
129	250	4	4	29229	6	12	2002	29.203	−88.510	1.4505
130	250	4	13	29235	6	13	2002	29.495	−87.995	2.9231
131	23	17	17001	29699	10	10	2002	29.505	−87.500	1.4810
132	23	17	17004	29708	10	11	2002	29.500	−88.001	1.3235
133	23	17	17005	29711	10	11	2002	29.501	−88.501	4.4217
134	24	17	17015	29717	10	19	2002	29.500	−88.500	1.9559
135	252	4	247	29856	11	14	2002	29.200	−88.502	0.6450

Table 3: Stations Matched

	CRUISE.NO	VESSEL	P.STA.NO	SAMPLE.NO	MO	DAY	YR	latdd	londd	cpue
136	252	4	248	29859	11	14	2002	29.228	−87.995	0.4218
137	252	4	255	29862	11	15	2002	29.440	−88.035	2.6393
138	145	4	41024	3063	6	8	1984	29.500	−87.500	3.6765
139	841	17	17001	3288	6	8	1984	29.553	−88.617	9.9444
140	138	4	39591	3385	10	14	1983	29.500	−87.503	0.8342
141	138	4	39793	3437	10	29	1983	29.568	−88.352	1.4000
142	138	4	39800	3439	10	29	1983	29.488	−88.272	0.4964
143	138	4	39813	3443	10	29	1983	29.382	−88.103	1.9409
144	138	4	39822	3445	10	30	1983	29.262	−88.313	1.3892
145	138	4	39834	3447	10	30	1983	29.275	−88.492	0.8744
146	138	4	39843	3449	10	30	1983	29.413	−88.650	0.8696
147	148	4	41658	3576	10	13	1984	29.403	−88.147	2.2706
148	148	4	41678	3578	10	13	1984	29.343	−88.487	2.0548
149	851	17	17033	4025	6	12	1985	29.500	−88.500	2.3566
150	153	4	42795	4037	6	11	1985	29.500	−87.500	0.5909
151	153	4	43124	4143	7	14	1985	29.497	−88.000	2.3023
152	153	4	43130	4146	7	15	1985	29.502	−87.490	0.9375
153	154	4	43185	4232	8	4	1985	29.423	−87.250	0.9178
154	154	4	43186	4235	8	5	1985	29.332	−87.496	0.2857
155	154	4	43193	4238	8	5	1985	29.408	−87.505	0.2491
156	154	4	43194	4241	8	6	1985	29.427	−87.501	0.5221
157	154	4	43196	4244	8	7	1985	29.436	−87.505	0.6852
158	154	4	43204	4247	8	7	1985	29.300	−88.008	1.1901
159	154	4	43205	4250	8	8	1985	29.285	−88.006	0.7236
160	154	4	43212	4253	8	8	1985	29.190	−88.005	0.3668
161	154	4	43213	4256	8	9	1985	29.172	−88.248	1.0854
162	154	4	43214	4259	8	9	1985	29.139	−88.489	0.1497
163	852	17	17023	4581	8	8	1985	29.167	−88.462	0.8565
164	852	17	17024	4584	8	9	1985	29.128	−88.742	2.2328
165	156	4	43428	5006	10	19	1985	29.460	−88.022	5.9483
166	127	4	36794	507	6	2	1982	29.500	−88.502	1.1056
167	127	4	36806	516	6	4	1982	29.457	−88.005	1.9360
168	127	4	36809	525	6	4	1982	29.497	−88.500	0.8659
169	160	4	44109	5398	6	13	1986	29.500	−87.482	1.7341
170	160	4	44110	5401	6	13	1986	29.497	−88.000	1.0714
171	161	4	44334	5689	9	4	1986	29.167	−88.500	1.1528
172	161	4	44335	5692	9	4	1986	29.250	−88.000	1.6242
173	161	4	44336	5695	9	5	1986	29.417	−87.500	0.6429
174	163	4	44638	6214	10	29	1986	29.447	−88.028	3.2376
175	163	4	44641	6217	10	30	1986	29.247	−88.193	0.6965
176	163	4	44644	6220	10	30	1986	29.503	−88.498	1.2874
177	862	17	17019	6364	6	12	1986	29.248	−88.498	1.1024
178	862	17	17020	6367	6	12	1986	29.485	−88.742	4.7333
179	862	17	17018	6370	6	12	1986	29.502	−88.493	2.8108
180	167	4	45511	6924	6	13	1987	29.502	−87.500	1.2238

Table 4: Stations Matched

	CRUISE.NO	VESSEL	P.STA.NO	SAMPLE.NO	MO	DAY	YR	latdd	londd	cpue
181	167	4	45530	6927	6	14	1987	29.500	−88.000	1.7479
182	171	4	46603	7173	10	26	1987	29.502	−88.495	0.0426
183	171	4	46618	7176	10	27	1987	29.502	−88.000	1.3953
184	171	4	46623	7179	10	27	1987	29.502	−87.500	1.8561
185	872	17	17067	7376	6	13	1987	29.502	−88.498	0.8826
186	872	17	17072	7382	7	13	1987	29.503	−87.500	0.5159
187	872	17	17070	7385	7	12	1987	29.498	−87.998	4.1857
188	872	17	17073	7394	7	15	1987	29.500	−88.498	3.2288
189	873	17	17006	7784	9	16	1987	29.388	−88.682	1.4486
190	873	17	17015	7805	9	17	1987	29.515	−88.008	1.2857
191	886	28	53	8379	8	7	1988	29.157	−87.925	0.6570
192	881	17	17028	8594	7	9	1988	29.500	−88.000	0.4688
193	881	17	17027	8597	7	9	1988	29.503	−88.500	4.9718
194	177	4	49154	8725	11	20	1988	29.433	−88.067	5.5429
195	177	4	49166	8728	11	21	1988	29.420	−87.572	5.4500
196	176	4	48511	8764	9	18	1988	29.497	−87.502	1.7006
197	176	4	48513	8768	9	19	1988	29.217	−88.500	4.6734
198	882	17	17032	9220	9	30	1988	29.506	−88.503	4.1646
199	882	17	17033	9223	9	30	1988	29.499	−88.001	4.4370
200	183	4	50380	9961	9	29	1989	29.252	−88.002	0.8272

Table 5: Stations Matched

	Taxa	BIOCODE	cnt	pct	cpue
11	ENGRAULIDAE	121060000	10611	0.137882193952467	0.326924854422775
99	BREGMACEROS	148030100	8539	0.110958067492236	0.263086545275287
235	GOBIIDAE	170550000	5967	0.0775368062684356	0.183843238746649
43	SYNODONTIDAE	129040000	5183	0.067349298959159	0.159688202853006
52	DIAPHUS	131010200	3932	0.0510934677807087	0.121144899405367
1	UNID.FISH	100000000	3742	0.0486245565705524	0.11529100040053
5	BREVOORTIA	121050300	3421	0.0444533960523409	0.105400992081831
241	OPHIDIIDAE	171010000	2999	0.0389698143118885	0.0923991742921404
267	SYMPHURUS	183050700	2503	0.0325246566264277	0.0771174168900391
183	MICROPOUNDULA	170201902	2293	0.0297958600257287	0.0706473179899559
3	CLUPEIFORMES	121000000	1813	0.0235586106527022	0.0558585205040515
190	LABRIDAE	170280000	1683	0.0218693556141741	0.0518532211849524
256	SYACIUM	183011000	1495	0.0194264329430721	0.0460609421696398
68	ANGUILLIFORME	143000000	1426	0.0185298283456995	0.0439350525310411
180	LEIOSTOXANTHU	170201701	1325	0.0172174071234586	0.0408232430600487
247	BOTHIDAE	183010000	1299	0.0168795561157530	0.0400221831962289
51	MYCTOPHIDAE	131010000	1135	0.0147484959133022	0.0349693440552115
75	OPHICHTHIDAE	143150000	868	0.0112790259495562	0.0267430754536772
22	MAUROLIMUELLE	121140801	681	0.00884909754798134	0.0209816064331269
253	ETROPUS	183010600	648	0.00842028665358577	0.0199648766059710
257	SYACIUMPAPILL	183011003	628	0.008160401263043	0.0193486767107250
122	SERRANIDAE	170020000	582	0.00756266486479463	0.0179314169516591
74	CONGRIDAE	143130000	555	0.00721181958756188	0.017099547093077
8	HARENGUJAGUAN	121052004	543	0.00705588835323622	0.0167298271559294
46	PARALEPIDIDAE	129050000	498	0.00647114622451499	0.0153433773916258
118	SCORPAENIDAE	168010000	495	0.00643216341593357	0.0152509474073389
254	ETROPUSCROSSO	183010602	456	0.00592538690437517	0.0140493576116092
248	CITHARICHTHYS	183010300	448	0.00582143274815806	0.0138028776535108
4	CLUPEIDAE	121050000	431	0.0056005301661967	0.0132791077425517
231	PEPRILUBURTI	170511103	416	0.00540561612328963	0.0128169578211172
101	BREGMACCANTOR	148030104	362	0.00470392556882415	0.0111532181039529
121	PERCIFORMES	170000000	357	0.00463895422118846	0.0109991681301414
9	OPISTHOOGLINU	121053002	356	0.00462595995166132	0.0109683581353791
223	TRICHIULEPTUR	170460402	335	0.00435308029159141	0.0103213482453708
13	ANCHOA HEPSET	121060101	307	0.00398924074483153	0.00945866839202637
173	SCIAENIDAE	170200000	302	0.00392426939719584	0.00930461841821487
266	CYNOGLOSSIDAE	183050000	295	0.00383330951050587	0.00908894845487876
7	ETRUMEUTERES	121051602	292	0.00379432670192445	0.00899651847059186
18	GONOSTOMATIDA	121140000	284	0.00369037254570734	0.00875003851249345
19	CYCLOTHONE	121140200	283	0.00367737827618020	0.00871922851773115
151	CHLOROSCHRYSU	170110902	238	0.00309263614745897	0.00733277875342761
207	AUXIS	170440100	224	0.00291071637407903	0.0069014388267554
12	ANCHOA	121060100	206	0.00267681952259054	0.00634685892103398
56	MYCTOPHUM	131010600	194	0.00252088828826488	0.00597713898388637
246	PLEURONECTIFO	183000000	188	0.00244292267110204	0.00579227901531257

	Taxa	BIOCODE	cnt	pct	cpue
153	DECAPTEPUNCTA	170111202	171	0.00222202008914069	0.00526850910435345
86	MYROPHIPUNCTA	143151902	156	0.00202710604623361	0.00480635918291894
281	CERATIOIDEI	999010200	144	0.00187117481190795	0.00443663924577133
163	LUTJANIDAE	170150000	139	0.00180620346427226	0.00428258927195982
262	BOTHUS	183012200	134	0.00174123211663656	0.00412853929814832
119	TRIGLIDAE	168020000	133	0.00172823784710942	0.00409772930338602
59	HYGOPHUM	131011000	130	0.00168925503852801	0.00400529931909912
73	NETTASTOMATID	143110000	129	0.00167626076900087	0.00397448932433681
71	MORINGUIDAE	143080000	127	0.00165027222994659	0.00391286933481221
123	DIPLECTRUM	170020900	123	0.00159829515183804	0.00378962935576301
206	SCOMBRIDAE	170440000	122	0.0015853008823109	0.00375881936100071
125	CENTROPRISTIS	170024800	120	0.00155931234325662	0.00369719937147611
208	EUTHYNNALLETT	170440201	119	0.00154631807372949	0.00366638937671381
236	MICRODESMIDAE	170700000	118	0.00153332380420235	0.00363557938195151
120	PRIONOTUS	168020500	113	0.00146835245656665	0.00348152940814
45	SYNODUSFOETEN	129040302	111	0.00144236391751238	0.0034199094186154
148	CARANGIDAE	170110000	102	0.00132541549176813	0.00314261946575469
228	CUBICEPS	170510100	94	0.00122146133555102	0.00289613950765628
117	SCORPAENIFORM	168000000	93	0.00120846706602388	0.00286532951289398
57	CERATOSCOPELU	131010900	88	0.00114349571838819	0.00271127953908248
94	GADIFORMES	148000000	83	0.00107852437075250	0.00255722956527097
155	SELAR CRUMEN	170112801	78	0.00101355302311681	0.00240317959145947
227	STROMATEIDAE	170510000	76	0.000987564484062528	0.00234155960193487
55	LAMPANYCTUS	131010500	73	0.000948581675481113	0.00224912961764797
24	VINCIGUERRIA	121141700	72	0.000935587405953974	0.00221831962288566
199	BLENNIIDAE	170360000	72	0.000935587405953974	0.00221831962288566
63	BENTHOSEMA	131012200	69	0.000896604597372559	0.00212588963859876
215	SCOMBERMACULA	170440803	68	0.00088361032784542	0.00209507964383646
88	PSEUDOMFUGESA	143152002	66	0.000857621788791143	0.00203345965431186
149	CARANX	170110800	64	0.000831633249736866	0.00197183966478726
53	NOTOLYCVALDIV	131010301	63	0.000818638980209728	0.00194102967002496
134	ANTHIASNICHOL	170026002	61	0.00079265044115545	0.00187940968050035
203	BROTULA	170390300	59	0.000766661902101173	0.00181778969097575
230	PEPRILUS	170511100	59	0.000766661902101173	0.00181778969097575
178	CYNOSCIREGALI	170200907	56	0.000727679093519758	0.00172535970668885
28	STERNOPTYCHID	121150000	55	0.00071468482399262	0.00169454971192655
98	BREGMACEROTID	148030000	55	0.00071468482399262	0.00169454971192655
169	RHOMBOPAURORU	170152001	55	0.00071468482399262	0.00169454971192655
250	CITHARISPILOP	183010305	54	0.000701690554465481	0.00166373971716425
77	OPHICHTGOMESI	143150401	52	0.000675702015411204	0.00160211972763965
111	MUGILIDAE	165010000	50	0.000649713476356927	0.00154049973811504
176	CYNOSCIARENAR	170200901	49	0.000636719206829788	0.00150968974335274
275	TETRAODONTIDA	189080000	49	0.000636719206829788	0.00150968974335274
112	MUGIL	165010800	48	0.00062372493730265	0.00147887974859044
184	SCIAENOOCELLA	170203701	48	0.00062372493730265	0.00147887974859044

	Taxa	BIOCODE	cnt	pct	cpue
145	POMATOMSALTAT	170080101	46	0.000597736398248373	0.00141725975906584
25	VINCIGUNIMBAR	121141701	45	0.000584742128721234	0.00138644976430354
14	ENGRAULEURYST	121060201	44	0.000571747859194095	0.00135563976954124
150	CARANX CRYSOS	170110803	44	0.000571747859194095	0.00135563976954124
177	CYNOSCINOTHUS	170200904	44	0.000571747859194095	0.00135563976954124
214	SCOMBERCAVALL	170440801	43	0.000558753589666957	0.00132482977477894
204	CALLIONYMIDAE	170420000	42	0.000545759320139818	0.00129401978001664
276	SPHOEROIDES	189080600	42	0.000545759320139818	0.00129401978001664
96	UROPHYCIS	148010100	39	0.000506776511558403	0.00120158979572973
210	THUNNUS	170440400	38	0.000493782242031264	0.00117077980096743
196	BEMBROPS	170320200	36	0.000467793702976987	0.00110915981144283
66	DIOGENIATLANT	131012301	33	0.000428810894395572	0.00101672982715593
202	BROTULA	170380902	33	0.000428810894395572	0.00101672982715593
268	SYMPHURPLAGIU	183050707	33	0.000428810894395572	0.00101672982715593
124	SERRANUS	170024200	32	0.000415816624868433	0.000985919832393628
259	ENGYOPHSENTA	183011401	32	0.000415816624868433	0.000985919832393628
157	SELENE VOMER	170113003	31	0.000402822355341294	0.000955109837631328
182	MICROPOGONIAS	170201900	31	0.000402822355341294	0.000955109837631328
232	PEPRILUPARU	170511105	30	0.000389828085814156	0.000924299842869027
238	ACROPOMATIDAE	170740000	29	0.000376833816287017	0.000893489848106726
192	SCARIDAE	170300000	28	0.000363839546759879	0.000862679853344425
221	TRICHIURIDAE	170460000	28	0.000363839546759879	0.000862679853344425
116	SPHYRAENA	165030100	27	0.000350845277232740	0.000831869858582124
78	OPHICHTREX	143150407	26	0.000337851007705602	0.000801059863819823
113	MUGIL CUREMA	165010802	26	0.000337851007705602	0.000801059863819823
186	SPARIDAE	170210000	26	0.000337851007705602	0.000801059863819823
244	CARAPUSBERMUD	171020101	25	0.000324856738178463	0.000770249869057522
287	EPINEPHELINAE	999020100	24	0.000311862468651325	0.000739439874295221
126	CENTROPSTRIAT	170024806	23	0.000298868199124186	0.00070862987953292
107	MELAMPHAIDAE	160030000	22	0.000285873929597048	0.00067781988477062
102	STEINDAARGENT	148041501	21	0.000272879660069909	0.000647009890008319
194	OPISTOGNATHID	170310000	21	0.000272879660069909	0.000647009890008319
234	ARIOMMA	170530100	21	0.000272879660069909	0.000647009890008319
249	CITHARICORNUT	183010303	21	0.000272879660069909	0.000647009890008319
255	ETROPUSMICROS	183010605	21	0.000272879660069909	0.000647009890008319
243	CARAPUS	171020100	20	0.000259885390542771	0.000616199895246018
27	VINCIGUATTENU	121141703	19	0.000246891121015632	0.000585389900483717
131	SERRANIPUMILI	170025401	19	0.000246891121015632	0.000585389900483717
136	GRAMMISTIDAE	170030000	19	0.000246891121015632	0.000585389900483717
70	MURAENIDAE	143060000	18	0.000233896851488494	0.000554579905721416
87	PSEUDOMYROPHI	143152000	18	0.000233896851488494	0.000554579905721416
168	PRISTIPAQUILO	170151802	18	0.000233896851488494	0.000554579905721416
288	MYROPHINAE	999020200	18	0.000233896851488494	0.000554579905721416
290	GRAMMISTINAE	999020400	18	0.000233896851488494	0.000554579905721416
42	SCOPELARCHIDA	129030000	17	0.000220902581961355	0.000523769910959115

	Taxa	BIOCODE	cnt	pct	cpue
165	LUTJANUS	170151100	17	0.00022090258196135 5	0.00052376991095911 5
181	MENTICIRRHUS	170201800	17	0.00022090258196135 5	0.00052376991095911 5
209	KATSUWOPELAMI	170440301	17	0.00022090258196135 5	0.00052376991095911 5
269	TETRAODONTIFO	189000000	17	0.00022090258196135 5	0.00052376991095911 5
171	GERREIDAE	170180000	16	0.00020790831243421 7	0.00049295991619681 4
229	PSENES	170510200	16	0.00020790831243421 7	0.00049295991619681 4
293	CERATIOIDEA	999030001	16	0.00020790831243421 7	0.00049295991619681 4
21	GONOSTOMA	121140400	15	0.00019491404290707 8	0.00046214992143451 3
23	POLLICHMAULI	121140901	15	0.00019491404290707 8	0.00046214992143451 3
97	MORIDAE	148020000	15	0.00019491404290707 8	0.00046214992143451 3
133	ANTHIAS	170026000	15	0.00019491404290707 8	0.00046214992143451 3
139	APOGONIDAE	170060000	15	0.00019491404290707 8	0.00046214992143451 3
179	LARIMUSFASCIA	170201604	15	0.00019491404290707 8	0.00046214992143451 3
252	CYCLOPSETTA	183010400	15	0.00019491404290707 8	0.00046214992143451 3
95	GADIDAE	148010000	13	0.00016892550385280 1	0.00040052993190991 2
127	HEMANTHIAS	170025000	13	0.00016892550385280 1	0.00040052993190991 2
187	MULLIDAE	170220000	13	0.00016892550385280 1	0.00040052993190991 2
270	BALISTIDAE	189030000	13	0.00016892550385280 1	0.00040052993190991 2
10	SARDINEAURITA	121053801	12	0.00015593123432566 2	0.00036971993714761 1
38	ELOPIDAE	124010000	12	0.00015593123432566 2	0.00036971993714761 1
90	EXOCOETIDAE	147040000	12	0.00015593123432566 2	0.00036971993714761 1
2	SALMONIFORMES	120000000	11	0.00014293696479852 4	0.00033890994238531
44	TRACHINMYOPS	129040101	11	0.00014293696479852 4	0.00033890994238531
58	CERATOSMADERE	131010902	11	0.00014293696479852 4	0.00033890994238531
60	HYGOPHUREINHA	131011002	11	0.00014293696479852 4	0.00033890994238531
242	CARAPIDAE	171020000	11	0.00014293696479852 4	0.00033890994238531
265	SOLEIDAE	183040000	11	0.00014293696479852 4	0.00033890994238531
277	LOPHIIFORMES	195000000	11	0.00014293696479852 4	0.00033890994238531
54	LAMPADENA	131010400	10	0.00012994269527138 5	0.00030809994762300 9
138	PRIACANTHIDAE	170050000	10	0.00012994269527138 5	0.00030809994762300 9
156	SELENE	170113000	10	0.00012994269527138 5	0.00030809994762300 9
15	ARGENTINIDAE	121110000	9	0.00011694842574474 7	0.00027728995286070 8
160	TRACHURLATHAM	170113802	9	0.00011694842574474 7	0.00027728995286070 8
205	CALLIONYMUS	170420100	9	0.00011694842574474 7	0.00027728995286070 8
225	DIPLOSPMULTIS	170460701	9	0.00011694842574474 7	0.00027728995286070 8
260	MONOLENE	183011600	9	0.00011694842574474 7	0.00027728995286070 8
31	STOMIIDAE	121160000	8	0.00010395415621710 8	0.00024647995809840 7
34	CHAULIOSLOANI	121170102	8	0.00010395415621710 8	0.00024647995809840 7
114	ATHERINIDAE	165020000	8	0.00010395415621710 8	0.00024647995809840 7
200	HYPSOBLHENTZI	170360401	8	0.00010395415621710 8	0.00024647995809840 7
218	NEOEPINAMERIC	170450201	8	0.00010395415621710 8	0.00024647995809840 7
61	CENTROBNIGROO	131011101	7	9.09598866899697e−05	0.00021566996333610 6
103	MACROURIDAE	148060000	7	9.09598866899697e−05	0.00021566996333610 6
140	APOGON	170060200	7	9.09598866899697e−05	0.00021566996333610 6
143	MALACANTHIDAE	170070000	7	9.09598866899697e−05	0.00021566996333610 6

	Taxa	BIOCODE	cnt	pct	cpue
154	ELAGATIBIPINN	170111301	7	9.09598866899697e−05	0.000215669963336106
166	LUTJANUCAMPEC	170151107	7	9.09598866899697e−05	0.000215669963336106
251	CITHARIGYMNOR	183010306	7	9.09598866899697e−05	0.000215669963336106
272	MONACANTHIDAE	189040000	7	9.09598866899697e−05	0.000215669963336106
17	BATHYLAGUS	121120100	6	7.79656171628312e−05	0.000184859968573805
30	STERNOPTYX	121150300	6	7.79656171628312e−05	0.000184859968573805
32	CHAULIODONTID	121170000	6	7.79656171628312e−05	0.000184859968573805
40	AULOPIFORMES	129000000	6	7.79656171628312e−05	0.000184859968573805
64	BENTHOSSUBORB	131012202	6	7.79656171628312e−05	0.000184859968573805
100	BREGMACATLANT	148030101	6	7.79656171628312e−05	0.000184859968573805
142	HOWELLA	170061000	6	7.79656171628312e−05	0.000184859968573805
152	DECAPTERUS	170111200	6	7.79656171628312e−05	0.000184859968573805
159	SERIOLA	170113100	6	7.79656171628312e−05	0.000184859968573805
162	CORYPHAHIPPUR	170130202	6	7.79656171628312e−05	0.000184859968573805
189	POMACENTRIDAE	170270000	6	7.79656171628312e−05	0.000184859968573805
197	URANOSCOPIDAE	170340000	6	7.79656171628312e−05	0.000184859968573805
33	CHAULIODUS	121170100	5	6.49713476356927e−05	0.000154049973811504
65	DIOGENICHTHYS	131012300	5	6.49713476356927e−05	0.000154049973811504
79	APLATOPCHAULI	143150601	5	6.49713476356927e−05	0.000154049973811504
141	SYNAGROPS	170060700	5	6.49713476356927e−05	0.000154049973811504
222	LEPIDOPCAUDAT	170460201	5	6.49713476356927e−05	0.000154049973811504
237	MICRODESMUS	170700100	5	6.49713476356927e−05	0.000154049973811504
284	PERCOIDEI	999010500	5	6.49713476356927e−05	0.000154049973811504
292	MELANOSTOMIIN	999021600	5	6.49713476356927e−05	0.000154049973811504
29	ARGYROPELECUS	121150100	4	5.19770781085541e−05	0.000123239979049204
47	LESTIDIATLANT	129050301	4	5.19770781085541e−05	0.000123239979049204
84	CALLECHMURAEN	143151301	4	5.19770781085541e−05	0.000123239979049204
108	MELAMPHSIMUS	160030108	4	5.19770781085541e−05	0.000123239979049204
115	SPHYRAENIDAE	165030000	4	5.19770781085541e−05	0.000123239979049204
128	HEMANTHVIVANU	170025001	4	5.19770781085541e−05	0.000123239979049204
213	SCOMBEROMORUS	170440800	4	5.19770781085541e−05	0.000123239979049204
279	CERATIIDAE	195130000	4	5.19770781085541e−05	0.000123239979049204
16	BATHYLAGIDAE	121120000	3	3.89828085814156e−05	9.24299842869027e−05
35	MELANOSTOMIID	121190000	3	3.89828085814156e−05	9.24299842869027e−05
50	MYCTOPHIFORME	131000000	3	3.89828085814156e−05	9.24299842869027e−05
62	GONICHTCOCCOI	131011201	3	3.89828085814156e−05	9.24299842869027e−05
72	NEOCONGMUCRON	143081601	3	3.89828085814156e−05	9.24299842869027e−05
82	LETHARCVELIFE	143151101	3	3.89828085814156e−05	9.24299842869027e−05
89	APTERICANSP	143152101	3	3.89828085814156e−05	9.24299842869027e−05
130	HEMANTHAUREOR	170025003	3	3.89828085814156e−05	9.24299842869027e−05
175	CYNOSCION	170200900	3	3.89828085814156e−05	9.24299842869027e−05
185	STELLIFLANCEO	170203902	3	3.89828085814156e−05	9.24299842869027e−05
216	SCOMBERREGALI	170440804	3	3.89828085814156e−05	9.24299842869027e−05
264	PARALICHTHYS	183012400	3	3.89828085814156e−05	9.24299842869027e−05
274	ALUTERUS	189040400	3	3.89828085814156e−05	9.24299842869027e−05

	Taxa	BIOCODE	cnt	pct	cpue
282	BLENNIOIDEI	999010300	3	3.89828085814156e−05	9.24299842869027e−05
6	BREVOORPATRON	121050302	2	2.59885390542771e−05	6.16199895246018e−05
49	SUDIS HYALIN	129050602	2	2.59885390542771e−05	6.16199895246018e−05
67	EVERMANNELLID	132040000	2	2.59885390542771e−05	6.16199895246018e−05
85	CALLECHGUINIE	143151302	2	2.59885390542771e−05	6.16199895246018e−05
104	FISTULARIIDAE	151020000	2	2.59885390542771e−05	6.16199895246018e−05
105	SYNGNATHIDAE	151060000	2	2.59885390542771e−05	6.16199895246018e−05
129	HEMANTHLEPTUS	170025002	2	2.59885390542771e−05	6.16199895246018e−05
135	PSEUDOGGREGOR	170026101	2	2.59885390542771e−05	6.16199895246018e−05
158	SELENE SETAPI	170113004	2	2.59885390542771e−05	6.16199895246018e−05
161	BRAMIDAE	170120000	2	2.59885390542771e−05	6.16199895246018e−05
170	ACANTHURUS	170160100	2	2.59885390542771e−05	6.16199895246018e−05
172	HAEMULIDAE	170190000	2	2.59885390542771e−05	6.16199895246018e−05
188	KYPHOSUS	170240300	2	2.59885390542771e−05	6.16199895246018e−05
193	SPARISOMA	170301200	2	2.59885390542771e−05	6.16199895246018e−05
201	HYPLEURGEMINA	170360701	2	2.59885390542771e−05	6.16199895246018e−05
233	ARIOMMIDAE	170530000	2	2.59885390542771e−05	6.16199895246018e−05
273	MONACANHISPID	189040204	2	2.59885390542771e−05	6.16199895246018e−05
289	ANTHIINAE	999020300	2	2.59885390542771e−05	6.16199895246018e−05
20	DIPLOPHTAENIA	121140302	1	1.29942695271385e−05	3.08099947623009e−05
26	VINCIGUPOWERI	121141702	1	1.29942695271385e−05	3.08099947623009e−05
36	MELANOSTOMIAS	121190300	1	1.29942695271385e−05	3.08099947623009e−05
37	STOMIIFORMES	122000000	1	1.29942695271385e−05	3.08099947623009e−05
39	ELOPS SAURUS	124010101	1	1.29942695271385e−05	3.08099947623009e−05
41	CHLOROPHTHALM	129020000	1	1.29942695271385e−05	3.08099947623009e−05
48	SUDIS	129050600	1	1.29942695271385e−05	3.08099947623009e−05
69	XENOCONGRIDAE	143040000	1	1.29942695271385e−05	3.08099947623009e−05
76	BASCANIBASCAN	143150101	1	1.29942695271385e−05	3.08099947623009e−05
80	PHAENOMLONGIS	143150701	1	1.29942695271385e−05	3.08099947623009e−05
81	LETHARCHUS	143151100	1	1.29942695271385e−05	3.08099947623009e−05
83	LETHARCALICUL	143151102	1	1.29942695271385e−05	3.08099947623009e−05
91	PAREXOCBRACHY	147040601	1	1.29942695271385e−05	3.08099947623009e−05
92	CYPSELURUS	147040700	1	1.29942695271385e−05	3.08099947623009e−05
93	HEMIRAMPHIDAE	147070000	1	1.29942695271385e−05	3.08099947623009e−05
106	HIPPOCAMPUS	151060600	1	1.29942695271385e−05	3.08099947623009e−05
109	HOLOCENTRIDAE	161110000	1	1.29942695271385e−05	3.08099947623009e−05
110	ANTIGONIA	162030100	1	1.29942695271385e−05	3.08099947623009e−05
132	LIOPROPOMA	170025600	1	1.29942695271385e−05	3.08099947623009e−05
137	RYPTICUS	170030100	1	1.29942695271385e−05	3.08099947623009e−05
144	POMATOMIDAE	170080000	1	1.29942695271385e−05	3.08099947623009e−05
146	ECHENEIDAE	170090000	1	1.29942695271385e−05	3.08099947623009e−05
147	RACHYCECANADU	170100101	1	1.29942695271385e−05	3.08099947623009e−05
164	ETELIS	170150500	1	1.29942695271385e−05	3.08099947623009e−05
167	LUTJANUGRISEU	170151109	1	1.29942695271385e−05	3.08099947623009e−05
174	BAIRDIECHRYSO	170200502	1	1.29942695271385e−05	3.08099947623009e−05

	Taxa	BIOCODE	cnt	pct	cpue
191	POMACANTHIDAE	170290000	1	1.29942695271385e−05	3.08099947623009e−05
195	PERCOPHIDIDAE	170320000	1	1.29942695271385e−05	3.08099947623009e−05
198	CHIASMODONTID	170350000	1	1.29942695271385e−05	3.08099947623009e−05
211	THUNNUSATLANT	170440403	1	1.29942695271385e−05	3.08099947623009e−05
212	SCOMBERSCOMBR	170440604	1	1.29942695271385e−05	3.08099947623009e−05
217	GEMPYLIDAE	170450000	1	1.29942695271385e−05	3.08099947623009e−05
219	NEALOTUTRIPES	170450401	1	1.29942695271385e−05	3.08099947623009e−05
220	NESIARCNASUTU	170451201	1	1.29942695271385e−05	3.08099947623009e−05
224	BENTHODTENUIS	170460503	1	1.29942695271385e−05	3.08099947623009e−05
226	TETRAGONURIDA	170500000	1	1.29942695271385e−05	3.08099947623009e−05
239	EPIGONIDAE	170760000	1	1.29942695271385e−05	3.08099947623009e−05
240	OPHIDIIFORMES	171000000	1	1.29942695271385e−05	3.08099947623009e−05
245	ECHIODODAWSON	171020201	1	1.29942695271385e−05	3.08099947623009e−05
258	ENGYOPHRYS	183011400	1	1.29942695271385e−05	3.08099947623009e−05
261	TRICHOPSETTA	183011800	1	1.29942695271385e−05	3.08099947623009e−05
263	BOTHUS OCELLA	183012203	1	1.29942695271385e−05	3.08099947623009e−05
271	BALISTECAPRIS	189030502	1	1.29942695271385e−05	3.08099947623009e−05
278	LOPHIUSAMERIC	195010202	1	1.29942695271385e−05	3.08099947623009e−05
280	ARGENTINOIDEI	999010100	1	1.29942695271385e−05	3.08099947623009e−05
283	LABROIDEI	999010400	1	1.29942695271385e−05	3.08099947623009e−05
285	SCOMBROIDEI	999010600	1	1.29942695271385e−05	3.08099947623009e−05
286	STROMATEOIDEI	999010700	1	1.29942695271385e−05	3.08099947623009e−05
291	SERRANINAE	999021200	1	1.29942695271385e−05	3.08099947623009e−05
294	TOTAL	0	76957	1	2.37104476692238

	Taxa	cpue	lcl	ucl
102	ENGRAULIDAE	0.369761028081995	0.242017320758635	0.497504735405354
41	BREGMACEROS	0.316043974317391	0.254174057988178	0.377913890646603
44	BREVOORTIA	0.249422655597967	0	0.694254505453659
120	GOBIIDAE	0.233744619319406	0.192365638316547	0.275123600322265
273	SYNODONTIDAE	0.187245292147283	0.131336961366088	0.243153622928478
286	UNID.FISH	0.140202403868653	0.0869768087615717	0.193427998975733
90	DIAPHUS	0.129192988720118	0.0859547179753587	0.172431259464877
197	OPHIDIIDAE	0.117394789249287	0.0902012718731254	0.144588306625449
172	MICROPOUNDULA	0.102180004118223	0	0.213440744106706
270	SYMPHURUS	0.098483249299576	0.0680117266728278	0.128954771926324
76	CLUPEIFORMES	0.083285243378059	0.0204543419031260	0.146116144852992
147	LEIOSTOXANTHU	0.0612431298016443	0	0.143207465416136
267	SYACIUM	0.0606107855577521	0.0371302705049542	0.08409130061055
142	LABRIDAE	0.055849658380713	0.0315626836873922	0.0801366330740338
6	ANGUILLIFORME	0.0488678715051614	0.0286525747947208	0.0690831682156019
35	BOTHIDAE	0.0462786709037874	0.0305276100021559	0.0620297318054188
183	MYCTOPHIDAE	0.0341554242489938	0.0234667868754294	0.0448440616225582
195	OPHICHTHIDAE	0.0317402847650028	0.0196873266836342	0.0437932428463714
108	ETROPUS	0.025551716839572	0.00950722036982135	0.0415962133093226
268	SYACIUMPAPILL	0.0233929822698209	0.0130870008768207	0.033698963662821
247	SERRANIDAE	0.0227938108763475	0.0155651893759557	0.0300224323767394
127	HARENGUJAGUAN	0.0219647625378073	0.0088035953225699	0.0351259297530447
77	CONGRIDAE	0.0196194508963648	0.0127757282704096	0.02646317352232
199	OPISTHOOGLINU	0.0190178778738385	0.0049702366990565	0.0330655190486205
71	CITHARICHTHYS	0.0181449510248315	0.00842473639810178	0.0278651656515612
204	PEPRILUBURTI	0.0180622670063089	0.00840671693900144	0.0277178170736163
109	ETROPUSCROSSO	0.0179205052902482	0.00711216817904241	0.0287288424014540
201	PARALEPIDIDAE	0.0172632371012926	0.0100295214360913	0.0244969527664939
240	SCORPAENIDAE	0.0159343953893039	0.0102850283398043	0.0215837624388036
230	SCIAENIDAE	0.0158199043863289	0.00370392195152	0.0279358868211378
75	CLUPEIDAE	0.0147003252039942	0.00240385102275931	0.0269967993852291
162	MAUROLIMUELLE	0.0145682530731927	0.0084255933519695	0.0207109127944160
207	PERCIFORMES	0.0144392514682748	0.00998394986994639	0.0188945530666032
282	TRICHIULEPTUR	0.0124355585628416	0.00860346913159668	0.0162676479940866
40	BREGMACCANTOR	0.0114557546165137	0	0.0254632181748668
82	CYNOGLOSSIDAE	0.0107843389701165	0.000387659570648628	0.0211810183695844
70	CHLOROSCHRYSU	0.00856602687631402	0.00109889045819719	0.0160331632944308
22	AUXIS	0.00855182004213532	0.00378316822397707	0.0133204718602936
111	ETRUMEUTERES	0.00831500422738058	0	0.0236005398309434
123	GONOSTOMATIDA	0.00775874813867326	0.00319973482064107	0.0123177614567055
211	PLEURONECTIFO	0.00764159828205273	0.00202460500691474	0.0132585915571907
5	ANCHOA HEPSET	0.00743426385241384	0	0.0221685002592423
237	SCOMBRIDAE	0.00698926676520112	0.00155579697125354	0.0124227365591487
81	CYCLOTHONE	0.00689423401035256	0.00423461069959585	0.00955385732110928
185	MYCTOPHUM	0.00635572107869126	0.00206523311640259	0.0106462090409799

	Taxa	cpue	lcl	ucl
88	DECAPTEPUNCTA	0.0059506132948216	0.00266026464296389	0.00924096194667931
4	ANCHOA	0.00556059594560623	0	0.0123134813977157
156	LUTJANIDAE	0.00547984073264361	0.00259641159039873	0.00836326987488849
36	BOTHUS	0.00525304287042013	0.00341724777163681	0.00708883796920344
285	TRIGLIDAE	0.00515167609613086	0.00315493336114408	0.00714841883111765
187	MYROPHIPUNCTA	0.00509676475633408	0.00165170849244242	0.00854182102022573
93	DIPLECTRUM	0.00485603095293325	0.00177603524523120	0.00793602666063531
169	MICRODESMIDAE	0.00481505254231546	0.00293724844327489	0.00669285664135603
62	CERATIOIDEI	0.00480214736233747	0.00349027978679179	0.00611401493788314
51	CARANGIDAE	0.00474203208265842	0.00187884359658311	0.00760522056873373
218	PRIONOTUS	0.00471149422801093	0.00234688212195081	0.00707610633407106
112	EUTHYNNALLETT	0.00460121962795215	0.00239151646994005	0.00681092278596425
58	CENTROPRISTIS	0.00458383836981738	0.00154864536068326	0.00761903137895149
192	NETTASTOMATID	0.00412108709703064	0.00248132370617937	0.00576085048788192
177	MORINGUIDAE	0.00409128011743176	0.000946391436100417	0.0072361687987631
136	HYGOPHUM	0.00405304756569879	0.0021884202543414	0.00591767487705617
242	SELAR CRUMEN	0.00375224535521527	0.00132814883593187	0.00617634187449866
63	CERATOSCOPELU	0.00343182208923522	0.00168659058903602	0.00517705358943443
79	CUBICEPS	0.00315703415243457	0.00195461149316057	0.00435945681170856
33	BLENNIIDAE	0.00313650884452446	0.00183152269003719	0.00444149499901173
274	SYNODUSFOETEN	0.00310061070630755	0	0.00711948148907128
241	SCORPAENIFORM	0.00307932107551546	0	0.00675225724434121
222	PSEUDOMFUGESA	0.00288740419424769	0.000932670516062624	0.00484213787243276
8	ANTHIASNICHOL	0.00277918019304523	0	0.00586535633725986
171	MICROPOGONIAS	0.00267241379310345	0	0.00801724137931034
233	SCOMBERMACULA	0.00259538245883336	0.00061524595868481	0.00457551895898190
46	BROTULA	0.00256774154360771	0.00123957559789506	0.00389590748932035
206	PEPRILUS	0.00249490262915933	0.00112184031196251	0.00386796494635614
117	GADIFORMES	0.00247413973543538	0.000985430912858542	0.00396284855801221
52	CARANX	0.00246622459827108	0.000795442527824398	0.00413700666871777
231	SCIAENOOCELLA	0.00225436984170082	0.000230521940977401	0.00427821774242424
263	STROMATEIDAE	0.00223324775517702	0.000113372458007915	0.00435312305234612
145	LAMPANYCTUS	0.00220992973773158	0.00128424967116274	0.00313560980430043
225	RHOMBOPAURORU	0.00218038334757259	0.00141792478541162	0.00294284190973356
74	CITHARISPILOP	0.00215684204157504	0.000517733765982673	0.00379595031716741
216	POMATOMSALTAT	0.0021311710223951	0.000580562477788936	0.00368177956700126
178	MUGIL	0.00201607865172544	0.000397588948479526	0.00363456835497135
276	TETRAODONTIDA	0.0019496888748869	0.000702742003686273	0.00319663574608753
83	CYNOSCIARENAR	0.00193051269784247	0	0.0038803292045835
232	SCOMBERCAVALL	0.00191450790564492	0.000334677013554145	0.0034943387977357
194	OPHICHTGOMESI	0.00184396783940338	0.0011893873127574	0.00249854836604935
42	BREGMACEROTID	0.00183702258242191	0	0.00464075479689145
53	CARANX CRYSOS	0.00183181177159100	0	0.00375671111494375
180	MUGILIDAE	0.00177873224825863	0.000592921077544868	0.0029645434189724
290	VINCIGUERRIA	0.00173439634373909	0.000571390371428504	0.00289740231604968

	Taxa	cpue	lcl	ucl
84	CYNOSCINOTHUS	0.00170382105733614	0	0.00350600255180593
31	BENTHOSEMA	0.00166530103223982	0.000819760700795403	0.00251084136368423
193	NOTOLYCVALDIV	0.00161811184087774	0.000786352695682981	0.00244987098607251
252	SPARIDAE	0.00161715820067094	0	0.00345886013122788
49	CALLIONYMIDAE	0.00156292190129276	0.00062544084726863	0.00250040295531689
45	BROTULA	0.00152777777777778	0	0.00458333333333333
288	UROPHYCIS	0.00146325409897419	7.97818207584524e−05	0.00284672637718992
254	SPHOEROIDES	0.00146059294966171	0.000692240942020443	0.00222894495730298
291	VINCIGUNIMBAR	0.00133685833037854	0.000795012114026842	0.00187870454673024
186	MYROPHINAE	0.00132971731717244	0	0.00318494544834024
250	SERRANUS	0.00131763866888713	0.000584600676775464	0.0020506766609988
86	CYNOSCIREGALI	0.00128440366972477	0	0.00385321100917431
104	ENGYOPHSENTA	0.00123058147989922	0.000687378969594505	0.00177378399020393
196	OPHICHTREX	0.00118154210132828	0	0.00247318146269245
278	THUNNUS	0.00117043946145095	0.000528292234245949	0.00181258668865596
101	ENGRAULEURYST	0.00112343865690205	0	0.00291025009591016
205	PEPRILUPARU	0.00111915343955163	0.000316153756093697	0.00192215312300956
59	CENTROPSTRIAT	0.00109757394282708	0	0.00231509588458423
283	TRICHIURIDAE	0.00102773296424583	0	0.00244998788052785
269	SYMPHURPLAGIU	0.00101653450886753	0	0.00217203157495812
255	SPHYRAENA	0.0009909361109801	0.000504648560820147	0.00147722366114005
200	OPISTOGNATHID	0.000954800904142132	0.000354255444693048	0.00155534636359122
2	ACROPOMATIDAE	0.000917183298531107	0	0.00186236184756742
179	MUGIL CUREMA	0.000892547261853505	4.95510549022462e−05	0.00173554346880476
91	DIOGENIATLANT	0.000879614572990716	0.000403501669019366	0.00135572747696207
106	EPINEPHELINAE	0.000873958023610981	0.000157212995701296	0.00159070305152067
259	STERNOPTYCHID	0.000869103311657734	0.000394920936112349	0.00134328568720312
229	SCARIDAE	0.000848517763406307	0.000400889752088421	0.00129614577472419
72	CITHARICORNUT	0.000819547269200464	0	0.00200979710971529
124	GRAMMISTIDAE	0.000763944764533742	0.000189807974284998	0.00133808155478249
277	TETRAODONTIFO	0.000751902247850172	0.000194026877757588	0.00130977761794276
18	ARIOMMA	0.000744004138782732	8.07988851893968e−05	0.00140720939237607
29	BEMBROPS	0.00074395010214817	0.000182314847188988	0.00130558535710735
249	SERRANIPUMILI	0.000737486273997034	0	0.00152220948620011
219	PRISTIPAQUILO	0.000702409173928125	0.000237778426221831	0.00116703992163442
245	SELENE VOMER	0.000701177687320826	0.000358864607129074	0.00104349076751258
243	SELENE	0.000694444444444444	0	0.00208333333333333
110	ETROPUSMICROS	0.000685893071361411	0	0.00196423173937879
129	HEMANTHIAS	0.000660213206466675	0	0.00158414664442511
125	GRAMMISTINAE	0.000653147682877719	0.000164762009644217	0.00114153335611122
182	MURAENIDAE	0.000651567647779328	0.000256606233284325	0.00104652906227433
181	MULLIDAE	0.000646031090541659	0	0.00151045587801593
168	MENTICIRRHUS	0.000645401304191868	0.000170879916685439	0.00111992269169830
55	CARAPUS	0.000643247893189449	0.000197648457832569	0.00108884732854633
163	MELAMPHAIDAE	0.000640121866591628	2.39604548651583e−05	0.00125628327831810

	Taxa	cpue	lcl	ucl
119	GERREIDAE	0.00063132561051145	9.50231152908403e−05	0.00116762810573206
13	APOGONIDAE	0.00063074596098424 6	0.00014087046292618 9	0.00112062145904230
159	LUTJANUS	0.00062648722886883 3	0.0001719661715829	0.00108100828615477
61	CERATIOIDEA	0.00061918604573511 2	4.17617237551729e−05	0.00119661036771505
223	PSEUDOMYROPHI	0.00059649964684352 8	0	0.00129750590309642
146	LARIMUSFASCIA	0.00056580421950988 4	0	0.00113306271589200
257	STEINDAARGENT	0.00056515978335869 1	0	0.00117302911283906
80	CYCLOPSETTA	0.00055756346150343 9	0.00018218406071661 5	0.00093294286229026 3
25	BALISTIDAE	0.00055244320539615 5	0.00015692831340652 9	0.00094795809738578 1
220	PSENES	0.00055210691515238 8	0.00018590030785766 5	0.00091831352244711 2
114	EXOCOETIDAE	0.0005479770272075 6	0.00018283224753988 1	0.00091312180687523 9
7	ANTHIAS	0.00050891789029875 3	9.13529097697616e−05	0.00092648287082774 4
217	PRIACANTHIDAE	0.00049281628473947 4	0.00013540146218423 8	0.0008502311072947 1
122	GONOSTOMA	0.00047569694648708 3	0.00013858675964868 5	0.00081280713332548 1
140	KATSUWOPELAMI	0.00047320987991903 1	0.00013318772606724 4	0.00081323203377081 7
212	POLLICHMAULI	0.00047109547868845 4	8.50982440943643e−05	0.00085709271328254 4
50	CALLIONYMUS	0.00045572155931464 0	8.95175901579542e−05	0.00082192552847132 5
56	CARAPUSBERMUD	0.00042968755441075 3	0	0.0008616980133077 4
251	SOLEIDAE	0.00041679418202948 2	5.17653777706403e−05	0.00078182298628832 4
64	CERATOSMADERE	0.00038830020873946 6	0	0.00081525169371958 2
99	ELOPIDAE	0.00037018492260427 7	0	0.00078260717969072 4
289	VINCIGUATTENU	0.00036821269390632 7	0.00016894258219537 4	0.00056748280561727 9
89	DECAPTERUS	0.0003633741888969	0	0.00088039055823581 9
176	MORIDAE	0.00032496208846354 9	0	0.00090949864295078 4
227	SALMONIFORMES	0.00032473070616945	0	0.00065966598224982 1
174	MONACANTHIDAE	0.00032153370899418 9	0	0.00070601332236603 4
228	SARDINEAURITA	0.00032135029573819 2	0	0.00070481814889353 9
175	MONOLENE	0.00031975204809519 4	0	0.00074035610961281 6
157	LUTJANUCAMPEC	0.00029595616504090 5	7.28732950570512e−05	0.00051903903502475 8
116	GADIDAE	0.00029467177927563 2	0	0.00062032449740109 4
20	ATHERINIDAE	0.00029184998271213 7	0	0.00061190989516895 4
15	ARGENTINIDAE	0.00028690421224997 0	0	0.00061241241436427 6
54	CARAPIDAE	0.00027820156413104 2	0	0.00055778190270581 7
12	APOGON	0.00027054714076539 3	2.45956035845101e−05	0.00051649867794627 7
239	SCOPELARCHIDA	0.00026865014300003 8	6.08887295553076e−05	0.00047641155644476 8
144	LAMPADENA	0.00026854408934079 6	0	0.00062829989677774 3
139	HYPSOBLHENTZI	0.00026474897004796 1	0	0.00054578570720918 8
137	HYGOPHUREINHA	0.00026453536404529 8	5.29125366969032e−05	0.00047615819139369 2
281	TRACHURLATHAM	0.00026386748844376 0	0	0.00072177430609989 6
280	TRACHINMYOPS	0.00026360437350760 3	0	0.00072706477354709 5
190	NEOEPINAMERIC	0.00025742421380819 4	0	0.00052796038383590 9
261	STOMIIDAE	0.00025247935791879 9	2.44007295821985e−06	0.00050251864287937 9
246	SERIOLA	0.00025031476181229 6	2.51685315899764e−05	0.00047546099203461 5
214	POMACENTRIDAE	0.00024437612288265 8	0	0.00055533624847464 5
234	SCOMBEROMORUS	0.00024305555555555 6	0	0.00066512526081056 5

	Taxa	cpue	lcl	ucl
73	CITHARIGYMNOR	0.000242618411811629	1.27649846662727e−05	0.000472471838956985
78	CORYPHAHIPPUR	0.000242599501673464	0	0.000507191301954485
287	URANOSCOPIDAE	0.000222533789847637	0	0.000551910221694452
95	DIPLOSPMULTIS	0.000221672509066496	1.05734941098751e−05	0.000432771524023117
66	CHAULIODUS	0.000200228956704299	0	0.000456845557139596
98	ELAGATIBIPINN	0.000194444444444444	0	0.000583333333333333
161	MALACANTHIDAE	0.00019090225798874	0	0.000436479246974527
11	APLATOPCHAULI	0.000190654957879675	7.11520066008398e−06	0.000374194715099265
256	SPHYRAENIDAE	0.000184829059829060	0	0.000453571386024453
21	AULOPIFORMES	0.000182926829268293	0	0.000548780487804878
170	MICRODESMUS	0.000182539682539683	0	0.000446114764289174
135	HOWELLA	0.000176511770761718	1.2444322182915e−05	0.000340579219340521
3	ALUTERUS	0.000170485542825968	0	0.00041833985475093
60	CERATIIDAE	0.000155164519388657	0	0.000368532824108411
208	PERCOIDEI	0.000152439024390244	0	0.000457317073170732
189	NEOCONGMUCRON	0.000151065699846188	0	0.000368128274148362
65	CHAULIODONTID	0.000150557514394848	0	0.000362386368314956
48	CALLECHMURAEN	0.000150430711447925	0	0.000325664732040111
160	MACROURIDAE	0.000150178422400645	5.93044179093274e−06	0.000294426403010357
67	CHAULIOSLOANI	0.000149920260482424	0	0.000361482737059563
260	STERNOPTYX	0.000145477155438416	0	0.000332971582955956
154	LOPHIIFORMES	0.000142071266226378	0	0.000335191935755917
39	BREGMACATLANT	0.000140186915887850	0	0.000420560747663551
92	DIOGENICHTHYS	0.000138885878453735	0	0.000302006212165559
167	MELANOSTOMIIN	0.000138336645623626	0	0.000288059266069015
148	LEPIDOPCAUDAT	0.000138226243731180	0	0.000280517097093843
28	BATHYLAGUS	0.000136478188057058	4.02167350498396e−06	0.000268934702609133
57	CENTROBNIGROO	0.00013590366370792	5.08701668632073e−06	0.000266720310729519
271	SYNAGROPS	0.000128724270705250	0	0.000264718862508044
202	PARALICHTHYS	0.000127684075052496	0	0.000322573719617129
32	BENTHOSSUBORB	0.000119768760545460	0	0.000291754242740267
131	HEMANTHVIVANU	0.000117997162531575	0	0.000304617166556900
235	SCOMBERREGALI	0.000113636363636364	0	0.000340909090909091
34	BLENNIOIDEI	0.000113455659072105	0	0.000244032049433721
152	LETHARCVELIFE	0.000112468827930175	0	0.000313893157985859
1	ACANTHURUS	0.000111082518442271	0	0.000290290479365626
258	STELLIFLANCEO	0.000107040229885057	0	0.000284213667743461
85	CYNOSCION	0.000106497175141243	0	0.000257010168051068
128	HEMANTHAUREOR	0.000104426510149181	0	0.000259205653904994
14	APTERICANSP	0.000101463066775899	0	0.000219418677029489
164	MELAMPHSIMUS	9.26867686768677e−05	0	0.000208966874961168
115	FISTULARIIDAE	9.25925925925926e−05	0	0.000277777777777778
184	MYCTOPHIFORME	8.87573964497041e−05	0	0.000266272189349112
121	GONICHTCOCCOI	8.83997893592115e−05	0	0.00021105742080549 8
153	LIOPROPOMA	8.62068965517241e−05	0	0.000258620689655172

	Taxa	cpue	lcl	ucl
149	LESTIDIATLANT	8.43881856540084e−05	0	0.000253164556962025
126	HAEMULIDAE	7.99888517279822e−05	0	0.000199941226101235
23	BAIRDIECHRYSO	7.93650793650794e−05	0	0.000238095238095238
43	BREVOORPATRON	7.75193798449612e−05	0	0.000232558139534884
27	BATHYLAGIDAE	7.74551066217733e−05	0	0.000168463023449919
138	HYPLEURGEMINA	7.57451686865378e−05	0	0.00019706914139001
47	CALLECHGUINIE	7.44327614831212e−05	0	0.000179491111321203
113	EVERMANNELLID	7.43395725474579e−05	0	0.000189278978180461
68	CHIASMODONTID	7.35294117647059e−05	0	0.000220588235294118
203	PAREXOCBRACHY	7.35294117647059e−05	0	0.000220588235294118
275	TETRAGONURIDA	7.35294117647059e−05	0	0.000220588235294118
166	MELANOSTOMIID	7.14592274678112e−05	0	0.000180081783359751
215	POMATOMIDAE	6.84931506849315e−05	0	0.000205479452054795
221	PSEUDOGGREGOR	6.72212230215827e−05	0	0.000162283179471066
130	HEMANTHLEPTUS	6.62914321450907e−05	0	0.000162196430678427
26	BASCANIBASCAN	6.57894736842105e−05	0	0.000197368421052632
10	ANTIGONIA	6.25e−05	0	0.0001875
158	LUTJANUGRISEU	6.25e−05	0	0.0001875
9	ANTHIINAE	6.09756097560976e−05	0	0.000182926829268293
173	MONACANHISPID	5.9593023255814e−05	0	0.00014741615979054
17	ARGYROPELECUS	5.88088661486078e−05	0	0.000117803763298551
150	LETHARCALICUL	5.81395348837209e−05	0	0.000174418604651163
266	SUDIS HYALIN	5.68181818181818e−05	0	0.000170454545454545
143	LABROIDEI	5.20833333333333e−05	0	0.00015625
293	XENOCONGRIDAE	5.10204081632653e−05	0	0.000153061224489796
253	SPARISOMA	5.0216237266597e−05	0	0.000127461287888368
133	HIPPOCAMPUS	4.95049504950495e−05	0	0.000148514851485149
272	SYNGNATHIDAE	4.83091787439614e−05	0	0.000144927536231884
188	NEALOTUTRIPES	4.76190476190476e−05	0	0.000142857142857143
19	ARIOMMIDAE	4.67289719626168e−05	0	0.000140186915887850
213	POMACANTHIDAE	4.62962962962963e−05	0	0.000138888888888889
236	SCOMBERSCOMBR	4.62962962962963e−05	0	0.000138888888888889
284	TRICHOPSETTA	4.31034482758621e−05	0	0.000129310344827586
198	OPHIDIIFORMES	4.0650406504065e−05	0	0.000121951219512195
97	ECHIODODAWSON	3.78787878787879e−05	0	0.000113636363636364
151	LETHARCHUS	3.78787878787879e−05	0	0.000113636363636364
244	SELENE SETAPI	3.75730398151923e−05	0	9.15685547238779e−05
38	BRAMIDAE	3.65641711229947e−05	0	8.81444142730765e−05
103	ENGYOPHRYS	3.54609929078014e−05	0	0.000106382978723404
209	PERCOPHIDIDAE	3.52112676056338e−05	0	0.000105633802816901
248	SERRANINAE	3.52112676056338e−05	0	0.000105633802816901
224	RACHYCECANADU	3.49650349650350e−05	0	0.000104895104895105
141	KYPHOSUS	3.33021612635079e−05	0	8.17537338536332e−05
132	HEMIRAMPHIDAE	3.125e−05	0	9.375e−05
96	ECHENEIDAE	3.08641975308642e−05	0	9.25925925925926e−05

	Taxa	cpue	lcl	ucl
262	STOMIIFORMES	3.04878048780488e−05	0	9.14634146341463e−05
165	MELANOSTOMIAS	2.84090909090909e−05	0	8.52272727272727e−05
107	ETELIS	2.56410256410256e−05	0	7.69230769230769e−05
16	ARGENTINOIDEI	2.5e−05	0	7.5e−05
210	PHAENOMLONGIS	2.5e−05	0	7.5e−05
100	ELOPS SAURUS	2.48756218905473e−05	0	7.46268656716418e−05
155	LOPHIUSAMERIC	2.47524752475248e−05	0	7.42574257425743e−05
87	CYPSELURUS	2.41545893719807e−05	0	7.2463768115942e−05
191	NESIARCNASUTU	1.81818181818182e−05	0	5.45454545454545e−05
238	SCOMBROIDEI	1.81818181818182e−05	0	5.45454545454545e−05
265	SUDIS	1.70068027210884e−05	0	5.10204081632653e−05
37	BOTHUS OCELLA	1.64473684210526e−05	0	4.93421052631579e−05
292	VINCIGUPOWERI	1.64473684210526e−05	0	4.93421052631579e−05
69	CHLOROPHTHALM	1.62337662337662e−05	0	4.87012987012987e−05
226	RYPTICUS	1.51515151515152e−05	0	4.54545454545455e−05
118	GEMPYLIDAE	1.51057401812689e−05	0	4.53172205438066e−05
279	THUNNUSATLANT	1.51057401812689e−05	0	4.53172205438066e−05
105	EPIGONIDAE	1.5015015015015e−05	0	4.5045045045045e−05
134	HOLOCENTRIDAE	1.5015015015015e−05	0	4.5045045045045e−05
24	BALISTECAPRIS	1.43678160919540e−05	0	4.31034482758621e−05
30	BENTHODTENUIS	1.11358574610245e−05	0	3.34075723830735e−05
94	DIPLOPHTAENIA	8.38926174496644e−06	0	2.51677852348993e−05
264	STROMATEOIDEI	8.38926174496644e−06	0	2.51677852348993e−05
294	TOTAL	2.96987258614144	1.57143360692443	4.63113983688046

APPENDIX A-1

ATTACHMENT 3

BOET WINTER SEAMAP POLYGON DATA

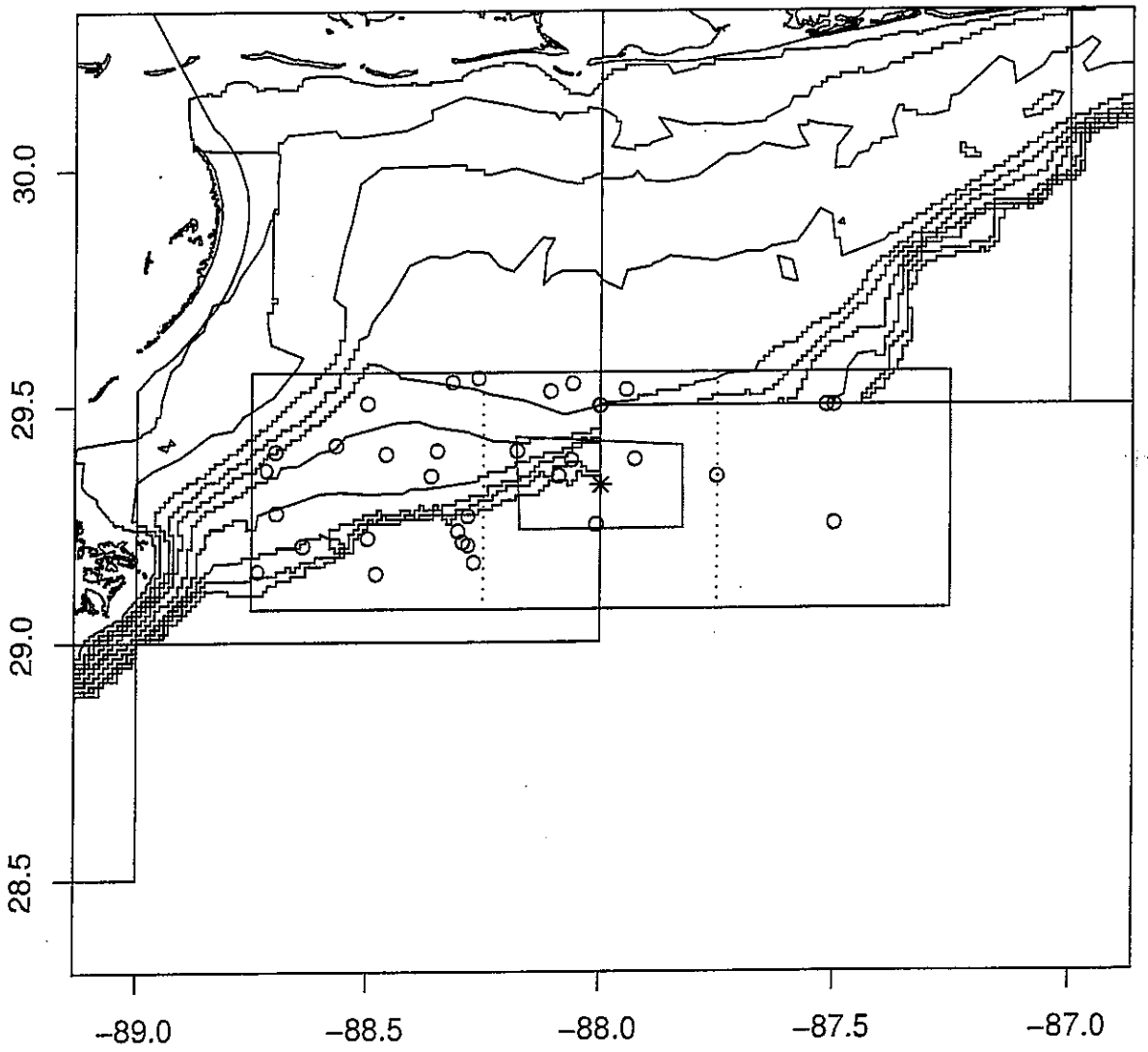


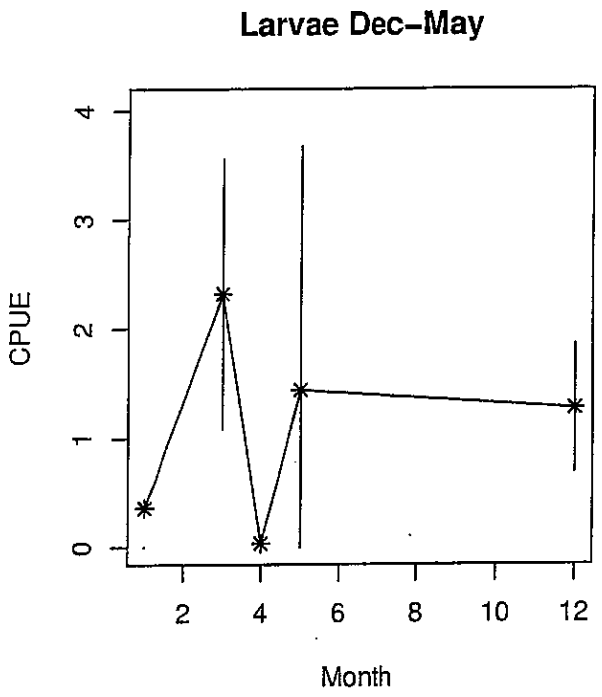
Figure 1. The Proposed Project Study Area with Winter Sampling Stations. The bold-bordered polygon denotes the area within which the proposed Terminal will be located. The three large squares separated by dashed vertical lines denote 30 minute SEAMAP sampling blocks. Circles show the location of the ichthyoplankton sampling sites. Depth contours are in 5-fathom increments.

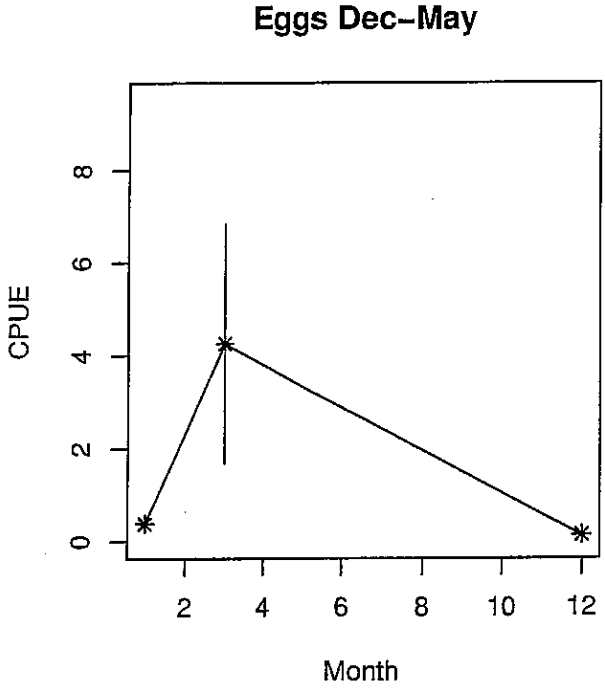
	setName	meancat	se	lcl	ucl	gmeancat	gmcount	gmse	gmlcl	gmucl
1	1	0.360				0.360	1			
11	3	2.319	0.619	1.081	3.556	1.463	18	0.542	0.379	2.546
12	4	0.033				0.033	1	Inf	0.000	Inf
13	5	1.440	1.115	0.000	3.671	0.758	8	0.564	0.000	1.886
14	12	1.272	0.293	0.686	1.858	1.023	7	0.223	0.578	1.469
6	0	1.787	0.413	0.960	2.614	0.994	35	0.279	0.437	1.552

Table 1: Monthly Fish Larvae Statistics (Dec-May)

	MO	eggcpue	se	egglen	lcl	ucl
1	1	0.376		1		
2	3	4.258	1.286	15	1.685	6.830
3	12	0.124	0.047	2	0.030	0.218
11	0	3.583	1.127	18	1.330	5.836

Table 2: Number Eggs per cubic meter


Larvae Dec–May
CPUE
0
1
2
3
4
2
4
6
8
10
12
Month


Eggs Dec–May
CPUE
0
2
4
6
8
2
4
6
8
10
12
Month

	CRUISE.NO	VESSEL	P.STA.NO	SAMPLE.NO	MO	DAY	YR	latdd	londd	cpue
1	203	4	54606	15236	1	6	1993	29.350	−87.750	0.3596
2	133	4	38617	2151	3	15	1983	29.500	−87.517	0.5389
3	133	4	38740	2157	3	28	1983	29.550	−88.317	0.2447
4	133	4	38747	2159	3	28	1983	29.417	−88.567	2.0052
5	143	4	40864	2205	4	24	1984	29.250	−87.500	0.0329
6	967	28	28001	22064	12	3	1996	29.505	−88.500	2.3108
7	967	28	28001	22065	12	3	1996	29.505	−88.500	2.3919
8	967	28	28002	22067	12	3	1996	29.220	−88.500	0.6094
9	967	28	28002	22068	12	3	1996	29.220	−88.500	0.4632
10	967	28	28063	22266	12	14	1996	29.249	−88.009	0.9496
11	15	17	17002	28662	12	4	2001	29.500	−87.501	1.0256
12	15	17	17006	28674	12	5	2001	29.500	−88.001	1.1538
13	142	4	40378	3308	3	13	1984	29.558	−88.260	1.2769
14	142	4	40444	3314	3	16	1984	29.403	−88.692	2.3077
15	151	4	42367	3876	3	8	1985	29.530	−88.106	2.1447
16	151	4	42368	3878	3	8	1985	29.385	−88.062	2.1154
17	151	4	42373	3880	3	9	1985	29.405	−88.350	0.2976
18	861	17	17017	5546	5	21	1986	29.212	−88.295	0.2069
19	861	17	17018	5549	5	22	1986	29.145	−88.482	0.0915
20	861	17	17024	5552	5	22	1986	29.205	−88.283	0.1862
21	861	17	17025	5555	5	23	1986	29.235	−88.305	1.0000
22	861	17	17026	5558	5	23	1986	29.168	−88.270	0.0921
23	861	17	17031	5561	5	23	1986	29.387	−87.927	0.4412
24	861	17	17032	5564	5	24	1986	29.533	−87.945	0.2903
25	173	4	47668	8289	5	26	1988	29.500	−88.000	9.2126
26	125	4	36119	883	3	3	1982	29.547	−88.058	11.1633
27	125	4	36136	885	3	3	1982	29.405	−88.177	1.9048
28	125	4	36139	886	3	3	1982	29.352	−88.088	4.6825
29	125	4	36146	887	3	3	1982	29.267	−88.283	0.3750
30	125	4	36151	888	3	4	1982	29.352	−88.363	5.5652
31	125	4	36162	890	3	4	1982	29.398	−88.460	1.5052
32	125	4	36234	899	3	6	1982	29.365	−88.713	1.4000
33	125	4	36244	900	3	9	1982	29.273	−88.690	1.2581
34	125	4	36248	901	3	9	1982	29.204	−88.635	0.4731
35	125	4	36250	960	3	9	1982	29.150	−88.733	2.4800

Table 1: Stations Matched Dec-May

	Taxa	BIOCODE	cnt	pct	cpue
5	BREVOORPATRON	121050302	1309	0.219226260257913	0.217948717948718
3	BREVOORTIA	121050300	663	0.111036677273489	0.110389610389610
53	BREGMACEROS	148030100	547	0.0916094456539943	0.091075591075591
7	ENGRAULIDAE	121060000	447	0.0748618321889131	0.0744255744255744
114	GOBIIDAE	170550000	385	0.0644783118405627	0.0641025641025641
26	MYCTOPHIDAE	131010000	284	0.0475632222408307	0.0472860472860473
6	ETRUMEUTERES	121051602	259	0.0433763188745604	0.0431235431235431
89	LEIOSTOXANTHU	170201701	259	0.0433763188745604	0.0431235431235431
27	DIAPHUS	131010200	204	0.0341651314687657	0.0339660339660340
23	SYNODONTIDAE	129040000	136	0.0227767543125105	0.0226440226440226
129	SYMPHURUS	183050700	132	0.0221068497739072	0.0219780219780220
1	UNID.FISH	100000000	115	0.0192597554848434	0.0191475191475191
84	SCIAENIDAE	170200000	111	0.0185898509462402	0.0184815184815185
116	OPHIDIIDAE	171010000	63	0.0105509964830012	0.0104895104895105
52	BREGMACEROTID	148030000	55	0.00921118740579467	0.00915750915750916
119	BOTHIDAE	183010000	45	0.00753642605928655	0.0074925074925075
12	MAUROLIMUELLE	121140801	41	0.0068665215206833	0.00682650682650683
69	SERRANIDAE	170020000	39	0.00653156925138168	0.0064935064935065
90	MICROPOUNDULA	170201902	39	0.00653156925138168	0.0064935064935065
9	GONOSTOMATIDA	121140000	38	0.00636409311673087	0.00632700632700633
68	PERCIFORMES	170000000	35	0.00586166471277843	0.00582750582750583
87	CYNOSCIREGALI	170200907	34	0.00569418857812762	0.00566100566100566
37	NETTASTOMATID	143110000	33	0.0055267124434768	0.00549450549450549
81	TRACHURLATHAM	170113802	33	0.0055267124434768	0.00549450549450549
123	ETROPUSCROSSO	183010602	33	0.0055267124434768	0.00549450549450549
105	TRICHIULEPTUR	170460402	32	0.00535923630882599	0.00532800532800533
32	HYGOPHUM	131011000	30	0.00502428403952437	0.004995004995005
91	SPARIDAE	170210000	28	0.00468933177022274	0.00466200466200466
35	ANGUILLIFORME	143000000	27	0.00452185563557193	0.00449550449550450
25	PARALEPIDIDAE	129050000	26	0.00435437950092112	0.00432900432900433
85	CYNOSCIARENAR	170200901	25	0.00418690336627031	0.00416250416250416
2	CLUPEIFORMES	121000000	23	0.00385195109696868	0.00382950382950383
120	CITHARICHTHYS	183010300	20	0.00334952269301625	0.00333000333000333
118	PLEURONECTIFO	183000000	16	0.00267961815441300	0.00266400266400266
38	CONGRIDAE	143130000	15	0.00251214201976218	0.0024975024975025
4	BREVOORGUNTER	121050301	14	0.00234466588511137	0.00233100233100233
10	CYCLOTHONE	121140200	14	0.00234466588511137	0.00233100233100233
33	BENTHOSEMA	131012200	14	0.00234466588511137	0.00233100233100233
39	OPHICHTHIDAE	143150000	13	0.00217718975046056	0.00216450216450216
51	UROPHYCIS	148010100	12	0.00200971361580975	0.001998001998002
45	PSEUDOMYROPHI	143152000	11	0.00184223748115893	0.00183150183150183
65	SCORPAENIDAE	168010000	11	0.00184223748115893	0.00183150183150183
112	PEPRILUBURTI	170511103	11	0.00184223748115893	0.00183150183150183
124	SYACIUM	183011000	11	0.00184223748115893	0.00183150183150183
127	BOTHUS	183012200	10	0.00167476134650812	0.00166500166500167

	Taxa	BIOCODE	cnt	pct	cpue
30	MYCTOPHUM	131010600	9	0.00150728521185731	0.0014985014985015
34	DIOGENIATLANT	131012301	9	0.00150728521185731	0.0014985014985015
49	GADIFORMES	148000000	9	0.00150728521185731	0.0014985014985015
61	ATHERINIDAE	165020000	9	0.00150728521185731	0.0014985014985015
67	PRIONOTUS	168020500	9	0.00150728521185731	0.0014985014985015
111	PEPRILUS	170511100	9	0.00150728521185731	0.0014985014985015
95	LABRIDAE	170280000	8	0.00133980907720650	0.00133200133200133
122	ETROPUS	183010600	8	0.00133980907720650	0.00133200133200133
16	VINCIGUATTENU	121141703	7	0.00117233294255569	0.00116550116550117
29	LAMPANYCTUS	131010500	7	0.00117233294255569	0.00116550116550117
50	GADIDAE	148010000	7	0.00117233294255569	0.00116550116550117
66	TRIGLIDAE	168020000	7	0.00117233294255569	0.00116550116550117
75	ANTHIASNICHOL	170026002	7	0.00117233294255569	0.00116550116550117
132	SPHOEROIDES	189080600	7	0.00117233294255569	0.00116550116550117
55	MACROURIDAE	148060000	6	0.00100485680790487	0.000999000999001
70	DIPLECTRUM	170020900	6	0.00100485680790487	0.000999000999001
93	CHAETODFABER	170250101	6	0.00100485680790487	0.000999000999001
14	VINCIGUNIMBAR	121141701	5	0.00083738067325406 1	0.000832500832500833
71	SERRANUS	170024200	5	0.00083738067325406 1	0.000832500832500833
121	CITHARISPILOP	183010305	5	0.00083738067325406 1	0.000832500832500833
8	ANCHOA	121060100	4	0.00066990453860324 9	0.000666000666000666
17	STERNOPTYCHID	121150000	4	0.00066990453860324 9	0.000666000666000666
54	STEINDAARGENT	148041501	4	0.00066990453860324 9	0.000666000666000666
79	CARANGIDAE	170110000	4	0.00066990453860324 9	0.000666000666000666
88	LARIMUSFASCIA	170201604	4	0.00066990453860324 9	0.000666000666000666
109	CUBICEPPAUCIR	170510102	4	0.00066990453860324 9	0.000666000666000666
13	VINCIGUERRIA	121141700	3	0.00050242840395243 7	0.0004995004995005
24	SYNODUSFOETEN	129040302	3	0.00050242840395243 7	0.0004995004995005
31	CERATOSMADERE	131010902	3	0.00050242840395243 7	0.0004995004995005
58	MELAMPHAIDAE	160030000	3	0.00050242840395243 7	0.0004995004995005
62	SPHYRAENA	165030100	3	0.00050242840395243 7	0.0004995004995005
72	CENTROPRISTIS	170024800	3	0.00050242840395243 7	0.0004995004995005
73	PRONOTOGRAMMU	170025300	3	0.00050242840395243 7	0.0004995004995005
96	SCARIDAE	170300000	3	0.00050242840395243 7	0.0004995004995005
102	AUXIS	170440100	3	0.00050242840395243 7	0.0004995004995005
104	THUNNUSTHYNNU	170440405	3	0.00050242840395243 7	0.0004995004995005
107	STROMATEIDAE	170510000	3	0.00050242840395243 7	0.0004995004995005
113	ARIOMMAREGULU	170530104	3	0.00050242840395243 7	0.0004995004995005
117	CARAPUSBERMUD	171020101	3	0.00050242840395243 7	0.0004995004995005
18	CHAULIODONTID	121170000	2	0.00033495226930162 5	0.000333000333000333
21	MALACOSTEIDAE	121210000	2	0.00033495226930162 5	0.000333000333000333
28	NOTOLYCVALDIV	131010301	2	0.00033495226930162 5	0.000333000333000333
44	MYROPHIPUNCTA	143151902	2	0.00033495226930162 5	0.000333000333000333
64	SCORPAENIFORM	168000000	2	0.00033495226930162 5	0.000333000333000333
80	CARANX	170110800	2	0.00033495226930162 5	0.000333000333000333

	Taxa	BIOCODE	cnt	pct	cpue
92	MULLIDAE	170220000	2	0.000334952269301625	0.000333000333000333
115	ACROPOMATIDAE	170740000	2	0.000334952269301625	0.000333000333000333
125	SYACIUMPAPILL	183011003	2	0.000334952269301625	0.000333000333000333
126	ENGYOPHSENTA	183011401	2	0.000334952269301625	0.000333000333000333
131	TETRAODONTIDA	189080000	2	0.000334952269301625	0.000333000333000333
133	CERATIOIDEA	999030001	2	0.000334952269301625	0.000333000333000333
11	GONOSTOMA	121140400	1	0.000167476134650812	0.000166500166500167
15	VINCIGUPOWERI	121141702	1	0.000167476134650812	0.000166500166500167
19	ASTRONESTHIDA	121180000	1	0.000167476134650812	0.000166500166500167
20	MELANOSTOMIAS	121190300	1	0.000167476134650812	0.000166500166500167
22	SCOPELARCHIDA	129030000	1	0.000167476134650812	0.000166500166500167
36	MURAENIDAE	143060000	1	0.000167476134650812	0.000166500166500167
40	OPHICHTGOMESI	143150401	1	0.000167476134650812	0.000166500166500167
41	OPHICHTPUNCTI	143150402	1	0.000167476134650812	0.000166500166500167
42	APLATOPCHAULI	143150601	1	0.000167476134650812	0.000166500166500167
43	MYRICHTHYS	143151600	1	0.000167476134650812	0.000166500166500167
46	PSEUDOMFUGESA	143152002	1	0.000167476134650812	0.000166500166500167
47	SYNAPHOBRANCH	143180000	1	0.000167476134650812	0.000166500166500167
48	EXOCOETIDAE	147040000	1	0.000167476134650812	0.000166500166500167
56	MACRORHAMPHOS	151030200	1	0.000167476134650812	0.000166500166500167
57	SYNGNATHUS	151061500	1	0.000167476134650812	0.000166500166500167
59	MUGILIDAE	165010000	1	0.000167476134650812	0.000166500166500167
60	MUGIL	165010800	1	0.000167476134650812	0.000166500166500167
63	POLYDACOCTONE	166010401	1	0.000167476134650812	0.000166500166500167
74	ANTHIAS	170026000	1	0.000167476134650812	0.000166500166500167
76	PSEUDOGRAMMA	170026100	1	0.000167476134650812	0.000166500166500167
77	HOWELLA	170061000	1	0.000167476134650812	0.000166500166500167
78	MALACANTHIDAE	170070000	1	0.000167476134650812	0.000166500166500167
82	CORYPHAENIDAE	170130000	1	0.000167476134650812	0.000166500166500167
83	GERREIDAE	170180000	1	0.000167476134650812	0.000166500166500167
86	CYNOSCINEBULO	170200903	1	0.000167476134650812	0.000166500166500167
94	POMACENTRIDAE	170270000	1	0.000167476134650812	0.000166500166500167
97	SPARISOMA	170301200	1	0.000167476134650812	0.000166500166500167
98	BEMBROPS	170320200	1	0.000167476134650812	0.000166500166500167
99	URANOSCOPIDAE	170340000	1	0.000167476134650812	0.000166500166500167
100	CALLIONYMIDAE	170420000	1	0.000167476134650812	0.000166500166500167
101	CALLIONYMUS	170420100	1	0.000167476134650812	0.000166500166500167
103	THUNNUS	170440400	1	0.000167476134650812	0.000166500166500167
106	DIPLOSPMULTIS	170460701	1	0.000167476134650812	0.000166500166500167
108	CUBICEPS	170510100	1	0.000167476134650812	0.000166500166500167
110	PSENES	170510200	1	0.000167476134650812	0.000166500166500167
128	PLEURONECTIDA	183020000	1	0.000167476134650812	0.000166500166500167
130	BALISTIDAE	189030000	1	0.000167476134650812	0.000166500166500167
134	TOTAL	0	5971	1	0.994172494172496

	Taxa	cpue	lcl	ucl
19	BREVOORPATRON	0.605948967132641	0	1.24151619298211
20	BREVOORTIA	0.199900386874769	0.0487385919487096	0.351062181800829
16	BREGMACEROS	0.111587524789824	0.00985649862521527	0.213318550954433
63	LEIOSTOXANTHU	0.100964762605629	0	0.21426917751761
55	GOBIIDAE	0.0933484124226174	0	0.195977758036804
46	ENGRAULIDAE	0.0855058283499585	0	0.171538808500150
76	MYCTOPHIDAE	0.0731446359735869	0.0254984023797087	0.120790869567465
50	ETRUMEUTERES	0.0578373160117307	0.0155994280690907	0.100075203954371
42	DIAPHUS	0.0395667942798869	0	0.0949708505490882
17	BREGMACEROTID	0.0344343757047277	0	0.0741673492570961
101	SCIAENIDAE	0.0313147023532382	0.000359398027677055	0.0622700066787993
119	SYNODONTIDAE	0.0296971743983388	0	0.0648615385049741
116	SYMPHURUS	0.0282109629923967	0	0.0789522538429975
127	UNID.FISH	0.0274624994178502	0	0.0654864195777642
85	OPHIDIIDAE	0.0196595619567267	0.00233854470074547	0.0369805792127079
71	MICROPOUNDULA	0.0141570557536944	0	0.0324501171176658
41	CYNOSCIREGALI	0.0124542124542125	0	0.0373626373626374
124	TRACHURLATHAM	0.0123903120083086	0.000815232619566689	0.0239653913970505
89	PERCIFORMES	0.010916440611631	0	0.0228112363796027
105	SERRANIDAE	0.0102750757564921	0.00326160785277636	0.0172885436602078
14	BOTHIDAE	0.010263274464636	0.00516286918328385	0.0153636797459882
33	CLUPEIFORMES	0.00928390932738759	0	0.0195896632583123
39	CYNOSCIARENAR	0.0079814921920185	0	0.0191095334809846
57	GONOSTOMATIDA	0.00762920815722905	0.00241909185227599	0.0128393244621821
49	ETROPUSCROSSO	0.00701766946081946	0	0.0187453100064574
107	SPARIDAE	0.00689525022574792	0	0.0138994312768577
125	TRICHIULEPTUR	0.00676100445802618	0	0.0193451690830271
3	ANGUILLIFORME	0.00664949786184585	0	0.0142706395347624
31	CITHARICHTHYS	0.00607711655447114	0	0.0123919546854986
68	MAUROLIMUELLE	0.00590686080100518	0.00153107770074885	0.0102826439012615
80	NETTASTOMATID	0.00586749713507547	0	0.0157700544912584
59	HYGOPHUM	0.00559928795315398	0	0.0123139076442226
86	PARALEPIDIDAE	0.00476984332127177	7.47209208862591e−05	0.00946496572165727
18	BREVOORGUNTER	0.00476190476190476	0	0.0142857142857143
87	PEPRILUBURTI	0.00404794245509887	0.000149621694850033	0.0079462632153477
88	PEPRILUS	0.00324465008675535	0	0.00790837545590476
38	CYCLOTHONE	0.00317986756840296	0.000512019159620147	0.00584771597718577
126	TRIGLIDAE	0.00308905686816851	0.000211630497958699	0.00596648323837833
48	ETROPUS	0.00285151222651223	0	0.00665682194187721
36	CUBICEPPAUCIR	0.00242954324586978	0	0.0061458429151023
94	PRIONOTUS	0.00240522355080762	4.14162613034124e−05	0.00476903084031182
83	OPHICHTHIDAE	0.00238432639710755	0	0.00560225691561506
99	PSEUDOMYROPHI	0.00231237542675587	0	0.00680987193600231
34	CONGRIDAE	0.00230842602125463	0.000307214559261736	0.00430963748324752
13	BENTHOSEMA	0.00210886838472823	0	0.00595973867124424

	Taxa	cpue	lcl	ucl
91	PLEURONECTIFO	0.00197829131652661	0	0.00537464985994398
129	UROPHYCIS	0.00191892404187849	0	0.00430483666328354
114	SYACIUM	0.00174074682979738	0	0.00390236262711824
52	GADIDAE	0.00170940170940171	0	0.00512820512820513
65	MACROURIDAE	0.00170149226799473	0	0.00382793940438919
103	SCORPAENIDAE	0.00164317042606516	0	0.00401805515506791
5	ANTHIASNICHOL	0.00151862026862027	0	0.00401505373049815
111	STEINDAARGENT	0.00148502700049092	0	0.00392089804169736
77	MYCTOPHUM	0.00148425660497657	0.000220222380693763	0.00274829082925937
43	DIOGENIATLANT	0.0014446227929374	0	0.0043338683788122
60	LABRIDAE	0.00132439912625609	3.03559895882431e−05	0.00261844226292394
26	CENTROPRISTIS	0.00131868131868132	0	0.00395604395604396
53	GADIFORMES	0.00131835628988437	0	0.00305136097194904
15	BOTHUS	0.00129264738648047	0.000178240485854679	0.00240705428710627
79	MYROPHIPUNCTA	0.00119226638023630	0	0.00296953106665906
61	LAMPANYCTUS	0.000955425783560024	0	0.00206742315223517
7	ARIOMMAREGULU	0.000921658986175115	0	0.00276497695852535
69	MELAMPHAIDAE	0.000921248044947108	0	0.00203560082273425
25	CARAPUSBERMUD	0.000913698812858477	0	0.00211776526676003
109	SPHOEROIDES	0.000910011354818344	0	0.00192947544318604
62	LARIMUSFASCIA	0.000899887514060742	0	0.00269966254218223
30	CHAULIODONTID	0.000890310041067118	0	0.00219237125361793
44	DIPLECTRUM	0.000853295477783643	0	0.00205389636922743
130	VINCIGUATTENU	0.000807220835395747	0	0.00182582618644705
9	ATHERINIDAE	0.000761524527743891	0	0.00191287251504038
29	CHAETODFABER	0.000720288115246098	0	0.00216086434573830
131	VINCIGUERRIA	0.000685155952144637	0	0.00151515493305818
35	CORYPHAENIDAE	0.000680272108843537	0	0.00204081632653061
121	TETRAODONTIDA	0.00063030063030063	0	0.00153176841870065
47	ENGYOPHSENTA	0.000611072264615572	0	0.00149328843039293
100	SCARIDAE	0.000586369465564493	0	0.00128800125415997
21	CALLIONYMIDAE	0.000549450549450549	0	0.00164835164835165
106	SERRANUS	0.000527180193640154	0	0.00117854945181737
113	STROMATEIDAE	0.000526539563193699	0	0.00126190743466789
23	CARANGIDAE	0.000502661901892958	0	0.00115217236592694
132	VINCIGUNIMBAR	0.00049162645353708	0	0.00104851034784547
112	STERNOPTYCHID	0.000480192076830732	0	0.00144057623049220
32	CITHARISPILOP	0.000456745311554749	0	0.00125117403183078
120	SYNODUSFOETEN	0.000456349206349206	0	0.00112266286060720
2	ANCHOA	0.000454250197239484	0	0.00100102593074688
8	ASTRONESTHIDA	0.000453514739229025	0	0.00136054421768707
70	MELANOSTOMIAS	0.000453514739229025	0	0.00136054421768707
97	PSEUDOGRAMMA	0.000453514739229025	0	0.00136054421768707
27	CERATIOIDEA	0.000449943757030371	0	0.00134983127109111
115	SYACIUMPAPILL	0.000449943757030371	0	0.00134983127109111

	Taxa	cpue	lcl	ucl
95	PRONOTOGRAMMU	0.000447994987468672	0	0.00110695595381238
75	MURAENIDAE	0.000386100386100386	0	0.00115830115830116
98	PSEUDOMFUGESA	0.000386100386100386	0	0.00115830115830116
74	MULLIDAE	0.000384256266609208	0	0.000940089274264048
10	AUXIS	0.000381407598887968	0	0.000975011320037847
72	MUGIL	0.00037593984962406	0	0.00112781954887218
118	SYNGNATHUS	0.00037593984962406	0	0.00112781954887218
54	GERREIDAE	0.000366300366300366	0	0.00109890109890110
45	DIPLOSPMULTIS	0.000307219662058372	0	0.000921658986175115
117	SYNAPHOBRANCH	0.000307219662058372	0	0.000921658986175115
110	SPHYRAENA	0.000302621524791836	0	0.000660025268216637
81	NOTOLYCVALDIV	0.000297619047619048	0	0.000892857142857143
123	THUNNUSTHYNNU	0.000295566502463054	0	0.000886699507389162
67	MALACOSTEIDAE	0.000280561662867394	0	0.000675746003830422
1	ACROPOMATIDAE	0.000268857543017207	0	0.000645712744853862
93	POMACENTRIDAE	0.000244200244200244	0	0.000732600732600733
24	CARANX	0.000239964883187826	0	0.000579923346173983
40	CYNOSCINEBULO	0.000230414746543779	0	0.000691244239631336
66	MALACANTHIDAE	0.000224971878515186	0	0.000674915635545557
108	SPARISOMA	0.000224971878515186	0	0.000674915635545557
104	SCORPAENIFORM	0.000202232989256372	0	0.000506835775826796
28	CERATOSMADERE	0.00018796992481203	0	0.00056390977443609
58	HOWELLA	0.000160513643659711	0	0.000481540930979133
84	OPHICHTPUNCTI	0.000158730158730159	0	0.000476190476190476
133	VINCIGUPOWERI	0.000150375939849624	0	0.000451127819548872
73	MUGILIDAE	0.000148809523809524	0	0.000446428571428571
6	APLATOPCHAULI	0.000141442715700141	0	0.000424328147100424
78	MYRICHTHYS	0.000141442715700141	0	0.000424328147100424
96	PSENES	0.000141442715700141	0	0.000424328147100424
11	BALISTIDAE	0.000140056022408964	0	0.000420168067226891
22	CALLIONYMUS	0.000140056022408964	0	0.000420168067226891
4	ANTHIAS	0.000120048019207683	0	0.000360144057623049
12	BEMBROPS	0.000120048019207683	0	0.000360144057623049
56	GONOSTOMA	0.000120048019207683	0	0.000360144057623049
64	MACRORHAMPHOS	0.000120048019207683	0	0.000360144057623049
102	SCOPELARCHIDA	0.000120048019207683	0	0.000360144057623049
128	URANOSCOPIDAE	0.000120048019207683	0	0.000360144057623049
51	EXOCOETIDAE	6.70690811535882e−05	0	0.000201207243460765
92	POLYDACOCTONE	6.70690811535882e−05	0	0.000201207243460765
122	THUNNUS	6.265664160401e−05	0	0.00018796992481203
37	CUBICEPS	6.0790273556231e−05	0	0.000182370820668693
82	OPHICHTGOMESI	6.0790273556231e−05	0	0.000182370820668693
90	PLEURONECTIDA	3.7593984962406e−05	0	0.000112781954887218
134	TOTAL	1.77624424036493	0.117306184909815	3.62772156267

APPENDIX A-1

ATTACHMENT 4

AGE-1 EQUIVALENT ANALYSIS RESULTS

Table 1. Age-1 equivalents for red drum (Sciaenops ocellatus) using base mortality estimates.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.7558
Larvae	0.25000	20	5.0000	0	5.0000	0.0067	0.0134
Juvenile 1	0.13650	12	1.6380	0	1.6380	0.1944	0.3255
Juvenile 2	0.00540	166	0.8964	0	0.8964	0.4080	0.5796
Juvenile 3	0.00180	166	0.2988	0	0.2988	0.7417	0.8517
	Total =	365		Total =	8.3316		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	50,449	369,878	722,644	3.00E-04	15	111	216
Larvae	103,494	695,678	1,287,862	7.87E-04	81	548	1,014
Juvenile 1							
Juvenile 2							
Juvenile 3							
				Total =	97	659	1,231

Table 2. Age-1 equivalents for red drum (Sciaenops ocellatus) using low mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.7558
Larvae	0.17000	20	3.4000	0	3.4000	0.0334	0.0646
Juvenile 1	0.13400	12	1.6080	0	1.6080	0.2003	0.3337
Juvenile 2	0.00478	166	0.7942	0	0.7942	0.4520	0.6225
Juvenile 3	0.00090	166	0.1494	0	0.1494	0.8612	0.9254
	Total =	365		Total =	6.4500		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	50,449	369,878	722,644	1.97E-03	99	727	1,421
Larvae	103,494	695,678	1,287,862	5.04E-03	521	3,503	6,485
Juvenile 1							
Juvenile 2							
Juvenile 3							
				Total =	620	4,230	7,906

Table 3. Age-1 equivalents for red drum (Sciaenops ocellatus) using high mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.4984	1	0.4984	0	0.4984	0.6075	0.75583
Larvae	0.33	20	6.6000	0	6.6000	0.0014	0.00272
Juvenile 1	0.139	20	2.7800	0	2.7800	0.0620	0.11683
Juvenile 2	0.00609	162	0.9866	0	0.9866	0.3728	0.54318
Juvenile 3	0.0018	162	0.2916	0	0.2916	0.7471	0.85522
	Total =	365		Total =	11.1566		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	50,449	369,878	722,644	0.000018	1	7	13
Larvae	103,494	695,678	1,287,862	0.000047	5	33	60
Juvenile 1							
Juvenile 2							
Juvenile 3							
				Total =	6	39	73

Table 4. Age-1 equivalents for red drum (Sciaenops ocellatus) using low larval mortality rates and base mortality estimates across all other stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.7558
Larvae	**0.17000**	20	3.4000	0	3.4000	0.0334	0.0646
Juvenile 1	0.13650	12	1.6380	0	1.6380	0.1944	0.3255
Juvenile 2	0.00540	166	0.8964	0	0.8964	0.4080	0.5796
Juvenile 3	0.00180	166	0.2988	0	0.2988	0.7417	0.8517
	Total =	365		Total =	6.7316		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	50,449	369,878	722,644	1.48E-03	75	549	1,072
Larvae	103,494	695,678	1,287,862	3.80E-03	393	2,643	4,893
Juvenile 1							
Juvenile 2							
Juvenile 3							
				Total =	468	3,192	5,966

Table 5. Age-1 equivalents for red drum (Sciaenops ocellatus) using high larval mortality rates and base mortality estimates across all other stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.7558
Larvae	**0.33**	20	6.6000	0	6.6000	0.0014	0.0027
Juvenile 1	0.13650	12	1.6380	0	1.6380	0.1944	0.3255
Juvenile 2	0.00540	166	0.8964	0	0.8964	0.4080	0.5796
Juvenile 3	0.00180	166	0.2988	0	0.2988	0.7417	0.8517
	Total =	365		Total =	9.9316		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	50,449	369,878	722,644	6.05E-05	3	22	44
Larvae	103,494	695,678	1,287,862	1.60E-04	17	111	206
Juvenile 1							
Juvenile 2							
Juvenile 3							
				Total =	20	134	250

Table 6. Age-1 equivalents for red snapper (Lutjanus camphechanus) using base mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.75583
Larvae	0.20500	28	5.7400	0	5.7400	0.0032	0.00641
Juvenile 1	0.10000	24	2.4000	0	2.4000	0.0907	0.16635
Juvenile 3	0.00160	312	0.5001	0	0.5001	0.6064	0.75502
	Total =	365		Total =	9.138536		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	109,076	294,554	496,170	0.000134	15	39	66
Larvae	223,764	554,007	884,251	0.000353	79	195	312
Juvenile 1				0.100880			
Juvenile 3				0.755017			
				Total =	93	235	378

Table 7. Age-1 equivalents for red snapper (Lutjanus camphechanus) using low mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.75583
Larvae	0.15500	26	4.0300	0	4.0300	0.0178	0.03493
Juvenile 1	0.04500	10	0.4500	0	0.4500	0.6376	0.77872
Juvenile 3	0.00163	307	0.5004	0	0.5004	0.6063	0.75489
	Total =	344		Total =	5.47881		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	109,076	294,554	496,170	0.005194	566	1,530	2,577
Larvae	223,764	554,007	884,251	0.013502	3,021	7,480	11,940
Juvenile 1				0.472125			
Juvenile 3				0.754889			
				Total =	3,588	9,010	14,516

Table 8. Age-1 equivalents for red snapper (Lutjanus camphechanus) using high mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.75583
Larvae	0.25500	30	7.6500	0	7.6500	0.0005	0.00095
Juvenile 1	0.12000	31	3.7200	0	3.7200	0.0242	0.04732
Juvenile 3	0.00154	324	0.5000	0	0.5000	0.6065	0.75508
	Total =	386		Total =	12.3683968		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	109,076	294,554	496,170	0.000005	1	2	3
Larvae	223,764	554,007	884,251	0.000014	3	8	12
Juvenile 1				0.028702			
Juvenile 3				0.755083			
				Total =	4	9	15

Table 9. Age-1 equivalents for red snapper (Lutjanus camphechanus) using low larval mortality rates and base mortality estimates across all other stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.75583
Larvae	0.15500	26	4.0300	0	4.0300	0.0178	0.03493
Juvenile 1	0.10000	24	2.4000	0	2.4000	0.0907	0.16635
Juvenile 3	0.00160	312	0.5001	0	0.5001	0.6064	0.75502
	Total =	363		Total =	7.428536		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	109,076	294,554	496,170	0.000739	81	218	367
Larvae	223,764	554,007	884,251	0.001922	430	1,065	1,699
Juvenile 1				0.100880			
Juvenile 3				0.755017			
				Total =	511	1,282	2,066

Table 10. Age-1 equivalents for red snapper (Lutjanus camphechanus) using high larval mortality rates and base mortality estimates across all other stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.49840	1	0.4984	0	0.4984	0.6075	0.75583
Larvae	0.25500	30	7.6500	0	7.6500	0.0005	0.00095
Juvenile 1	0.10000	24	2.4000	0	2.4000	0.0907	0.16635
Juvenile 3	0.00160	312	0.5001	0	0.5001	0.6064	0.75502
	Total =	367		Total =	11.048536		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	109,076	294,554	496,170	0.000020	2	6	10
Larvae	223,764	554,007	884,251	0.000052	12	29	46
Juvenile 1				0.100880			
Juvenile 3				0.755017			
				Total =	14	35	56

Table 11. Age-1 equivalents for Gulf menhaden (Brevoortia patronus) using base mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.044	1.75	1.8270	0	1.8270	0.1609	0.27719
YSL	0.059	65	3.8350	0	3.8350	0.0216	0.04229
Juvenile	0.013	298.3	3.8779	0	3.8779	0.0207	
	Total =	365.05		Total =	9.5399		

	Number Potentially Entrained			Fraction Surviving	Number Surviving to Age 1+		
Stage	LCL	Mean	UCL	to Age 1+	LCL	Mean	UCL
Egg	2,542,177	371,063,888	867,207,773	0.000124	315	45,979	107,457
YSL	5,031,412	244,708,618	544,898,233	0.000875	4,403	214,155	476,863
Juvenile							
				Total =	4,718	260,134	584,320

Table 12. Age-1 equivalents for Gulf menhaden (Brevoortia patronus) using low mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.044	1.50	1.5660	0	1.5660	0.2089	0.34557
YSL	0.0488	60	2.9280	0	2.9280	0.0535	0.10157
Juvenile	0.013	303.5	3.9455	0	3.9455	0.0193	
	Total =	365		Total =	8.4395		

	Number Potentially Entrained			Fraction Surviving	Number Surviving to Age 1+		
Stage	LCL	Mean	UCL	to Age 1+	LCL	Mean	UCL
Egg	2,542,177	371,063,888	867,207,773	0.000358	909	132,699	310,129
YSL	5,031,412	244,708,618	544,898,233	0.001965	9,885	480,751	1,070,499
Juvenile							
				Total =	10,794	613,450	1,380,627

Table 13. Age-1 equivalents for Gulf menhaden (Brevoortia patronus) using high mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	6.210	2.00	12.4200	0	12.4200	0.0000	0.00001
YSL	0.077	60	4.6200	0	4.6200	0.0099	0.01951
Juvenile	0.013	303	3.9390	0	3.9390	0.0195	
	Total =	365		Total =	20.979		

	Number Potentially Entrained			Fraction Surviving	Number Surviving to Age 1+		
Stage	LCL	Mean	UCL	to Age 1+	LCL	Mean	UCL
Egg	2,542,177	371,063,888	867,207,773	0.000000	0	1	1
YSL	5,031,412	244,708,618	544,898,233	0.000380	1,911	92,960	206,995
Juvenile							
				Total =	1,911	92,960	206,997

Table 14. Age-1 equivalents for Gulf menhaden (Brevoortia patronus) using low larval mortality rates and base mortality estimates across all other stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.044	1.75	1.8270	0	1.8270	0.1609	0.27719
YSL	**0.049**	**60.000**	2.9280	0	2.9280	0.0535	0.10157
Juvenile	0.013	298.3	3.8779	0	3.8779	0.0207	
	Total =	360.05		Total =	8.6329		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	2,542,177	371,063,888	867,207,773	0.000307	780	113,885	266,158
YSL	5,031,412	244,708,618	544,898,233	0.002102	10,576	514,373	1,145,366
Juvenile							
				Total =	11,356	628,258	1,411,524

Table 15. Age-1 equivalents for Gulf menhaden (Brevoortia patronus) using high larval mortality rates and base mortality estimates across all other stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.044	1.75	1.8270	0	1.8270	0.1609	0.27719
YSL	**0.077**	**60.000**	4.6200	0	4.6200	0.0099	0.01951
Juvenile	0.013	298.3	3.8779	0	3.8779	0.0207	
	Total =	360.05		Total =	10.3249		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	2,542,177	371,063,888	867,207,773	0.000057	144	20,972	49,013
YSL	5,031,412	244,708,618	544,898,233	0.000404	2,032	98,817	220,037
Juvenile							
				Total =	2,175	119,789	269,050

Table 16. Age-1 equivalents for bay anchovy (Anchoa sp.) using base mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.044	1	1.0440	0	1.0440	0.3520	0.52076
Larvae	0.2059	34	7.0006	0	7.0006	0.0009	0.00182
Juvenile	0.004	330	1.3035	0	1.3035	0.2716	
	Total =	365		Total =	9.3481		

	Number Potentially Entrained			Fraction Surviving	Number Surviving to Age 1+		
Stage	LCL	Mean	UCL	to Age 1+	LCL	Mean	UCL
Egg	34,283,884	109,848,796	193,787,264	0.000129	4,419	14,158	24,977
Larvae	70,331,947	142,253,696	206,793,986	0.000495	34,783	70,351	102,270
Juvenile							
				Total =	39,201	84,510	127,247

Table 17. Age-1 equivalents for bay anchovy (Anchoa sp.) using low mortality estimates across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	0.69	1	0.6900	0	0.6900	0.5016	0.66807
Larvae	0.1804	30.63	5.5257	0	5.5257	0.0040	0.00793
Juvenile	0.004	333.4	1.3336	0	1.3336	0.2635	
	Total =	365.03		Total =	7.549252		

	Number Potentially Entrained			Fraction Surviving	Number Surviving to Age 1+		
Stage	LCL	Mean	UCL	to Age 1+	LCL	Mean	UCL
Egg	34,283,884	109,848,796	193,787,264	0.000701	24,042	77,033	135,897
Larvae	70,331,947	142,253,696	206,793,986	0.002091	147,069	297,462	432,420
Juvenile							
				Total =	171,111	374,496	568,317

Table 18. Age-1 equivalents for bay anchovy (Anchoa sp.) using high mortality estimate across all life stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.94	1	1.9400	0	1.9400	0.1437	0.25130
Larvae	0.231	34	7.8540	0	7.8540	0.0004	0.00078
Juvenile	0.01	330	3.3000	0	3.3000	0.0369	
	Total =	365		Total =	13.094		

	Number Potentially Entrained			Fraction Surviving	Number Surviving to Age 1+		
Stage	LCL	Mean	UCL	to Age 1+	LCL	Mean	UCL
Egg	34,283,884	109,848,796	193,787,264	0.000004	123	395	697
Larvae	70,331,947	142,253,696	206,793,986	0.000029	2,013	4,072	5,919
Juvenile							
				Total =	2,137	4,467	6,617

Table 19. Age-1 equivalents for bay anchovy (Anchoa sp.) using low larval mortality rates and base mortality estimates across all other stages stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.044	1	1.0440	0	1.0440	0.3520	0.52076
Larvae	**0.1804**	**30.63**	5.5257	0	5.5257	0.0040	0.00793
Juvenile	0.004	330	1.3035	0	1.3035	0.2716	
	Total =	361.63		Total =	7.873152		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	34,283,884	109,848,796	193,787,264	0.000563	19,314	61,883	109,169
Larvae	70,331,947	142,253,696	206,793,986	0.002155	151,563	306,552	445,634
Juvenile							
				Total =	170,877	368,434	554,803

Table 20. Age-1 equivalents for bay anchovy (Anchoa sp.) using low larval mortality rates and base mortality estimates across all other stages.

Stage	Instantaneous Mortality	Duration (Days)	Natural Mortality per Stage	Fishing Mortality per Stage	Total Mortality per Stage	Fraction Surviving	Correction
Egg	1.044	1	1.0440	0	1.0440	0.3520	0.52076
Larvae	**0.231**	**34**	7.8540	0	7.8540	0.0004	0.00078
Juvenile	0.004	330	1.3035	0	1.3035	0.2716	
	Total =	365		Total =	10.2015		

Stage	Number Potentially Entrained			Fraction Surviving to Age 1+	Number Surviving to Age 1+		
	LCL	Mean	UCL		LCL	Mean	UCL
Egg	34,283,884	109,848,796	193,787,264	0.000055	1,882	6,031	10,639
Larvae	70,331,947	142,253,696	206,793,986	0.000211	14,824	29,983	43,586
Juvenile							
				Total =	16,706	36,014	54,225

APPENDIX A-1

ATTACHMENT 5

EQUIVALENT YIELD ANALYSIS RESULTS

Table 1. Base Life History Table and Average Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	369,878	0.00030	**111**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	5.0000	0	1	5.00	0.01	0.01	695,678	0.00079	**548**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6380	0	1	1.64	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.8964	0	1	0.90	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2988	0	1	0.30	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	271	118	270	**659**	702	305	701
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	171	28	71	270	1,178	195	488
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	18	9	44	71	186	92	447
4	0.16	0.190	1	0.35	0.70	NA	NA	NA	NA	11.45316	7	6	31	44	80	67	352
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	1	4	26	31	13	53	322
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	3	3	20	26	36	43	271
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	2	2	15	20	30	36	226
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	2	2	12	15	25	30	186
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	1	1	9	12	20	24	152
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	1	1	7	9	16	20	123
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	1	1	5	7	13	16	100
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	1	1	4	5	11	13	80
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	0	1	3	4	9	10	64
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	0	0	3	3	7	8	51
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	0	2	3	5	6	40
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	2	2	4	5	32
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	1	2	3	4	25
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	1	1	3	3	20
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	1	1	2	2	16
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	1	1	2	2	12
									659	**Total =**	479	179	1	659	**2,346**	936	12
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**3,294**
To Fishing Mortality	**2,346**
To Natural Mortality	**936**

Table 2. Base Life History Table and LCL Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	50,449	0.00030	**15**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	5.0000	0	1	5.00	0.01	0.01	103,494	0.00079	**81**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6380	0	1	1.64	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.8964	0	1	0.90	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2988	0	1	0.30	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	40	17	40	**97**	103	45	103
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	25	4	10	40	173	29	72
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	3	1	6	10	27	13	66
4	0.16	0.190	1	0.35	0.70	NA	NA	NA	NA	11.45316	1	1	5	6	12	10	52
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	0	1	4	5	2	8	47
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	0	0	3	4	5	6	40
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	0	0	2	3	4	5	33
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	0	0	2	2	4	4	27
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	0	0	1	2	3	4	22
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	0	0	1	1	2	3	18
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	0	0	1	1	2	2	15
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	0	0	1	1	2	2	12
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	0	0	0	1	1	1	9
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	0	0	0	0	1	1	7
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	0	0	0	1	1	6
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	0	0	1	1	5
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	0	0	0	1	4
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	0	0	0	0	3
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	0	0	0	0	2
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	0	0	0	0	2
									97	**Total =**	70	26	0	97	**344**	137	2
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**483**
To Fishing Mortality	**344**
To Natural Mortality	**137**

Table 3. Base Life History Table and UCL Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	722,644	0.00030	**216**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	5.0000	0	1	5.00	0.01	0.01	1,287,862	0.00079	**1,014**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6380	0	1	1.64	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.8964	0	1	0.90	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2988	0	1	0.30	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	506	220	505	**1,231**	1,312	571	1,310
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	320	53	132	505	2,201	364	911
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	34	17	82	132	348	172	835
4	0.16	0.190	1	0.35	0.70	NA	NA	NA	NA	11.45316	13	11	57	82	150	126	658
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	2	8	48	57	24	99	602
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	5	6	37	48	68	81	507
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	4	5	29	37	56	67	421
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	3	4	22	29	46	55	347
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	2	3	17	22	38	45	284
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	2	2	13	17	31	37	231
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	1	2	10	13	25	30	186
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	1	1	8	10	20	24	150
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	1	1	6	8	16	19	120
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	1	1	5	6	13	15	95
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	1	4	5	10	12	76
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	3	4	8	10	60
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	2	3	6	8	47
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	2	2	5	6	37
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	1	2	4	5	29
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	1	1	3	4	23
									1,231	**Total =**	896	334	1	1,231	**4,383**	1,749	23
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**6,155**
To Fishing Mortality	**4,383**
To Natural Mortality	**1,749**

Table 4. Low Mortality Life History Table and Average Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	369,878	0.00197	**727**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	3.4000	0	1	3.40	0.03	0.06	695,678	0.00504	**3,503**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6080	0	1	1.61	0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.7942	0	1	0.79	0.45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.1494	0	1	0.15	0.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	1,739	756	1,735	**4,230**	4,512	1,962	4,503
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	1,099	182	455	1,735	7,565	1,251	3,132
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	117	58	280	455	1,196	590	2,869
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	45	38	198	280	515	433	2,263
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	6	27	164	198	82	341	2,070
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	17	20	127	164	232	278	1,741
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	13	16	98	127	193	231	1,449
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	10	12	76	98	159	191	1,194
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	8	9	59	76	130	156	977
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	6	7	45	59	106	127	793
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	5	6	35	45	85	102	640
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	4	4	27	35	69	82	514
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	3	3	21	27	55	66	411
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	2	3	16	21	44	52	328
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	2	2	13	16	35	42	260
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	1	2	10	13	27	33	206
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	1	1	8	10	22	26	162
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	1	1	6	8	17	20	128
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	1	1	4	6	13	16	101
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	1	3	4	11	13	79
									4,230	**Total =**	3,079	1,148	3	4,230	**15,067**	6,012	79
											Population in Numbers				**Population in Pounds**		
														Mean Weight (pounds)	4.89	5.24	22.71

Total Weight Lost	**21,158**
To Fishing Mortality	**15,067**
To Natural Mortality	**6,012**

Table 5. Low Mortality History Table and LCL Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	50,449	0.00197	**99**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	3.4000	0	1	3.40	0.03	0.06	103,494	0.00504	**521**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6080	0	1	1.61	0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.7942	0	1	0.79	0.45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.1494	0	1	0.15	0.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	255	111	254	**620**	662	288	660
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	161	27	67	254	1,109	183	459
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	17	8	41	67	175	87	421
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	7	6	29	41	75	64	332
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	1	4	24	29	12	50	304
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	2	3	19	24	34	41	255
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	2	2	14	19	28	34	212
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	1	2	11	14	23	28	175
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	1	1	9	11	19	23	143
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	1	1	7	9	16	19	116
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	1	1	5	7	13	15	94
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	1	1	4	5	10	12	75
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	0	0	3	4	8	10	60
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	0	0	2	3	6	8	48
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	0	2	2	5	6	38
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	1	2	4	5	30
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	1	1	3	4	24
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	1	1	3	3	19
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	1	1	2	2	15
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	1	1	2	2	12
									620	**Total =**	452	168	1	620	**2,209**	882	12
											Population in Numbers				**Population in Pounds**		
														Mean Weight (pounds)	4.89	5.24	22.71

Total Weight Lost	**3,103**
To Fishing Mortality	**2,209**
To Natural Mortality	**882**

Table 6. Low Mortality History Table and UCL Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	722,644	0.00197	**1,421**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	3.4000	0	1	3.40	0.03	0.06	1,287,862	0.00504	**6,485**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6080	0	1	1.61	0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.7942	0	1	0.79	0.45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.1494	0	1	0.15	0.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	3,250	1,413	3,243	**7,906**	8,432	3,666	8,415
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	2,054	340	850	3,243	14,138	2,338	5,852
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	218	108	524	850	2,235	1,104	5,362
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	84	71	369	524	962	810	4,229
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	12	51	307	369	153	638	3,869
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	32	38	237	307	434	519	3,254
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	24	29	183	237	361	432	2,708
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	19	23	142	183	298	356	2,232
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	15	18	110	142	243	291	1,825
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	11	14	85	110	198	237	1,482
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	9	10	66	85	160	191	1,197
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	7	8	51	66	128	153	961
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	5	6	39	51	103	123	769
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	4	5	30	39	82	98	612
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	3	4	23	30	65	78	486
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	2	3	18	23	51	61	385
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	2	2	14	18	41	48	304
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	1	2	11	14	32	38	239
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	1	1	8	11	25	30	188
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	1	1	6	8	20	24	147
									7,906	**Total =**	5,754	2,145	6	7,906	**28,159**	11,235	147
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**39,542**
To Fishing Mortality	**28,159**
To Natural Mortality	**11,235**

Table 7. High Mortality History Table and Average Entrainment Estimate for Red Drum (Sciaenops ocellatus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	369,878	0.00002	**7**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	6.6000	0	1	6.60	0.00	0.00	695,678	0.00005	**33**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.7800	0	1	2.78	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.9866	0	1	0.99	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2916	0	1	0.29	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	16	7	16	**39**	42	18	42
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	10	2	4	16	70	12	29
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	1	1	3	4	11	5	27
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	0	0	2	3	5	4	21
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	0	0	2	2	1	3	19
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	0	0	1	2	2	3	16
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	0	0	1	1	2	2	13
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	0	0	1	1	1	2	11
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	0	0	1	1	1	1	9
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	0	0	0	1	1	1	7
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	0	0	0	0	1	1	6
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	0	0	0	0	1	1	5
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	0	0	0	0	1	1	4
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	0	0	0	0	0	0	3
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	0	0	0	0	0	2
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	0	0	0	0	2
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	0	0	0	0	2
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	0	0	0	0	1
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	0	0	0	0	1
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	0	0	0	0	1
									39	**Total =**	29	11	0	39	**140**	56	1
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**196**
To Fishing Mortality	**140**
To Natural Mortality	**56**

Table 8. High Mortality Life History Table and LCL Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	**Natural Mortality per Stage or Age (M)**	**Fishing Mortality per Stage or Age (F)**	**% Vulnerable to Fishery**	**Total Mortality per Stage (Z)**	**Fraction Surviving at Stage or Age**	**Corrected Survival Fraction**	**Number Potentially Entrained at Stage or Age**	**Cumulative Survival at Stage or Age**	**Projected Mortality of Age-1 fish**	**Weight of an Individual Fish at Median Age of Death**	**Number Potentially Lost to Fishing Mortality**	**Number Potentially Lost to Natural Mortality**	**Number That Might Have Remained in the Population at End of Year**	**Total Number at Age**	**Weight of Fish Potentially Lost to Fishing Mortality**	**Weight of Fish Potentially Lost to Natural Mortality**	**Weight of Fish That Might Have Remained in the Population at End of Year**
Egg	0.4984	0	1	0.50	0.61	0.76	50,449	0.00002	**1**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	6.6000	0	1	6.60	0.00	0.00	103,494	0.00005	**5**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.7800	0	1	2.78	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.9866	0	1	0.99	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2916	0	1	0.29	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	2	1	2	**6**	6	3	6
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	1	0	1	2	10	2	4
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	0	0	0	1	2	1	4
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	0	0	0	0	1	1	3
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	0	0	0	0	0	0	3
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	0	0	0	0	0	0	2
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	0	0	0	0	0	0	2
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	0	0	0	0	0	0	2
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	0	0	0	0	0	0	1
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	0	0	0	0	0	0	1
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	0	0	0	0	0	0	1
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	0	0	0	0	0	0	1
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	0	0	0	0	0	0	1
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	0	0	0	0	0	0	0
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	0	0	0	0	0	0
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	0	0	0	0	0
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	0	0	0	0	0
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	0	0	0	0	0
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	0	0	0	0	0
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	0	0	0	0	0
									6	**Total =**	4	2	0	6	**20**	8	0
											Population in Numbers				**Population in Pounds**		
														Mean Weight (pounds)	4.89	5.24	22.71

Total Weight Lost	**29**
To Fishing Mortality	**20**
To Natural Mortality	**8**

Table 9. High Mortality Life History Table and UCL Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	722,644	0.00002	**13**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	6.6000	0	1	6.60	0.00	0.00	1,287,862	0.00005	**60**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.7800	0	1	2.78	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.9866	0	1	0.99	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2916	0	1	0.29	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	30	13	30	73	78	34	78
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	19	3	8	30	131	22	54
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	2	1	5	8	21	10	50
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	1	1	3	5	9	8	39
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	0	0	3	3	1	6	36
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	0	0	2	3	4	5	30
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	0	0	2	2	3	4	25
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	0	0	1	2	3	3	21
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	0	0	1	1	2	3	17
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	0	0	1	1	2	2	14
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	0	0	1	1	1	2	11
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	0	0	0	1	1	1	9
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	0	0	0	0	1	1	7
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	0	0	0	0	1	1	6
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	0	0	0	1	1	5
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	0	0	0	1	4
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	0	0	0	0	3
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	0	0	0	0	2
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	0	0	0	0	2
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	0	0	0	0	1
									73	**Total =**	53	20	0	73	**261**	104	1
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**367**
To Fishing Mortality	**261**
To Natural Mortality	**104**

Table 10. Base Life History Table (Low Larval Mortality) and Average Entrainment Estimate for Red Drum (Sciaenops ocellatus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	369,878	0.00148	**549**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	3.4000	0	1	3.40	0.03	0.06	695,678	0.00380	**2,643**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6380	0	1	1.64	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.8964	0	1	0.90	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2988	0	1	0.30	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	1,312	570	1,310	**3,192**	3,404	1,480	3,398
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	829	137	343	1,310	5,708	944	2,363
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	88	44	212	343	902	446	2,165
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	34	29	149	212	388	327	1,707
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	5	20	124	149	62	258	1,562
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	13	15	96	124	175	210	1,314
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	10	12	74	96	146	175	1,093
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	8	9	57	74	120	144	901
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	6	7	44	57	98	118	737
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	5	5	34	44	80	96	598
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	4	4	26	34	64	77	483
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	3	3	20	26	52	62	388
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	2	3	16	20	41	50	310
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	2	2	12	16	33	39	247
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	1	2	9	12	26	31	196
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	1	1	7	9	21	25	155
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	1	1	6	7	16	20	123
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	1	1	4	6	13	15	97
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	1	3	4	10	12	76
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	3	3	8	10	60
									3,192	**Total =**	2,323	866	3	3,192	**11,369**	4,536	60
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**15,965**
To Fishing Mortality	**11,369**
To Natural Mortality	**4,536**

Table 11. Base Life History Table (High Larval Mortality) and Average Entrainment Estimate for Red Drum (Sciaenops ocellatus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	369,878	0.00006	**22**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	6.6000	0	1	6.60	0.00	0.00	695,678	0.00016	**111**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	1.6380	0	1	1.64	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.8964	0	1	0.90	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.2988	0	1	0.30	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.27	0.621	1	0.89	0.41	NA	NA	NA	NA	2.59458	55	24	55	**134**	142	62	142
2	0.19	1.149	1	1.34	0.26	NA	NA	NA	NA	6.88424	35	6	14	55	239	39	99
3	0.16	0.324	1	0.48	0.62	NA	NA	NA	NA	10.23435	4	2	9	14	38	19	91
4	0.16	0.19	1	0.35	0.70	NA	NA	NA	NA	11.45316	1	1	6	9	16	14	71
5	0.15	0.036	1	0.19	0.83	NA	NA	NA	NA	12.62000	0	1	5	6	3	11	65
6	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	13.72648	1	1	4	5	7	9	55
7	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	14.76732	0	0	3	4	6	7	46
8	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	15.73977	0	0	2	3	5	6	38
9	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	16.64306	0	0	2	2	4	5	31
10	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	17.47794	0	0	1	2	3	4	25
11	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.24628	0	0	1	1	3	3	20
12	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	18.95076	0	0	1	1	2	3	16
13	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	19.59460	0	0	1	1	2	2	13
14	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.18136	0	0	1	1	1	2	10
15	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	20.71480	0	0	0	1	1	1	8
16	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.19871	0	0	0	0	1	1	6
17	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	21.63685	0	0	0	0	1	1	5
18	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.03290	0	0	0	0	1	1	4
19	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.39038	0	0	0	0	0	1	3
20	0.14	0.117	1	0.26	0.77	NA	NA	NA	NA	22.71262	0	0	0	0	0	0	2
									134	**Total =**	97	36	0	134	**476**	190	2
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				4.89	5.24	22.71

Total Weight Lost	**668**
To Fishing Mortality	**476**
To Natural Mortality	**190**

Table 12. Base Life History Table and Average Entrainment Estimate for Red Snapper (Lutjanus campechanus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	294,554	0.00013	**39**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	5.7400	0	1	5.74	0.00	0.01	554,007	0.00035	**195**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.4000	0	1	2.40	0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5001	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	143	14	77	**235**	45	4	24
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	5	7	65	77	6	8	70
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	16	5	44	65	36	12	102
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	18	3	23	44	68	13	90
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	8	2	14	23	44	10	77
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	3	1	9	14	25	9	70
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	2	1	7	9	15	8	65
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	1	1	5	7	10	7	60
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	1	0	4	5	7	6	56
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	0	0	4	4	5	6	52
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	0	0	3	4	4	5	48
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	0	0	2	3	4	5	43
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	0	0	2	2	3	4	38
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	0	0	2	2	3	4	33
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	0	0	1	2	3	3	29
									235	**Total =**	197	36	1	235	**277**	103	29
											Population in Numbers				**Population in Pounds**		
														Mean Weight (pounds)	1.41	2.83	20.03

Total Weight Lost	**409**
To Fishing Mortality	**277**
To Natural Mortality	**103**

Table 13. Base Life History Table and LCL Entrainment Estimate for Red Snapper (Lutjanus campechanus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	109,076	0.00013	**15**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	5.7400	0	1	5.74	0.00	0.01	223,764	0.00035	**79**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.4000	0	1	2.40	0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5001	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	57	6	31	**93**	18	2	10
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	2	3	26	31	2	3	28
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	6	2	18	26	14	5	40
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	7	1	9	18	27	5	36
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	3	1	5	9	18	4	31
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	1	0	4	5	10	3	28
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	1	0	3	4	6	3	26
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	0	0	2	3	4	3	24
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	0	0	2	2	3	2	22
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	0	0	1	2	2	2	21
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	0	0	1	1	2	2	19
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	0	0	1	1	2	2	17
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	0	0	1	1	1	2	15
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	0	0	1	1	1	1	13
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	0	0	1	1	1	1	11
									93	**Total =**	78	14	1	93	**110**	41	11
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				1.41	2.83	20.03

Total Weight Lost	**163**
To Fishing Mortality	**110**
To Natural Mortality	**41**

Table 14. Base Life History Table and UCL Entrainment Estimate for Red Snapper (Lutjanus campechanus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	496,170	0.00013	**66**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	5.7400	0	1	5.74	0.00	0.01	884,251	0.00035	**312**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.4000	0	1	2.40	0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5001	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	231	23	125	**378**	72	7	39
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	8	11	105	125	9	12	113
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	25	9	71	105	58	20	164
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	28	5	38	71	109	20	145
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	13	3	22	38	71	16	125
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	5	2	15	22	40	14	112
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	3	1	11	15	24	12	104
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	1	1	9	11	16	11	97
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	1	1	7	9	12	10	90
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	1	1	6	7	8	9	84
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	0	1	5	6	7	8	77
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	0	0	4	5	6	8	69
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	0	0	3	4	6	7	61
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	0	0	3	3	5	6	53
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	0	0	2	3	4	5	46
									378	**Total =**	317	59	2	378	**447**	166	46
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				1.41	2.83	20.03

Total Weight Lost	**659**
To Fishing Mortality	**447**
To Natural Mortality	**166**

Table 15. Low Mortality Life History Table and Average Entrainment Estimate for Red Snapper (Lutjanus campechanus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	**Natural Mortality per Stage or Age (M)**	**Fishing Mortality per Stage or Age (F)**	**% Vulnerable to Fishery**	**Total Mortality per Stage (Z)**	**Fraction Surviving at Stage or Age**	**Corrected Survival Fraction**	**Number Potentially Entrained at Stage or Age**	**Cumulative Survival at Stage or Age**	**Projected Mortality of Age-1 fish**	**Weight of an Individual Fish at Median Age of Death**	**Number Potentially Lost to Fishing Mortality**	**Number Potentially Lost to Natural Mortality**	**Number That Might Have Remained in the Population at End of Year**	**Total Number at Age**	**Weight of Fish Potentially Lost to Fishing Mortality**	**Weight of Fish Potentially Lost to Natural Mortality**	**Weight of Fish That Might Have Remained in the Population at End of Year**
Egg	0.4984	0	1	0.50	0.61	0.76	294,554	0.00519	**1,530**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	4.0300	0	1	4.03	0.02	0.03	554,007	0.01350	**7,480**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	0.4500	0	1	0.45	0.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5004	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	5,493	544	2,972	**9,010**	1,715	170	928
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	199	273	2,500	2,972	215	294	2,696
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	597	207	1,696	2,500	1,372	477	3,900
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	674	125	897	1,696	2,604	485	3,467
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	302	70	526	897	1,702	392	2,968
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	126	44	356	526	946	327	2,678
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	61	31	264	356	575	289	2,481
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	34	23	206	264	385	262	2,310
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	22	19	166	206	278	239	2,143
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	13	15	138	166	184	219	1,998
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	11	13	115	138	168	200	1,824
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	9	11	96	115	151	180	1,638
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	7	9	80	96	134	159	1,451
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	6	7	66	80	117	140	1,272
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	5	6	55	66	102	121	1,105
									9,010	**Total =**	7,559	1,396	55	9,010	**10,649**	3,956	1,105
											Population in Numbers				**Population in Pounds**		
														Mean Weight (pounds)	1.41	2.83	20.03

Total Weight Lost	**15,710**
To Fishing Mortality	**10,649**
To Natural Mortality	**3,956**

Table 16. Low Mortality History Table and LCL Entrainment Estimate for Red Snapper (Lutjanus campechanus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	109,076	0.00519	**566**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	4.0300	0	1	4.03	0.02	0.03	223,764	0.01350	**3,021**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	0.4500	0	1	0.45	0.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5004	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	2,187	217	1,184	**3,588**	683	68	370
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	79	109	996	1,184	86	117	1,073
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	238	83	675	996	546	190	1,553
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	268	50	357	675	1,037	193	1,381
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	120	28	209	357	678	156	1,182
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	50	17	142	209	377	130	1,067
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	24	12	105	142	229	115	988
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	14	9	82	105	153	104	920
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	9	7	66	82	111	95	853
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	5	6	55	66	73	87	796
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	4	5	46	55	67	80	726
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	4	4	38	46	60	72	652
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	3	3	32	38	53	63	578
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	2	3	26	32	47	56	506
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	2	2	22	26	41	48	440
									3,588	**Total =**	3,010	556	22	3,588	**4,241**	1,575	440
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				1.41	2.83	20.03

Total Weight Lost	**6,256**
To Fishing Mortality	**4,241**
To Natural Mortality	**1,575**

Table 17. Low Mortality History Table and UCL Entrainment Estimate for Red Snapper (Lutjanus campechanus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	496,170	0.00519	**2,577**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	4.0300	0	1	4.03	0.02	0.03	884,251	0.01350	**11,940**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	0.4500	0	1	0.45	0.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5004	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	8,850	877	4,789	**14,516**	2,763	274	1,495
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	321	440	4,028	4,789	346	474	4,343
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	962	334	2,733	4,028	2,211	768	6,284
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	1,085	202	1,445	2,733	4,195	781	5,586
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	486	112	847	1,445	2,742	632	4,781
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	203	70	574	847	1,524	527	4,315
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	99	50	426	574	927	466	3,997
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	55	38	333	426	621	422	3,722
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	35	30	268	333	447	385	3,453
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	21	24	223	268	297	353	3,219
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	17	20	185	223	271	323	2,939
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	14	17	154	185	243	290	2,639
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	12	14	128	154	216	257	2,338
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	10	12	107	128	189	225	2,049
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	8	10	89	107	164	195	1,780
									14,516	**Total =**	12,178	2,250	89	14,516	**17,157**	6,373	1,780
											Population in Numbers				**Population in Pounds**		
													Mean Weight (pounds)		1.41	2.83	20.03

Total Weight Lost	**25,310**
To Fishing Mortality	**17,157**
To Natural Mortality	**6,373**

Table 18. High Mortality Life History Table and Average Entrainment Estimate for Red Snapper (Lutjanus campechanus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	294,554	0.00001	**2**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	7.6500	0	1	7.65	0.00	0.00	554,007	0.00001	**8**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.7200	0	1	3.72	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5000	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	6	1	3	**9**	2	0	1
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	0	0	3	3	0	0	3
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	1	0	2	3	1	0	4
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	1	0	1	2	3	1	4
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	0	0	1	1	2	0	3
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	0	0	0	1	1	0	3
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	0	0	0	0	1	0	3
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	0	0	0	0	0	0	2
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	0	0	0	0	0	0	2
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	0	0	0	0	0	0	2
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	0	0	0	0	0	0	2
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	0	0	0	0	0	0	2
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	0	0	0	0	0	0	1
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	0	0	0	0	0	0	1
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	0	0	0	0	0	0	1
									9	**Total =**	8	1	0	9	**11**	4	1
											Population in Numbers				**Population in Pounds**		
														Mean Weight (pounds)	1.41	2.83	20.03

Total Weight Lost	**16**
To Fishing Mortality	**11**
To Natural Mortality	**4**

Table 19. High Mortality History Table and LCL Entrainment Estimate for Red Snapper (Lutjanus campechanus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	109,076	0.00001	**1**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	7.6500	0	1	7.65	0.00	0.00	223,764	0.00001	**3**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.7200	0	1	3.72	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5000	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	2	0	1	**4**	1	0	0
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	0	0	1	1	0	0	1
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	0	0	1	1	1	0	2
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	0	0	0	1	1	0	1
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	0	0	0	0	1	0	1
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	0	0	0	0	0	0	1
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	0	0	0	0	0	0	1
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	0	0	0	0	0	0	1
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	0	0	0	0	0	0	1
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	0	0	0	0	0	0	1
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	0	0	0	0	0	0	1
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	0	0	0	0	0	0	1
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	0	0	0	0	0	0	1
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	0	0	0	0	0	0	1
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	0	0	0	0	0	0	0
									4	**Total =**	3	1	0	4	**4**	2	0
											Population in Numbers				**Population in Pounds**		
														Mean Weight (pounds)	1.41	2.83	20.03

Total Weight Lost	**6**
To Fishing Mortality	**4**
To Natural Mortality	**2**

Table 20. High Mortality History Table and UCL Entrainment Estimate for Red Snapper (Lutjanus campechanus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	496,170	0.00001	**3**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	7.6500	0	1	7.65	0.00	0.00	884,251	0.00001	**12**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.7200	0	1	3.72	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5000	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 3	0.0000	0	1	0.00	1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	9	1	5	**15**	3	0	2
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	0	0	4	5	0	0	4
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	1	0	3	4	2	1	6
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	1	0	1	3	4	1	6
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	1	0	1	1	3	1	5
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	0	0	1	1	2	1	4
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	0	0	0	1	1	0	4
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	0	0	0	0	1	0	4
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	0	0	0	0	0	0	4
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	0	0	0	0	0	0	3
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	0	0	0	0	0	0	3
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	0	0	0	0	0	0	3
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	0	0	0	0	0	0	2
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	0	0	0	0	0	0	2
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	0	0	0	0	0	0	2
									15	**Total =**	13	2	0	15	**18**	7	2
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				1.41	2.83	20.03

Total Weight Lost	**26**
To Fishing Mortality	**18**
To Natural Mortality	**7**

Table 21. Base Life History (Low Larval Mortality) Table and Average Entrainment Estimate for Red Snapper (Lutjanus campechanus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	294,554	0.00074	**218**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	4.0300	0	1	4.03	0.02	0.03	554,007	0.00192	**1,065**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.4000	0	1	2.40	0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5001	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	782	77	423	**1,282**	244	24	132
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	28	39	356	423	31	42	384
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	85	29	241	356	195	68	555
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	96	18	128	241	371	69	493
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	43	10	75	128	242	56	422
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	18	6	51	75	135	47	381
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	9	4	38	51	82	41	353
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	5	3	29	38	55	37	329
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	3	3	24	29	39	34	305
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	2	2	20	24	26	31	284
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	2	2	16	20	24	29	260
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	1	1	14	16	21	26	233
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	1	1	11	14	19	23	207
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	1	1	9	11	17	20	181
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	1	1	8	9	15	17	157
									1,282	**Total =**	1,076	199	8	1,282	**1,516**	563	157
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				1.41	2.83	20.03

Total Weight Lost	**2,236**
To Fishing Mortality	**1,516**
To Natural Mortality	**563**

Table 22. Base Life History (High Larval Mortality) Table and Average Entrainment Estimate for Red Snapper (Lutjanus campechanus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	0.4984	0	1	0.50	0.61	0.76	294,554	0.00002	**6**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	7.6500	0	1	7.65	0.00	0.00	554,007	0.00005	**29**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	2.4000	0	1	2.40	0.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 2	0.5001	0	1	0.50	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.1	1.009	1	1.11	0.33	NA	NA	NA	NA	0.312203291	21	2	11	**35**	7	1	4
2	0.1	0.073	1	0.17	0.84	NA	NA	NA	NA	1.078177702	1	1	10	11	1	1	10
3	0.1	0.288	1	0.39	0.68	NA	NA	NA	NA	2.29954469	2	1	7	10	5	2	15
4	0.1	0.537	1	0.64	0.53	NA	NA	NA	NA	3.86505456	3	0	3	7	10	2	13
5	0.1	0.434	1	0.53	0.59	NA	NA	NA	NA	5.643088548	1	0	2	3	7	2	11
6	0.1	0.289	1	0.39	0.68	NA	NA	NA	NA	7.514896779	0	0	1	2	4	1	10
7	0.1	0.199	1	0.30	0.74	NA	NA	NA	NA	9.386632383	0	0	1	1	2	1	10
8	0.1	0.147	1	0.25	0.78	NA	NA	NA	NA	11.19085368	0	0	1	1	1	1	9
9	0.1	0.116	1	0.22	0.81	NA	NA	NA	NA	12.88340238	0	0	1	1	1	1	8
10	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	14.43874938	0	0	1	1	1	1	8
11	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	15.84530904	0	0	0	1	1	1	7
12	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	17.10136025	0	0	0	0	1	1	6
13	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	18.21176751	0	0	0	0	1	1	6
14	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	19.18548284	0	0	0	0	0	1	5
15	0.1	0.084	1	0.18	0.83	NA	NA	NA	NA	20.03372138	0	0	0	0	0	0	4
									35	**Total =**	29	5	0	35	**41**	15	4
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				1.41	2.83	20.03

Total Weight Lost	**61**
To Fishing Mortality	**41**
To Natural Mortality	**15**

Table 23. Base Life History Table and Average Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.8270	0	1	1.83	0.16	0.28	371,063,888	0.00012	**45,979**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	3.8350	0	1	3.84	0.02	0.04	244,708,618	0.00088	**214,155**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.8779	0	1	3.88	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	103,807	103,807	52,520	**260,134**	13,617	13,617	6,890
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	20,958	20,958	10,604	52,520	5,072	5,072	2,566
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	4,231	4,231	2,141	10,604	1,473	1,473	745
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	854	854	432	2,141	374	374	189
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	172	172	87	432	88	88	44
									260,134	**Total =**	130,023	130,023	65,784	325,831	**20,623**	20,623	10,434
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**51,681**
To Fishing Mortality	**20,623**
To Natural Mortality	**20,623**

Table 24. Base Life History Table and LCL Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.8270	0	1	1.83	0.16	0.28	2,542,177	0.00012	**315**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	3.8350	0	1	3.84	0.02	0.04	5,031,412	0.00088	**4,403**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.8779	0	1	3.88	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	1,883	1,883	953	**4,718**	247	247	125
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	380	380	192	953	92	92	47
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	77	77	39	192	27	27	14
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	15	15	8	39	7	7	3
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	3	3	2	8	2	2	1
									4,718	**Total =**	2,358	2,358	1,193	5,910	**374**	374	189
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**937**
To Fishing Mortality	**374**
To Natural Mortality	**374**

Table 25. Base Life History Table and UCL Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.8270	0	1	1.83	0.16	0.28	867,207,773	0.00012	**107,457**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	3.8350	0	1	3.84	0.02	0.04	544,898,233	0.00088	**476,863**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.8779	0	1	3.88	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	233,174	233,174	117,972	**584,320**	30,588	30,588	15,476
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	47,077	47,077	23,818	117,972	11,392	11,392	5,764
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	9,505	9,505	4,809	23,818	3,308	3,308	1,674
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	1,919	1,919	971	4,809	840	840	425
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	387	387	196	971	197	197	100
									584,320	**Total =**	292,062	292,062	147,766	731,890	**46,325**	46,325	23,438
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**116,087**
To Fishing Mortality	**46,325**
To Natural Mortality	**46,325**

Table 26. Low Mortality Life History Table and Average Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.5660	0	1	1.57	0.21	0.35	371,063,888	0.00036	**132,699**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	2.9280	0	1	2.93	0.05	0.10	244,708,618	0.00196	**480,751**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.9455	0	1	3.95	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	244,798	244,798	123,853	**613,450**	32,113	32,113	16,247
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	49,424	49,424	25,006	123,853	11,960	11,960	6,051
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	9,979	9,979	5,049	25,006	3,473	3,473	1,757
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	2,015	2,015	1,019	5,049	882	882	446
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	407	407	206	1,019	207	207	105
									613,450	**Total =**	306,622	306,622	155,133	768,376	**48,634**	48,634	24,606
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**121,874**
To Fishing Mortality	**48,634**
To Natural Mortality	**48,634**

Table 27. Low Mortality History Table and LCL Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.5660	0	1	1.57	0.21	0.35	2,542,177	0.00036	**909**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	2.9280	0	1	2.93	0.05	0.10	5,031,412	0.00196	**9,885**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.9455	0	1	3.95	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	4,307	4,307	2,179	**10,794**	565	565	286
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	870	870	440	2,179	210	210	106
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	176	176	89	440	61	61	31
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	35	35	18	89	16	16	8
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	7	7	4	18	4	4	2
									10,794	**Total =**	5,395	5,395	2,730	13,520	**856**	856	433
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**2,144**
To Fishing Mortality	**856**
To Natural Mortality	**856**

Table 28. Low Mortality History Table and UCL Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.5660	0	1	1.57	0.21	0.35	867,207,773	0.00036	**310,129**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	2.9280	0	1	2.93	0.05	0.10	544,898,233	0.00196	**1,070,499**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.9455	0	1	3.95	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	550,942	550,942	278,744	**1,380,627**	72,272	72,272	36,566
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	111,233	111,233	56,277	278,744	26,917	26,917	13,619
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	22,458	22,458	11,362	56,277	7,817	7,817	3,955
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	4,534	4,534	2,294	11,362	1,984	1,984	1,004
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	915	915	463	2,294	465	465	235
									1,380,627	**Total =**	690,082	690,082	349,141	1,729,305	**109,456**	109,456	55,378
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**274,290**
To Fishing Mortality	**109,456**
To Natural Mortality	**109,456**

Table 29. High Mortality History Table and Average Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	12.4200	0	1	12.42	0.00	0.00	371,063,888	0.00000	**1**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	4.6200	0	1	4.62	0.01	0.02	244,708,618	0.00038	**92,960**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.9390	0	1	3.94	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	37,096	37,096	18,768	**92,960**	4,866	4,866	2,462
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	7,490	7,490	3,789	18,768	1,812	1,812	917
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	1,512	1,512	765	3,789	526	526	266
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	305	305	154	765	134	134	68
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	62	62	31	154	31	31	16
									92,960	**Total =**	46,465	46,465	23,508	116,437	**7,370**	7,370	3,729
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**18,468**
To Fishing Mortality	**7,370**
To Natural Mortality	**7,370**

Table 30. High Mortality History Table and LCL Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Projected Fate of Age-1 Fish In the Absence of the ORV: Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	12.4200	0	1	12.42	0.00	0.00	2,542,177	0.00000	**0**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	4.6200	0	1	4.62	0.01	0.02	5,031,412	0.00038	**1,911**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.9390	0	1	3.94	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	763	763	386	**1,911**	100	100	51
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	154	154	78	386	37	37	19
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	31	31	16	78	11	11	5
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	6	6	3	16	3	3	1
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	1	1	1	3	1	1	0
									1,911	**Total =**	955	955	483	2,394	**152**	152	77
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**380**
To Fishing Mortality	**152**
To Natural Mortality	**152**

Table 31. High Mortality History Table and UCL Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	12.4200	0	1	12.42	0.00	0.00	867,207,773	0.00000	**1**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	4.6200	0	1	4.62	0.01	0.02	544,898,233	0.00038	**206,995**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.9390	0	1	3.94	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	82,602	82,602	41,792	**206,997**	10,836	10,836	5,482
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	16,677	16,677	8,438	41,792	4,036	4,036	2,042
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	3,367	3,367	1,704	8,438	1,172	1,172	593
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	680	680	344	1,704	297	297	151
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	137	137	69	344	70	70	35
									206,997	**Total =**	103,464	103,464	52,346	259,274	**16,411**	16,411	8,303
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**41,124**
To Fishing Mortality	**16,411**
To Natural Mortality	**16,411**

Table 32. Base Life History (Low Larval Mortality) Table and Average Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.8270	0	1	1.83	0.16	0.28	371,063,888	0.00031	**113,885**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	**2.9280**	0	1	2.93	0.05	0.10	244,708,618	0.00210	**514,373**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.8779	0	1	3.88	0.02	NA	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	250,707	250,707	126,843	**628,258**	32,888	32,888	16,639
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	50,617	50,617	25,609	126,843	12,249	12,249	6,197
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	10,219	10,219	5,170	25,609	3,557	3,557	1,800
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	2,063	2,063	1,044	5,170	903	903	457
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	417	417	211	1,044	212	212	107
									628,258	**Total =**	314,023	314,023	158,877	786,924	**49,808**	49,808	25,200
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**124,816**
To Fishing Mortality	**49,808**
To Natural Mortality	**49,808**

Table 33. Base Life History (Low Larval Mortality) Table and Average Entrainment Estimate for Gulf Menhaden (Brevoortia patronus).

											Projected Fate of Age-1 Fish In the Absence of the ORV						
Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	% Vulnerable to Fishery	Total Mortality per Stage (Z)	Fraction Surviving at Stage or Age	Corrected Survival Fraction	Number Potentially Entrained at Stage or Age	Cumulative Survival at Stage or Age	Projected Mortality of Age-1 fish	Weight of an Individual Fish at Median Age of Death	Number Potentially Lost to Fishing Mortality	Number Potentially Lost to Natural Mortality	Number That Might Have Remained in the Population at End of Year	Total Number at Age	Weight of Fish Potentially Lost to Fishing Mortality	Weight of Fish Potentially Lost to Natural Mortality	Weight of Fish That Might Have Remained in the Population at End of Year
Egg	1.8270	0	1	1.83	0.16	0.28	371,063,888	0.00006	**20,972**	NA	NA	NA	NA	NA	NA	NA	NA
Larvae	**4.6200**	0	1	4.62	0.01	0.02	244,708,618	0.00040	**98,817**	NA	NA	NA	NA	NA	NA	NA	NA
Juvenile 1	3.8779	0	1	3.88	0.02	NA	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.131179834	47,802	47,802	24,185	**119,789**	6,271	6,271	3,173
2	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.241990667	9,651	9,651	4,883	24,185	2,335	2,335	1,182
3	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.348069196	1,949	1,949	986	4,883	678	678	343
4	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.437623557	393	393	199	986	172	172	87
5	0.8	0.8	1	1.60	0.20	NA	NA	NA	NA	0.507986545	79	79	40	199	40	40	20
									119,789	**Total =**	59,874	59,874	30,293	150,041	**9,497**	9,497	4,805
											Population in Numbers				**Population in Pounds**		
											Mean Weight (pounds)				0.16	0.16	0.16

Total Weight Lost	**23,798**
To Fishing Mortality	**9,497**
To Natural Mortality	**9,497**