SUMMARY OF THE AT-SEA SAMPLING OF THE WESTERN ATLANTIC OCEAN, 1987-1995, BY INDUSTRIAL LONGLINE VESSELS FISHING OUT OF THE PORT OF CUMANA, VENEZUELA:ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH

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SUMMARY

The Biological Observer Database (BOD) has been compiled at the National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) for 1987 through 1995 as part of the ICCAT Enhanced Research Program for Billfish designed to monitor billfish in the western Atlantic Ocean. Data for the BOD data is collected by observers on longline vessels fishing out of the port of Cumana, Venezuela. This report gives a summary of cumulative results for the years of 1987 through 1995.

RÉSUMÉ

La Biological Observer Database (BOD) a été compilée au Southeast Fisheries Science Center (SEFSC) du Southeast Fisheries Science Center (SEFSC) pour la période 1987-95 dans le cadre du Programme de Recherche Intensive sur les Istiophoridés de l'ICCAT, destiné au suivi des istiophoridés dans l'Atlantique Ouest. Les données pour le BOD sont collectées par des observateurs sur les palangriers qui pêchent depuis le port de Cumana, Vénézuéla. Cette déclaration fournit un récapitulatif des résultats réunis pour les années 1987-95.

RESUMEN

La Biological Observer Database, (BOD), ha sido recopilada en el Southeast Fisheries Science Center (SEFSC), del National Marine Fisheries Service (NMFS), de 1987 hasta 1995, como parte del Programa ICCAT de Investigación Intensiva sobre Marlines diseñado para hacer un seguimiento de los marlines en el Océano Atlántico oeste. Los observadores, en palangreros que faenan frente al puerto de Cumaná, Venezuela, recolectan datos para introducirlos con los datos del BOD. Este informe facilita un resumen de los resultados acumulativos para los años 1987 a 1995.

1. INTRODUCTION

The ICCAT Enhanced Research Program for Billfish (ERPB) was initiated in 1987 to aid in determining the status of billfish stocks in the western Atlantic Ocean. Two databases were developed to collect catch and effort related statistics. A "shore-based" database in which fish were measured upon return to port at a number of locations in the western Atlantic Ocean. The second "at-sea" database was compiled by trained observers aboard longline vessels out of the port of Cumana, Venezuela, as well as from artisanal fisheries in Grenada, and Margarita Island, Venezuela. While at sea, the observers document various aspects of the ships location and gear, as well as collect data on sex, size, age, growth, and whether the fish is dead or alive when brought alongside the vessel. In the field reports, a variety of species are documented including members of: Xiphiidae, Istiophoridae, Scombridae, and Coryphaenidae, as well as members of the Chondrichthys (Table 1).

Field data are sent from Cumana to the Southeast Fisheries Science Center (SEFSC), Miami, for processing via the Biological Observer Database (BOD) software package[2]. This report is a summary of the results of the data collected at-sea out of Cumana from 1987 through October of 1995.

For 1995, there were 40 trips, comprised of 466 sets sampled. This made 1995 the heaviest sampled year for the entirety of the BOD program (Table 2). This is due, in part, to 1995 trips having up to 60 sets each. All prior years ranged

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[2] The BOD software is compiled using FOXPRO 1.02 and was developed by the SEFSC Miami Data Management Division. Currently, this database is being changed into MS EXCEL to make querries more powerful, flexible, and accessible.

from 18-26 sets per trip. The 1996 data have been received and are being processed at the Cooperative Tagging Center (CTC), NMFS, Miami.

2. METHODS

A detailed discussion outlining observer duties, and processing of the data is available in Carter (1992). Briefly, observers are trained and placed on longline vessels fishing out of the port of Cumana or other geographically close ports in northwest Venezuela. The data collected describes the fishing trips. The fishing year is separated into seasons where the winter is designated from December through February, spring includes March-May, summer is June-August, and fall is September through November. Fishing trips are designated as targeting yellowfin tuna (*Thunnus albacares*) or swordfish (*Xiphias gladius*). The bait type and time of day are documented, indicating if the trip is targeting tuna (diurnal fishing with sardines), or swordfish (nocturnal fishing with squid), or mixed. Mixed trips included yellowfin and swordfish, or billfish and swordfish combinations. A number of species are documented in the catch and are listed in Table 1. Each fishing trip is composed of sets which are described by documenting time of day, gear, and catch related statistics.

3. DATA

Data are compiled by the observers on two forms, "C" and "D" (Carter 1992). On form C, information collected includes the date, location (latitude/longitude), gear type, set direction, time of rigging, bait type, and total catch by species and weight. The data on form D is a description of the catch produced by the rigging (form C). On form D, the individual fish and time of catch are listed in chronological order as they were caught. The fish are, if possible, identified, sexed (male, female, or juvenile), documented as being alive or dead, and are described using a number of meristic measurements. These measurements were developed to aid in the description of the age/size structure of the fish stocks sampled. The specified measurements include the lower jaw fork length (LJFL), pectoral fork length (PFL), pectoral dorsal length (PDL), pectoral anus length (PAL), the cleithrum keel length (CK), and the total fork length (FL). These measurements were outlined in Prager *et al.* (1994), Lee (1991), Lee and Prince (1990), and Prince and Lee (1989).

By collecting weight and specified length measurements, length-weight regressions can be produced using the BOD (for the purpose of conversion) to aid in assessing and projecting the demographics of the stocks being sampled. The BOD produces reports which are summaries of: (1) set data by season; (2) counts and weights by season; (3) average lengths by species, sex and season; (4) average lengths by species and season; and (5) percentage alive/dead by season. These categories are subdivided so that the database can be queried for all data, target year, target species, and target species-year. The results for all species and all years are briefly described in this document and are a summary of the cumulative report produced by the BOD software. This includes data compiled on 170 trips from the projects inception in 1987, through October, 1995.

4. RESULTS AND DISCUSSION

4.1 Cumulative summary for 1987-1995: Trips, sets, and gross catch

In this report, all measurements are derived from a multi-year average of the data. A summary of the data reported for the individual years is provided in Tables 3a-c. In the total sampling period of 8 fishing years, 170 trips with 1,845 sets were recorded (Table 2). Overall, the rigging averaged 56.1 km of line with 1,335 hooks per set. The year with the greatest number of hooks/set was 1991 (1,646 hooks/set), when the average rigging was 39 km line/set for 99 sets over 16 trips. In 1995, the mean was 1,611 hooks/set with the an average of 67 km of line/set for 466 sets over 40 trips.

Seasonally, as in Carter (1992), the number of hooks and number of hooks/set for all years peaked in the fall and winter periods (September through February). The amount of line lost per trip is not documented but would be an important factor to monitor. Lost line is costly to fisherman and could affect estimates of fishing effort from the longline fleet.

Of 170 trips, 101 targeted yellowfin tuna (YFT), 45 targeted swordfish (SWO), 8 targeted billfish (BIL), and 14 trips were mixed (i.e., YFT, BIL/SWO) (Table 4). The numbers of target species caught were 10,620 (YFT) and 3,919 (SWO) with (5.8 YFT/set) and (2.1 SWO/set), respectively.

The breakdown of the 8,206 billfish captured during the entire sampling period (170 trips) is compiled in Table 5, and seasonally in Table 6. Over the entire sampling period (1987-1995), 863 blue marlin, 1,799 white marlin, 1,090

sailfish, 3,919 swordfish, 535 spearfish, 7,395 albacore, and 10,670 yellowfin tuna were documented by observers aboard longline vessels fishing off northwest Venezuela.

Because the catch/effort was greatest in the fall and winter, the highest catch rates would be expected to occur in those seasons (Table 5). The maximum number boated for all species (all years) was documented during the fall, where 42% (3,442, all BIL) of the multi-annual catch was noted (Tables 5 and 6). The winter produced 23% (1,882) of the catch. The summer and spring followed with 18% (1,444), and 18% (1,438), respectively.

Other data discussed in this report are presented in the following tables, by species, over all years: Table 7 summarizes the average number of fish/set with the mean weight; Table 8 presents the percent mortality; Table 9 depicts the catch breakdown by sex for billfish, swordfish, and yellowfin tuna; Table 10 lists the mean values for LJFL, PAL, PFL, PDL, CK, and FL; and Tables 11a-d report the meristics by species, by sex, and by season.

4.2 Breakdown of billfish species in the multi-annual catch

4.2.1 Blue marlin and white marlin (BUM, WHM)

The maximum annual number of BUM and WHM boated occurred in 1995 -- 302 and 779, respectively (Table 2). For the cumulative data during the fall, BUM and WHM comprised about 45% (388) and 49% (877), respectively, of the multi-annual catch (Table 6). The winter produced 20% (180) and 25% (448) of the BUM and WHM, respectively. The mean number caught per set, over all seasons and years was 0.5 BUM/set and 1.0 WHM/set (Table 5). The maximum number caught per set was recorded for BUM during the fall, 0.7 fish/set, and for WHM occurred during both the fall and winter, 1.5 WHM/set (Table 7). The greatest mean weight for BUM was reported for the fall, 52.3 kg, with 51.3 kg reported for the summer, and the lowest mean weight, 38.5 kg, reported from the winter (Table 7). For WHM, the largest mean weight was recorded during the fall, 19.6 kg, with the minimum reported during the winter, 16.3 kg.
The average percentage dead for BUM and WHM were 51% and 56%, respectively, over the period 1987-1995 (Table 8). Over all years, 863 BUM (501 males, 322 females, 11 juveniles, and 29 were unsexed) and 1,799 WHM (800 males, 829 females, 16 juveniles, and 154 were unsexed) (Table 9). Over all years sampled, about 41 mt of BUM and 32 mt of WHM were caught (Table 3a).

The mean LJFL for all BUM, over all years, was 187.7 cm, and for WHM 154.6 cm (Table 10). The seasonal LJFL length for BUM males ranged from 177.4 cm in the winter to 188.0 cm in the fall (Table 11). The seasonal LJFL length for BUM females ranged from 183.5 in the spring to 208.1 cm in the summer. For WHM, the seasonal LJFL for males ranged from 143.0 in the spring to 158.7 cm in the fall. The seasonal LJFL length for WHM females ranged from 142.1 in the winter to 160.5 cm in the fall.

4.2.2 Sailfish (SAI)

Over the entire sampling period, 1,090 sailfish were reported (Table 2) with a cumulative weight of nearly 22 mt (Table 3a). Of these, 484 were reported as male, 466 female, 8 as juvenile, and 132 were unsexed (Table 9). The maximum annual number of SAI was reported in 1995, when 343 SAI were documented (Table 2). The next highest number of SAI reported (250) was in 1993. The multi-year average percentage dead was reported to be 68% (Table 8).

The mean weight for SAI for the 8 year sampling period was 20.4 kg (Table 5). Over all years, 44% (476) of the catch was recorded in the fall, with 26% (284) reported in the summer (Table 6). The mean number caught per set for all years and seasons was 0.6 SAI/set (Table 5). The seasonal maximum of 0.8 SAI/set (Table 7) was recorded during both the fall and winter. The seasonal minimum was during the spring with 0.2 SAI/set. The winter produced the highest mean weight (21.4 kg), and the smallest mean weight was reported during the spring (19.1 kg).

The mean LJFL for SAI (all years) was 167.5 cm (Table 10). The seasonal mean LJFL for males changed very little over the years, ranging from 164.4 cm in the spring to 167.9 cm in the summer (Table 11). Similarly, for females, the LJFL ranged seasonally from 167.3 cm in the spring to 169.7 cm in the fall.

4.2.3 Spearfish (SPF)

Over the 8 year sampling period, 535 spearfish (Table 2) weighing an estimated 9 mt were reported (Table 3b). Of these, 328 were male, 189 female, 7 juvenile, and 11 were reported unsexed (Table 9). The annual number of spearfish reported has steadily increased from none in 1987 through 1989 to 245 in 1995. The multi-year average percentage dead was reported to be 66% (Table 8).

Fall produced the primary portion of the annual catch, 49% (Table 6). The mean number caught per set for all seasons and years was reported as 0.3 SPF/set (Table 5). The seasonal maximum of 0.5 SPF/set was caught during the fall, with a minimum was 0.2 SPF/set for both the spring and summer (Table 7). The mean weight for the entire sampling period was 17.8 kg, with minimal seasonal variation, 16.8 kg in the spring to 18.5 kg in the winter.

The LJFL for all SPF, over all years, was 166.9 cm (Table 10). Seasonally, males ranged from 160.6 cm in the spring to 170.5 cm in the fall (Table 11). For females, the LJFL ranged from 156.1 cm in the spring to 170.3 cm in the fall.

4.2.4 Swordfish (SWO)

During this study, 45 trips targeted SWO (Table 4). There were 14 trips targeting a mix of YFT or BIL and SWO (Table 4). Over all 8 years, 3,919 swordfish were reported (Table 5) weighing an estimated 92 mt. Of these, 1,482 were reported as male, 2,120 female, 105 juvenile, and 212 were reported unsexed (Table 9). For SWO, the maximum annual catch occurred in 1993 when 1,299 were documented (Table 3b). The multi-year average percentage dead was 82% (Table 8).

The mean LJFL for SWO for all years is 130.3 cm (Table 10). Seasonally, for all years, the males LJFL ranged from 117.6 cm in the summer to 130.4 cm in the spring (Table 11). For females, the LJFL (all years) ranged seasonally from 128.6 cm (summer) to 140.7 cm (spring)

4.2.5 Tunas: Yellowfin Tuna and Albacore (YFT and ALB)

This paper focused primarily on the catch of billfish and their corresponding data. However, large quantities of data exist on the main target species, yellowfin tuna. Therefore, a short description of the target tuna catch is helpful. The seasonal tables in this paper do not include YFT or ALB data. Over the entire survey, 101 trips targeted YFT (Table 4). During 1995, some of the observed trips on larger vessels targeted ALB (<5 trips). Since 1987, the total number of YFT caught was 10,670, weighing about 334 mt, and 7,395 ALB weighing about 150 mt (Table 3c). Of these, 2,471 YFT and 6,435 ALB were caught in 1995. Therefore, 23% of the cumulative YFT catch and 87% of the cumulative ALB catch was caught in 1995. This could signify a change towards targeting ALB versus YFT, or this could be an artifact from the types of ships sampled.

The number of fish (all years) caught per set was 4.0 for ALB and 5.8 for YFT. The mean weight for all years was 20.6 kg for ALB and 34.7 kg for YFT (table 3c). The mean LJFL for all ALB measured was 151 cm. The mean LJFL for all YFT measured was 129.5 cm.

5. CONCLUSIONS

Since 1987, the Biological Observer Database (BOD) has grown to include a significant amount of size data, along with related meristics (LJFL, mean lengths, etc.) and dead/alive percentages. Often, many of the roughly identified species are given in Spanish, or, less often, in a colloquial or slang for that species. Spanish to English translations of commonly caught species of fish are easily obtained. However, the local slang for a species is often not included. This information could be supplemented by Cumana artisanal observations, thereby adding to the database. In addition, many species of sharks/rays, and marine mammals are listed, but written in the margins of the forms provided. The shark and ray data are readily available and are maintained in a separate database by FONAIAP in Cumana. As many species of elasmobranchs are of increased importance to agencies, such as NMFS and ICCAT, these data could be made available upon request.

The amount of information received from the BOD contributors has increased substantially each year. For example, in 1987, three fishing trips with 23 sets were documented and by 1995 this increased to 40 trips with 466 sets. Over the 8 years, a total of 103,638 km of line was used by the Cumana and artisanal longline fleets. Over a third of the total line (all years) was recorded in 1995 alone (36,351 km). It is recommended that mainline and hooks lost during trips should be noted on form C in the future. Requests to access these data can be made through the National Marine Fisheries Service, Miami Laboratory, Migratory Fisheries Biology Division, 75 Virginia Beach Drive, Miami, FL 33149.

6. LITERATURE CITED

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Table 1. Species reported in field data by "at-sea" observers.

FAMILY	GENUS SPECIES	COMMON NAME
SCOMBRIDAE	*Thunnus albacares*	yellowfin tuna
	Thunnus alalunga	albacore
	Thunnus obesus	bigeye tuna
	Thunnus thynnus	bluefin tuna
	Thunnus atlanticus	blackfin tuna
ISTIOPHORIDAE	*Makaira nigricans*	blue marlin
	Tetrapterus albidus	white marlin
	Tetrapterus pfleugeri	spearfish
	Istiophorus platypterus	sailfish
XIPHIIDAE	*Xiphias gladius*	swordfish
CORYPHAENIDAE	Coryphaena sp.	dolphin
(CHONDRICHTHYS)	(various taxa)	(sharks*)
	(various taxa)	(rays*)

* Shark and ray taxa are grouped together and represented by cumulative gross number and gross weight in field data.

Table 2. Numbers of trips and sets.average number of hooks-per-set and longline length-per-set (km), numbers of billfish caught, and estimated mortality of billfish brought alongside the boat for at-sea sampling in Venezuela, 1987-1995. Note: BUM=blue marlin, WHM=white marlin, SAI=sailfish, and SPF=spearfish.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1987 - 95
No. of trips	3	3	3	7	16	32	37	34	40	170
No. of sets	23	37	34	43	99	265	488	320	466	1845
Avg. hooks/set	1171	1225	2439	1552	1646	1036	1231	1125	1611	1335
Avg. length/set	57	58	42	46	39	47	50	47	78	56
# BUM caught	38	13	11	34	59	87	96	174	302	863
# WHM caught	144	60	47	69	60	92	242	266	779	1799
# SAI caught	30	7	18	19	94	148	250	144	343	1090
# SPF caught	0	0	0	8	36	31	66	111	245	535
% BUM mortality	68	40	64	76	67	52	38	44	70	51
% WHM mortality	55	55	65	56	57	65	61	55	54	56
% SAI mortality	50	67	72	68	78	66	67	75	67	68
% SPF mortality	N/A	N/A	N/A	75	67	61	65	61	70	66

Table 3a. **Summary of the annual catch, mean weight and total weight (kg), and average lower jaw fork length (cm) for males, females, and combined sexes for blue marlin (BUM), white marlin (WHM), and sailfish (SAI), 1987-95.**

Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL
BUM										
# caught	38	13	11	34	59	87	96	174	302	863
mean wgt	58.9	34.9	29.7	40.1	37.2	54.3	51.7	51.2	47	47.9
total wgt	2240	454	208	1363	2192	4508	4967	8712	13993	40539
length male	146.8	192.8	164.6	180.4	178.4	185.9	180.3	185	184.6	183.9
length fema	152.8	200	169.2	191.8	183.7	206.8	194.3	199.8	194.9	196
mean length	149.7	196.2	166.9	176.3	179.5	195.6	185.8	190.7	187.7	187.7
WHM										
# caught	144	60	47	69	60	91	242	266	779	1799
mean wgt	17.7	27.1	23.6	16.9	20.3	18.1	18.3	20.1	17.1	18.5
total wgt	2548	1626	1064	1163	1216	1631	3962	5335	12669	32051
length male	155.5	161.2	161.2	152.7	155.5	157.2	157.7	158.2	149.9	154.6
length fema	157.4	167.6	167.3	152.3	161.2	157.4	160	158.4	150	155
mean length	156.4	163.4	162.8	149.8	157.8	155.5	158.4	158	150.4	154.6
SAI										
# caught	30	7	18	19	94	147	250	144	343	1090
mean wgt	21.9	19.5	21.1	25	19.4	19.8	20.7	18.3	21.9	11.7
total wgt	657	117	380	475	1825	2818	4884	2549	7067	21557
length male	162.6	160	159	170.5	166.5	166.5	167.6	164.2	165.2	166.1
length fema	169.1	166	167.3	171.7	168.8	168.5	170.6	168.7	169.6	169.7
mean length	165.2	159.8	165.1	170.3	165.7	166.3	169.3	165.7	166.9	167.5

Table 3b. **Summary of the annual catch, mean weight and total weight (kg), and average lower jaw fork length (cm) for males, females, and combined sexes for swordfish (SWO) and spearfish (SPF), 1987-95.**

Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL
SWO										
# caught	16	20	156	90	154	912	1299	587	578	3919
mean wgt	28.1	28.9	29.8	24.8	21.5	25.1	22.4	27.9	24.7	49.9
total wgt	450	578	4646	2229	3224	20526	28893	14509	14198	92027
length male	130.7	121.3	134.5	124.8	120.3	127.7	120.3	124.9	125.3	123.9
length fema	197	100	136.7	132.1	138.9	138.8	132.7	140.9	145.3	138
mean length	135.8	118.7	128	124.3	124.7	132.4	126.3	133.5	134.3	130.3
SPF										
# caught	0	0	0	8	36	32	66	111	245	535
mean wgt	0	0	0	30.3	14.2	13.9	13.1	17.8	19.5	17.8
total wgt	0	0	0	242	497	430	863	1867	4693	9315
length male	0	0	0	168.4	167.1	169.5	167.7	168.7	166.5	167.6
length fema	0	0	0	--	162.7	170.5	161.7	165.5	168.1	166.6
mean length	0	0	0	166.3	164.4	168.1	164.8	167.1	166.9	166.9

Table 3C. **Summary of the annual catch, mean weight and total weight (kg), and average lower jaw fork length (cm) for males, fe** females and combined

Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL
YFT										
# caught	389	531	280	259	825	1520	2069	2121	2471	10670
mean wgt	36.2	33.8	34.7	43.3	31.3	36	33.6	36.2	34.5	34.7
total wgt	10016	10688	5767	1163	16972	53332	69297	71983	85058	333725
length male	129.8	129.2	128.1	142.6	133.1	132.8	133.4	136	135.4	133.2
length fema	133.8	138.3	130.8	143.3	129.7	134.3	131.7	133.6	134.9	130.2
mean length	130.8	131.1	128.6	141	123.4	131.8	132.7	135.1	133.9	129.5
BET										
# caught	7	29	26	34	86	186	790	604	1218	3350
mean wgt	30	14.1	25.3	24.4	25.9	42.7	27.5	34	31.9	31.1
total wgt	30	409	632	122	880	3968	21681	20365	38850	98130
length male	131.5	105.1	107.1	72	104	110	116.6	125.8	124.7	122.7
length fema	127.5	112	102.3	--	124.6	127.7	123.1	123	125.7	121.2
mean length	119.2	92.4	113.5	118.7	115.5	110.4	118.6	124.4	125.1	118.3
ALB										
# caught	10	9	14	35	37	58	132	340	6435	7395
mean wgt	16.4	17.5	29.8	19.2	19.9	17.9	9.9	16.5	21.1	20.6
total wgt	148	35	149	173	556	822	1309	5480	134698	149978
length male	98	108	118.5	102	104	106	82.7	103	103.2	152.9
length fema	99	104	(none)	--	104.4	102.3	98.1	110.7	102.6	158.1
mean length	98.4	104.4	108.5*	101.4	102.5	101.8	90	102.4	103.2	151

Table 4. Number, number per set, and number of trips, by target species, 1987-1995.

Trget Species	# caught	# / set	# target trips
tuna - YFT	10,620	5.8	101
swordfish - SWO	3,919	2.1	45
billfish - BIL	------	------	8
mixed - YFT; BIL/SWO	------	------	14

Table 5. Catch statistics for billfish caught, 1987-1995.

Species	# caught	# / set	mean weight	season catch rank*
blue marlin (BUM)	863	0.5	47.9 kg	F, W, SP, SU
white marlin (WHM)	1799	1	18.5 kg	F, W, SP, SU
sailfish (SAI)	1090	0.6	20.4 kg	F, SU, W, SP
swordfish (SWO)	3919	2.1	24.3 kg	F, W, SP, SU
spearfish (SPF)	535	0.3	17.8 kg	F, SU, W, SP
All species combined	8206	---------	---------	F, W, SU (=) SP

* season catch rank = % of season catch ranked by decreasing order where F = fall, W = winter, SP = spring, and SU = summer

Table 6. Percentage (%) of total catch and number (#) of all billfish species caught by season, over all years, 1987-1995.

	FALL	WINTER	SPRING	SUMMER	TOTAL
Species	% / (#)	% / (#)	% / (#)	% / (#)	% / (#)
BUM	45.0% / (388)	20.1% / (180)	16.8% / (145)	17.4% / (150)	100% / (863)
WHM	48.7% / (877)	24.9% / (448)	14.3% / (257)	12.1% / (217)	100% / (1,799)
SAI	43.7% / (476)	23.6% / (257)	6.7% / (73)	26.1% / (284)	100% / (1,090)
SWO	36.8% / (1,441)	22.6% / (887)	22.5% / (883)	18.1% / (708)	100% / (3,919)
SPF	48.6% / (260)	20.6% / (110)	15.0% / (80)	25.9% / (85)	100% / (535)
TOTALS	41.9% / (3,442)	22.9% / (1,882)	17.5% / (1,438)	17.6% / (1,444)	100% / (8,206)

Table 7. Number of fish per set and mean weights (kg) per season for all billfish species, 1987-1995.

	FALL	WINTER	SPRING	SUMMER	TOTAL
Species	(#/set) / (mn wt*)	(#/set) / (mn wt)	(#/set) / (mn wt)	(#/set) / (mn wt)	(#/set) / (mn wt)
BUM	(0.7) / (52.3)	(0.6) / (38.5)	(0.3) / (44.4)	(0.3) / (51.3)	(0.5) / (47.9)
WHM	(1.5) / (19.6)	(1.5) / (16.3)	(0.4) / (19.0)	(0.4) / (18.1)	(1.0) / (18.5)
SAI	(0.8) / (20.4)	(0.8) / (21.4)	(0.2) / (19.1)	(0.5) / (20.8)	(0.6) / (20.6)
SWO	(2.5) / (22.7)	(2.9) / (27.0)	(2.1) / (28.4)	(1.3) / (21.2)	(2.1) / (24.6)
SPF	(0.5) / (18.5)	(0.4) / (17.5)	(0.2) / (16.8)	(0.2) / (18.5)	(0.3) / (17.8)

Table 8. Percent mortality for all billfish species caught from 1987-1995.

Species	% mortality
BUM	51.4
WHM	56.1
SAI	68.2
SWO	82.3
SPF	66.4
YFT	55.3

Table 9. Breakdown of total catch by sex and maturity for all years.

Species	# male	# female	# juvenile	# unsexed	Total Catch
BUM	501	322	11	29	863
WHM	800	829	16	154	1,799
SAI	484	466	8	132	1,090
SWO	1,482	2,120	105	212	3,919
SPF	328	189	7	11	535
YFT	5,098	3,635	115	1,822	10,670

Table 10. Mean length measurements (cm) for the total catch for 1987-1995: lower jaw fork length (LJFL); pectoral fork length (PFL); pectoral dorsal length (PDL); pectoral anus length (PAL); the cleithrum keel length (CK); and the total fork length (FL).

Species	meanLJFL	meanPAL	meanPFL	meanPDL	mean CK	meanFL
BUM	187.7	60.9	142.4	95.9	-----	108.7
WHM	154.6	51.3	115.1	86.6	88.2	56.8
SAI	167.5	64.5	129.6	94.0	-----	39.9
SWO	130.3	44.1	95.2	68.6	74.4	118.6
SPF	166.9	56.3	127.0	98.2	91.7	117.1
YFT	129.5	40.3	98.5	128.4	78.8	132.4

Table 11a. Length measurements (cm) in LJFL, PAL, PDL, CK, and FL for male and female billfish and swordfish collected during the fall fishing seasons of 1987-95.

species	mean LJFL female/ male	mean PAL female/ male	mean PFL female/ male	mean PDL female/ male	mean CK female/ male	mean FL female/ male
BUM	200.8 / 188.0	66.0 / 61.9	151.9 / 142.9	103.0 / ------	135.0 / 160.0	------ / 105.8
WHM	160.5 / 158.7	56.0 / 55.6	120.0 / 119.4	94.6 / 87.1	127.0 / 122.0	95.0 / ------
SAI	169.7 / 165.4	67.5 / 64.7	132.1 / 126.7	98.6 / 122.0	185.0 / 185.0	258.0 / 212.0
SWO	132.6 / 122.1	43.3 / 41.8	91.1 / 90.7	------ / 71.8	75.7 / 69.1	135.0 / 118.5
SPF	170.3 / 170.5	56.7 / 60.3	128.8 / 130.2	------ / ------	------ / 85.0	131.0 / 136.5

*Consult Appendix C for the number of specimens used for each calculation LJFL, PAL, PFL, PDL, CK, and FL.
------ denotes no available data.

Table 11b. Length measurements (cm) in LJFL, PAL, PDL, CK, and FL for male and female billfish and swordfish collected during the winter fishing seasons of 1987-95.

species	mean LJFL female/ male	mean PAL female/ male	mean PFL female/ male	mean PDL female/ male	mean CK female/ male	mean FL female/ male
BUM	186.5 / 177.4	59.9 / 55.9	140.9 / 135.1	123.6 / 105.6	------ /------	120.0 / 107.0
WHM	142.1 / 145.2	44.4 / 46.5	105.1 / 110.0	82.6 / 81.6	40.0 / 40.0	108.0 / 126.0
SAI	176.4 / 165.8	63.8 / 61.8	121.1 / 125.8	93.3 / 90.3	------ / ------	------ / 145.0
SWO	140.0 / 123.7	48.3 / 40.5	103.1 / 88.5	70.6 / 67.3	79.4 / 69.6	126.0 / 75.1
SPF	164.5 / 166.3	55.5 / 55.8	125.2 / 125.1	95.0 / 103.0	------ / ------	133.0 / 135.0

Table 11c. Length measurements (cm) in LJFL, PAL, PDL, CK, and FL for male and female billfish and swordfish collected during the spring fishing seasons of 1987-95.

species	mean LJFL female/ male	mean PAL female/ male	mean PFL female/ male	mean PDL female/ male	mean CK female/ male	mean FL female/ male
BUM	183.5 / 180.0	59.0 / 59.7	141.6 / 136.0	100.0 / 96.0	------ / ------	74.5 / 74.5
WHM	153.2 / 143.0	47.2 / 45.0	113.0 / 105.8	89.0 / 81.6	------ / ------	------ / ------
SAI	167.3 / 164.4	63.2 / 60.7	129.2 / 127.1	96.2 / 94.2	------ / ------	------ / ------
SWO	140.7 / 130.4	49.2 / 43.9	106.5 / 96.8	68.0 / 73.0	80.7 / 75.4	------ / ------
SPF	156.1 / 160.6	51.5 / 53.5	120.7 / 122.1	------ / 95.7	------ / 131.0	------ / 18.0

Table 11d. Length measurements (cm) in LJFL, PAL, PDL, CK, and FL for male and female billfish and swordfish collected during the summer fishing seasons of 1987-95.

species	mean LJFL female/ male	mean PAL female/ male	mean PFL female/ male	mean PDL female/ male	mean CK female/ male	mean FL female/ male
BUM	208.1 / 185.3	68.4 / 53.7	159.9 / 142.2	103.5 / ------	------ / ------	------ / 145.0
WHM	154.8 / 152.6	49.4 / 49.5	113.9 / 111.4	90.0 / ------	------ / ------	------ / ------
SAI	169.0 / 167.9	64.6 / 64.5	132.6 / 132.9	94.5 / 86.0	------ / ------	------ / 130.0
SWO	128.6 / 117.6	43.0 / 24.4	90.6 / 55.8	------ / ------	73.5 / 67.1	------ / ------
SPF	166.5 / 167.0	52.2 / 55.2	126.9 / 126.9	------ / ------	------ / ------	------ / ------

Summary of Appendices

Appendix A: Summary of set data by season for all years.

Appendix B: Summary of counts and weights (kg) by season and species for:
- B1. ALB, BET, BFT, BLT, BUM, DOL, SAI
- B2. SPF, SWO, TUN*, WHM, YFT, and ***Totals*** *All years, species, and seasons.*

Appendix C: Summary of LJFL, PAL, PFL, PDL, CK, FL (cm) by species for :
- C1. winter
- C2. spring
- C3. summer
- C4. fall
- C5. ***Total*** *- All years, species, and seasons.*

Appendix D: Summary of average length LJFL, PAL, PFL, PDL, CK, FL (cm) by species and sex, and all species by sex (***Total***), for all years for:
- D1. winter
- D2. spring
- D3. summer
- D4. fall
- D5. ***Total*** *- All years, species, and seasons.*

Appendix E: Summary of the fish caught alive, dead, and percent mortality for all years for:
- E1. winter and spring
- E2. summer and fall
- E3. ***Total*** *- All seasons all years.*

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Appendix A: Summary of set data by season for all years.

SEASON	WINTER	SPRING	SUMMER	FALL	***TOTAL***
# trips	---	---	---	---	***170***
# sets	308	422	538	577	***1,845***
# hooks	461,564	406,723	754,548	839,767	***2,462,602***
# hooks / set	1,499	964	1,403	1,455	***1,335***
line length (m)	18,276,385	20,025,303	34,563,831	307,772,966	***103,638,485***
length (m) / set	59,339	47,453	64,245	53,333	***56,173***

Appendix B1: Summary of counts and weights (kg) by season and species for ALB, BET, BFT, BLT, BUM, DOL, and SAI.

SPECIES: ALB	WINTER	SPRING	SUMMER	FALL	*total / mean*
# caught	462	1,001	5,196	736	***7,395***
# / set	1.5	2.4	9.7	1.3	***4.0***
total weight (kg)	8,456	16,649	112,931	119,421	***149,978***
weight (kg) / set	27.5	39.5	209.9	20.7	***81.3***
number weighed	441	952	5,151	730	***7,274***
(mean weight) / # fish	19.2	17.5	21.9	16.4	***20.6***
SPECIES: BET	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	1,251	502	491	1106	***3,350***
# / set	4.1	1.2	0.9	1.9	***1.8***
total weight (kg)	37,912	11,770	14,714	33,734	***98,130***
weight (kg) / set	123.1	27.9	27.3	58.5	***53.2***
number weighed	1,229	361	473	1,097	***3,160***
(mean weight) / # fish	30.8	32.6	31.1	30.8	***31.1***
SPECIES: BFT	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	1	2	3	36	***42***
# / set	0.0	0.0	0.0	0.1	***0.0***
total weight (kg)	43	4	183	1023	***1253***
weight (kg) / set	0.1	0.0	0.3	1.8	***0.7***
number weighed	1	1	3	35	***40***
(mean weight) / # fish	43.0	4.0	61.0	29.2	***31.3***
SPECIES: BLT	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	24	5	45	35	***109***
# / set	0.1	0.0	0.1	0.1	***0.1***
total weight (kg)	193	115	302	177	***787***
weight (kg) / set	0.6	0.3	0.6	0.3	***0.4***
number weighed	23	5	45	35	***108***
(mean weight) / # fish	8.4	23.0	6.7	5.1	***7.3***
SPECIES: BUM	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	180	145	150	388	***863***
# / set	0.6	0.3	0.3	0.7	***0.5***
total weight (kg)	6,888	6,173	7,490	19,988	***40,539***
weight (kg) / set	22.4	14.6	13.9	34.6	***22.0***
number weighed	179	139	146	382	***846***
(mean weight) / # fish	38.5	44.4	51.3	52.3	***47.9***
SPECIES: DOL	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	218	179	334	172	***903***
# / set	0.7	0.4	0.6	0.3	***0.5***
total weight (kg)	969	1,766	2,421	744	***5,900***
weight (kg) / set	3.1	4.2	4.5	1.3	***3.2***
number weighed	216	177	333	167	***893***
(mean weight) / # fish	4.5	10.0	7.3	4.5	***6.6***
SPECIES: SAI	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	257	73	284	476	***1,090***
# / set	0.8	0.2	0.5	0.8	***0.6***
total weight (kg)	5,416	1,334	5,812	8,995	***21,557***
weight (kg) / set	17.6	3.2	10.8	15.6	***11.7***
number weighed	253	70	280	441	***1,044***
(mean weight) / # fish	21.4	19.1	20.8	20.4	***20.6***

Appendix B2: Summary of counts and weights (kg) by season and species for SPF, SWO, TUN*, WHM, and YFT and Total all species.

SPECIES: SPF	WINTER	SUMMER		FALL	*total / mean*
# caught	110	80	85	260	*535*
# / set	0.4	0.2	0.2	0.5	*0.3*
total weight (kg)	1,923	1,309	1,375	4,708	*9,315*
weight (kg) / set	6.2	3.1	2.6	8.2	*5.0*
number weighed	110	78	81	254	*523*
(mean weight) / # fish	17.5	16.8	17.0	18.5	*17.8*
SPECIES: SWO	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	887	883	708	1,441	*3,919*
# / set	2.9	2.1	1.3	2.5	*2.1*
total weight (kg)	23,399	22,007	14,428	32,193	*92,027*
weight (kg) / set	76.0	52.1	26.8	55.8	*49.9*
number weighed	867	775	679	1,421	*3,742*
(mean weight) / # fish	27.0	28.4	21.2	22.7	*24.6*
SPECIES: TUN*	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	11	22	88	81	*202*
# / set	0.0	0.1	0.2	0.1	*0.1*
total weight (kg)	160	273	1,526	1,375.0	*3,334*
weight (kg) / set	0.5	0.6	2.8	2.4	*1.8*
number weighed	11	22	88	81	*202*
(mean weight) / # fish	14.5	12.4	17.3	17.0	*16.5*
SPECIES: WHM	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	448	257	217	877	*1,799*
# / set	1.5	0.6	0.4	1.5	*1.0*
total weight (kg)	7,164	4,834	3,823	16,230	*32,051*
weight (kg) / set	23.3	11.5	7.1	28.1	*17.4*
number weighed	440	255	211	827	*1,733*
(mean weight) / # fish	16.3	19.0	18.1	19.6	*18.5*
SPECIES: YFT	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	1,128	2,354	2,423	4,765	*10,670*
# / set	3.7	5.6	4.5	8.3	*5.8*
total weight (kg)	35,487	49,727	89,346	159165	*333,725*
weight (kg) / set	115.2	117.8	166.1	275.8	*180.9*
number weighed	1,105	1,567	2,320	4,614	*9,606*
(mean weight) / # fish	32.1	31.7	38.5	34.5	*34.7*
SPECIES: TOTAL	**WINTER**	**SPRING**	**SUMMER**	**FALL**	*total / mean*
# caught	***4,992***	***5,515***	***10,063***	***1,0431***	***31,001***
# / set	***16.2***	***13.1***	***18.7***	***18.1***	***16.8***
total weight (kg)	***128,010***	***115,961***	***254,351***	***291,464***	***789,786***
weight (kg) / set	***415.6***	***274.8***	***472.8***	***505.1***	***428.1***
number weighed	***4,875***	***4,402***	***9,810***	***10,133***	***29,220***
(mean weight) / # fish	***26.3***	***26.3***	***25.9***	***28.8***	***27.0***

* Various tuna species.

Appendix C1: Summary of LJFL, PAL, PFL, PDL, CK, and FL (cm) by species for winter for all years.

species	# caught	LJFL	PAL	PFL	PDL	CK	FL
ALB	462	127.8	35.7	88.2	---	---	101.7
BET	1,251	115.5	43.5	97.1	138.1	62.8	122.3
BFT	1	---	---	---	---	---	135.0
BLT	24	---	---	---	---	---	79.5
BUM	180	180.4	57.2	137.0	110.5	---	116.7
DOL	218	73.8	19.7	48.4	---	43.5	71.9
SAI	257	168.3	62.9	128.2	92.5	---	162.0
SPF	110	165.7	55.7	125.1	103.0	---	134.0
SWO	887	132.9	44.9	96.8	69.6	75.1	126.0
TUN	11	---	---	---	---	---	129.4
WHM	448	145.3	46.5	108.5	80.7	40.0	114.5
YFT	1,128	120.1	39.3	84.1	128.0	76.2	130.8
total / mean	***4,992***	***141.9***	***46.8***	***105.5***	***84.9***	***74.0***	***119.5***

Appendix C2: Summary of LJFL, PAL, PFL, PDL, CK, and FL (cm) by species for spring for all years.

species	# caught	LJFL	PAL	PFL	PDL	CK	FL
ALB	1,001	154.8	44.7	104.3	---	78.5	101.1
BET	502	113.6	38.4	68.3	---	88.0	120.8
BFT	2	---	---	---	---	---	60.5
BLT	5	---	---	---	---	---	115.0
BUM	145	179.2	58.7	137.1	93.5	---	74.5
DOL	179	100.4	31.1	79.4	88.6	66.5	102.0
SAI	73	165.4	62.0	127.8	92.6	---	---
SPF	80	159.0	52.8	121.7	94.6	98.5	74.0
SWO	883	134.5	46.9	101.7	72.2	77.4	106.0
TUN	22	---	35.5	66.0	---	---	124.1
WHM	257	153.0	48.6	12.6	89.2	112.0	100.2
YFT	2,354	124.9	41.4	100.4	---	69.4	131.4
total / mean	***5,515***	***143.7***	***46.5***	***107.8***	***90.2***	***76.9***	***121.0***

Appendix C3: Summary of LJFL, PAL, PFL, PDL, CK, and FL (cm) by species for summer for all years.

species	# caught	LJFL	PAL	PFL	PDL	CK	FL
ALB	5,196	160.3	53.2	104.5	---	76.5	104.0
BET	491	153.0	42.9	---	---	91.0	123.1
BFT	3	---	---	---	---	---	96.5
BLT	45	4.0	18.5	96.0	---	---	67.3
BUM	150	191.2	61.3	144.7	89.0	---	121.5
DOL	334	110.8	26.2	73.5	---	---	92.3
SAI	284	168.3	64.4	132.5	93.2	---	130.0
SPF	85	166.6	53.4	126.7	---	---	---
SWO	708	125.2	41.1	90.0	45.5	71.9	135.0
TUN	88	127.0	---	---	---	---	127.5
WHM	217	155.7	49.8	115.2	92.2	---	100.8
YFT	2,423	150.8	42.3	99.8	---	86.5	137.3
total / mean	***10,063***	***147.0***	***45.2***	***105.5***	***78.6***	***72.0***	***114.1***

Appendix C4: Summary of LJFL, PAL, PFL, PDL, CK, and FL (cm) by species for fall for all years.

species	# caught	LJFL	PAL	PFL	PDL	CK	FL
ALB	736	142.0	33.7	72.1	---	84.1	97.2
BET	1,106	120.0	43.2	92.1	---	65.9	119.3
BFT	36	176.6	60.3	134.0	---	107.0	114.0
BLT	35	186.0	46.5	144.0	---	---	67.4
BUM	388	193.0	63.4	146.0	86.0	147.5	105.8
DOL	172	71.9	23.0	61.1	87.0	66.5	78.2
SAI	476	166.9	65.8	128.8	99.1	185.0	21.2
SPF	260	170.0	58.7	129.6	---	85.0	134.6
SWO	1,441	128.5	44.1	94.3	69.1	73.4	116.3
TUN	81	---	45.0	---	---	---	130.5
WHM	877	159.4	54.9	119.2	87.7	124.5	33.6
YFT	4,765	135.1	39.5	102.8	131.0	81.9	130.7
total / mean	***10,431***	***149.7***	***48.9***	***113.9***	***74.6***	***75.1***	***122.9***

Appendix C5: Summary of LJFL, PAL, PFL, PDL, CK, and FL (cm) by species for all seasons and years.

species	# caught	LJFL	PAL	PFL	PDL	CK	FL
ALB	7,395	151.0	43.0	98.1	---	81.5	102.8
BET	3,350	118.3	42.2	82.7	138.1	66.2	121.2
BFT	42	176.6	60.3	134.0	---	107.0	110.7
BLT	109	95.0	32.5	120.0	---	---	72.3
BUM	863	187.7	60.9	142.4	95.9	147.5	108.7
DOL	903	76.9	25.3	67.7	88.3	46.7	88.5
SAI	1,090	167.5	64.5	129.6	94.0	185.0	39.9
SPF	535	166.9	56.3	127.0	98.2	91.7	117.1
SWO	3,919	130.3	44.1	95.0	68.6	74.4	118.6
TUN	202	127.0	38.6	66.0	---	---	128.4
WHM	1,799	154.6	51.3	115.1	86.6	88.2	56.8
YFT	10,670	129.5	40.3	98.5	128.4	78.8	132.4
total / mean	*31,001*	*146.4*	*47.4*	*109.3*	*82.1*	*74.7*	*118.7*

Appendix D1: Summary of average length LJFL, PAL, PFL, PDL, CK, FL (cm) during the winter by species and sex for all years.

ALB	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	231	80.5	23.0	55.0	----------	----------	99.6
female	101	80.5	38.8	131.0	----------	----------	99.7
juvenile	22	157.0	52.0	116.5	----------	----------	101.3
male	108	94.0	31.7	65.0	----------	----------	108.0
total / mean	*462*	*127.8*	*35.7*	*88.2*	----------	----------	*101.7*
BET	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	38	52.0	----------	----------	----------	37.0	110.5
female	648	114.3	42.6	----------	136.7	64.8	123.0
juvenile	9	77.0	----------	55.0	----------	----------	94.2
male	556	131.0	43.9	114.0	139.2	63.6	122.6
total / mean	*1,251*	*115.5*	*43.5*	*97.1*	*138.1*	*62.8*	*122.3*
FT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	----------	----------	----------	----------	----------	----------	----------
female	----------	----------	----------	----------	----------	----------	----------
juvenile	----------	----------	----------	----------	----------	----------	----------
male	1	----------	----------	----------	----------	----------	135.0
total / mean	*1*	----------	----------	----------	----------	----------	135.0
BLT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	8	----------	----------	----------	----------	----------	63.0
female	3	----------	----------	----------	----------	----------	92.6
juvenile	----------	----------	----------	----------	----------	----------	----------
male	13	----------	----------	----------	----------	----------	81.5
total / mean	*24*	----------	----------	----------	----------	----------	*79.5*
BUM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	2	194.0	55.5	144.5	----------	----------	----------
female	65	186.5	59.9	140.9	----------	----------	120.0
juvenile	2	138.5	42.5	106.5	----------	----------	----------
male	111	177.4	55.9	135.1	105.6	----------	107.0
total / mean	*180*	*180.4*	*57.2*	*137.0*	*110.5*	----------	*116.7*
DOL	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	9	93.7	----------	----------	----------	----------	----------
female	141	70.0	----------	----------	----------	----------	42.0
male	68	80.5	----------	----------	----------	----------	51.5
total / mean	*218*	*73.8*	*19.7*	*48.4*	----------	----------	*43.5*
SAI	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	106	168.2	63.2	129.1	----------	----------	----------
female	75	171.4	64.8	129.1	93.3	----------	180.0
juvenile	2	146.0	56.0	111.0	----------	----------	----------
male	74	165.8	61.8	126.5	90.3	----------	145.0
total / mean	*257*	*168.3*	*62.9*	*128.2*	*92.5*	----------	*162.5*
SPF	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	1	----------	----------	----------	----------	----------	----------
female	39	164.6	55.5	125.2	95.0	----------	133.0
juvenile	----------	----------	----------	----------	----------	----------	----------
male	70	166.3	55.8	125.0	111.0	----------	135.0
total / mean	*110*	*165.7*	*55.7*	*125.1*	*103.0*	----------	*134.0*

Appendix D1 (cont.): **Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the winter by species and sex for all years.**

SWO	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	28	123.9	41.4	96.7	69.8	65.8	--------
female	544	140.0	48.3	103.1	70.6	79.4	126.0
juvenile	20	86.2	26.2	59.6	----------	47.5	--------
male	295	123.7	40.6	88.5	67.3	69.3	--------
total/mean	***887***	***132.9***	***44.9***	***96.8***	***69.6***	***75.1***	***126.0***
TUN	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	2	----------	----------	----------	----------	----------	--------
female	5	----------	----------	----------	----------	----------	--------
juvenile	1	----------	----------	----------	----------	----------	--------
male	3	----------	----------	----------	----------	----------	--------
total/mean	***11***	----------	----------	----------	----------	----------	--------
WHM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	85	153.7	50.9	113.8	80.1	----------	98.0
female	170	142.1	44.4	105.1	87.6	40.0	108.0
juvenile	11	137.9	46.7	99.4	70.1	----------	--------
male	182	145.2	46.5	110.0	81.6	----------	126.0
total/mean	***448***	***145.3***	***46.5***	***108.5***	***80.7***	***40.0***	***114.5***
YFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	197	75.9	23.9	56.2	----------	35.0	108.3
female	325	126.9	42.2	100.6	127.0	74.3	136.0
juvenile	4	----------	----------	----------	----------	----------	81.0
male	602	132.7	41.8	106.0	128.2	78.0	1,35.5
total/mean	***1,128***	***120.1***	***39.3***	***84.1***	***128.0***	***76.2***	***1,30.8***

Appendix D1 (*Total*): **Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the winter by sex for all species and years.**

TOTAL	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	722	148.1	52.2	112.3	73.9	57.2	103.6
female	2,116	141.6	45.7	102.3	84.7	77.3	120.1
juvenile	71	107.6	41.6	88.7	70.1	47.5	98.3
male	2,083	142.1	46.4	107.2	93.4	70.4	125.1
total/mean	***4,992***	***141.9***	***46.8***	***105.5***	***84.9***	***74.0***	***119.5***

Appendix D2: Summary of average length LJFL, PAL, PFL, PDL, CK, FL (cm) during the spring by species and sex for all years.

ALB	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	580	97.0	----------	68.0	----------	----------	104.1
female	228	155.1	41.9	107.1	----------	83.0	99.6
juvenile	----------	----------	----------	----------	----------	----------	----------
male	193	161.8	47.6	105.7	----------	74.0	93.2
total/mean	*1,001*	*154.8*	*44.7*	*104.3*	----------	*78.5*	*101.1*
BET	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	119	----------	----------	----------	----------	109.0	106.9
female	144	130.0	41.9	93.0	----------	67.0	130.4
juvenile	1	81.0	----------	----------	----------	----------	----------
male	238	----------	35.8	59.0	----------	----------	121.9
total/mean	*502*	*113.6*	*38.4*	*68.3*	----------	*88.0*	*120.8*
BFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	2	----------	----------	----------	----------	----------	60.5
female	----------	----------	----------	----------	----------	----------	----------
juvenile	----------	----------	----------	----------	----------	----------	----------
male	----------	----------	----------	----------	----------	----------	----------
total/mean	*2*	----------	----------	----------	----------	----------	*60.5*
BLT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	2	----------	----------	----------	----------	----------	----------
female	2	----------	----------	----------	----------	----------	93.0
juvenile	----------	----------	----------	----------	----------	----------	132.5
male	1	----------	----------	----------	----------	----------	124.0
total/mean	*5*	----------	----------	----------	----------	----------	*115.0*
BUM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	9	159.0	54.1	129.1	46.0	----------	----------
female	55	183.5	59.0	141.6	100.0	----------	74.5
juvenile	3	143.3	46.0	109.0	77.0	----------	----------
male	78	180.0	59.7	136.0	96.0	----------	----------
total/mean	*145*	*179.2*	*58.7*	*137.1*	*93.5*	----------	*74.5*
DOL	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	3	----------	33.0	82.0	----------	----------	108.0
female	117	97.2	31.5	79.4	76.0	66.5	101.0
male	59	103.1	30.1	79.3	91.7	----------	103.6
total/mean	*179*	*100.4*	*31.1*	*79.4*	*88.6*	*66.5*	*102.0*
SAI	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	2	152.0	55.0	122.5	81.0	----------	----------
female	38	167.3	63.2	129.2	96.2	----------	----------
juvenile	2	156.0	68.0	118.5	75.0	----------	----------
male	31	164.4	60.7	127.1	94.2	----------	----------
total/mean	*73*	*165.4*	*62.0*	*127.8*	*92.6*	----------	----------
SPF	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	5	157.7	51.0	124.5	----------	----------	----------
female	24	156.1	51.5	120.7	----------	----------	----------
juvenile	1	152.0	59.0	114.0	87.0	----------	----------
male	50	160.6	53.5	122.1	95.7	131.0	18.0
total/mean	*80*	*159.0*	*52.8*	*121.7*	*94.6*	*98.5*	*74.0*

Appendix D2 (cont.): **Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the spring by species and sex for all years.**

SWO	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	17	97.2	31.3	64.3	----------	54.7	106.0
female	506	140.7	49.2	106.5	68.0	80.7	----------
juvenile	24	84.8	43.9	96.8	73.0	47.5	----------
male	336	130.5	46.9	101.7	72.2	75.4	----------
total/mean	***883***	***134.5***	***46.9***	***101.7***	***72.2***	***77.4***	***106.0***
TUN	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	12	----------	----------	----------	----------	----------	110.2
female	9	----------	50.0	98.0	----------	----------	142.7
juvenile	----------	----------	----------	----------	----------	----------	----------
male	1	----------	21.0	34.0	----------	----------	53.0
total/mean	***22***	----------	***35.5***	***66.0***	----------	----------	***124.1***
WHM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	27	151.6	49.4	108.8	107.6	----------	99.0
female	123	153.2	47.9	113.0	89.0	112.0	----------
juvenile	1	161.0	57.0	122.0	93.0	----------	----------
male	106	153.0	49.3	112.9	87.9	----------	104.0
total/mean	***257***	***153.0***	***48.6***	***112.6***	***89.2***	***112.0***	***100.2***
YFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	848	170.0	63.0	129.0	----------	----------	129.3
female	565	123.3	40.4	99.2	----------	69.0	135.8
juvenile	5	----------	----------	----------	----------	----------	82.4
male	936	125.3	42.2	100.9	----------	69.7	131.0
total/mean	***2,354***	***124.9***	***41.4***	***100.4***	----------	***69.4***	***131.4***

Appendix D2 (*Total*): **Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the spring by sex for all species and years.**

TOTAL	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	*1,638*	*138.5*	*47.6*	*107.4*	*90.0*	*58.8*	*118.0*
female	*1,811*	*146.1*	*46.1*	*107.4*	*90.9*	*80.1*	*123.2*
juvenile	*37*	*99.1*	*48.6*	*98.2*	*80.1*	*47.5*	*82.4*
male	*2,029*	*143.3*	*47.0*	*108.5*	*90.7*	*75.0*	*123.0*
total/mean	***5,515***	***143.7***	***46.5***	***107.8***	***90.2***	***76.9***	***121.O***

Appendix D3: Summary of average length LJFL, PAL, PFL, PDL, CK, FL (cm) for all species, years and sex for summer for all years.

ALB	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	2,140	169.0	41.1	126.0	----------	----------	103.4
female	1,232	157.2	92.6	93.1	----------	----------	104.3
juvenile	----------	----------	----------	----------	----------	----------	----------
male	1,824	160.1	42.4	107.4	----------	76.5	104.6
total/mean	***5,196***	***160.3***	***53.2***	***104.5***	----------	***76.5***	***104.0***
BET	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	23	----------	35.0	----------	----------	----------	113.4
female	209	153.0	44.7	----------	----------	91.0	127.7
juvenile	6	----------	----------	----------	----------	----------	76.5
male	253	----------	42.0	----------	----------	----------	121.3
total/mean	***491***	***153.0***	***42.9***	----------	----------	***91.0***	***123.1***
BFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	2	----------	----------	----------	----------	----------	96.5
female	----------	----------	----------	----------	----------	----------	----------
juvenile	----------	----------	----------	----------	----------	----------	----------
male	1	----------	----------	----------	----------	----------	----------
total/mean	***3***	----------	----------	----------	----------	----------	***96.5***
BLT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	16	4.0	----------	----------	----------	----------	66.5
female	9	----------	----------	----------	----------	----------	61.3
juvenile	2	----------	18.5	----------	----------	----------	45.0
male	18	----------	----------	96.0	----------	----------	73.6
total/mean	***45***	***4.0***	***18.5***	***96.0***	----------	----------	***67.3***
BUM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	6	172.7	54.2	126.0	81.7	----------	----------
female	43	208.1	68.4	158.1	103.5	----------	----------
juvenile	1	115.0	47.0	80.0	----------	----------	----------
male	100	185.3	58.7	140.6	----------	----------	124.0
total/mean	***150***	***191.2***	***61.3***	***144.7***	***89.0***	----------	***121.5***
DOL	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	11	----------	26.5	90.1	----------	----------	111.0
female	218	113.0	26.1	72.0	----------	----------	89.9
male	105	100.0	26.3	75.5	----------	----------	95.1
total/mean	***334***	***110.8***	***26.2***	***73.5***	----------	----------	***92.3***
SAI	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	8	166.1	63.5	128.2	----------	----------	----------
female	133	169.4	64.6	132.6	94.5	----------	----------
juvenile	1	119.0	46.0	90.0	----------	----------	----------
male	142	167.8	64.5	132.9	86.0	----------	130.0
total/mean	***284***	***168.3***	***64.4***	***132.5***	***93.2***	----------	***130.0***
SPF	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	4	162.5	43.5	123.5	----------	----------	1
female	37	166.5	52.2	126.9	----------	----------	89
juvenile	----------	----------	----------	----------	----------	----------	6
male	44	167.0	55.2	126.9	----------	----------	164
total/mean	***85***	***166.6***	***53.4***	***126.7***	----------	----------	***260***

Appendix D3 (cont.) **Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the summer by species and sex for all years.**

SWO	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	87	124.8	38.9	47.1	7.0	74.8	----------
female	323	132.1	43.3	91.1	----------	75.7	135.0
juvenile	16	82.7	24.4	52.3	36.0	47.0	----------
male	282	119.8	41.0	88.4	----------	68.2	----------
total/mean	***708***	***125.2***	***41.1***	***90.0***	***45.5***	***71.9***	***135.0***
TUN	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	19	----------	----------	----------	----------	----------	103.0
female	39	----------	----------	----------	----------	----------	135.8
juvenile	----------	----------	----------	----------	----------	----------	----------
male	30	127.0	----------	----------	----------	----------	132.0
total/mean	***88***	***127.0***	----------	----------	----------	----------	***127.5***
WHM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	15	156.6	48.0	117.6	93.6	----------	101.0
female	135	156.3	50.9	115.0	90.0	----------	102.0
juvenile	----------	----------	----------	----------	----------	----------	----------
male	67	154.5	48.0	115.1	----------	----------	98.0
total/mean	***217***	***155.7***	***49.8***	***115.2***	***92.2***	----------	***100.8***
YFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	198	----------	----------	----------	----------	----------	----------
female	884	----------	----------	----------	----------	----------	86.5
juvenile	6	----------	----------	----------	----------	----------	----------
male	1,335	186.5	42.3	99.8	----------	----------	----------
total/mean	***2,423***	***150.8***	***42.3***	***99.8***	----------	----------	***86.5***

Appendix D3: **Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the summer by sex for all species and years.**

TOTAL	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	*2,568*	*132.4*	*40.9*	*101.3*	*68.5*	*74.8*	*105.9*
female	*3,262*	*150.5*	*44.9*	*102.9*	*95.4*	*75.8*	*116.5*
juvenile	*32*	*86.5*	*26.7*	*58.2*	*36.0*	*47.0*	*72.9*
male	*4,201*	*147.4*	*46.5*	*110.0*	*86.0*	*68.3*	*118.0*
total/mean	***10,063***	***147.0***	***45.2***	***105.5***	***78.6***	***72.0***	***114.1***

Appendix D4: Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the fall by species and sex for all years.

ALB	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	178	----------	31.0	----------	----------	----------	----------
female	312	152.0	38.3	66.3	----------	93.5	----------
juvenile	14	----------	27.4	----------	----------	----------	----------
male	232	137.0	41.1	78.0	----------	79.5	94.7
total/mean	***736***	***142.0***	***33.7***	***72.1***	----------	***84.1***	***97.2***
BET	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	46	----------	30.5	70.0	----------	65.0	109.9
female	569	123.2	43.0	74.0	----------	69.6	121.5
juvenile	8	----------	29.0	----------	----------	----------	69.6
male	483	117.2	46.4	102.2	----------	62.3	118.5
total/mean	***1,106***	***120.0***	***43.2***	***92.1***	----------	***65.9***	***119.3***
BFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	2	----------	----------	----------	----------	----------	59.5
female	28	176.6	60.3	134.0	----------	107.0	116.0
male	6	----------	----------	----------	----------	----------	125.4
total/mean	***36***	***176.6***	***60.3***	***134.0***	----------	***107.0***	***114.0***
BLT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	7	----------	----------	----------	----------	----------	60.8
female	10	----------	----------	----------	----------	----------	68.0
juvenile	----------	----------	----------	----------	----------	----------	----------
male	18	186.0	86.0	144.0	----------	----------	69.4
total/mean	***35***	***186.0***	***46.5***	***144.0***	----------	----------	***67.4***
BUM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	12	----------	----------	----------	----------	135.0	----------
female	159	----------	----------	----------	----------	----------	----------
juvenile	5	----------	----------	----------	----------	----------	----------
male	212	----------	----------	----------	----------	160.0	105.8
total/mean	***388***	***193.0***	***63.4***	***146.0***	***86.0***	***147.5***	***105.8***
DOL	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	20	68.8	19.9	55.5	----------	----------	61.0
female	106	54.9	23.0	59.5	----------	66.5	74.1
male	46	118.1	24.6	67.6	87.0	----------	88.7
total/mean	***172***	***71.9***	***23.0***	***61.1***	***87.0***	***66.5***	***78.2***
SAI	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	16	145.7	58.0	116.0	94.0	----------	----------
female	220	169.7	67.5	132.1	98.6	185.0	25.8
juvenile	3	139.3	47.3	105.3	----------	----------	----------
male	237	165.4	64.7	126.7	122.0	----------	19.5
total/mean	***476***	***166.9***	***65.8***	***128.8***	***99.1***	***185.0***	***21.2***
SPF	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	1	178.0	50.0	160.0	----------	----------	----------
female	89	170.3	56.7	128.8	----------	----------	131.0
juvenile	6	149.8	46.3	120.5	----------	----------	----------
male	164	170.5	60.3	130.2	----------	85.0	136.5
total/mean	***260***	***170.0***	***58.7***	***129.6***	----------	***85.0***	***134.6***

Appendix D4 (cont.): Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the fall by species and sex for all years.

SWO	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	80	110.3	38.6	82.9	57.9	61.2	134.0
female	747	137.4	47.2	99.6	74.7	78.5	107.6
juvenile	45	91.2	31.4	66.3	47.0	52.7	----------
male	569	122.1	41.8	90.7	71.8	69.1	118.5
total/mean	***1,441***	***128.5***	***44.1***	***94.3***	***69.1***	***73.4***	***116.3***
TUN	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	8	----------	----------	----------	----------	----------	----------
female	52	----------	45.0	----------	----------	----------	131.7
juvenile	----------	----------	----------	----------	----------	----------	----------
male	21	----------	----------	----------	----------	----------	127.6
total/mean	***81***	----------	***45.0***	----------	----------	----------	***130.5***
WHM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	27	150.0	49.0	113.9	84.3	----------	----------
female	401	160.6	55.4	119.9	94.6	127.0	52.6
juvenile	4	133.7	48.2	98.0	----------	----------	----------
male	445	158.8	54.9	119.0	87.1	122.0	25.6
total/mean	***877***	***159.4***	***54.9***	***119.2***	***87.7***	***124.5***	***33.6***
YFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	579	172.0	39.1	102.7	131.0	137.0	133.9
female	1,861	134.3	41.0	101.0	----------	81.4	131.2
juvenile	100	----------	24.1	61.7	----------	----------	80.4
male	2,225	135.4	40.9	108.6	----------	81.5	131.8
total/mean	***4,765***	***135.1***	***39.5***	***102.8***	***131.0***	***81.9***	***130.7***

Appendix D4 (*Total*): Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) during the fall by sex for all species and years.

TOTAL	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	*993*	*118.6*	*39.8*	*92.5*	*68.4*	*67.6*	*122.2*
female	*4,570*	*153.5*	*50.4*	*114.7*	*78.6*	*79.0*	*123.4*
juvenile	*185*	*106.2*	*28.8*	*88.3*	*55.0*	*52.7*	*80.0*
male	*4,683*	*149.7*	*50.1*	*115.7*	*76.6*	*72.4*	*124.4*
total/mean	***10,431***	***149.7***	***48.9***	***113.9***	***74.6***	***75.1***	***122.9***

Appendix D5 (*Total*): Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) by species, and sex for all seasons and years.

ALB	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	3,129	119.2	39.6	86.0	--------	--------	102.6
female	1,873	158.1	51.8	98.7	----------	90.0	103.2
juvenile	36	157.0	29.2	116.5	----------	--------	94.3
male	2,357	152.9	41.4	99.5	----------	77.8	102.9
total/mean	***7,395***	***151.0***	***43.0***	***98.1***	----------	***81.5***	***102.8***
BET	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	226	52.0	32.0	70.0	----------	70.3	108.7
female	1,570	121.2	43.1	88.2	136.7	68.3	123.8
juvenile	24	78.3	29.0	56.6	----------	--------	79.8
male	1,530	122.7	42.6	87.0	139.2	62.7	121.0
total/mean	***3,350***	***118.3***	***42.2***	***82.7***	***138.1***	***66.2***	***121.2***
BFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	6	----------	----------	--------	----------	--------	72.1
female	28	176.6	60.3	134.0	----------	107.0	116.0
male	8	----------	----------	--------	----------		127.0
total/mean	***42***	***176.6***	***60.3***	***134.0***	----------	***107.0***	***110.7***
BLT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	33	4.0	----------	--------	----------	--------	66.7
female	24	----------	7.0	--------	----------	--------	75.7
juvenile	2	---------	18.5	---------	----------	-------	45.0
male	50	186.0	86.0	120.0	----------	---------	75.4
total/mean	***109***	***95.0***	***32.5***	***120.0***	----------	--------	***72.3***
BUM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	29	175.4	56.6	131.4	77.5	135.0	-------
female	322	196.0	63.8	148.8	108.1	--------	106.7
juvenile	11	143.4	46.0	106.4	73.5	--------	-------
male	501	183.9	59.6	139.6	98.1	160.0	110.5
total/mean	***863***	***187.7***	***60.9***	***142.4***	***95.9***	***147.5***	***108.7***
DOL	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	43	73.4	22.4	66.0	----------	--------	101.4
female	582	71.8	25.3	66.1	76.0	45.9	85.7
male	278	91.1	25.8	71.5	90.8	51.5	93.5
total/mean	***903***	***76.9***	***25.3***	***67.7***	***88.3***	***46.7***	***88.5***
SAI	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	132	166.4	62.7	127.9	91.4	--------	-------
female	466	169.7	65.7	131.5	95.4	185.0	51.5
juvenile	8	142.6	52.5	108.1	75.0	--------	-------
male	484	166.1	64.0	128.5	94.7	--------	35.2
total/mean	***1,090***	***167.5***	***64.5***	***129.6***	***94.0***	***185.0***	***51.5***
SPF	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	11	162.1	47.1	128.0	----------	66.0	130.0
female	189	166.6	54.9	126.7	95.0	--------	132.0
juvenile	7	150.1	48.1	119.5	87.0	--------	-------
male	328	167.6	57.6	127.4	100.3	100.3	106.5
total/mean	***535***	***166.9***	***56.3***	***127.0***	***98.2***	***91.7***	***117.1***

Appendix D5 (cont): Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) by species, and sex for all seasons and years (*Total*).

SWO	# caught	LJFL	PAL	PFL	PDL	CK	FL
undetermined	212	117.4	38.8	90.0	60.2	68.4	120.0
female	2,120	138.0	47.2	100.5	73.2	78.8	118.3
juvenile	105	87.4	29.9	60.4	41.5	49.5	----------
male	1,482	123.9	41.6	90.5	70.8	70.4	118.5
total/mean	***3,919***	***130.3***	***44.1***	***95.2***	***68.6***	***70.4***	***118.6***
TUN	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	41	----------	----------	----------	----------	----------	106.8
female	105	----------	47.5	98.0	----------	----------	133.9
juvenile	1	----------	----------	----------	----------	----------	130.0
male	55	127.0	21.0	34.0	----------	----------	129.0
total/mean	***202***	***127.0***	***38.6***	***66.0***	----------	----------	***128.4***
WHM	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	154	153.0	50.1	113.2	85.7	----------	99.5
female	829	155.0	51.2	115.0	89.9	79.7	66.6
juvenile	16	138.3	48.5	100.5	73.0	----------	----------
male	800	154.6	51.7	115.8	86.5	122.0	40.9
total/mean	***1,799***	***154.6***	***51.3***	***115.1***	***86.6***	***88.2***	***56.8***
YFT	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	1,822	83.5	36.9	77.0	131.0	103.0	129.6
female	3,635	130.2	41.3	100.2	127.0	77.8	133.7
juvenile	115	----------	24.1	61.7	----------	----------	80.4
male	5,098	133.2	41.5	103.6	128.2	79.1	133.7
total/mean	***10,670***	***129.5***	***40.3***	***98.5***	***128.4***	***78.8***	***132.4***

Appendix D5 (*Total*): Summary of average length LJFL, PAL, PFL, PDL, CK, and FL (cm) by sex for all species, seasons and years.

TOTAL	**# caught**	**LJFL**	**PAL**	**PFL**	**PDL**	**CK**	**FL**
undetermined	5,921	136.7	44.8	104.2	70.9	69.6	111.9
female	11,759	148.8	47.7	108.4	83.9	78.3	120.5
juvenile	325	102.6	30.9	85.4	70.4	49.5	83.1
male	12,996	146.7	48.3	111.7	87.7	71.9	121.8
total/mean	**31,001**	**146.4**	**47.4**	**109.3**	**82.1**	**74.7**	**118.7**

Appendix E1: Summary of winter and spring catch mortality, for all species, and years.

Species	WINTER # ALIVE	WINTER # DEAD	WINTER % MORT	SPRING # ALIVE	SPRING # DEAD	SPRING % MORT
ALB	166	286	63%	499	523	51%
BET	538	696	56%	328	156	32%
BFT	1	------	0%	1	1	50%
BLT	6	18	75%	4	1	20%
BUM	90	86	49%	73	68	5%
DOL	181	27	13%	166	9	3%
SAI	88	164	65%	26	46	64%
SPF	40	67	63%	27	52	66%
SWO	166	714	81%	159	718	82%
TUN	4	6	60%	5	15	75%
WHM	172	267	61%	122	113	48%
YFT	420	683	62%	1,069	1,235	54%
TOTAL	**1,872**	**304**	**14%**	**2,429**	**2,937**	**55%**

Appendix E2: Summary of summer and fall catch mortality, all species, all seasons, all years.

Species	SUMMER # ALIVE	SUMMER # DEAD	SUMMER % MORT	FALL # ALIVE	FALL # DEAD	FALL % MORT
ALB	2,340	2,726	54 %	253	481	66 %
BET	183	300	62 %	610	481	44 %
BFT	1	2	67 %	21	15	43 %
BLT	9	33	79 %	13	22	63 %
BUM	73	75	51 %	176	206	55 %
DOL	298	32	10 %	152	19	11 %
SAI	95	171	65 %	127	338	64 %
SPF	33	52	62 %	78	181	70 %
SWO	112	572	84 %	249	1,188	83 %
TUN	20	67	77 %	25	55	69 %
WHM	113	104	48 %	367	505	58 %
YFT	1,128	1,203	52 %	2,038	2,037	56 %
TOTAL	**4,405**	**5,337**	**55 %**	**4,134**	**6,150**	**59 %**

Appendix E3: Total mortality for all species, all seasons, and all years.

SPECIES	*TOTALS # ALIVE*	*TOTALS # DEAD*	*TOTALS % MORT*
ALB	*3208*	*4,016*	*57 %*
BET	*1,659*	*1633*	*50 %*
BFT	*24*	*18*	*75 %*
BLT	*32*	*74*	*70 %*
BUM	*412*	*435*	*51 %*
DOL	*797*	*87*	*10 %*
SAI	*564*	*719*	*56 %*
SPF	*178*	*352*	*66 %*
SWO	*684*	*3,192*	*82 %*
TUN	*54*	*143*	*73 %*
WHM	*774*	*989*	*56 %*
YFT	*4,655*	*5,758*	*55 %*
TOTAL	**12,840**	**17,438**	**58 %**