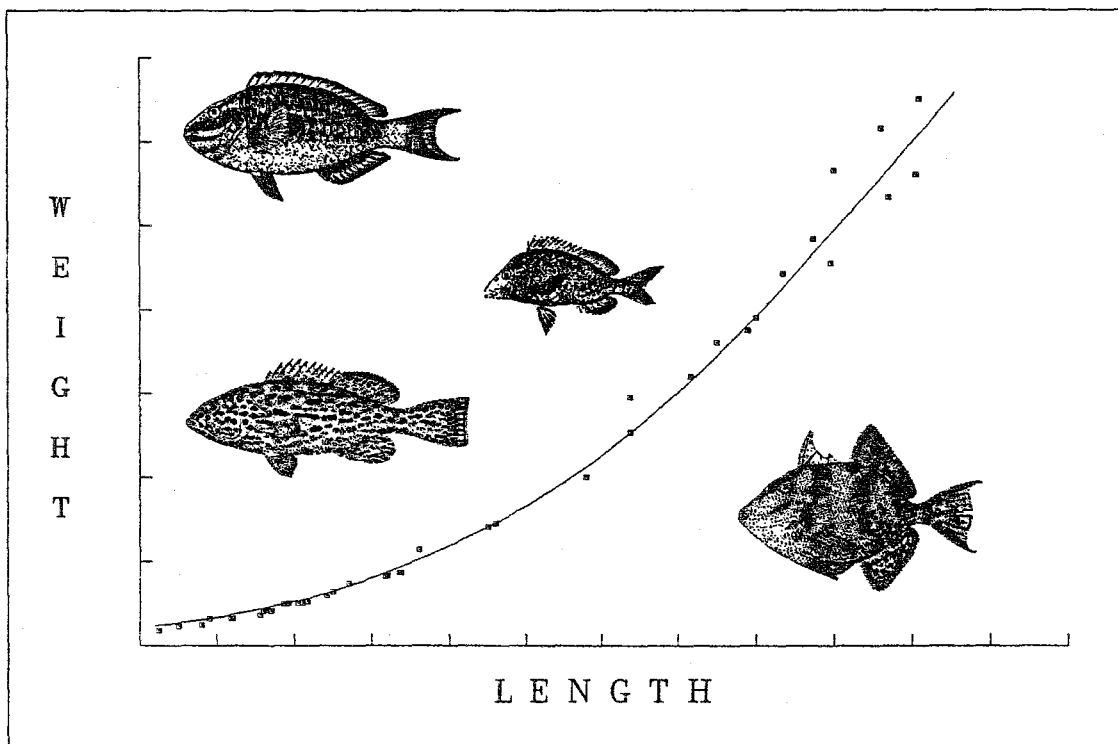




NOAA Technical Memorandum NMFS-SEFC-215

Length-Weight Relationships of Selected Marine Reef Fishes
from the Southeastern United States and the Caribbean



DECEMBER 1988

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Douglas E. Harper

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
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Miami, Florida 33149



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ABSTRACT

Formulae are provided for converting length estimates to wet weight biomass for 178 fish species from the southeast coast of the U.S., Gulf of Mexico, and the Caribbean. The formulae were empirically derived from measurements of 31,886 fishes. Species observed but lacking length-weight data are identified. Data contributions are solicited for future updates.

INTRODUCTION

A wide variety of visual censusing methods have been developed for non-destructive fishery-independent stock assessments. Most visual surveys of reef fishes have been limited to listing species or counting individuals (e.g., Brock, 1954; Jones and Thompson, 1978; Kimmel, 1985). A few visual census methods provide length estimates either for selected species (Bell, et al., 1985) or for general fish community structure (Bohnsack and Bannerot, 1986). Although fish length can be estimated underwater, use of these data have been limited because of a lack of information on relationships between length and weight for a majority of species. The mathematics of length-weight relationships has been reviewed by Weatherley and Gil (1987). Published data usually have been

restricted to single or a few commercial species (e.g., Starck, 1970; Campbell, 1984).

Length-to-weight conversion formulae would be helpful in estimating reef fish biomass. Biomass data are important for studying and modeling ecosystem structure, trophic relationships, population dynamics, species importance, stock characteristics, and fisheries exploitation. Lengths converted to weights can be used to estimate catch-at-age for fisheries analysis. In addition, conversion formulae may help law enforcement personnel estimate total catch weights for legal purposes.

PURPOSE

Here we provide a preliminary list of empirically derived length-to-weight relationships based on data collected during fishery research in the Caribbean and off the southeastern United States. Our intent is to provide a convenient reference of length-weight formulae that can be used to convert size-frequency observations to biomass estimates for comprehensive fish community and stock comparisons.

METHODS

Scientists from the Miami Laboratory, SEFC, have opportunistically collected biological data on reef fishes from southern Florida from 1980 to the present. All fish were measured with a standard fish measuring board graduated in millimeters (mm). Fork lengths (FL) were recorded to the nearest mm by measuring from the tip of the snout with the mouth closed, to the end of the middle-most caudal ray. Total length (TL), measured to the longest caudal ray, was used for species with rounded or truncated caudal fins. Weights were measured to the nearest 0.1 g on a laboratory triple beam balance whenever the fish could be brought into the laboratory. Fish processed in the field were weighed on spring-tension cylindrical scales to the nearest 10 g.

In addition to southern Florida fishes, length and weight information for reef fish were obtained from the 1985 Caribbean Biostatistical Database. Bohnsack et. al. (1986) provides detailed analysis and information concerning this database. For the purposes of this paper, records for all reef fish species were extracted and used in the regression computations. Outliers, data outside of the general length-weight trend area, were manually omitted from the analysis.

Weight-length relationships were calculated by fitting a regression line to the equation:

$$\log W = \log a + b \log L$$

which is equivalent to the equation:

$$W = aL^b$$

where W is weight in grams, and L is length in millimeters and a and b are constants. The regression constants, standard error of the constants, and coefficient of determination (R^2) were obtained using the least squares data regression function of the LOTUS 1-2-3 software.

Regressions for species with less than four actual measurements were derived by forcing the intercept through a point close to the origin by adding a "zero" data point.

RESULTS

Regression formulae are provided for 174 fish species representing a total of 7,503 individuals from the South Atlantic/ Gulf of Mexico (southern Florida) (Table 1) and 32 fish species representing a total of 24,383 individuals from the Caribbean (Table 2). Graphical representations of size-distribution and length-weight relationships for 50 southern Florida species with more than 30 measurements are presented in Appendix A so that users can assess the range and precision of the data. Formulae for species with fewer measurements should be used cautiously. Species observed in visual reef fish samples but lacking adequate length- to-weight data are identified in Table 3.

DISCUSSION

Data include most, but not all, species that have been observed during visual censuses of reef fish

habitats by the staff at the Miami Laboratory. Many species are transients or visiting species and are not considered reef fish by traditional criteria (i.e., Starck, 1968). These species are included, however, because they potentially can be major influences on reef fish community structure.

Biomass is considered an important variable in ecological studies. Numbers of fishes used alone tend to give excessive importance to small species and juvenile fishes. Biomass may be more representative of community structure although it may give excessive importance to very large individuals. Numbers, biomass, and frequency-of-occurrence can be combined to provide an "importance value" for particular species in ecological studies (Brower and Zar, 1977).

We anticipate that the formulae and length-weight data will be useful, but will also indicate gaps in our knowledge. We anticipate publishing more comprehensive periodic updates. We encourage and solicit contributions of data for this effort, particularly for species with few data or lacking data. All contributions will be acknowledged. If sufficient interest exists, we may expand future editions to include other fishery parameters, various length-to-length relationships, regional length-to-weight relationships, and summaries of published length to weight relationships. Suggestions are welcome.

ACKNOWLEDGMENTS

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Table 1. - Summary of southern Florida reef fish weight-regressions for 7,503 fish.

Regression formula: $\log \text{WEIGHT(gms)} = \log a + b \log \text{LENGTH(mm)}$.

Names of fishes are from Robins et. al. (1980).

* - Species with less than four actual fish measurements. The regression values presented can be only considered to represent very crude estimates. The regression lines were derived by forcing the intercept through a point at or close to the origin by adding a "zero" data point.

SPECIES	COMMON NAME	NO.	TYPE	SIZE (mm)		log a	b	R ²	STANDARD DEVIATION	
				MIN.	MAX.				b	log a
1	<u>Abudefduf saxatilis</u>	35	FL	18	143	-4.7859	3.1420	0.98	0.0864	0.1359
2 *	<u>Acanthemblemaria aspera</u>	1	TL	30	30	-5.0750	2.9625	1.00	0.0000	0.0000
3	<u>Acanthurus bahianus</u>	29	FL	35	243	-4.6005	2.9752	0.99	0.0666	0.0771
4	<u>Acanthurus chirurgus</u>	61	FL	39	304	-5.9255	3.5328	0.94	0.1154	0.1438
5	<u>Acanthurus coeruleus</u>	394	FL	35	304	-4.2165	2.8346	0.97	0.0261	0.0775
6	<u>Aluterus schoepfi</u>	53	TL	277	548	-3.3770	2.3443	0.78	0.1732	0.0671
7	<u>Aluterus scriptus</u>	71	TL	193	615	-1.8982	1.8136	0.89	0.0781	0.0908
8	<u>Amblycirrhitus pinos</u>	25	FL	275	452	-6.0169	3.4266	0.87	0.2712	0.0610
9	<u>Anisotremus surinamensis</u>	21	FL	247	488	-5.6212	3.3916	0.85	0.3223	0.0968
10	<u>Anisotremus virginicus</u>	187	FL	17	298	-4.9963	3.1674	0.99	0.0239	0.0816
11	<u>Apogon maculatus</u>	22	FL	16	65	-4.8752	3.0734	0.97	0.1110	0.0907
12	<u>Apogon pseudomaculatus</u>	49	FL	18	68	-4.6413	2.9434	0.93	0.1156	0.1123
13 *	<u>Archosargus probatocephalus</u>	1	FL	271	271	-4.8175	3.0912	1.00	0.0000	0.0000
14	<u>Archosargus rhomboidalis</u>	18	FL	42	254	-4.8471	3.1021	1.00	0.0518	0.0477
15 *	<u>Astrapogon stellatus</u>	1	TL	57	57	-4.8463	3.0769	1.00	0.0000	0.0000
16 *	<u>Aulostomus maculatus</u>	1	TL	209	209	-5.2686	2.8657	1.00	0.0000	0.0000
17	<u>Balistes capriscus</u>	233	FL	158	536	-4.5359	2.9352	0.93	0.0549	0.0762
18	<u>Balistes vetula</u>	22	FL	165	425	-4.5638	2.9903	0.96	0.1388	0.0550
19	<u>Blennius cristata</u>	16	TL	22	73	-3.9658	2.4144	0.92	0.1873	0.0938
20 *	<u>Bodianus rufus</u>	2	FL	252	331	-4.8936	3.0532	1.00	0.0012	0.0045
21	<u>Bothus lunatus</u>	10	TL	81	469	-5.1974	3.1894	0.99	0.0978	0.0707
22	<u>Calamus bajonado</u>	130	FL	192	481	-4.1758	2.8175	0.92	0.0730	0.0511
23	<u>Calamus calamus</u>	207	FL	158	310	-4.1688	2.8009	0.84	0.0850	0.0640
24	<u>Calamus penna</u>	28	FL	165	369	-3.7826	2.6663	0.83	0.2401	0.1017
25	<u>Calamus proridens</u>	47	FL	134	272	-3.5329	2.5299	0.75	0.2206	0.1140
26 *	<u>Callionymus bairdi</u>	1	TL	16	16	-4.7580	3.1210	1.00	0.0000	0.0000
27	<u>Cantherhines macrocerus</u>	10	TL	233	395	-3.9037	2.6534	0.90	0.3109	0.0633
28	<u>Cantherhines pullus</u>	12	TL	151	200	-3.7282	2.5632	0.91	0.2508	0.0314
29	<u>Canthidermis sufflamen</u>	34	FL	363	555	-4.8095	3.0554	0.97	0.1023	0.0343
30	<u>Caranx bartholomaei</u>	34	FL	202	705	-4.4953	2.9085	0.99	0.0536	0.0484
31	<u>Caranx crysos</u>	235	FL	160	458	-3.9699	2.6900	0.84	0.0782	0.1042
32	<u>Caranx hippos</u>	18	FL	260	647	-4.0201	2.7344	0.99	0.0706	0.0422
33	<u>Caranx ruber</u>	34	FL	32	377	-5.3687	3.2370	0.98	0.0754	0.0800
34	<u>Centropristis ocyurus</u>	10	TL	192	299	-3.6555	2.5990	0.96	0.1944	0.0422
35	<u>Centropristis striata</u>	7	TL	215	328	-3.6557	2.4683	0.97	0.1903	0.0350
36	<u>Chaetodiperus faber</u>	43	FL	201	396	-3.7175	2.6836	0.91	0.1348	0.0495
37	<u>Chaetodon capistratus</u>	6	TL	43	115	-4.8475	3.1897	1.00	0.0323	0.0122
38	<u>Chaetodon ocellatus</u>	80	TL	103	181	-4.4820	2.9838	0.96	0.0732	0.0296
39	<u>Chaetodon sedentarius</u>	34	TL	37	134	-4.6749	3.0760	0.88	0.1990	0.1031
40	<u>Chaetodon striatus</u>	13	TL	57	143	-4.7940	3.1395	0.99	0.1043	0.0599
41 *	<u>Chilomycterus schoepfi</u>	1	FL	212	212	-4.7512	3.1244	1.00	0.0000	0.0000
42	<u>Coryphopterus glaucofraenum</u>	18	TL	17	48	-4.8489	2.9674	0.93	0.2033	0.1188
43 *	<u>Cryptotomus roseus</u>	3	TL	12	69	-4.4794	3.1816	0.99	0.2328	0.6985
44 *	<u>Dasyatis americana</u>	2	TL	651	4150	-5.5182	2.6724	0.99	0.2951	1.2681
45	<u>Diodon holocanthus</u>	162	TL	112	430	-3.1948	2.3979	0.73	0.1157	0.1126
46	<u>Diodon hystrix</u>	30	TL	103	345	-2.5498	2.2763	0.99	0.0384	0.0348
47	<u>Diplectrum formosum</u>	170	FL	39	728	-5.0229	3.0781	0.96	0.0463	0.1115
48	<u>Echeneis naucrates</u>	5	TL	430	479	-3.0099	2.1128	0.98	0.1651	0.0060
49 *	<u>Elops saurus</u>	2	FL	293	413	-5.0651	2.9680	1.00	0.0117	0.0434
50 *	<u>Enneanectes pectoralis</u>	3	TL	23	34	-4.8980	3.0502	1.00	0.0158	0.0474

Table 1. (continued) - Summary of southern Florida reef fish weight-regressions for 7,503 fish.

Regression formula: $\log \text{WEIGHT(gms)} = \log a + b \log \text{LENGTH(mm)}$.

Names of fishes are from Robins et. al. (1980).

* - Species with less than four actual fish measurements. The regression values presented can be only considered to represent very crude estimates. The regression lines were derived by forcing the intercept through a point at or close to the origin by adding a "zero" data point.

SPECIES	COMMON NAME	NO.	TYPE	SIZE (mm)		log a	b	R ²	STANDARD DEVIATION	
				MIN.	MAX.				b	log a
51 * <u>Epinephelus cruentatus</u>	Graysby	2	TL	219	246	-4.9123	3.0439	1.00	0.0030	0.0107
52 <u>Epinephelus guttatus</u>	Red hind	20	TL	139	255	-5.0680	3.1124	0.92	0.2174	0.0778
53 <u>Epinephelus morio</u>	Red grouper	47	TL	82	566	-4.9464	3.0350	0.99	0.0553	0.0585
54 <u>Epinephelus striatus</u>	Nassau grouper	9	TL	203	516	-5.4164	3.2292	0.98	0.1890	0.0810
55 <u>Equetus acuminatus</u>	High-hat	19	TL	28	199	-5.2620	3.2017	1.00	0.0492	0.0534
56 <u>Equetus lanceolatus</u>	Jackknife-fish	8	TL	93	223	-6.8068	3.8444	1.00	0.0851	0.0278
57 * <u>Eucinostomus havana</u>	Bigeye mojarra	1	FL	116	116	-4.8940	3.0530	1.00	0.0000	0.0000
58 <u>Gerres cinereus</u>	Yellowfin mojarra	4	FL	52	257	-4.8195	3.0843	1.00	0.1145	0.0650
59 <u>Ginglymostoma cirratum</u>	Nurse shark	16	TL	229	1070	-4.8681	2.8918	0.93	0.2143	0.1516
60 <u>Gnatholepis thompsoni</u>	Goldspot goby	9	TL	15	52	-6.2207	3.7669	0.96	0.3071	0.1676
61 * <u>Gobiosox strumosus</u>	Skilletfish	1	TL	42	42	-4.9281	3.0359	1.00	0.0000	0.0000
62 <u>Gobiosoma oceanops</u>	Neon goby	19	TL	23	45	-5.2341	3.1370	0.95	0.1823	0.0681
63 <u>Gymnothorax funebris</u>	Green moray	9	TL	597	2134	-5.2443	2.8560	0.94	0.2623	0.1475
64 <u>Gymnothorax moringa</u>	Spotted moray	22	TL	403	886	-6.1561	3.1577	0.90	0.2301	0.0931
65 * <u>Gymnothorax nigromarginatus</u>	Blackedge moray	1	TL	486	486	-5.3194	2.8403	1.00	0.0000	0.0000
66 * <u>Gymnothorax vicinus</u>	Purplemouth moray	1	TL	758	758	-5.2478	2.8761	1.00	0.0000	0.0000
67 <u>Haemulon album</u>	Margate	11	FL	162	595	-4.8186	3.0423	0.99	0.1154	0.0603
68 <u>Haemulon aurolineatum</u>	Tomtate	198	FL	12	260	-5.2081	3.2077	0.99	0.0186	0.0893
69 * <u>Haemulon carbonarium</u>	Caesar grunt	3	FL	32	37	-4.8879	3.0559	1.00	0.0218	0.0668
70 <u>Haemulon chrysargyreum</u>	Smallmouth grunt	8	FL	140	200	-2.5578	2.1567	1.00	0.0466	0.0060
71 <u>Haemulon flavolineatum</u>	French grunt	61	FL	32	289	-5.0428	3.1581	0.99	0.0392	0.0606
72 <u>Haemulon macrostomum</u>	Spanish grunt	6	FL	174	203	-4.6419	3.0295	0.91	0.4687	0.0233
73 <u>Haemulon melanurum</u>	Cottonwick	70	FL	29	277	-4.5993	2.9527	0.98	0.0565	0.0519
74 <u>Haemulon parrai</u>	Sailor's choice	143	FL	41	300	-4.6947	2.9932	0.99	0.0237	0.0542
75 <u>Haemulon plumieri</u>	White grunt	362	FL	20	298	-5.0781	3.1612	0.99	0.0148	0.0924
76 <u>Haemulon sciurus</u>	Bluestriped grunt	136	FL	26	265	-4.7114	2.9996	0.99	0.0215	0.0705
77 * <u>Haemulon striatum</u>	Striped grunt	3	FL	40	180	-4.8564	3.0988	1.00	0.0963	0.3398
78 <u>Halichoeres bivittatus</u>	Slippery dick	21	TL	36	152	-4.8117	2.9391	0.96	0.1441	0.1389
79 <u>Halichoeres garnoti</u>	Yellowhead wrasse	5	TL	26	105	-5.6591	3.3747	0.99	0.2205	0.1017
80 <u>Halichoeres maculipinna</u>	Clown wrasse	7	TL	15	97	-6.2524	3.6932	0.99	0.1994	0.1414
81 * <u>Halichoeres radiatus</u>	Puddingwife	2	TL	24	36	-4.9221	3.0382	1.00	0.0145	0.0410
82 <u>Hemiramphus brasiliensis</u>	Ballyhoo	4	TL	275	380	-3.3362	2.3555	1.00	0.0717	0.0080
83 <u>Holacanthus bermudensis</u>	Blue angelfish	117	TL	69	427	-4.3950	2.8994	0.97	0.0513	0.0776
84 <u>Holacanthus ciliaris</u>	Queen angelfish	25	TL	29	350	-4.3731	2.9004	1.00	0.0369	0.0559
85 <u>Holacanthus tricolor</u>	Rock beauty	20	TL	42	213	-4.2262	2.8577	0.98	0.0989	0.0925
86 <u>Holocentrus ascensionis</u>	Squirrelfish	108	FL	190	382	-3.6218	2.5596	0.76	0.1403	0.0704
87 * <u>Holocentrus coruscus</u>	Reef squirrelfish	1	FL	51	51	-4.8611	3.0695	1.00	0.0000	0.0000
88 * <u>Holocentrus rufus</u>	Longspine squirrelfish	3	FL	90	175	-4.8825	3.0594	1.00	0.0716	0.2552
89 <u>Hypleurochilus bermudensis</u>	Barred blenny	6	TL	24	47	-4.9426	3.0332	0.95	0.3295	0.0733
90 * <u>Hypoplectrus unicolor</u>	Butter hamlet	4	FL	109	170	-5.1419	3.1818	0.99	0.0346	0.2216
91 * <u>Kyphosus sectatrix</u>	Bermuda chub	2	FL	190	206	-4.8397	3.0801	1.00	0.0034	0.0120
92 <u>Lachnolaimus maximus</u>	Hogfish	228	FL	68	600	-4.6801	2.9880	0.98	0.0318	0.0518
93 <u>Lactophrys bicaudalis</u>	Spotted trunkfish	5	TL	136	271	-2.4461	2.0976	0.95	0.2775	0.0644
94 <u>Lactophrys polygona</u>	Honeycomb cowfish	6	TL	200	301	-5.6339	3.3462	0.94	0.4084	0.0553
95 <u>Lactophrys quadricornis</u>	Scrawled cowfish	177	TL	88	550	-3.0194	2.2629	0.87	0.0667	0.0785
96 * <u>Lactophrys trigonius</u>	Trunkfish	3	TL	292	395	-4.8334	3.0829	1.00	0.0207	0.0814

Table 1. (continued) - Summary of southern Florida reef fish weight-regressions for 7,503 fish.

Regression formula: $\log \text{WEIGHT(gms)} = \log a + b \log \text{LENGTH(mm)}$.

Names of fishes are from Robins et. al. (1980).

* - Species with less than four actual fish measurements. The regression values presented can be only considered to represent very crude estimates. The regression lines were derived by forcing the intercept through a point at or close to the origin by adding a "zero" data point.

SPECIES	COMMON NAME	NO.	TYPE	SIZE (mm)		log a	b	R ²	STANDARD DEVIATION	
				MIN.	MAX.				b	log a
97	<u>Lactophrys triqueter</u>	117	TL	124	276	-2.7388	2.2302	0.80	0.1042	0.0744
98	<u>Lagodon rhomboides</u>	12	FL	130	212	-5.2350	3.2504	0.97	0.1652	0.0318
99	<u>Lutjanus analis</u>	365	FL	116	722	-4.8030	3.0112	0.97	0.0278	0.0579
100	<u>Lutjanus apodus</u>	51	FL	38	791	-4.6909	2.9779	0.99	0.0428	0.0516
101	* <u>Lutjanus buccanella</u>	3	FL	30	104	-5.1309	2.9735	0.99	0.2120	0.6800
102	* <u>Lutjanus cyanopterus</u>	1	FL	693	693	-4.8799	3.0601	1.00	0.0000	0.0000
103	<u>Lutjanus griseus</u>	245	FL	53	513	-4.5159	2.8809	0.97	0.0316	0.0537
104	<u>Lutjanus jocu</u>	5	FL	265	774	-4.3683	2.8574	0.99	0.1567	0.0616
105	<u>Lutjanus mahogoni</u>	13	FL	220	357	-4.0870	2.7190	0.84	0.3624	0.0761
106	<u>Lutjanus synagris</u>	254	FL	25	389	-4.3452	2.8146	0.96	0.0351	0.0709
107	<u>Lythrypnus spilus</u>	11	TL	16	40	-4.6635	2.7441	0.94	0.2261	0.0808
108	<u>Malacanthus plumieri</u>	5	FL	366	427	-4.1981	2.6290	0.93	0.4208	0.0215
109	<u>Malacoctenus macrops</u>	5	TL	25	37	-3.8333	2.2229	0.83	0.5814	0.0937
110	<u>Malacoctenus triangulatus</u>	4	TL	41	53	-5.3645	3.1883	0.86	0.8935	0.0750
111	<u>Microspathodon chrysurus</u>	8	FL	16	58	-4.7033	3.0825	1.00	0.0652	0.0318
112	* <u>Monacanthus ciliatus</u>	1	TL	126	126	-4.8264	3.0868	1.00	0.0000	0.0000
113	<u>Monacanthus hispidus</u>	115	TL	74	316	-3.9200	2.6178	0.86	0.0991	0.0934
114	<u>Mulloidichthys martinicus</u>	13	FL	223	293	-6.3369	3.6627	0.96	0.2264	0.0310
115	<u>Muraena miliaris</u>	6	TL	249	742	-4.5351	2.5736	0.99	0.0916	0.0366
116	<u>Mycteroperca bonaci</u>	21	FL	201	824	-5.3696	3.2051	1.00	0.0390	0.0351
117	<u>Mycteroperca microlepis</u>	30	FL	419	851	-4.9169	3.0305	0.98	0.0888	0.0382
118	<u>Ocyurus chrysurus</u>	257	FL	15	363	-4.1108	2.7180	0.96	0.0363	0.0811
119	* <u>Odontoscion dentex</u>	1	TL	58	58	-4.9854	3.0073	1.00	0.0000	0.0000
120	* <u>Ogcocephalus radiatus</u>	3	FL	204	255	-4.8749	3.0626	1.00	0.0018	0.0084
121	<u>Ophioblennius atlanticus</u>	9	TL	44	82	-3.8680	2.3791	0.87	0.3500	0.0936
122	* <u>Opistognathus whitehursti</u>	1	TL	144	144	-5.0210	2.9895	1.00	0.0000	0.0000
123	<u>Orthopristis chrysoptera</u>	49	FL	156	234	-5.0130	3.1893	0.95	0.1039	0.0237
124	<u>Pagrus pagrus</u>	113	FL	190	393	-4.6955	3.0027	0.95	0.0663	0.0462
125	* <u>Paranthias furcifer</u>	3	FL	235	295	-4.9130	3.0430	1.00	0.0124	0.0476
126	* <u>Pempheris schomburgki</u>	1	FL	42	42	-4.8557	3.0721	1.00	0.0000	0.0000
127	<u>Phaeoptyx pigmentaria</u>	8	FL	25	49	-5.2814	3.2553	0.99	0.0968	0.0274
128	<u>Pomacanthus arcuatus</u>	121	TL	16	438	-4.4311	2.9680	0.96	0.0569	0.1309
129	<u>Pomacanthus paru</u>	63	TL	21	413	-4.8182	3.1264	0.99	0.0326	0.0665
130	<u>Pomacentrus fuscus</u>	12	FL	28	79	-4.3479	2.8956	0.89	0.3139	0.1869
131	<u>Pomacentrus leucostictus</u>	11	FL	30	89	-4.4057	2.8868	0.97	0.1616	0.0742
132	<u>Pomacentrus partitus</u>	33	FL	14	69	-4.8921	3.1519	0.88	0.2076	0.2271
133	<u>Pomacentrus planifrons</u>	11	FL	14	105	-4.2782	2.8569	0.99	0.1030	0.1075
134	<u>Pomacentrus variabilis</u>	25	FL	12	74	-4.3258	2.8365	0.96	0.1259	0.1276
135	<u>Priacanthus arenatus</u>	171	FL	199	726	-4.9233	3.0387	0.91	0.0733	0.0665
136	<u>Priacanthus cruentatus</u>	10	FL	222	345	-1.6587	1.7495	0.72	0.3880	0.0809
137	* <u>Prionotus roseus</u>	1	TL	142	142	-4.9430	3.0285	1.00	0.0000	0.0000
138	<u>Pseudupeneus maculatus</u>	32	FL	149	290	-4.8231	3.0257	0.91	0.1743	0.0561
139	* <u>Quisquilius hipoliti</u>	2	TL	36	46	-4.9180	3.0407	1.00	0.0117	0.0344
140	* <u>Rachycentron canadum</u>	1	FL	1085	1085	-5.3753	2.8123	1.00	0.0000	0.0000
141	<u>Rhomboplites aurorubens</u>	8	FL	138	245	-4.5217	3.0436	0.93	0.3388	0.0780
142	* <u>Scarus coelestinus</u>	1	TL	540	540	-4.8764	3.0618	1.00	0.0000	0.0000
143	<u>Scarus coeruleus</u>	15	TL	103	610	-5.0162	3.1109	0.99	0.0838	0.0558
144	<u>Scarus croicensis</u>	7	TL	24	96	-4.8887	3.0548	1.00	0.0628	0.0341

Table 1. (continued) - Summary of southern Florida reef fish weight-regressions for 7,503 fish.

Regression formula: $\log \text{WEIGHT(gms)} = \log a + b \log \text{LENGTH(mm)}$.

Names of fishes are from Robins et. al. (1980).

* - Species with less than four actual fish measurements. The regression values presented can be only considered to represent very crude estimates. The regression lines were derived by forcing the intercept through a point at or close to the origin by adding a "zero" data point.

SPECIES	COMMON NAME	NO.	TYPE	SIZE (mm)		log a	b	R ²	STANDARD DEVIATION	
				MIN.	MAX.				b	log a
145	<u>Scarus guacamaia</u>	11	TL	128	484	-4.8714	3.0626	0.99	0.1026	0.0553
146	<u>Scarus taeniopterus</u>	4	TL	176	280	-4.1836	2.7086	0.85	0.8116	0.1289
147	* <u>Scomberomorus cavalla</u>	1	FL	510	510	-5.0538	2.9731	1.00	0.0000	0.0000
148	* <u>Scomberomorus maculatus</u>	1	FL	472	472	-5.0356	2.9822	1.00	0.0000	0.0000
149	<u>Scorpaena plumieri</u>	122	TL	13	340	-4.5626	2.9486	0.99	0.0323	0.0582
150	<u>Selene vomer</u>	31	FL	127	295	-4.7842	3.0758	0.97	0.1039	0.0409
151	<u>Seriola dumerili</u>	30	FL	220	728	-4.2985	2.8091	0.98	0.0693	0.0389
152	* <u>Seriola rivoliana</u>	2	FL	258	307	-4.8908	3.0548	1.00	0.0100	0.0364
153	* <u>Serranus baldwini</u>	1	FL	51	51	-4.9285	3.0358	1.00	0.0000	0.0000
154	<u>Serranus tigrinus</u>	7	FL	30	288	-4.8862	3.0475	1.00	0.0529	0.0475
155	* <u>Sparisoma atomarium</u>	2	TL	62	86	-4.9446	3.0275	1.00	0.0041	0.0131
156	<u>Sparisoma aurofrenatum</u>	17	FL	129	235	-5.7587	3.4291	0.88	0.3336	0.0948
157	<u>Sparisoma chrysopterum</u>	228	FL	27	395	-5.1754	3.1708	0.98	0.0321	0.0704
158	* <u>Sparisoma rubripinne</u>	2	FL	240	315	-4.8701	3.0641	1.00	0.0241	0.0872
159	<u>Sparisoma viride</u>	67	FL	129	382	-4.5223	2.9214	0.96	0.0707	0.0370
160	<u>Sphoeroides nephelus</u>	23	TL	155	255	-4.0772	2.6973	0.72	0.3711	0.1228
161	<u>Sphoeroides spengleri</u>	40	TL	27	303	-5.2360	3.2671	0.96	0.1065	0.1598
162	* <u>Sphoeroides testudineus</u>	3	TL	170	205	-4.8561	3.0717	1.00	0.0083	0.0305
163	<u>Sphyraena barracuda</u>	10	FL	58	1020	-5.3865	3.0825	0.99	0.0850	0.1051
164	* <u>Sphyraena picudilla</u>	1	FL	430	430	-5.1165	2.9417	1.00	0.0000	0.0000
165	<u>Starksia ocellata</u>	19	TL	10	45	-4.7368	2.8771	0.69	0.4653	0.3248
166	* <u>Synodus foetens</u>	1	FL	305	305	-5.0425	2.9787	1.00	0.0000	0.0000
167	* <u>Synodus intermedius</u>	3	FL	299	386	-5.0020	2.9988	1.00	0.0042	0.0165
168	<u>Thalassoma bifasciatum</u>	39	TL	15	118	-4.8865	2.9162	0.90	0.1588	0.2709
169	* <u>Umbrina coroides</u>	1	TL	192	192	-4.9506	3.0247	1.00	0.0000	0.0000
170	<u>Urolophus jamaicensis</u>	6	TL	273	416	-5.2244	3.0826	0.99	0.1563	0.0227
171	* <u>Vomer setapinnis</u>	2	FL	187	224	-4.8312	3.0856	1.00	0.0245	0.0852
172	* <u>Xyrichtys martinicensis</u>	3	TL	25	62	-4.8221	3.0780	1.00	0.0593	0.1879
173	<u>Xyrichtys novacula</u>	5	TL	35	100	-3.5613	2.2430	0.97	0.2352	0.0792
174	* <u>Xyrichtys splendens</u>	3	TL	97	104	-5.0012	2.9995	1.00	0.0121	0.0420

Table 2. - Summary of Caribbean (Puerto Rico, St. Thomas/St. John, and St. Croix) reef fish weight-length regressions for 24,383 fish. Regression formula: $\log W(\text{gms}) = \log a + b \log L(\text{mm})$.

SPECIES Common Name	AREA	NO.	TYPE	SIZE (mm)		log a	b	R ²
				MIN.	MAX.			
1 <u>Acanthurus chirurgus</u> Doctorfish	St. Thomas/St. John	139	FL	160	320	-4.0350	2.7443	0.89
	St. Croix	227	FL	175	337	-2.4262	2.0768	0.75
2 <u>Acanthurus coeruleus</u> Blue tang	St. Thomas/St. John	410	FL	135	285	-3.1415	2.3964	0.80
	St. Croix	2767	FL	100	295	-2.8242	2.2638	0.61
3 <u>Balistes vetula</u> Queen triggerfish	Puerto Rico	339	FL	175	546	-4.1822	2.8293	0.91
	St. Thomas/St. John	509	FL	170	435	-4.0637	2.7837	0.94
4 <u>Calamus baionado</u> Jolthead porgy	Puerto Rico	114	FL	170	298	-4.1724	2.8216	0.94
5 <u>Calamus penna</u> Sheepshead porgy	Puerto Rico	596	FL	134	535	-3.5518	2.5420	0.85
6 <u>Canthidermis sufflamen</u> Ocean triggerfish	St. Thomas/St. John	3	FL	330	350	-9.0383	4.7279	0.74
7 <u>Caranx ruber</u> Bar jack	St. Thomas/St. John	32	FL	200	730	-4.6704	2.9545	0.98
	St. Croix	98	FL	175	380	-4.1896	2.7480	0.90
8 <u>Epinephelus fulvus</u> Coney	Puerto Rico	583	FL	157	639	-4.6508	2.9330	0.83
	St. Thomas/St. John	189	FL	190	370	-3.3353	2.4000	0.54
	St. Croix	1644	FL	105	315	-3.6232	2.5105	0.70
9 <u>Epinephelus guttatus</u> Red hind	Puerto Rico	723	FL	156	474	-4.4431	2.8386	0.88
	St. Thomas/St. John	448	FL	205	545	-5.0756	3.1001	0.91
	St. Croix	567	FL	208	500	-5.3835	3.2304	0.92
10 <u>Epinephelus striatus</u> Nassau grouper	Puerto Rico	60	FL	210	645	-4.8980	3.0386	0.90
	St. Thomas/St. John	73	FL	330	770	-5.8455	3.3804	0.60
	St. Croix	4	FL	320	470	-5.5063	3.2832	0.96
11 <u>Etelis oculatus</u> Queen snapper	St. Thomas/St. John	21	FL	360	890	-3.6326	2.5498	0.85
	St. Croix	48	FL	200	702	-3.7621	2.5775	0.95
12 <u>Haemulon flavolineatum</u> French grunt	Puerto Rico	200	FL	137	296	-3.8605	2.6509	0.76
	St. Thomas/St. John	12	FL	170	210	-3.4610	2.4850	0.72
	St. Croix	232	FL	170	280	-3.5676	2.5255	0.54
13 <u>Haemulon plumieri</u> White grunt	Puerto Rico	1071	FL	135	444	-4.2654	2.8186	0.89
	St. Thomas/St. John	39	FL	190	700	-4.7822	3.0336	0.97
	St. Croix	1588	FL	50	325	-2.2775	1.9849	0.57
14 <u>Haemulon sciurus</u> Bluestriped grunt	St. Thomas/St. John	23	FL	205	310	-4.6001	2.9630	0.91
	St. Croix	138	FL	193	285	-3.9303	2.6930	0.68
15 <u>Holocentrus ascensionis</u> Squirrelfish	St. Thomas/St. John	98	FL	180	270	-3.3204	2.4280	0.66
	St. Croix	187	FL	160	250	-2.6159	2.1061	0.38
16 <u>Lachnolaimus maximus</u> Hogfish	Puerto Rico	53	FL	230	595	-3.9814	2.7055	0.81
	St. Thomas/St. John	27	FL	245	704	-4.3997	2.8828	0.99
	St. Croix	3	FL	308	363	-5.3159	3.2641	1.00
17 <u>Lactophrys polygonia</u> Honeycomb cowfish	Puerto Rico	203	FL	132	417	-3.9652	2.6794	0.91
	St. Croix	199	FL	135	385	-3.4940	2.4922	0.86
	Puerto Rico	219	FL	120	360	-2.9762	2.2372	0.81
18 <u>Lactophrys quadricornis</u> Scrawled cowfish	St. Croix	9	FL	244	330	-5.8621	3.4177	0.91

Table 2. (continued) - Summary of Caribbean (Puerto Rico, St. Thomas/St. John, and St. Croix) reef fish weight-length regressions for 24,383 fish. Regression formula: $\log W(\text{gms}) = \log a + b \log L(\text{mm})$.

SPECIES Common Name	AREA	NO.	TYPE	SIZE (mm)		Log a	b	R ²
				MIN.	MAX.			
19 <u>Lutjanus analis</u> Mutton snapper	Puerto Rico	53	FL	214	771	-4.6555	2.9502	0.94
	St. Thomas/St. John	27	FL	230	610	-5.2541	3.1747	0.99
	St. Croix	17	FL	260	630	-4.8341	3.0345	0.96
20 <u>Lutjanus apodus</u> Schoolmaster	Puerto Rico	72	FL	185	464	-5.1010	3.1541	0.98
	St. Thomas/St. John	39	FL	255	450	-4.7653	3.0096	0.94
	St. Croix	101	FL	188	470	-4.2103	2.7965	0.81
21 <u>Lutjanus buccanella</u> Blackfin snapper	Puerto Rico	20	FL	173	360	-4.4161	2.8593	0.98
	St. Thomas/St. John	180	FL	190	450	-4.1265	2.7346	0.91
	St. Croix	65	FL	212	440	-4.6475	2.9636	0.95
22 <u>Lutjanus synagris</u> Lane snapper	Puerto Rico	396	FL	156	414	-4.4119	2.8437	0.85
	St. Thomas/St. John	99	FL	175	400	-4.7458	2.9809	0.94
	St. Croix	4	FL	185	238	-2.3588	1.9954	0.67
23 <u>Lutjanus vivanus</u> Silk snapper	Puerto Rico	181	FL	149	403	-5.3646	3.2368	0.93
	St. Thomas/St. John	36	FL	195	635	-4.6001	2.9132	0.97
	St. Croix	165	FL	222	650	-4.2096	2.7812	0.93
24 <u>Mulloidichthys martinicus</u> Yellow goatfish	Puerto Rico	90	FL	164	290	-4.9593	3.0918	0.93
	St. Thomas/St. John	22	FL	225	325	-2.6201	2.1091	0.64
	St. Croix	547	FL	125	270	-3.2528	2.3772	0.55
25 <u>Mycteroperca venenosa</u> Yellowfin grouper	Puerto Rico	19	FL	225	550	-4.7033	2.9764	0.93
	St. Thomas/St. John	103	FL	285	900	-5.1611	3.1402	0.96
	St. Croix	11	FL	254	645	-3.2945	2.3892	0.75
26 <u>Ocyurus chrysurus</u> Yellowtail snapper	Puerto Rico	992	FL	29	562	-3.1552	2.3311	0.76
	St. Thomas/St. John	456	FL	215	560	-4.1770	2.7588	0.92
	St. Croix	610	FL	194	562	-4.3379	2.8110	0.96
27 <u>Pomacanthus arcuatus</u> Gray angelfish	St. Thomas/St. John	82	FL	25	490	0.8074	0.8716	0.26
28 <u>Pseudupeneus maculatus</u> Spotted goatfish	Puerto Rico	1160	FL	127	297	-4.6397	2.9581	0.85
	St. Thomas/St. John	3	FL	195	270	-6.7109	3.8059	1.00
	St. Croix	125	FL	180	262	-3.7431	2.5866	0.74
29 <u>Rhomboplites aurorubens</u> Vermilion snapper	Puerto Rico	162	FL	152	303	-4.6686	2.9512	0.87
	St. Thomas/St. John	6	FL	150	245	-5.0857	3.1214	0.91
	St. Croix	14	FL	310	405	-3.5651	2.5201	0.95
30 <u>Scarus taeniopterus</u> Princess parrotfish	St. Thomas/St. John	29	FL	215	300	-3.2257	2.3852	0.87
	St. Croix	334	FL	200	350	-2.0098	1.8751	0.43
31 <u>Sparisoma aurofrenatum</u> Redband parrotfish	St. Thomas/St. John	25	FL	180	330	-3.1111	2.3363	0.84
	St. Croix	434	FL	190	280	-4.0781	2.7438	0.43
32 <u>Sparisoma chrysopterygum</u> Redtail parrotfish	St. Thomas/St. John	93	FL	220	425	-3.3969	2.4533	0.66
	St. Croix	1970	FL	150	383	-3.0509	2.3192	0.58
32 <u>Sparisoma viride</u> Stoplight parrotfish	St. Thomas/St. John	53	FL	218	460	-5.0057	3.1207	0.93
	St. Croix	1693	FL	190	425	-4.4317	2.9051	0.84

Table 3. - List of species observed in visual censusing by Reef Team and for which length-weight data is needed (fewer than 30 measured individuals available).

SPECIES	COMMON NAME
<u>Acanthemblemaria aspera</u>	Roughhead blenny
<u>Acanthemblemaria chaplini</u>	Papillose blenny
<u>Acanthurus bahianus</u>	Ocean surgeon
<u>Adioryx vexillarius</u>	Dusky squirrelfish
<u>Aetobatus narinari</u>	Spotted eagle ray
<u>Alectis crinitus</u>	African pompano
<u>Amblycirrhitus pinos</u>	Redspotted hawkfish
<u>Anchoa lyolepis</u>	Dusky anchovy
<u>Anisotremus surinamensis</u>	Black margate
<u>Apogon binotatus</u>	Barred cardinalfish
<u>Apogon maculatus</u>	Flamefish
<u>Apogon quadrisquamatus</u>	Sawcheek cardinalfish
<u>Archosargus probatocephalus</u>	Sheepshead
<u>Archosargus rhomboidalis</u>	Sea bream
<u>Astrapogon stellatus</u>	Conchfish
<u>Atherinomorus stipes</u>	Hardhead silverside
<u>Aulostomus maculatus</u>	Trumpetfish
<u>Blennius cristata</u>	Molly miller
<u>Bodianus puchellus</u>	Spotfin hogfish
<u>Bodianus rufus</u>	Spanish hogfish
<u>Bothus lunatus</u>	Peacock flounder
<u>Callionymus bairdi</u>	Lancer dragonet
<u>Cantherhines macrocerus</u>	Whitespotted filefish
<u>Cantherhines pullus</u>	Orangespotted filefish
<u>Canthigaster rostrata</u>	Sharpnose puffer
<u>Caranx hippos</u>	Crevalle jack
<u>Caranx latus</u>	Horse-eye jack
<u>Centropomus undecimalis</u>	Snook
<u>Centropristis ocyurus</u>	Bank sea bass
<u>Centropristis striata</u>	Black sea bass
<u>Chaetodon capistratus</u>	Foureye butterflyfish
<u>Chaetodon striatus</u>	Banded butterflyfish
<u>Chilomycterus schoepfi</u>	Stripped burrfish
<u>Chromis cyaneus</u>	Blue chromis
<u>Chromis insolatus</u>	Sunshinefish
<u>Chromis multilineatus</u>	Brown chromis
<u>Chromis scotti</u>	Purple reeffish
<u>Clepticus parrai</u>	Creole wrasse
<u>Coryphopterus dicrus</u>	Colon goby
<u>Coryphopterus glaucofraenum</u>	Bridled goby
<u>Coryphopterus personatus</u>	Masked goby
<u>Cryptotomus roseus</u>	Bluelip parrotfish
<u>Dactylopterus volitans</u>	Flying gurnard
<u>Dasyatis americana</u>	Southern stingray
<u>Decapterus macarellus</u>	Mackerel scad
<u>Decapterus punctatus</u>	Round scad
<u>Echeneis naucrates</u>	Sharksucker

Table 3. (continued) - List of species observed in visual censusing by Reef Team and for which length-weight data is needed (fewer than 30 measured individuals available).

SPECIES	COMMON NAME
<u>Elops saurus</u>	Ladyfish
<u>Emblemaria pandionis</u>	Sailfin blenny
<u>Enchelycore nigrans</u>	Viper moray
<u>Enneanectes boehlkei</u>	Roughhead triplefin
<u>Enneanectes pectoralis</u>	Redeye triplefin
<u>Epinephelus adscensionis</u>	Rock hind
<u>Epinephelus cruentatus</u>	Graysby
<u>Epinephelus itajara</u>	Jewfish
<u>Epinephelus niveatus</u>	Snowy grouper
<u>Epinephelus striatus</u>	Nassau grouper
<u>Equetus acuminatus</u>	High-hat
<u>Equetus lanceolatus</u>	Jackknife-fish
<u>Equetus punctatus</u>	Spotted drum
<u>Eucinostomus argenteus</u>	Spotfin mojarra
<u>Eucinostomus havana</u>	Bigeye mojarra
<u>Gerres cinereus</u>	Yellowfin mojarra
<u>Ginglymostoma cirratum</u>	Nurse shark
<u>Gnatholepis thompsoni</u>	Goldspot goby
<u>Gobiesox strumosus</u>	Skilletfish
<u>Gobiosoma evelynae</u>	Sharpnose goby
<u>Gobiosoma macrodon</u>	Tiger goby
<u>Gobiosoma oceanops</u>	Neon goby
<u>Gramma loreto</u>	Fairy basslet
<u>Gymnothorax funebris</u>	Green moray
<u>Gymnothorax moringa</u>	Spotted moray
<u>Gymnothorax nigromarginatus</u>	Blackedge moray
<u>Gymnothorax saxicola</u>	Ocellated moray
<u>Gymnothorax vicinus</u>	Purplemouth moray
<u>Haemulon album</u>	Margate
<u>Haemulon carbonarium</u>	Caesar grunt
<u>Haemulon chrysargyreum</u>	Smallmouth grunt
<u>Haemulon macrostomum</u>	Spanish grunt
<u>Haemulon striatum</u>	Striped grunt
<u>Halichoeres bivittatus</u>	Slippery dick
<u>Halichoeres garnoti</u>	Yellowhead wrasse
<u>Halichoeres maculipinna</u>	Clown wrasse
<u>Halichoeres pictus</u>	Rainbow wrasse
<u>Halichoeres poeyi</u>	Blackear wrasse
<u>Halichoeres radiatus</u>	Puddingwife
<u>Hemiemblemaria simulus</u>	Wrasse blenny
<u>Hemiramphus brasiliensis</u>	Ballyhoo
<u>Holacanthus tricolor</u>	Rock beauty
<u>Holocentrus coruscus</u>	Reef squirrelfish

Table 3. (continued) - List of species observed in visual censusing by Reef Team and for which length-weight data is needed (fewer than 30 measured individuals available).

SPECIES	COMMON NAME
<u>Holocentrus marianus</u>	Longjaw squirrelfish
<u>Holocentrus rufus</u>	Longspine squirrelfish
<u>Holocentrus vexillarius</u>	Dusky squirrelfish
<u>Hypleurochilus bermudensis</u>	Barred blenny
<u>Hypoplectrus unicolor</u>	Butter hamlet
<u>Inermia vittata</u>	Boga
<u>Ioglossus calliurus</u>	Blue goby
<u>Jenkinsia lamprotaenia</u>	Dwarf herring
<u>Kyphosus sectatrix</u>	Bermuda chub
<u>Lactophrys trigonius</u>	Trunkfish
<u>Lagodon rhomboides</u>	Pinfish
<u>Liopropoma rubre</u>	Peppermint bass
<u>Lutjanus cyanopterus</u>	Cubera snapper
<u>Lutjanus jocu</u>	Dog snapper
<u>Lutjanus mahogoni</u>	Mahogonay snapper
<u>Lythrypnus spilus</u>	Bluegold goby
<u>Malacanthus plumieri</u>	Sand tilefish
<u>Malacoctenus aurolineatus</u>	Goldline blenny
<u>Malacoctenus gilli</u>	Dusky blenny
<u>Malacoctenus macrops</u>	Rosy blenny
<u>Malacoctenus sp.</u>	Unidentified blenny
<u>Malacoctenus triangulatus</u>	Saddled blenny
<u>Malacoctenus versicolor</u>	Barfin blenny
<u>Manta birostris</u>	Atlantic manta
<u>Megalops atlanticus</u>	Tarpon
<u>Melichthys niger</u>	Black durgon
<u>Microgobius carri</u>	Seminole goby
<u>Microgobius microlepis</u>	Banner goby
<u>Microspathodon chrysurus</u>	Yellowtail damselfish
<u>Monacanthus ciliatus</u>	Fringed filefish
<u>Monacanthus tuckeri</u>	Slender filefish
<u>Mulloidichthys martinicus</u>	Yellow goatfish
<u>Muraena miliaris</u>	Goldentail moray
<u>Muraena retifera</u>	Reticulate moray
<u>Mycteroperca bonaci</u>	Black grouper
<u>Mycteroperca phenax</u>	Scamp
<u>Mycteroperca tigris</u>	Tiger grouper
<u>Mycteroperca venenosa</u>	Yellowfin grouper
<u>Myripristis jacobus</u>	Blackbar soldierfish
<u>Odontoscion dentex</u>	Reef crocker
<u>Ogcocephalus radiatus</u>	Polka-dot batfish

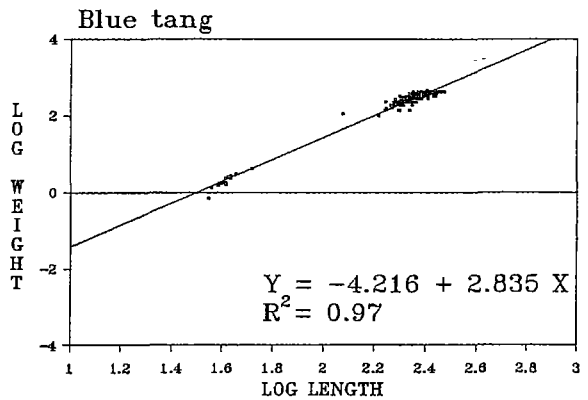
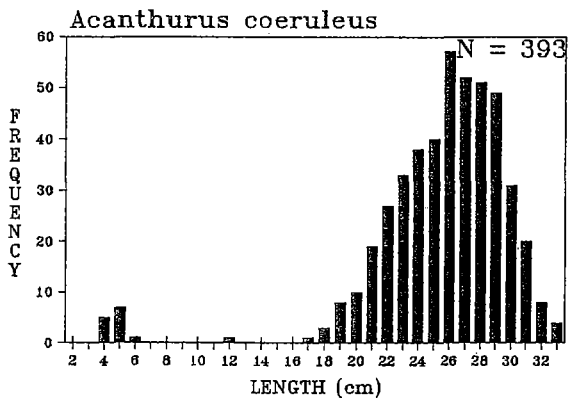
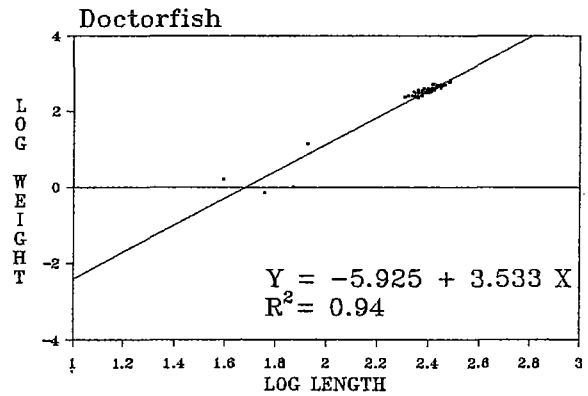
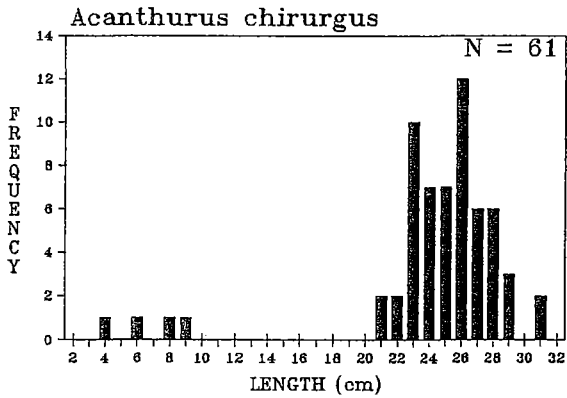
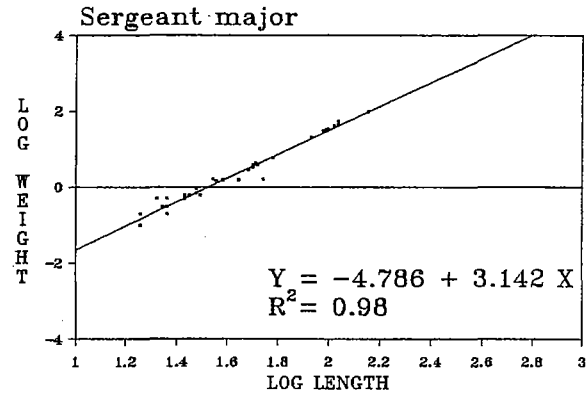
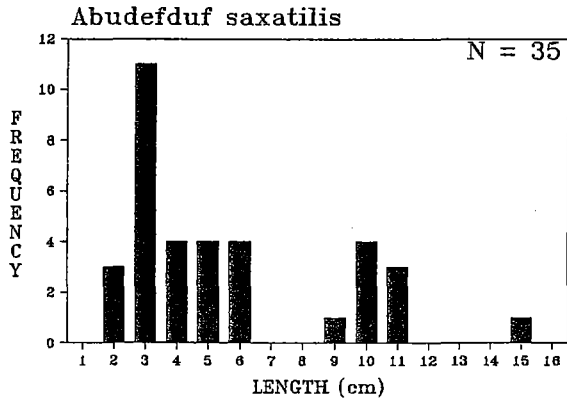
Table 3. (continued) - List of species observed in visual censusing by Reef Team and for which length-weight data is needed (fewer than 30 measured individuals available).

SPECIES	COMMON NAME
<u>Ophioblennius atlanticus</u>	Redlip blenny
<u>Opistognathus aurifrons</u>	Yellowhead jawfish
<u>Opistognathus maxillosum</u>	Mottled jawfish
<u>Opistognathus whitehursti</u>	Dusky jawfish
<u>Paranthias furcifer</u>	Creole-fish
<u>Pempheris schomburgki</u>	Glassy sweeper
<u>Phaeoptyx pigmentaria</u>	Dusky cardinalfish
<u>Pomacentrus diencaeus</u>	Longfin damselfish
<u>Pomacentrus fuscus</u>	Dusky damselfish
<u>Pomacentrus leucostictus</u>	Beaugregory
<u>Pomacentrus planifrons</u>	Three spot damselfish
<u>Pomacentrus variabilis</u>	Cocoa damselfish
<u>Priacanthus cruentatus</u>	Glasseye snapper
<u>Prionotus roseus</u>	Bluespotted searobin
<u>Quisquilius hipoliti</u>	Rusty goby
<u>Rachycentron canadum</u>	Cobia
<u>Rypticus saponaceus</u>	Greater soapfish
<u>Scarus coelestinus</u>	Midnight parrotfish
<u>Scarus coeruleus</u>	Blue parrotfish
<u>Scarus croicensis</u>	Striped parrotfish
<u>Scarus guacamaia</u>	Rainbow parrotfish
<u>Scarus taeniopterus</u>	Princess parrotfish
<u>Scarus vetula</u>	Queen parrotfish
<u>Scomberomorus cavalla</u>	King mackerel
<u>Scomberomorus maculatus</u>	Spanish mackerel
<u>Scomberomorus regalis</u>	Cero mackerel
<u>Seriola rivoliana</u>	Almaco jack
<u>Serranus baldwini</u>	Lanternfish
<u>Serranus tabacarius</u>	Tobaccofish
<u>Serranus tigrinus</u>	Harlequin bass
<u>Serranus tortugarum</u>	Chalk bass
<u>Sparisoma atomarium</u>	Greenblotch parrotfish
<u>Sparisoma radians</u>	Bucktooth parrotfish
<u>Sparisoma rubripinne</u>	Yellowtail parrotfish
<u>Sphoeroides nephelus</u>	Southern puffer
<u>Sphoeroides testudineus</u>	Checkered puffer
<u>Sphyraena barracuda</u>	Barracuda
<u>Sphyraena picudilla</u>	Southern sennet
<u>Sphyrna mokarran</u>	Great hammerhead
<u>Starksia ocellata</u>	Checkered blenny
<u>Strongylura notata</u>	Redfin needlefish
<u>Strongylura timucu</u>	Timucu
<u>Synodus foetens</u>	Inshore lizardfish
<u>Synodus intermedius</u>	Sand diver
<u>Trachinotus falcatus</u>	Permit

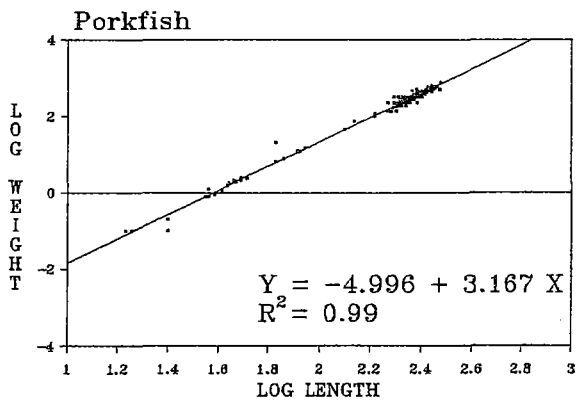
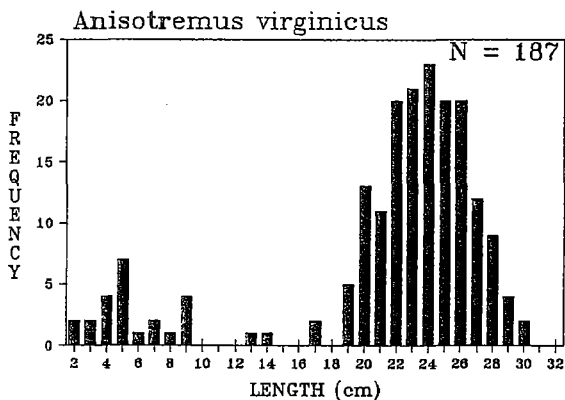
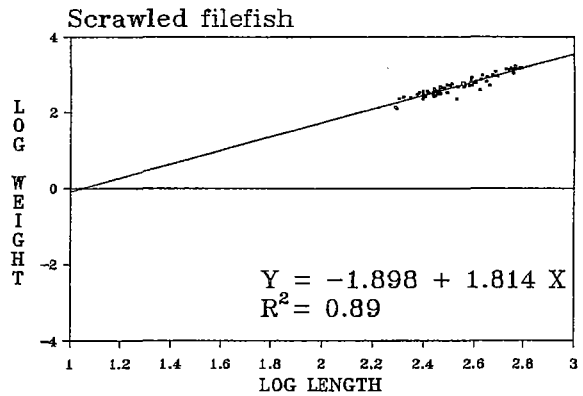
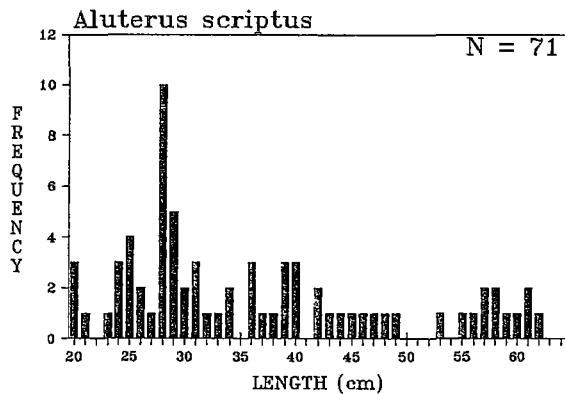
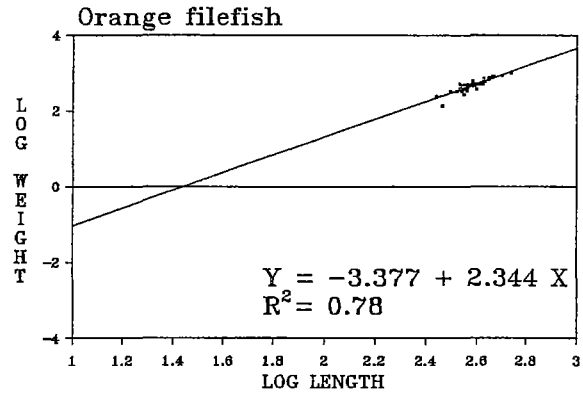
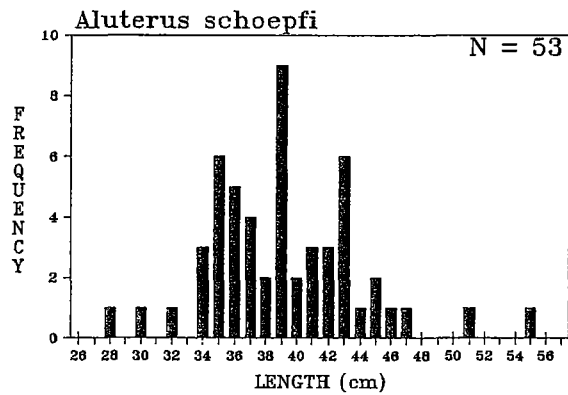
Table 3. (continued) - List of species observed in visual censusing by Reef Team and for which length-weight data is needed (fewer than 30 measured individuals available).

SPECIES	COMMON NAME
<u>Tylosurus</u> <u>crocodilus</u>	Houndfish
<u>Umbrina</u> <u>coroides</u>	Sand drum
<u>Urolophus</u> <u>jamaicensis</u>	Yellow stingray
<u>Vomer</u> <u>setapinnis</u>	Atlantic moonfish
<u>Xyrichtys</u> <u>martinicensis</u>	Rosy razorfish
<u>Xyrichtys</u> <u>novacula</u>	Pearly razorfish
<u>Xyrichtys</u> <u>splendens</u>	Green razorfish

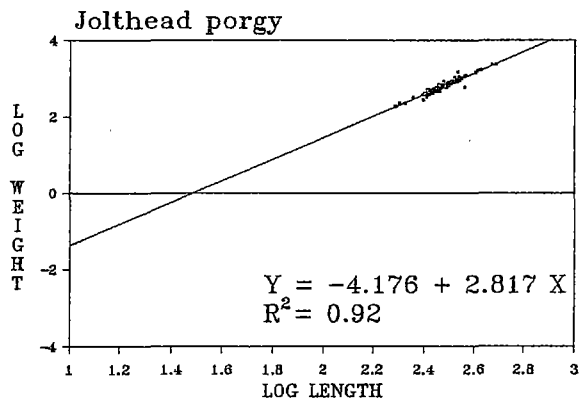
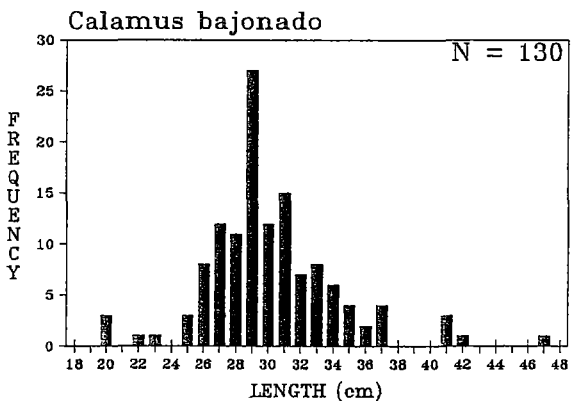
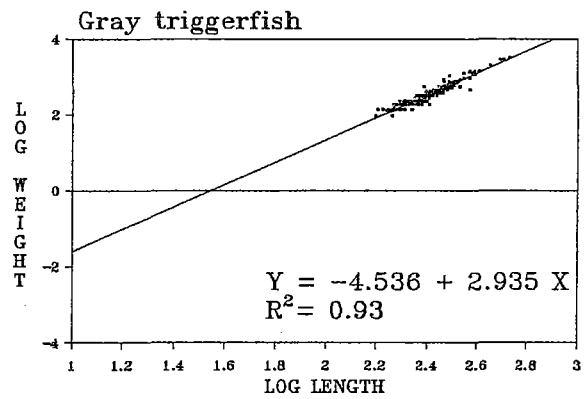
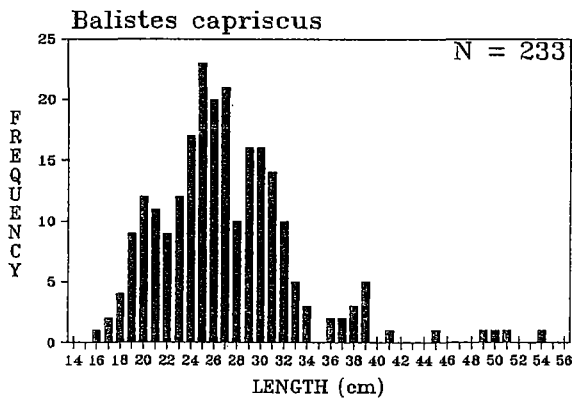
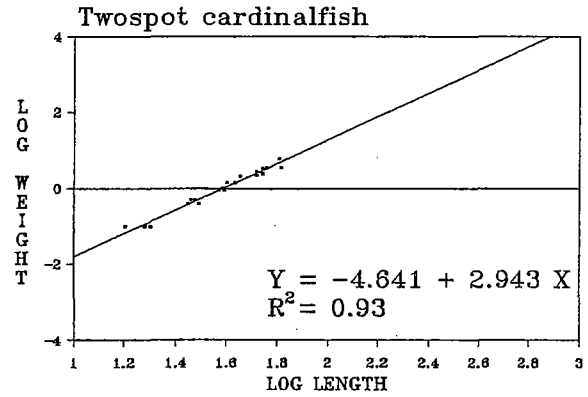
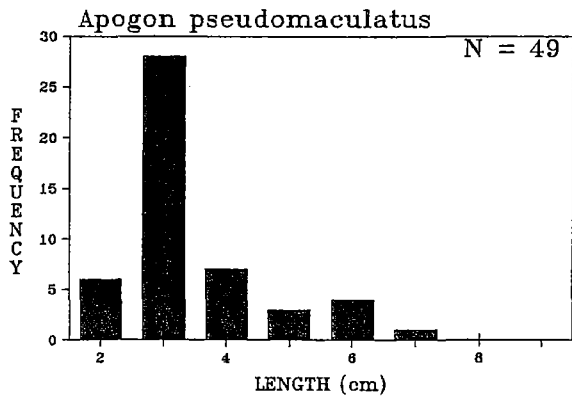
Appendix A.- Frequency distribution and regression graphics for southern Florida fish species with >30 measurements.



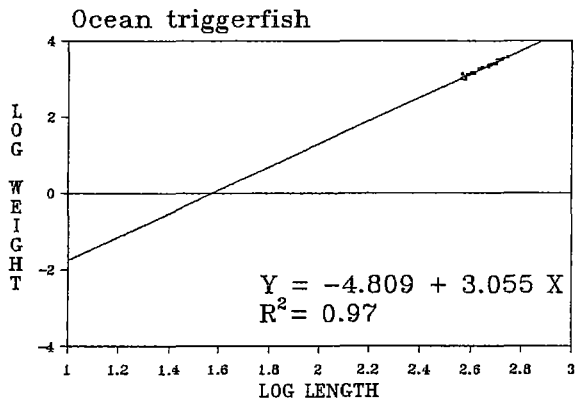
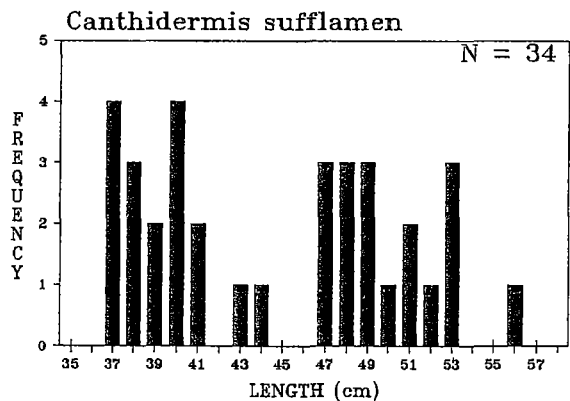
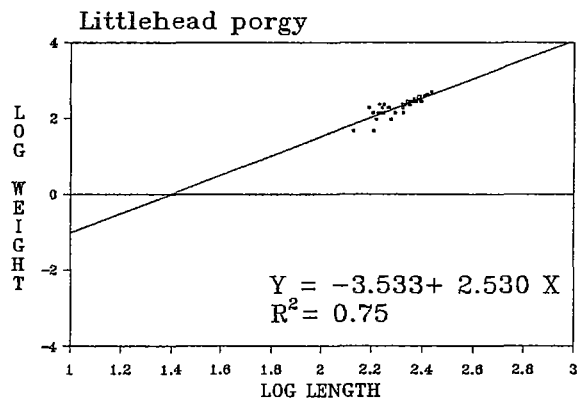
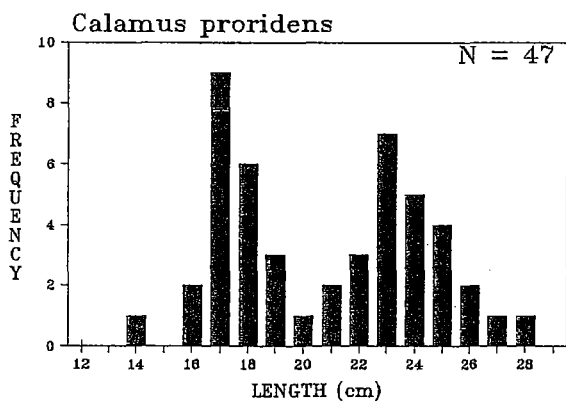
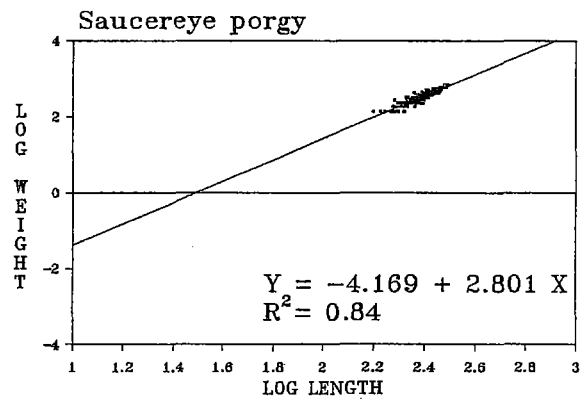
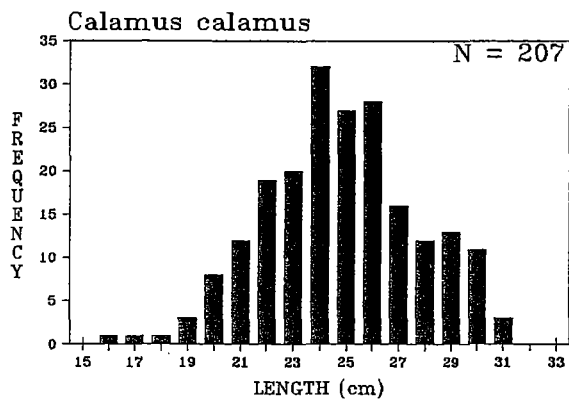
Appendix A.— Frequency distribution and regression graphics for
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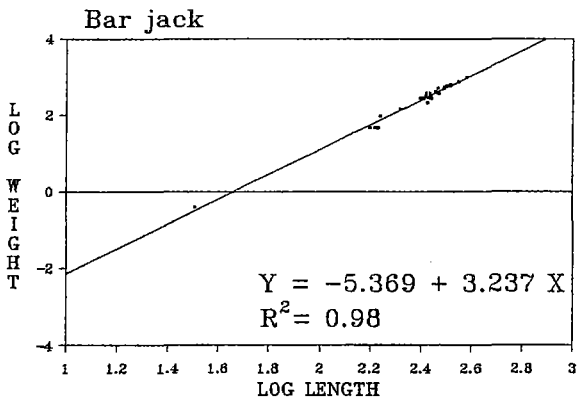
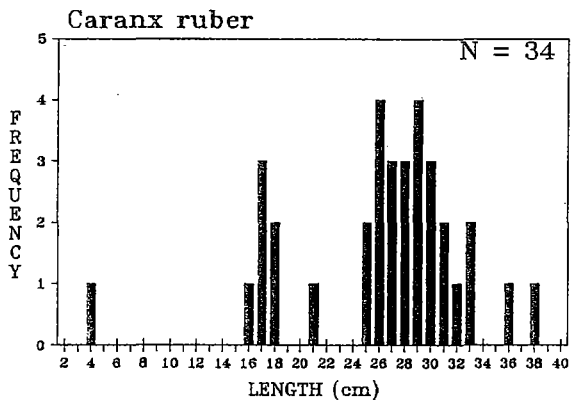
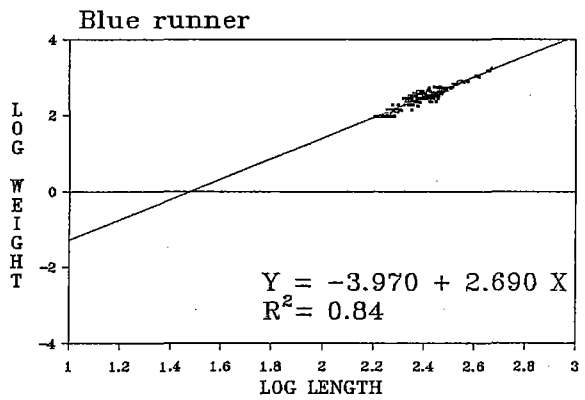
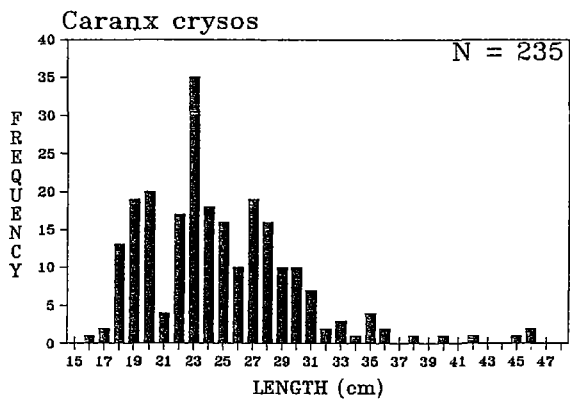
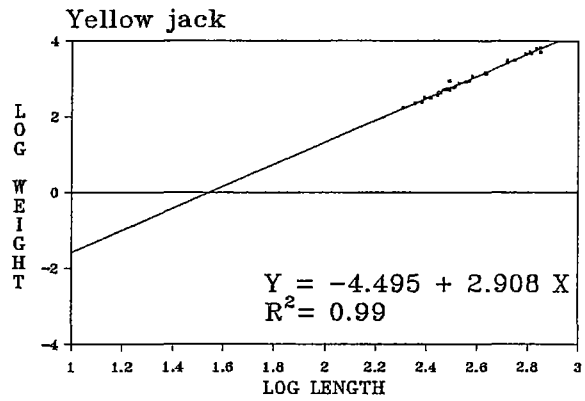
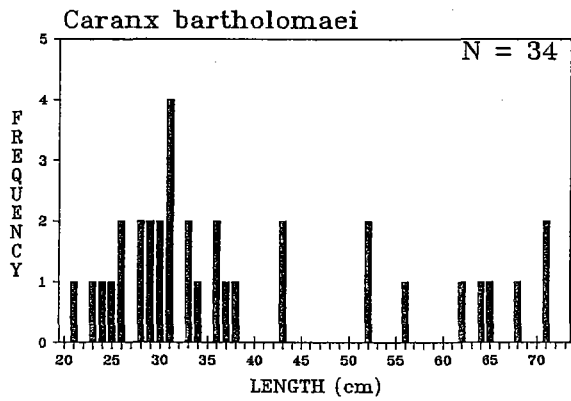
Appendix A.- Frequency distribution and regression graphics for
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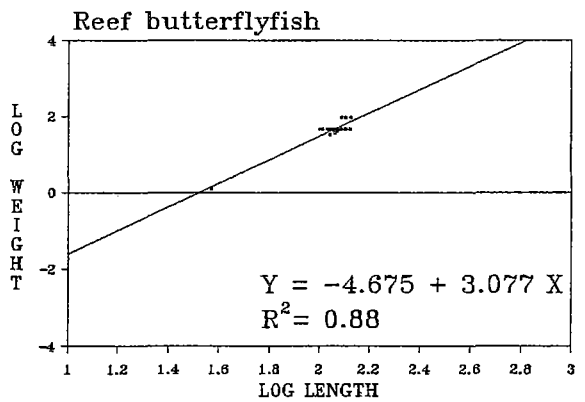
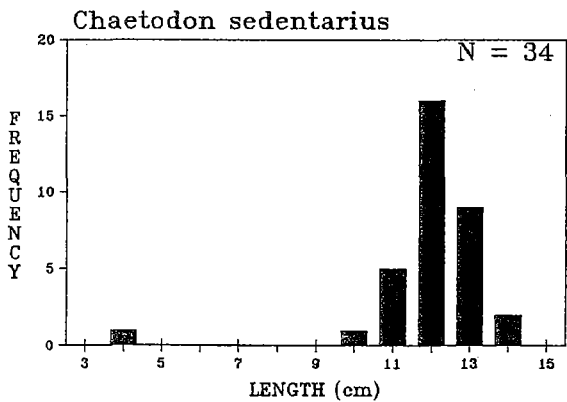
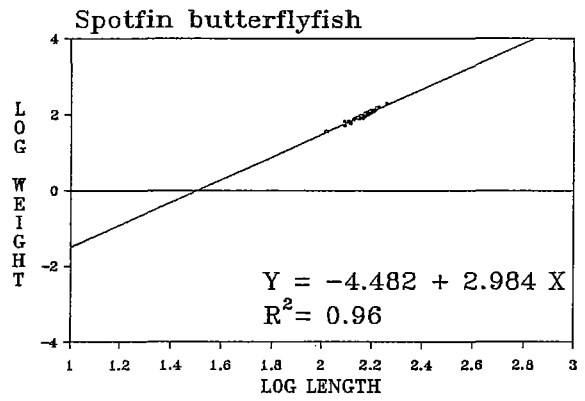
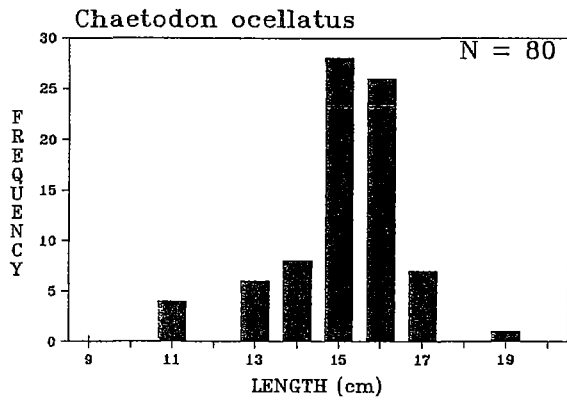
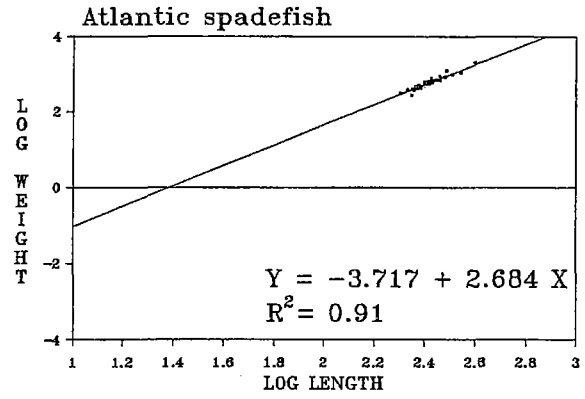
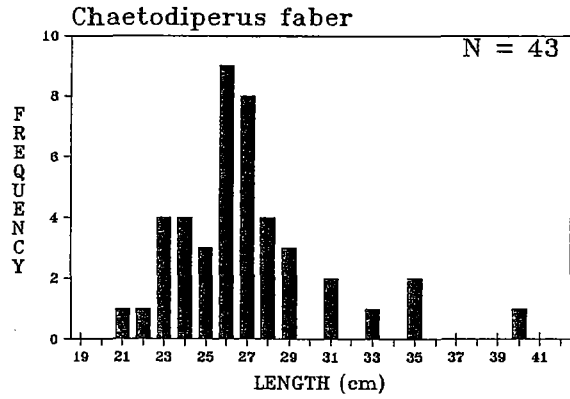
Appendix A.- Frequency distribution and regression graphics for
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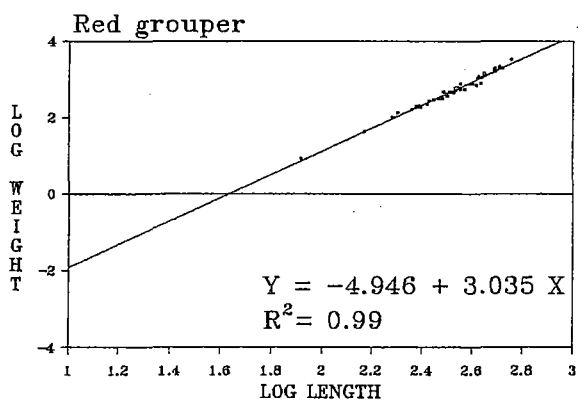
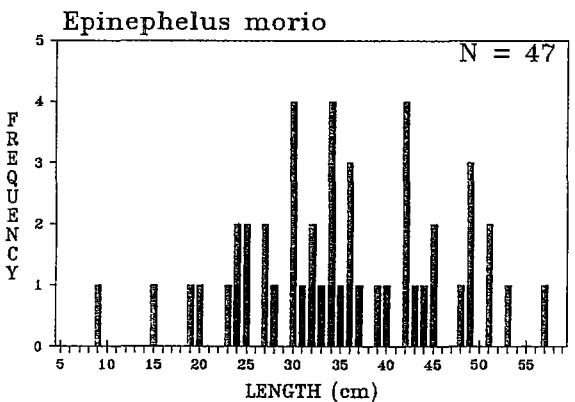
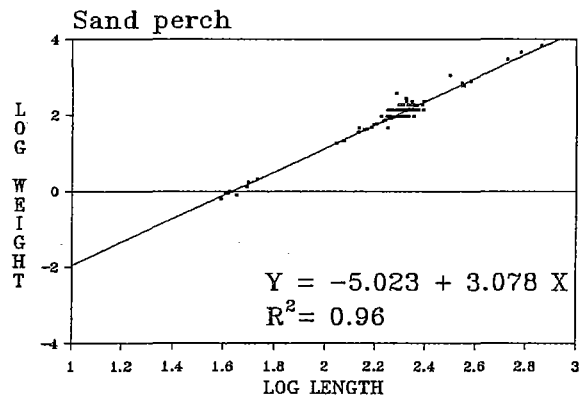
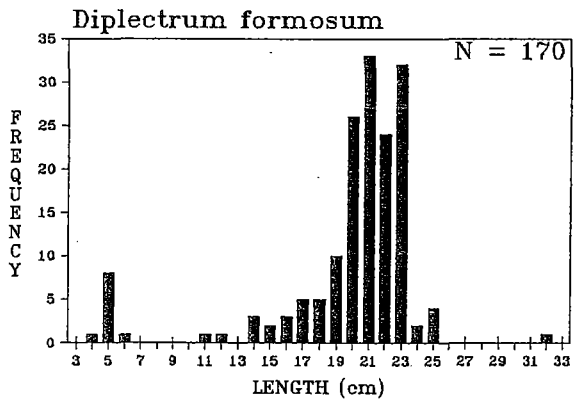
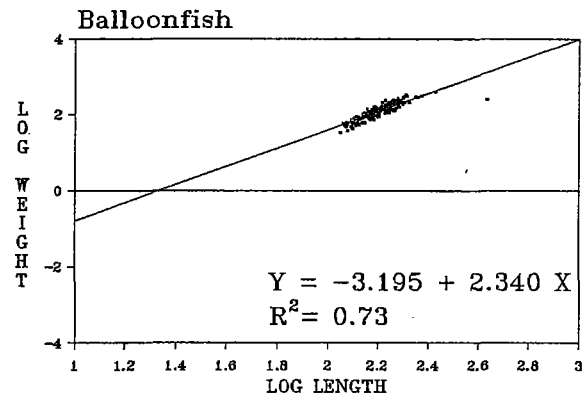
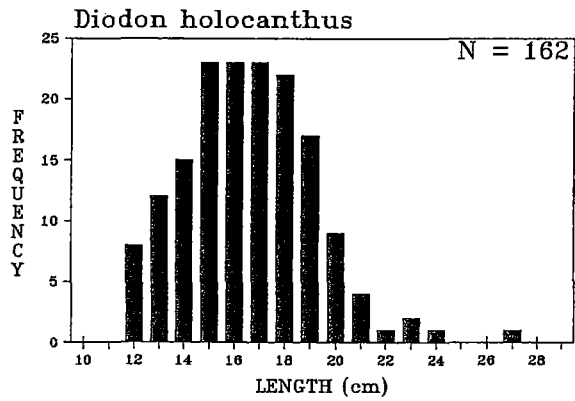
Appendix A.- Frequency distribution and regression graphics for
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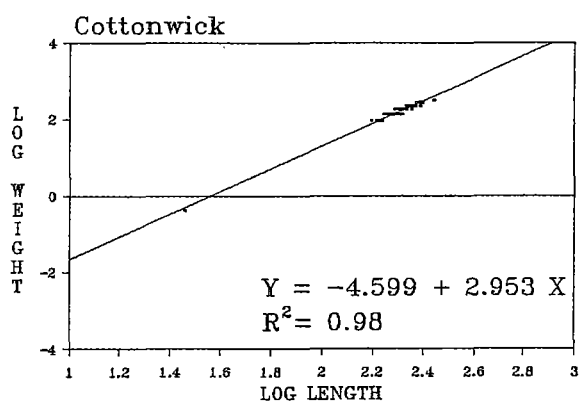
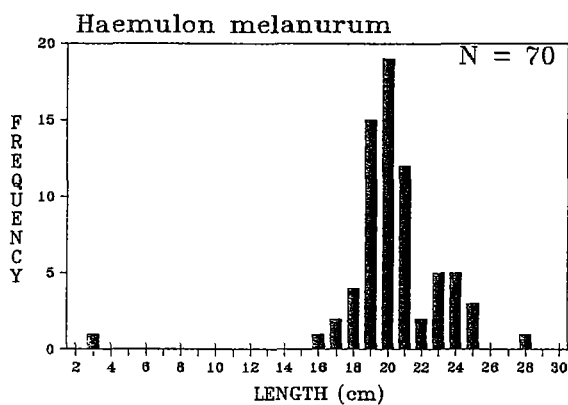
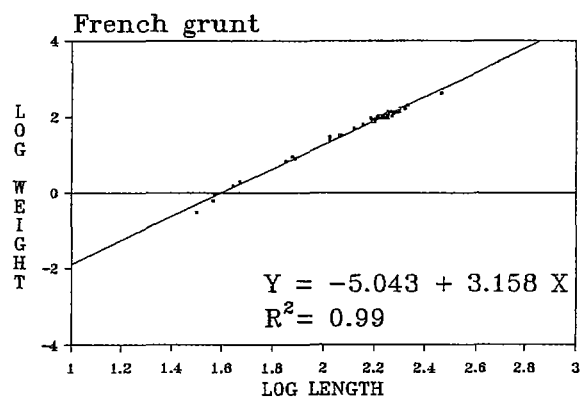
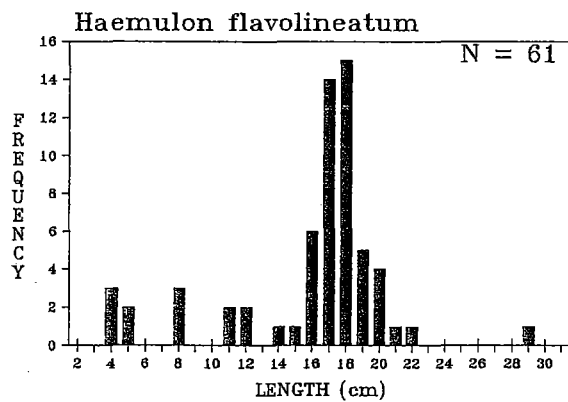
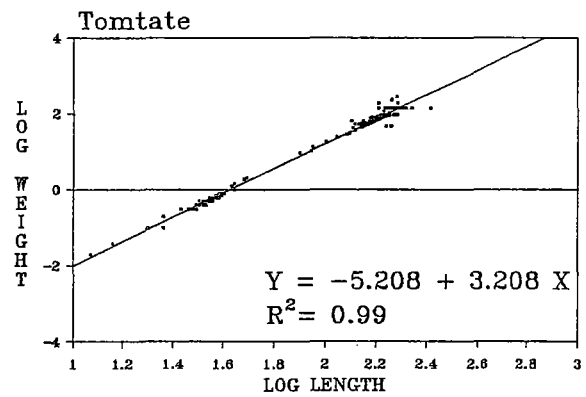
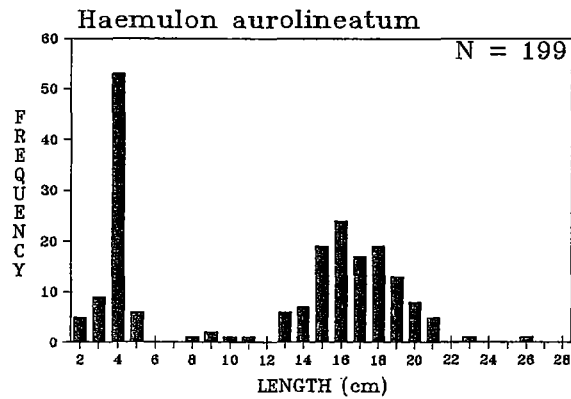
Appendix A.- Frequency distribution and regression graphics for
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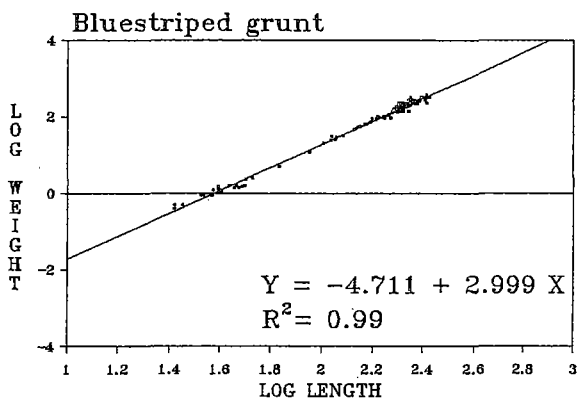
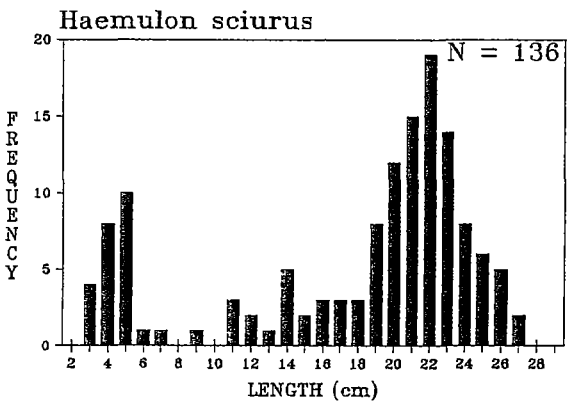
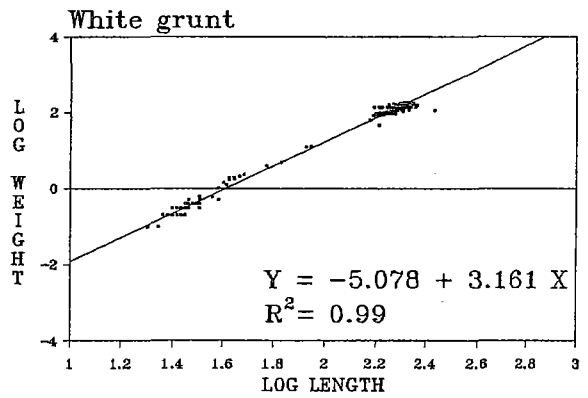
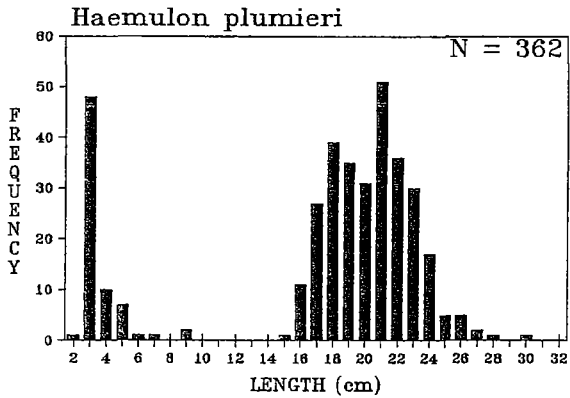
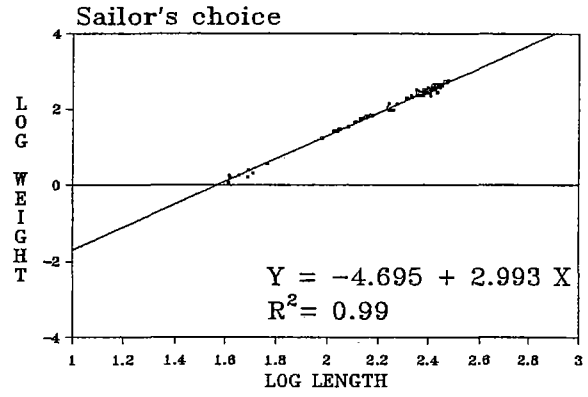
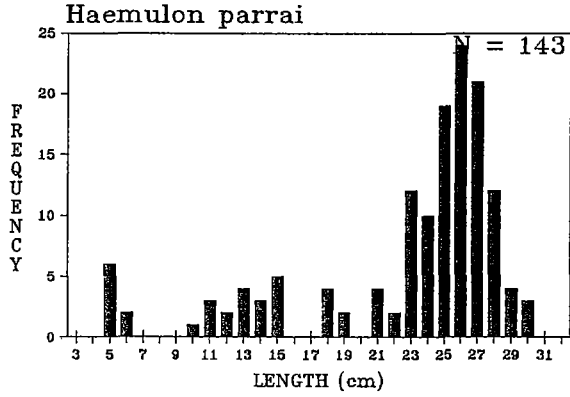
Appendix A.- Frequency distribution and regression graphics for
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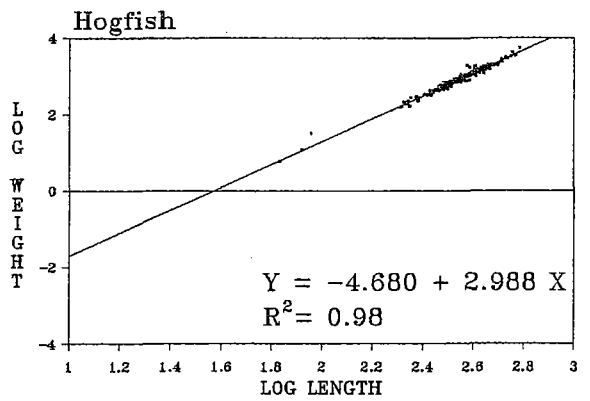
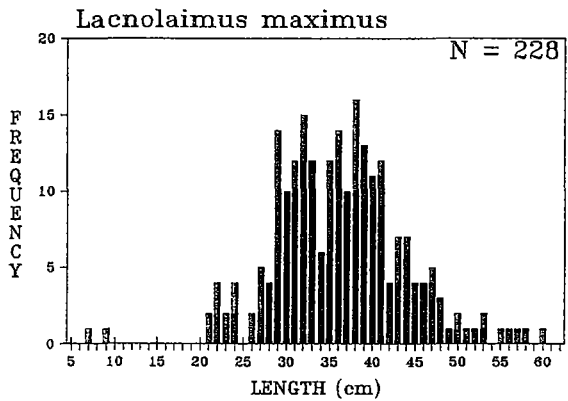
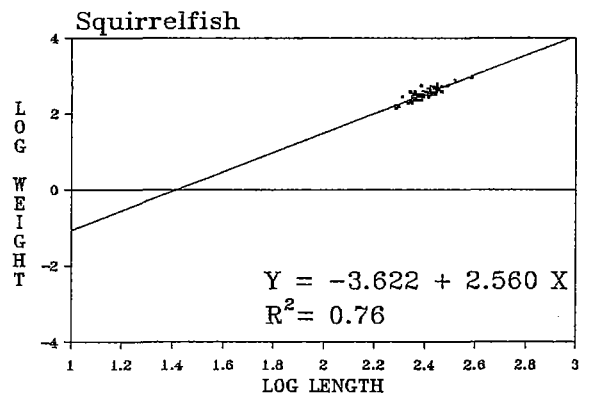
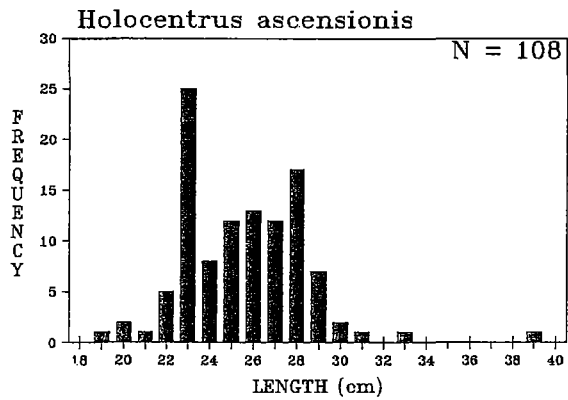
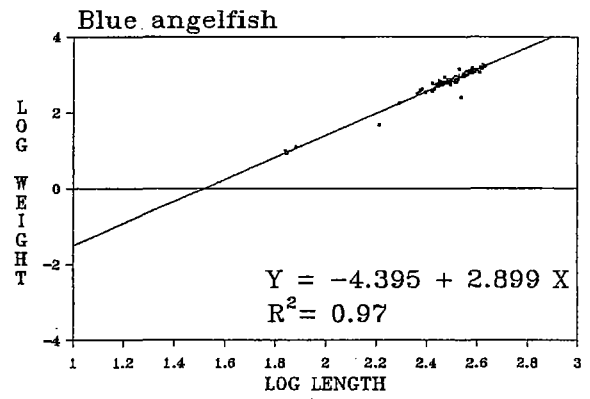
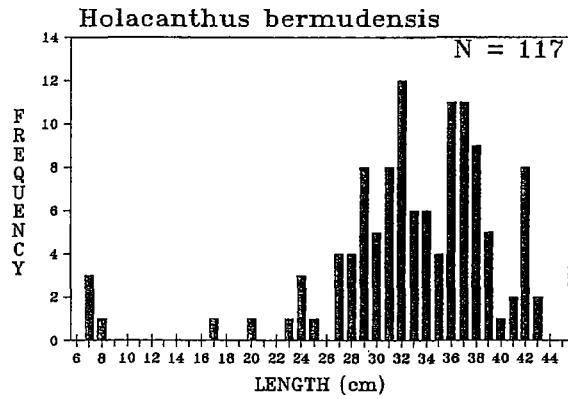
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



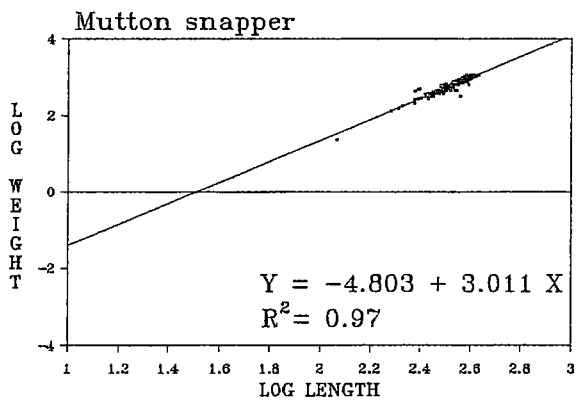
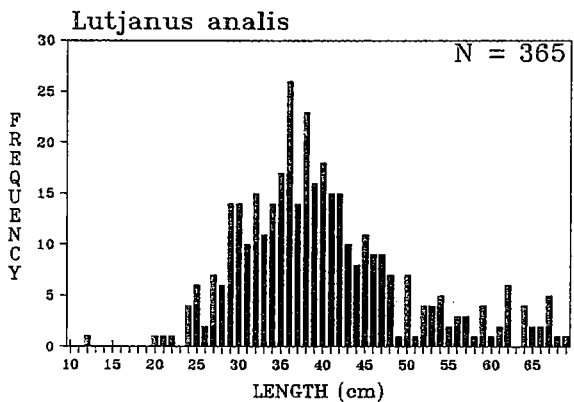
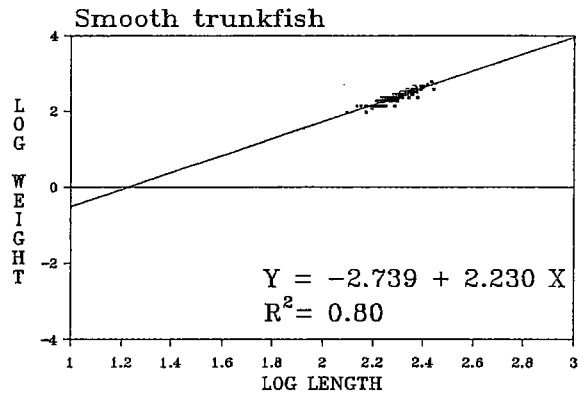
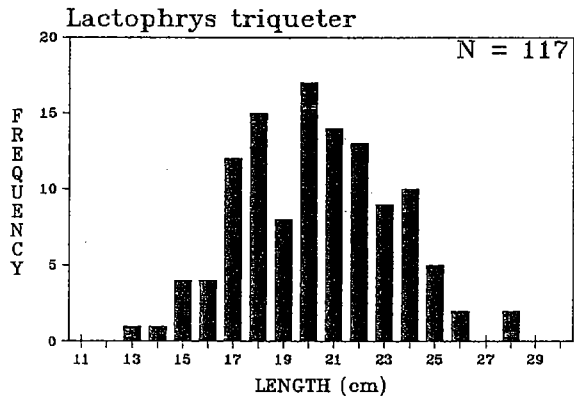
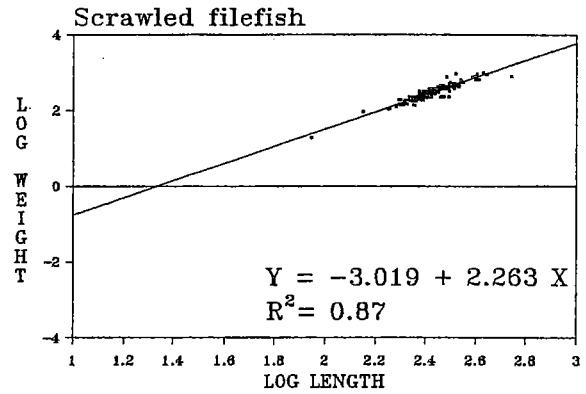
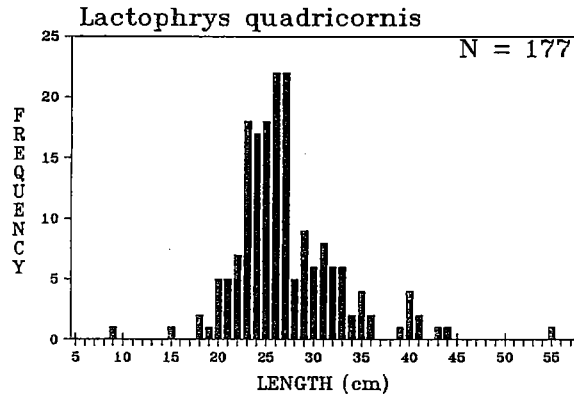
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



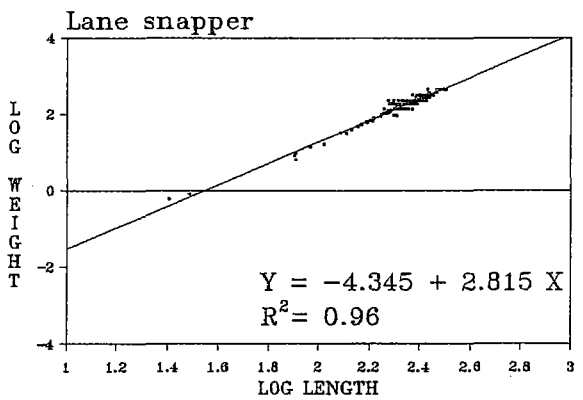
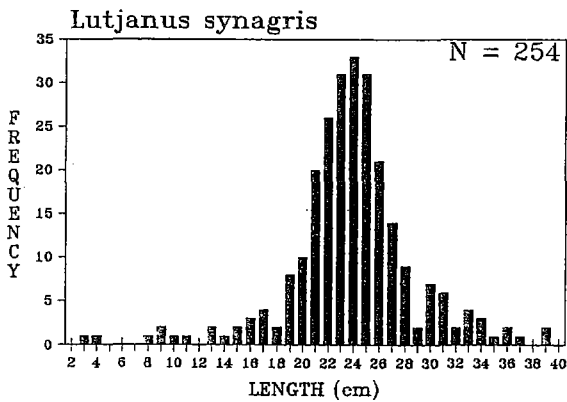
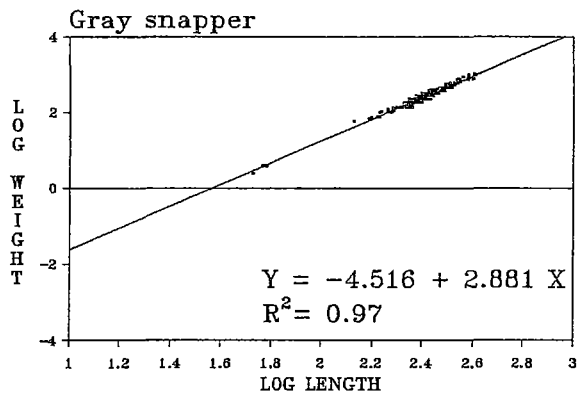
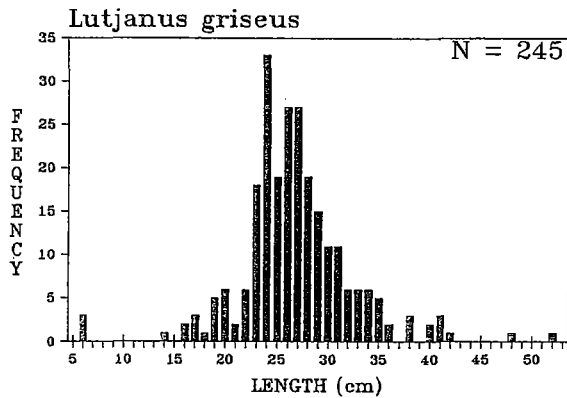
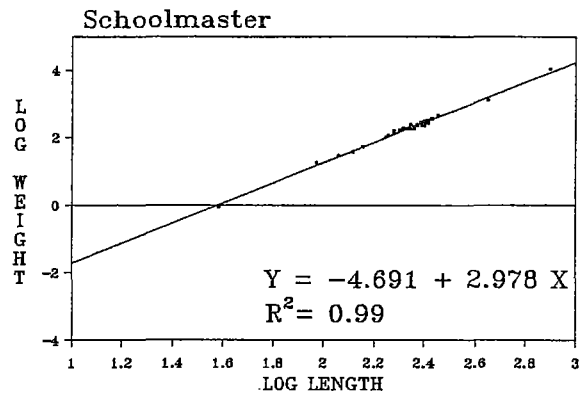
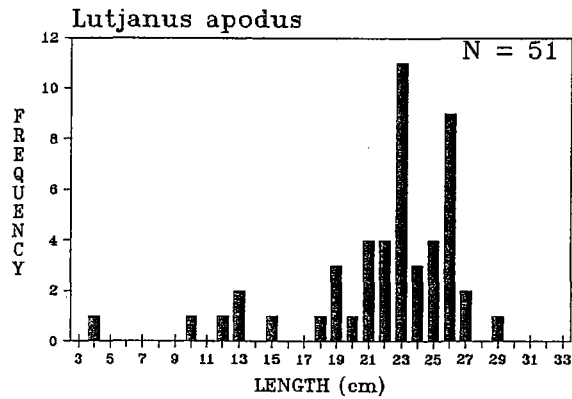
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



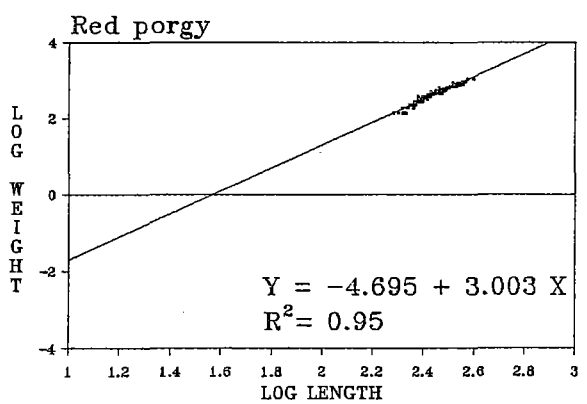
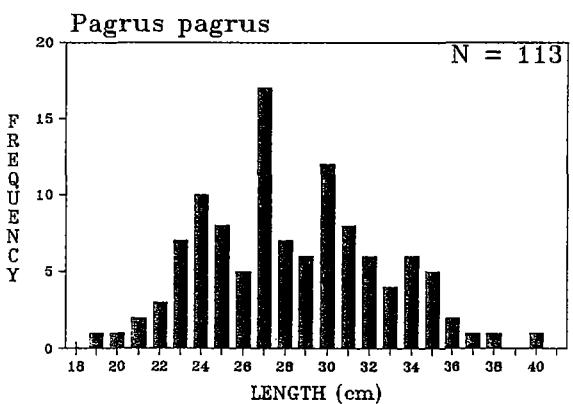
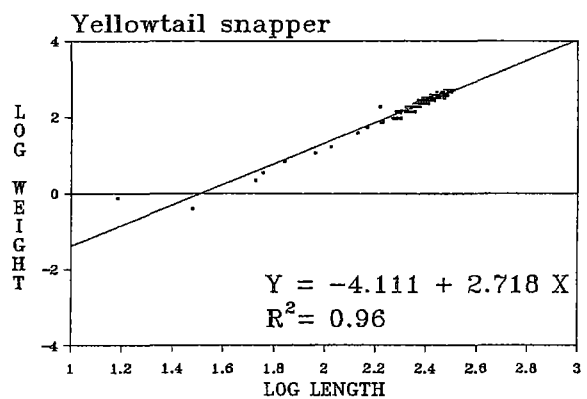
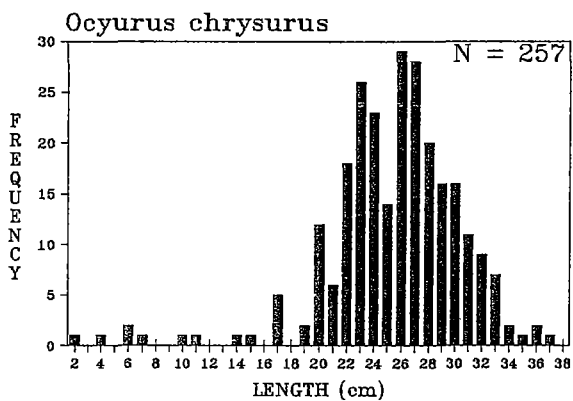
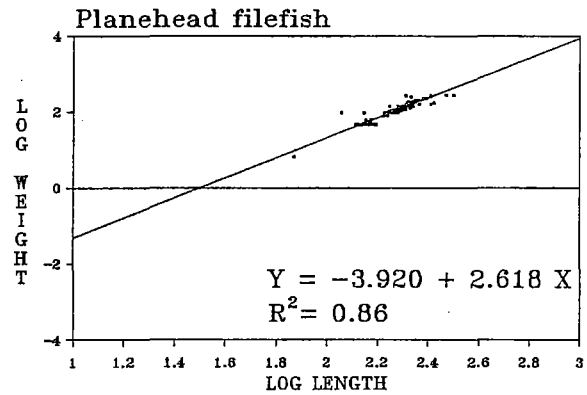
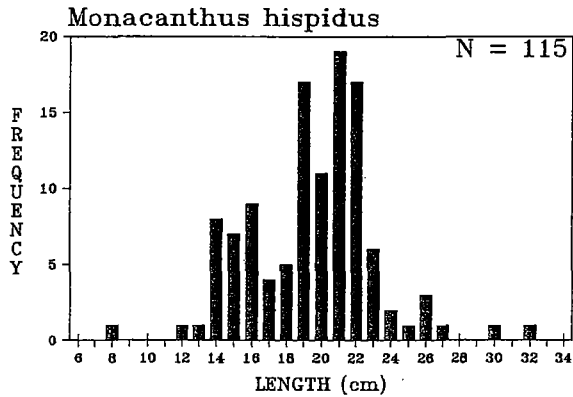
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



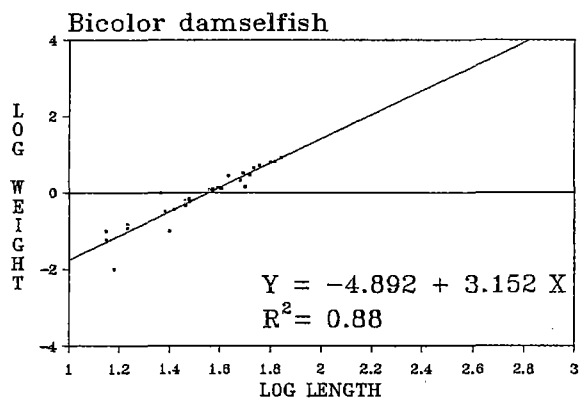
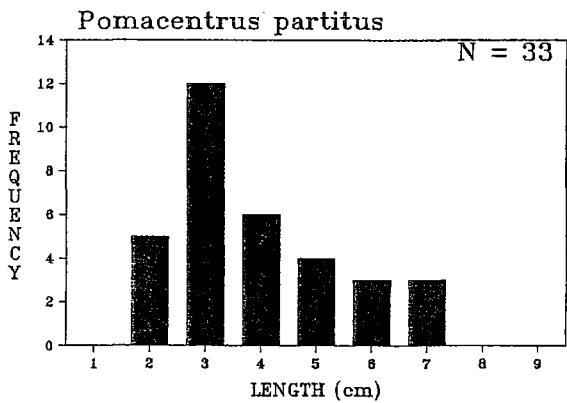
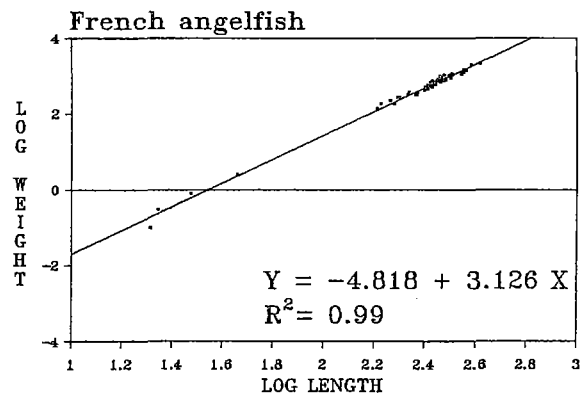
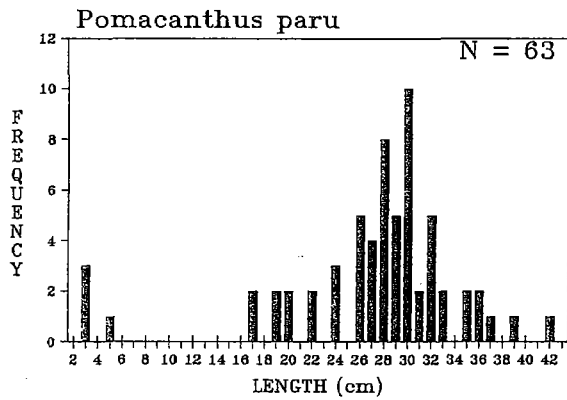
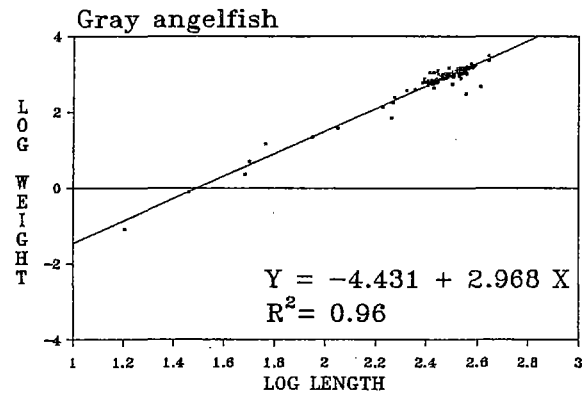
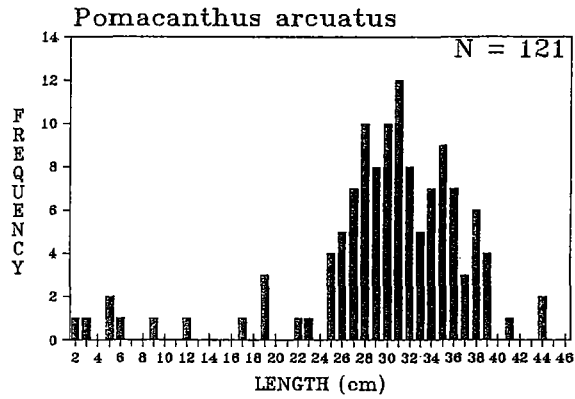
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



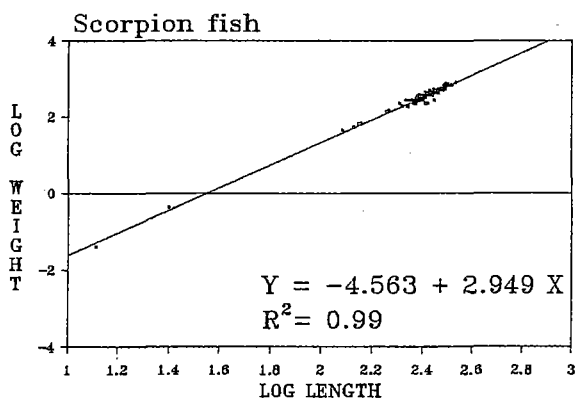
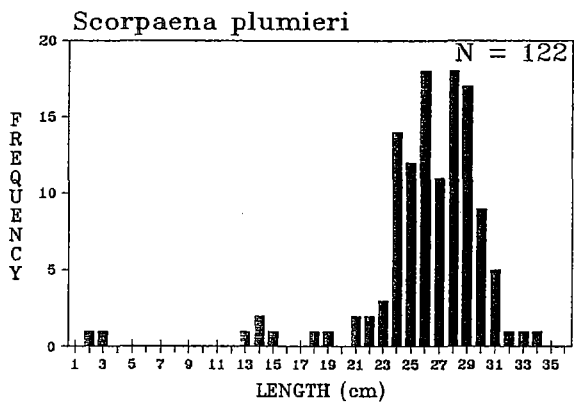
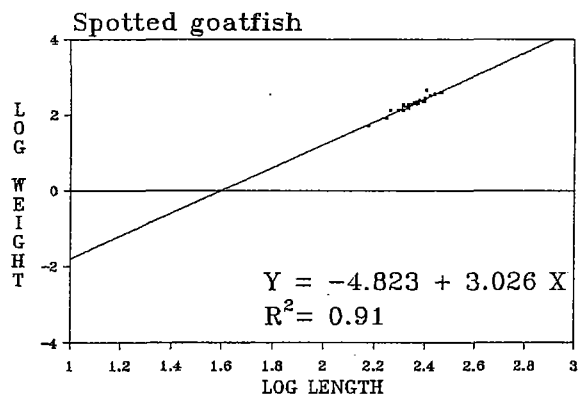
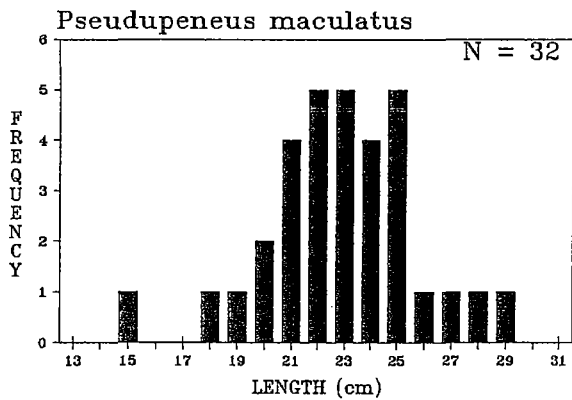
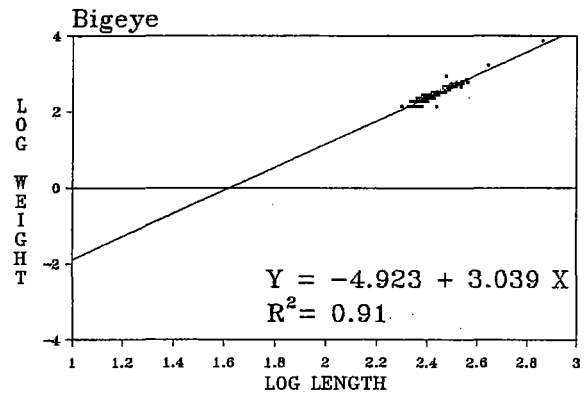
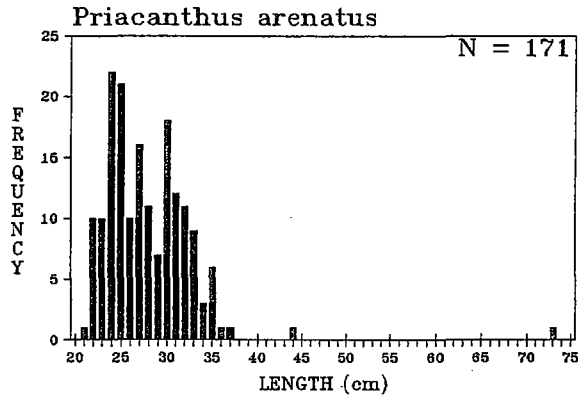
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



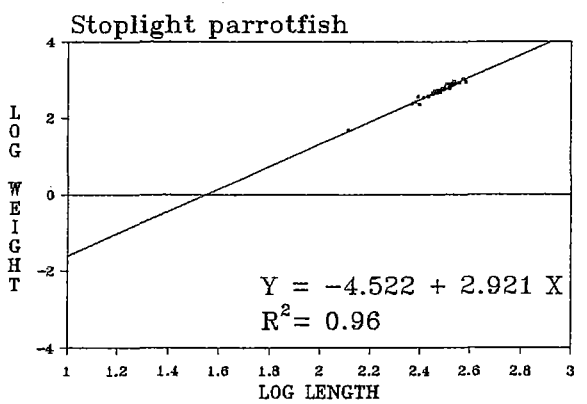
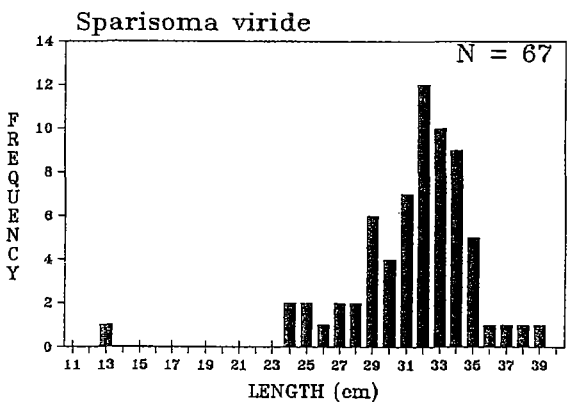
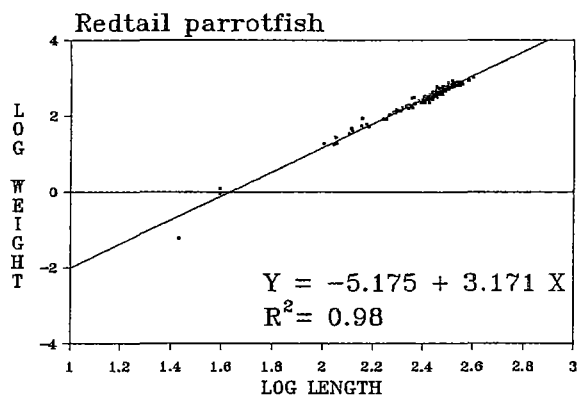
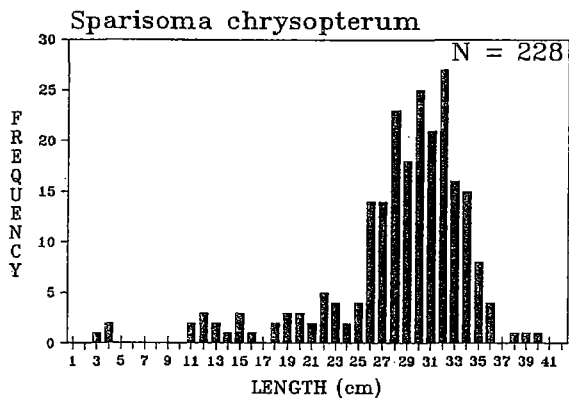
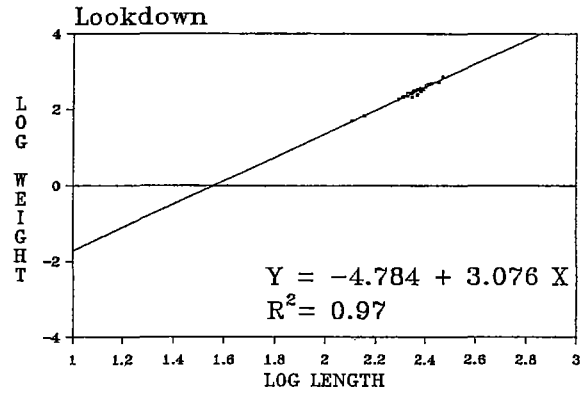
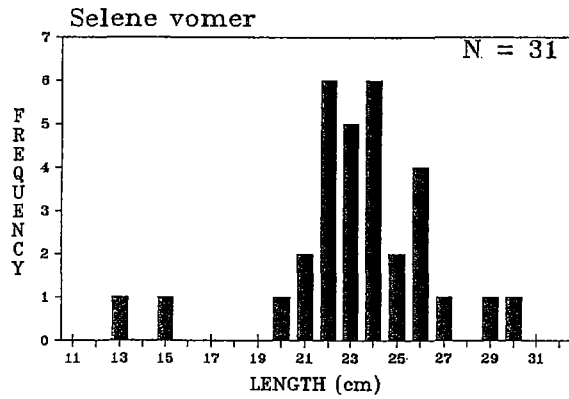
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



Appendix A.- Frequency distribution and regression graphics for
 (cont.) southern Florida fish species with >30 measurements.

