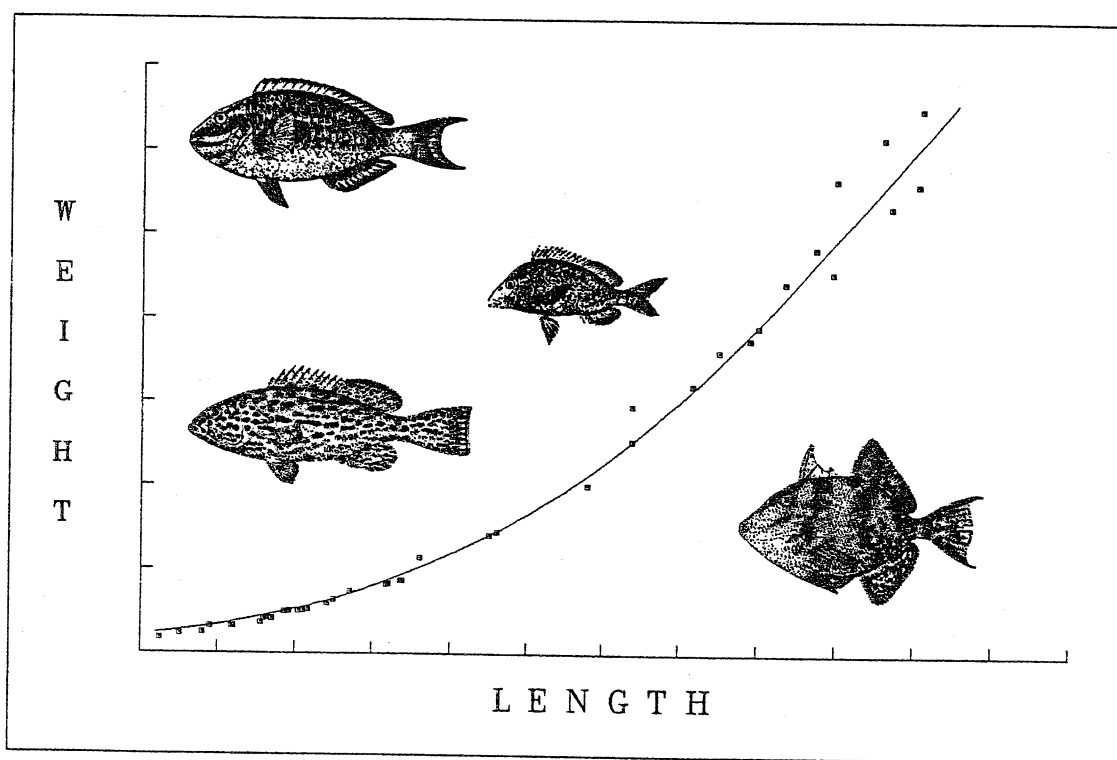




NOAA Technical Memorandum NMFS-SEFC-215

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



DECEMBER 1988

James A. Bohnsack
Douglas E. Harper

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



NOAA Technical Memorandum NMFS-SEFC-215

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

BY

James A. Bohnsack and Douglas E. Harper

U. S. DEPARTMENT OF COMMERCE
C. William Verity, Jr., Secretary

National Oceanic and Atmospheric Administration
William E. Evans, Administrator

National Marine Fisheries Service
James W. Brennan, Assistant Administrator for Fisheries

DECEMBER 1988

This Technical Memorandum series is used for documentation and timely communication of preliminary results, interim reports, or similar special-purpose information. Although the memoranda are not subject to complete formal review, editorial control, or detailed editing, they are expected to reflect sound professional work.

NOTICE

The National Marine Fisheries Service (NMFS) does not approve, recommend or endorse any proprietary product or material mentioned in this publication. No reference shall be made to NMFS, or to this publication furnished by NMFS, in any advertising or sales promotion which would indicate or imply that NMFS approves, recommends, or endorses any proprietary product or proprietary material mentioned herein, or which has as its purpose an intent to cause directly or indirectly the advertised product to be used or purchased because of this NMFS publication.

This report should be cited as follows:

Bohnsack, J.A. and D.E. Harper. 1988. Length-weight relationships of selected marine reef fishes from the southeastern United States and the Caribbean. NOAA Technical Memorandum NMFS-SEFC-215, 31 p.

Copies may be obtained by writing:

National Technical Information Service
5248 Port Royal Rd.
Springfield, VA 22161

TABLE OF CONTENTS

Abstract	1
Introduction	1
Purpose	1
Methods	1
Results	2
Discussion	2
Acknowledgments	2
Literature Cited	3
Table 1	4 - 7
Table 2	8 - 9
Table 3	10 - 14
Appendix A	15 - 31

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

by James A. Bohnsack and Douglas E. Harper

*National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Center
Miami Laboratory
75 Virginia Beach Drive
Miami, Florida 33149*

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

We thank the following people in alphabetical order for providing raw data: Christopher Holt, Ken Lindeman, and David McClellan. Organizations that contributed to this effort include the Newfound Harbor Marine Institute, Big Pine Key, Florida, the University of Miami, Miami, Florida, the Miami Seaquarium, Miami, Florida, and the Caribbean Biostatistical Sampling Program.

LITERATURE CITED

- BELL, J.D., G.J.S. CRAIK, D.A. POLLARD, and B.C. RUSSELL
1985. Estimating length frequency distributions of large reef fish underwater. *Coral Reefs* 4:41-44.
- BOHNSACK, J.A. and S.P. BANNEROT.
1986. A stationary visual census technique for quantitatively assessing community structure of coral reef fishes. NOAA Tech. Rep. NMFS 41. 15 p.
- BOHNSACK, J.A. , D.L. SUTHERLAND, A. BROWN, D.E. HARPER, and D.B. McCLELLAN.
1986. An analysis of the Caribbean biostatistical database for 1985. Coastal Resources Division Report, Contribution No. CRD-86/87-10.
- BROCK, V.E.
1954. A preliminary report on a method of estimating reef fish populations. *J. Wildl. Mgmt.* 18:297-308.
- BROWER, J.E. and J.H. ZAR.
1977. Field and laboratory methods for general ecology. Wm. C. Brown Co., Publishers. Dubuque, Iowa, 194 p.
- CAMPBELL, P.
1984. Weight-total length and length-length relationships for four saltwater fishes. Management Data Series No. 62. Texas Parks and Wildlife Department. Austin, Texas. 7 p.
- JONES, R.S. and M.J. THOMPSON.
1978. Comparison of Florida reef fish assemblages using a rapid visual technique. *Bull. Mar. Sci.* 28:159-172.
- KIMMEL, J.J.
1985. A new species-time method for visual assessment of fishes and its comparison with established methods. *Env. Biol. Fish.* 12:23-32.
- ROBINS, C.R., R.M. BAILEY, C.E. BOND, J.R. BROOKER, E.A. LACHNER, R.N. LEA, and W.B. SCOTT.
1980. A list of common and scientific names of fishes from the United States and Canada. Fourth edition. American Fisheries Society Special Publication No. 12. 174 p.
- STARCK, W.A., II.
1968. A list of fishes of Alligator Reef, Florida with comments on the nature of the Florida reef fish fauna. *Undersea Biol.* 1:5-36.
- STARCK, W.A., II.
1970. Biology of the gray snapper, Lutjanus griseus (Linnaeus), in the Florida Keys. *Stud. Trop. Oceanogr. Miami* 10:11-150.
- WEATHERLY, A.H. and H.S. GILL.
1987. The biology of fish growth. Academic Press, Harcourt Brace Jovanovich, Publishers. New York. 443 p.

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>	Sergeant major	35	FL	18	143	-4.7859	3.1420	0.98	0.0864	0.1359
2 * <u>Acanthemblemaria aspera</u>	Roughhead blenny	1	TL	30	30	-5.0750	2.9625	1.00	0.0000	0.0000
3 <u>Acanthurus bahianus</u>	Ocean surgeon	29	FL	35	243	-4.6005	2.9752	0.99	0.0666	0.0771
4 <u>Acanthurus chirurgus</u>	Doctorfish	61	FL	39	304	-5.9255	3.5328	0.94	0.1154	0.1438
5 <u>Acanthurus coeruleus</u>	Blue tang	394	FL	35	304	-4.2165	2.8346	0.97	0.0261	0.0775
6 <u>Aluterus schoepfi</u>	Orange filefish	53	TL	277	548	-3.3770	2.3443	0.78	0.1732	0.0671
7 <u>Aluterus scriptus</u>	Scrawled filefish	71	TL	193	615	-1.8982	1.8136	0.89	0.0781	0.0908
8 <u>Amblycirrhitis pinos</u>	Redspotted hawkfish	25	FL	275	452	-6.0169	3.4266	0.87	0.2712	0.0610
9 <u>Anisotremus surinamensis</u>	Black margate	21	FL	247	488	-5.6212	3.3916	0.85	0.3223	0.0968
10 <u>Anisotremus virginicus</u>	Porkfish	187	FL	17	298	-4.9963	3.1674	0.99	0.0239	0.0816
11 <u>Apogon maculatus</u>	Flamefish	22	FL	16	65	-4.8752	3.0734	0.97	0.1110	0.0907
12 <u>Apogon pseudomaculatus</u>	Twospot cardinalfish	49	FL	18	68	-4.6413	2.9434	0.93	0.1156	0.1123
13 * <u>Archosargus probatocephalus</u>	Sheepshead	1	FL	271	271	-4.8175	3.0912	1.00	0.0000	0.0000
14 <u>Archosargus rhomboidalis</u>	Sea bream	18	FL	42	254	-4.8471	3.1021	1.00	0.0518	0.0477
15 * <u>Astrapogon stellatus</u>	Conchfish	1	TL	57	57	-4.8463	3.0769	1.00	0.0000	0.0000
16 * <u>Aulostomus maculatus</u>	Trumpetfish	1	TL	209	209	-5.2686	2.8657	1.00	0.0000	0.0000
17 <u>Balistes capriscus</u>	Gray triggerfish	233	FL	158	536	-4.5359	2.9352	0.93	0.0549	0.0762
18 <u>Balistes vetula</u>	Queen triggerfish	22	FL	165	425	-4.5638	2.9903	0.96	0.1388	0.0550
19 <u>Blennius cristata</u>	Molly miller	16	TL	22	73	-3.9658	2.4144	0.92	0.1873	0.0938
20 * <u>Bodianus rufus</u>	Spanish hogfish	2	FL	252	331	-4.8936	3.0532	1.00	0.0012	0.0045
21 <u>Bothus lunatus</u>	Peacock flounder	10	TL	81	469	-5.1974	3.1894	0.99	0.0978	0.0707
22 <u>Calamus bajonado</u>	Jolthead porgy	130	FL	192	481	-4.1758	2.8175	0.92	0.0730	0.0511
23 <u>Calamus calamus</u>	Saucereye porgy	207	FL	158	310	-4.1688	2.8009	0.84	0.0850	0.0640
24 <u>Calamus penna</u>	Sheepshead porgy	28	FL	165	369	-3.7826	2.6663	0.83	0.2401	0.1017
25 <u>Calamus proridens</u>	Littlehead porgy	47	FL	134	272	-3.5329	2.5299	0.75	0.2206	0.1140
26 * <u>Callionymus bairdi</u>	Lancer dragonet	1	TL	16	16	-4.7580	3.1210	1.00	0.0000	0.0000
27 <u>Cantherhines macrocerus</u>	Whitespotted filefish	10	TL	233	395	-3.9037	2.6534	0.90	0.3109	0.0633
28 <u>Cantherhines pullus</u>	Orangespotted filefish	12	TL	151	200	-3.7282	2.5632	0.91	0.2508	0.0314
29 <u>Canthidermis sufflamen</u>	Ocean triggerfish	34	FL	363	555	-4.8095	3.0554	0.97	0.1023	0.0343
30 <u>Caranx bartholomaei</u>	Yellow jack	34	FL	202	705	-4.4953	2.9085	0.99	0.0536	0.0484
31 <u>Caranx crysos</u>	Blue runner	235	FL	160	458	-3.9699	2.6900	0.84	0.0782	0.1042
32 <u>Caranx hippos</u>	Crevalle jack	18	FL	260	647	-4.0201	2.7344	0.99	0.0706	0.0422
33 <u>Caranx ruber</u>	Bar jack	34	FL	32	377	-5.3687	3.2370	0.98	0.0754	0.0800
34 <u>Centropristis ocyurus</u>	Bank sea bass	10	TL	192	299	-3.6555	2.5990	0.96	0.1944	0.0422
35 <u>Centropristis striata</u>	Black sea bass	7	TL	215	328	-3.6557	2.4683	0.97	0.1903	0.0350
36 <u>Chaetodiperus faber</u>	Atlantic spadefish	43	FL	201	396	-3.7175	2.6836	0.91	0.1348	0.0495
37 <u>Chaetodon capistratus</u>	Four-eye butterflyfish	6	TL	43	115	-4.8475	3.1897	1.00	0.0323	0.0122
38 <u>Chaetodon ocellatus</u>	Spotfin butterflyfish	80	TL	103	181	-4.4820	2.9838	0.96	0.0732	0.0296
39 <u>Chaetodon sedentarius</u>	Reef butterflyfish	34	TL	37	134	-4.6749	3.0760	0.88	0.1990	0.1031
40 <u>Chaetodon striatus</u>	Banded butterflyfish	13	TL	57	143	-4.7940	3.1395	0.99	0.1043	0.0599
41 * <u>Chilomycterus schoepfi</u>	Stripped burrfish	1	FL	212	212	-4.7512	3.1244	1.00	0.0000	0.0000
42 <u>Coryphopterus glaucofraenum</u>	Bridled goby	18	TL	17	48	-4.8489	2.9674	0.93	0.2033	0.1188
43 * <u>Cryptotomus roseus</u>	Bluelip parrotfish	3	TL	12	69	-4.4794	3.1816	0.99	0.2328	0.6985
44 * <u>Dasyatis americana</u>	Southern stingray	2	TL	651	4150	-5.5182	2.6724	0.99	0.2951	1.2681
45 <u>Diodon holocanthus</u>	Balloonfish	162	TL	112	430	-3.1948	2.3979	0.73	0.1157	0.1126
46 <u>Diodon hystrix</u>	Porcupinefish	30	TL	103	345	-2.5498	2.2763	0.99	0.0384	0.0348
47 <u>Diplectrum formosum</u>	Sand perch	170	FL	39	728	-5.0229	3.0781	0.96	0.0463	0.1115
48 <u>Echeneis naucrates</u>	Sharksucker	5	TL	430	479	-3.0099	2.1128	0.98	0.1651	0.0060
49 * <u>Elops saurus</u>	Ladyfish	2	FL	293	413	-5.0651	2.9680	1.00	0.0117	0.0434
50 * <u>Enneanectes pectoralis</u>	Redeye triplefin	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>	2	TL	219	246	-4.9123	3.0439	1.00	0.0030	0.0107
52	<u>Epinephelus guttatus</u>	20	TL	139	255	-5.0680	3.1124	0.92	0.2174	0.0778
53	<u>Epinephelus morio</u>	47	TL	82	566	-4.9464	3.0350	0.99	0.0553	0.0585
54	<u>Epinephelus striatus</u>	9	TL	203	516	-5.4164	3.2292	0.98	0.1890	0.0810
55	<u>Equetus acuminatus</u>	19	TL	28	199	-5.2620	3.2017	1.00	0.0492	0.0534
56	<u>Equetus lanceolatus</u>	8	TL	93	223	-6.8068	3.8444	1.00	0.0851	0.0278
57 *	<u>Eucinostomus havana</u>	1	FL	116	116	-4.8940	3.0530	1.00	0.0000	0.0000
58	<u>Gerres cinereus</u>	4	FL	52	257	-4.8195	3.0843	1.00	0.1145	0.0650
59	<u>Ginglymostoma cirratum</u>	16	TL	229	1070	-4.8681	2.8918	0.93	0.2143	0.1516
60	<u>Gnatholepis thompsoni</u>	9	TL	15	52	-6.2207	3.7669	0.96	0.3071	0.1676
61 *	<u>Gobiosox strumosus</u>	1	TL	42	42	-4.9281	3.0359	1.00	0.0000	0.0000
62	<u>Gobiosoma oceanops</u>	19	TL	23	45	-5.2341	3.1370	0.95	0.1823	0.0681
63	<u>Gymnothorax funebris</u>	9	TL	597	2134	-5.2443	2.8560	0.94	0.2623	0.1475
64	<u>Gymnothorax moringa</u>	22	TL	403	886	-6.1561	3.1577	0.90	0.2301	0.0931
65 *	<u>Gymnothorax nigromarginatus</u>	1	TL	486	486	-5.3194	2.8403	1.00	0.0000	0.0000
66 *	<u>Gymnothorax vicinus</u>	1	TL	758	758	-5.2478	2.8761	1.00	0.0000	0.0000
67	<u>Haemulon album</u>	11	FL	162	595	-4.8186	3.0423	0.99	0.1154	0.0603
68	<u>Haemulon aurolineatum</u>	198	FL	12	260	-5.2081	3.2077	0.99	0.0186	0.0893
69 *	<u>Haemulon carbonarium</u>	3	FL	32	37	-4.8879	3.0559	1.00	0.0218	0.0668
70	<u>Haemulon chrysargyreum</u>	8	FL	140	200	-2.5578	2.1567	1.00	0.0466	0.0060
71	<u>Haemulon flavolineatum</u>	61	FL	32	289	-5.0428	3.1581	0.99	0.0392	0.0606
72	<u>Haemulon macrostomum</u>	6	FL	174	203	-4.6419	3.0295	0.91	0.4687	0.0233
73	<u>Haemulon melanurum</u>	70	FL	29	277	-4.5993	2.9527	0.98	0.0565	0.0519
74	<u>Haemulon parrai</u>	143	FL	41	300	-4.6947	2.9932	0.99	0.0237	0.0542
75	<u>Haemulon plumieri</u>	362	FL	20	298	-5.0781	3.1612	0.99	0.0148	0.0924
76	<u>Haemulon sciurus</u>	136	FL	26	265	-4.7114	2.9996	0.99	0.0215	0.0705
77 *	<u>Haemulon striatum</u>	3	FL	40	180	-4.8564	3.0988	1.00	0.0963	0.3398
78	<u>Halichoeres bivittatus</u>	21	TL	36	152	-4.8117	2.9391	0.96	0.1441	0.1389
79	<u>Halichoeres garnoti</u>	5	TL	26	105	-5.6591	3.3747	0.99	0.2205	0.1017
80	<u>Halichoeres maculipinna</u>	7	TL	15	97	-6.2524	3.6932	0.99	0.1994	0.1414
81 *	<u>Halichoeres radiatus</u>	2	TL	24	36	-4.9221	3.0382	1.00	0.0145	0.0410
82	<u>Hemiramphus brasiliensis</u>	4	TL	275	380	-3.3362	2.3555	1.00	0.0717	0.0080
83	<u>Holacanthus bermudensis</u>	117	TL	69	427	-4.3950	2.8994	0.97	0.0513	0.0776
84	<u>Holacanthus ciliaris</u>	25	TL	29	350	-4.3731	2.9004	1.00	0.0369	0.0559
85	<u>Holacanthus tricolor</u>	20	TL	42	213	-4.2262	2.8577	0.98	0.0989	0.0925
86	<u>Holocentrus ascensionis</u>	108	FL	190	382	-3.6218	2.5596	0.76	0.1403	0.0704
87 *	<u>Holocentrus coruscus</u>	1	FL	51	51	-4.8611	3.0695	1.00	0.0000	0.0000
88 *	<u>Holocentrus rufus</u>	3	FL	90	175	-4.8825	3.0594	1.00	0.0716	0.2552
89	<u>Hypleurochilus bermudensis</u>	6	TL	24	47	-4.9426	3.0332	0.95	0.3295	0.0733
90 *	<u>Hypoplectrus unicolor</u>	4	FL	109	170	-5.1419	3.1818	0.99	0.0346	0.2216
91 *	<u>Kyphosus sectatrix</u>	2	FL	190	206	-4.8397	3.0801	1.00	0.0034	0.0120
92	<u>Lachnolaimus maximus</u>	228	FL	68	600	-4.6801	2.9880	0.98	0.0318	0.0518
93	<u>Lactophrys bicaudalis</u>	5	TL	136	271	-2.4461	2.0976	0.95	0.2775	0.0644
94	<u>Lactophrys polygona</u>	6	TL	200	301	-5.6339	3.3462	0.94	0.4084	0.0553
95	<u>Lactophrys quadricornis</u>	177	TL	88	550	-3.0194	2.2629	0.87	0.0667	0.0785
96 *	<u>Lactophrys trigonius</u>	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 chrysopteron</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 St. Croix	139 227	FL FL	160 175	320 337	-4.0350 -2.4262	2.7443 2.0768	0.89 0.75
2 <u>Acanthurus coeruleus</u> Blue tang	St. Thomas/St. John St. Croix	410 2767	FL FL	135 100	285 295	-3.1415 -2.8242	2.3964 2.2638	0.80 0.61
3 <u>Balistes vetula</u> Queen triggerfish	Puerto Rico St. Thomas/St. John	339 509	FL FL	175 170	546 435	-4.1822 -4.0637	2.8293 2.7837	0.91 0.94
4 <u>Calamus bajonado</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 St. Croix	32 98	FL FL	200 175	730 380	-4.6704 -4.1896	2.9545 2.7480	0.98 0.90
8 <u>Epinephelus fulvus</u> Coney	Puerto Rico St. Thomas/St. John St. Croix	583 189 1644	FL FL FL	157 190 105	639 370 315	-4.6508 -3.3353 -3.6232	2.9330 2.4000 2.5105	0.83 0.54 0.70
9 <u>Epinephelus guttatus</u> Red hind	Puerto Rico St. Thomas/St. John St. Croix	723 448 567	FL FL FL	156 205 208	474 545 500	-4.4431 -5.0756 -5.3835	2.8386 3.1001 3.2304	0.88 0.91 0.92
10 <u>Epinephelus striatus</u> Nassau grouper	Puerto Rico St. Thomas/St. John St. Croix	60 73 4	FL FL FL	210 330 320	645 770 470	-4.8980 -5.8455 -5.5063	3.0386 3.3804 3.2832	0.90 0.60 0.96
11 <u>Etelis oculatus</u> Queen snapper	St. Thomas/St. John St. Croix	21 48	FL FL	360 200	890 702	-3.6326 -3.7621	2.5498 2.5775	0.85 0.95
12 <u>Haemulon flavolineatum</u> French grunt	Puerto Rico St. Thomas/St. John St. Croix	200 12 232	FL FL FL	137 170 170	296 210 280	-3.8605 -3.4610 -3.5676	2.6509 2.4850 2.5255	0.76 0.72 0.54
13 <u>Haemulon plumieri</u> White grunt	Puerto Rico St. Thomas/St. John St. Croix	1071 39 1588	FL FL FL	135 190 50	444 700 325	-4.2654 -4.7822 -2.2775	2.8186 3.0336 1.9849	0.89 0.97 0.57
14 <u>Haemulon sciurus</u> Bluestriped grunt	St. Thomas/St. John St. Croix	23 138	FL FL	205 193	310 285	-4.6001 -3.9303	2.9630 2.6930	0.91 0.68
15 <u>Holocentrus ascensionis</u> Squirrelfish	St. Thomas/St. John St. Croix	98 187	FL FL	180 160	270 250	-3.3204 -2.6159	2.4280 2.1061	0.66 0.38
16 <u>Lachnolaimus maximus</u> Hogfish	Puerto Rico St. Thomas/St. John St. Croix	53 27 3	FL FL FL	230 245 308	595 704 363	-3.9814 -4.3997 -5.3159	2.7055 2.8828 3.2641	0.81 0.99 1.00
17 <u>Lactophrys polygonia</u> Honeycomb cowfish	Puerto Rico St. Croix Puerto Rico	203 199 219	FL FL FL	132 135 120	417 385 360	-3.9652 -3.4940 -2.9762	2.6794 2.4922 2.2372	0.91 0.86 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 chrysotum</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

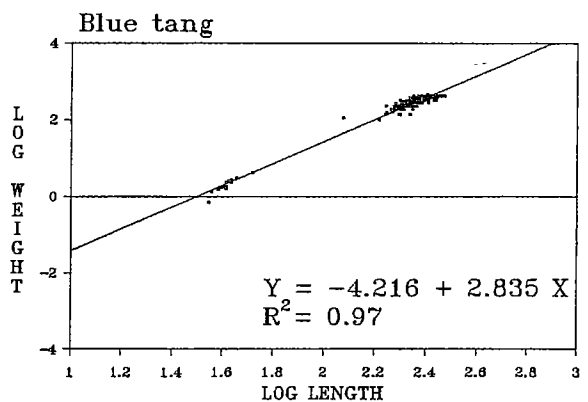
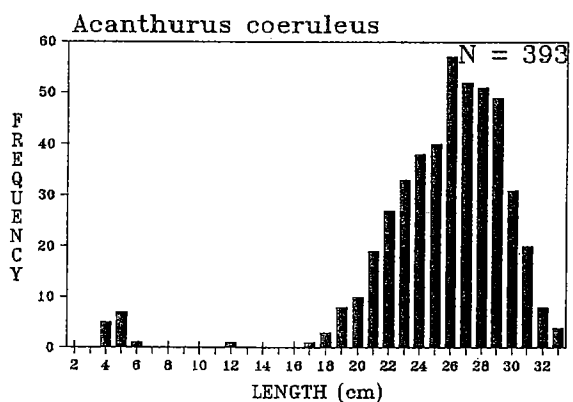
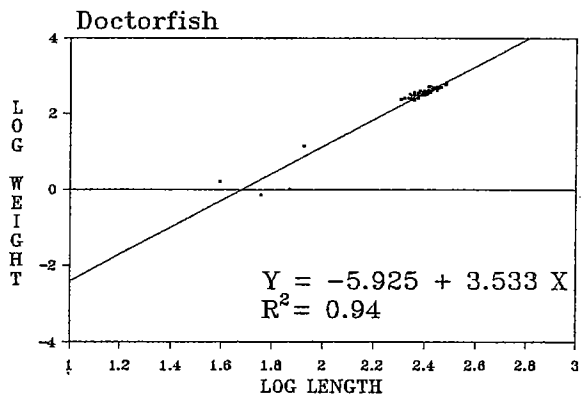
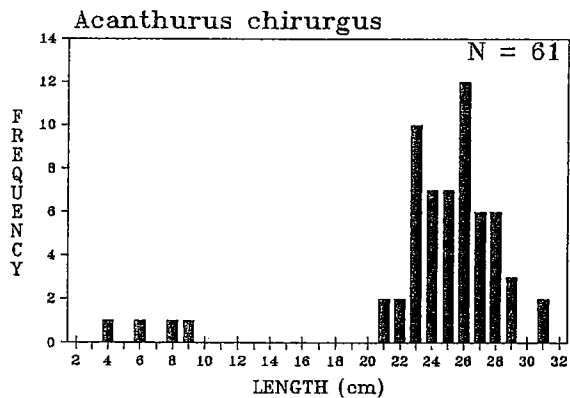
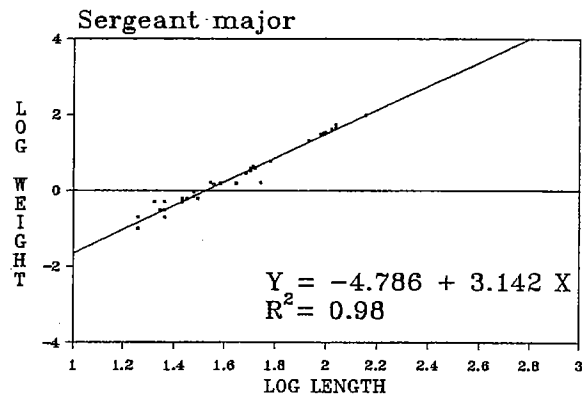
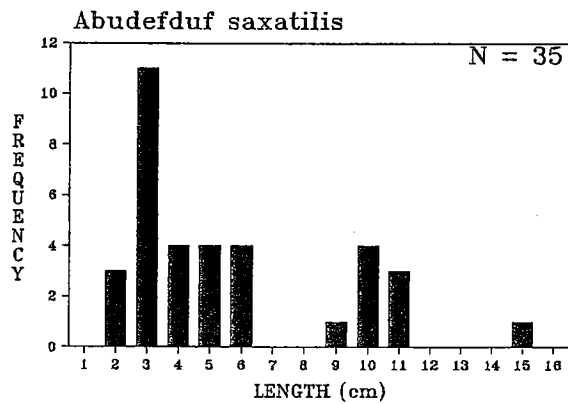
Table 3. (continued) - List of species observed in visual censusing by Reef Team and for which length-weight data is needed (fewer than 30 measured individuals available).

SPECIES	COMMON NAME
<u>Ophioblennius atlanticus</u>	Redlip blenny
<u>Opistognathus aurifrons</u>	Yellowhead jawfish
<u>Opistognathus maxilloso</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 dieneae</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

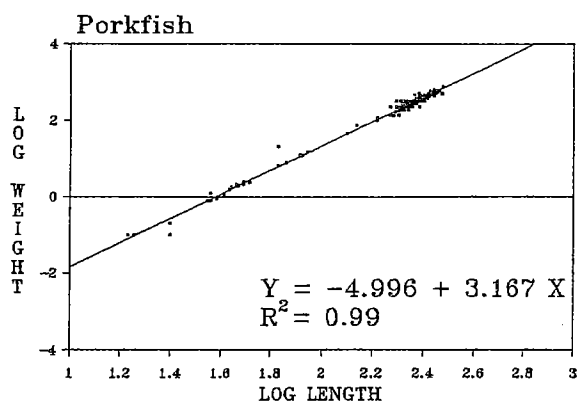
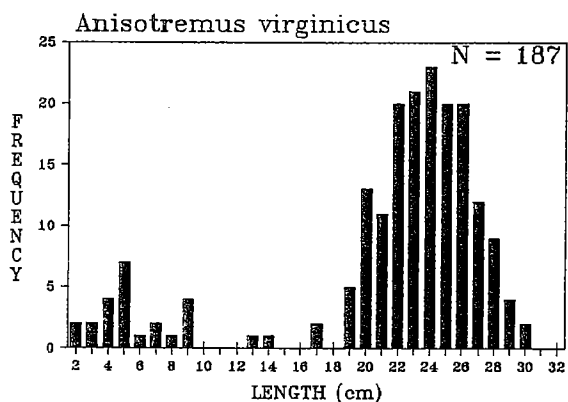
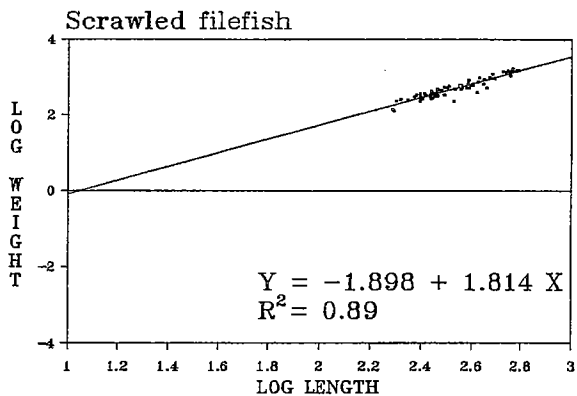
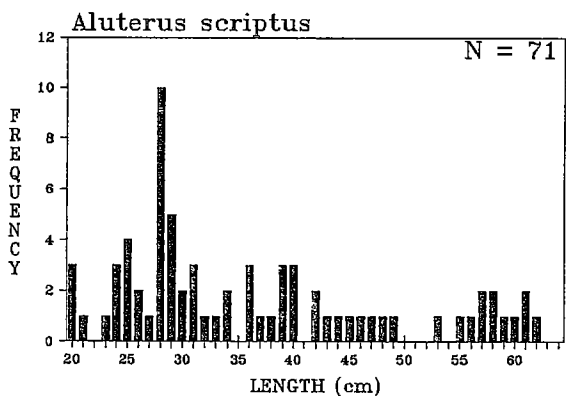
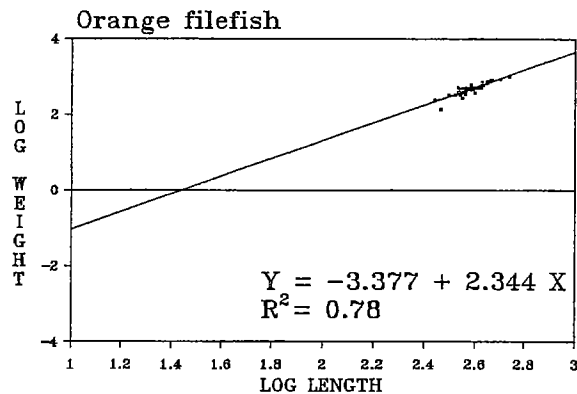
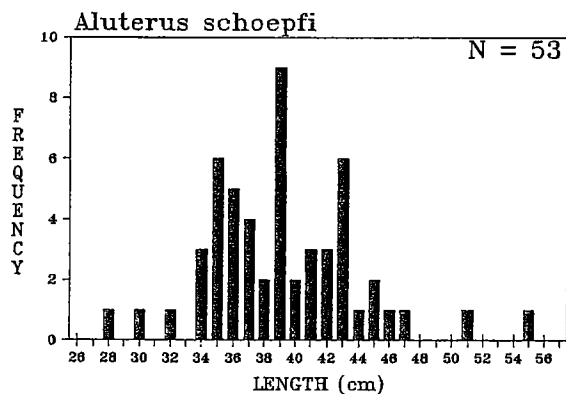
Table 3. (continued) - List of species observed in visual censusing by Reef Team and for which length-weight data is needed (fewer than 30 measured individuals available).

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>Xyrichthys</u> <u>martinicensis</u>	Rosy razorfish
<u>Xyrichthys</u> <u>novacula</u>	Pearly razorfish
<u>Xyrichthys</u> <u>splendens</u>	Green razorfish

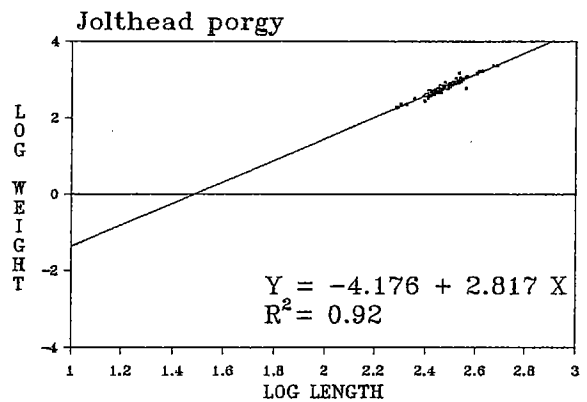
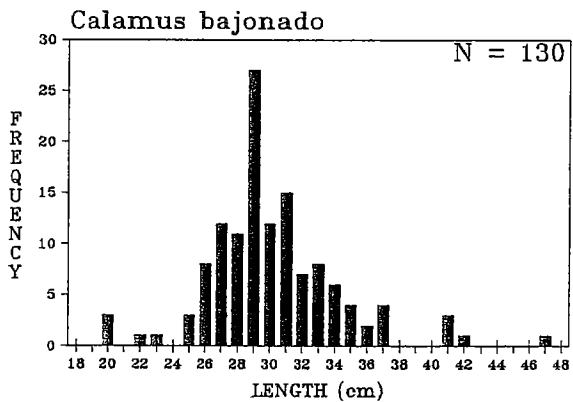
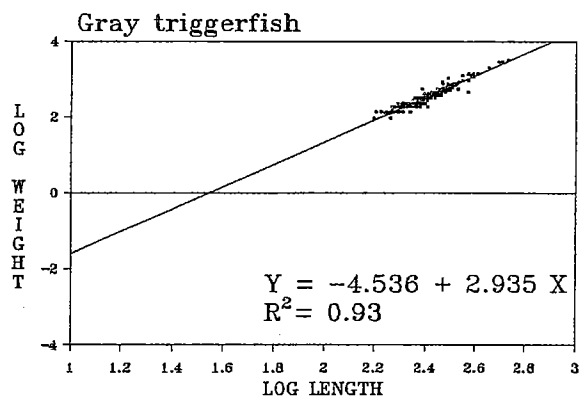
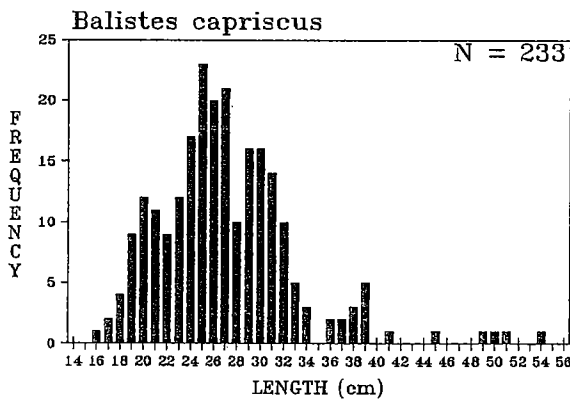
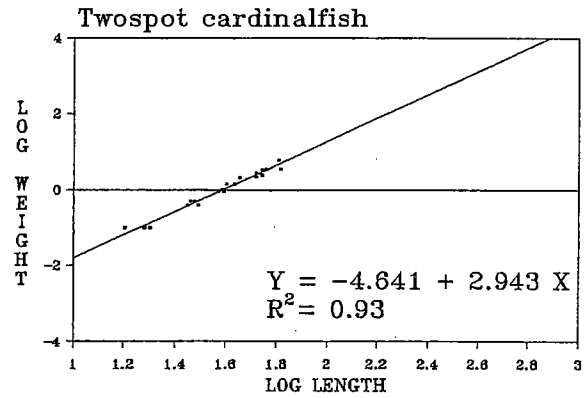
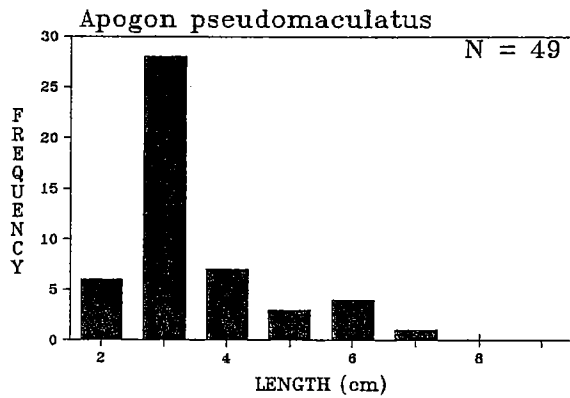
Appendix A.- Frequency distribution and regression graphics for southern Florida fish species with >30 measurements.



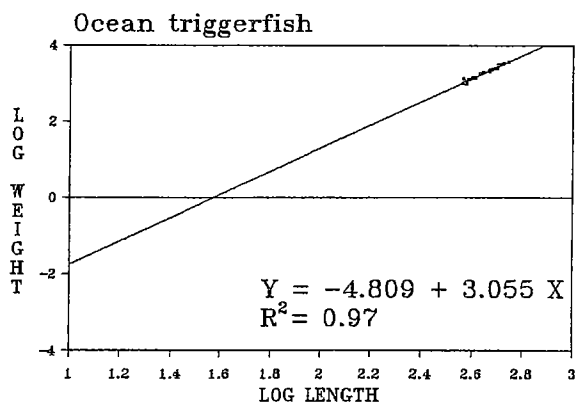
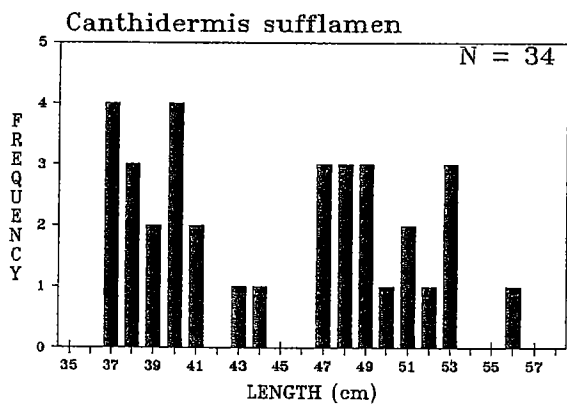
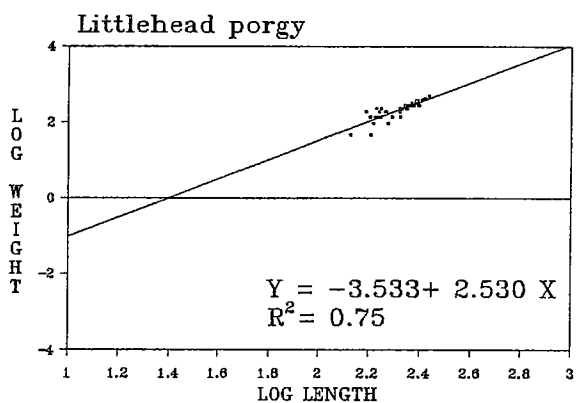
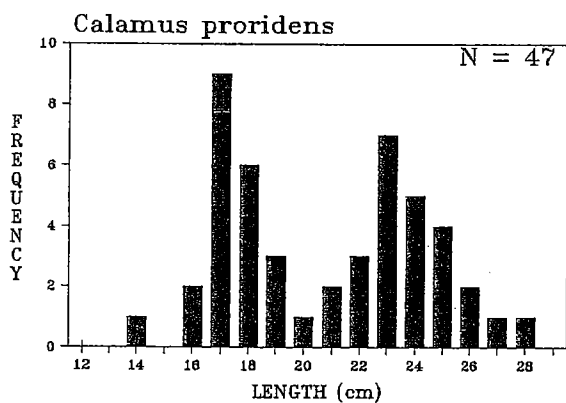
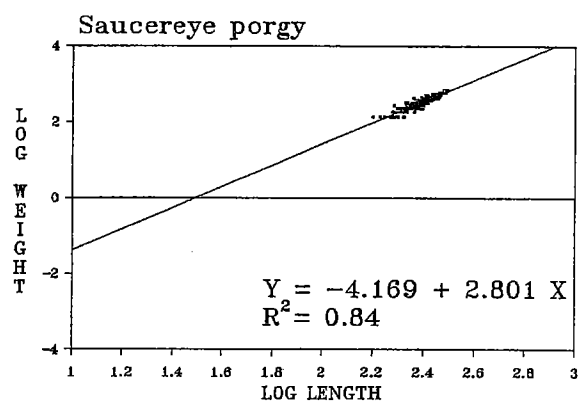
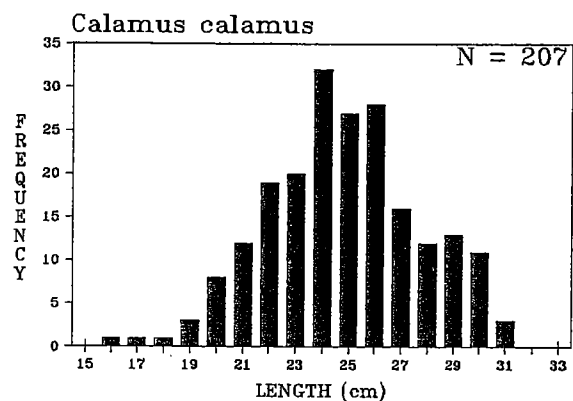
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



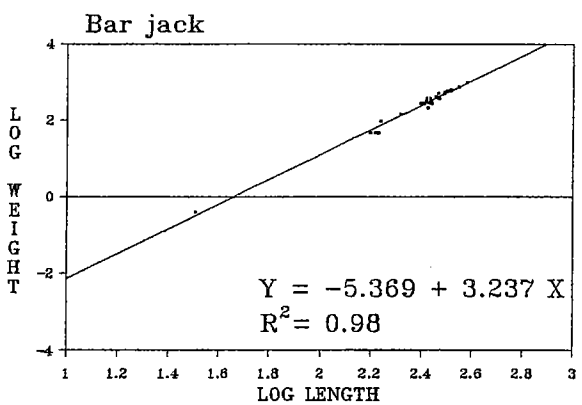
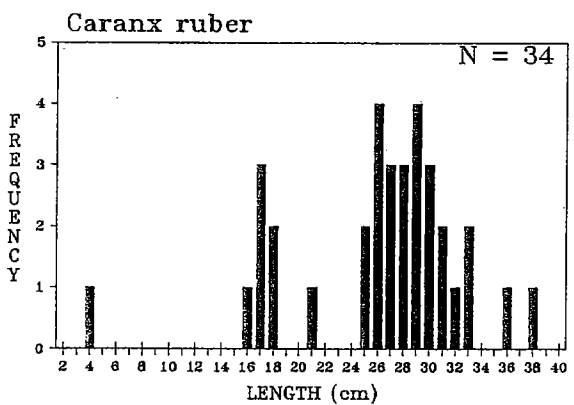
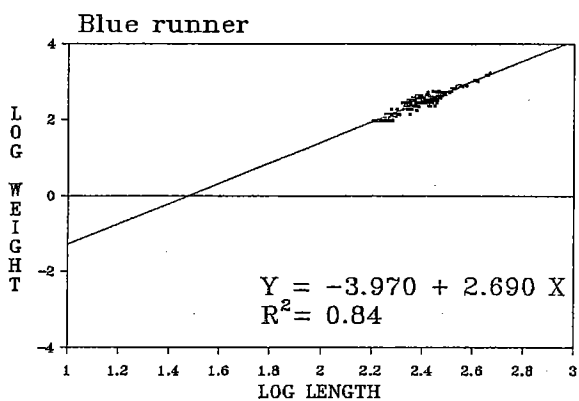
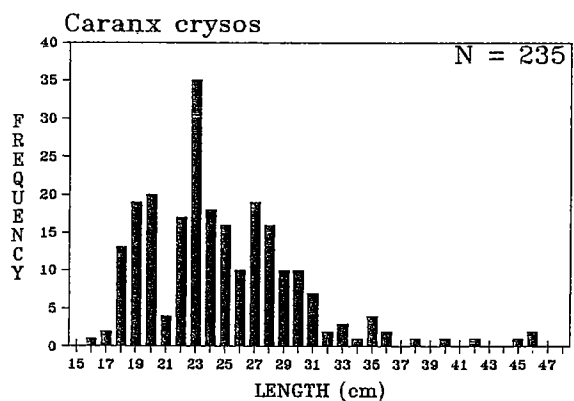
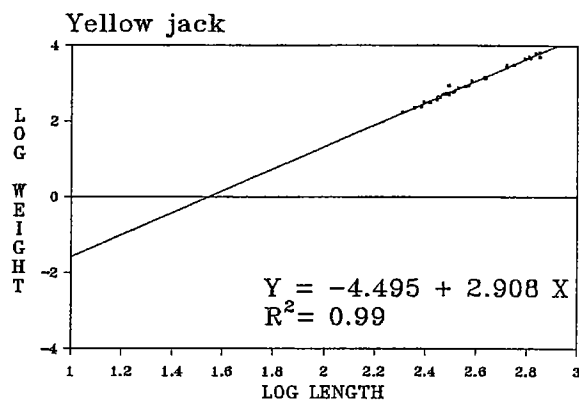
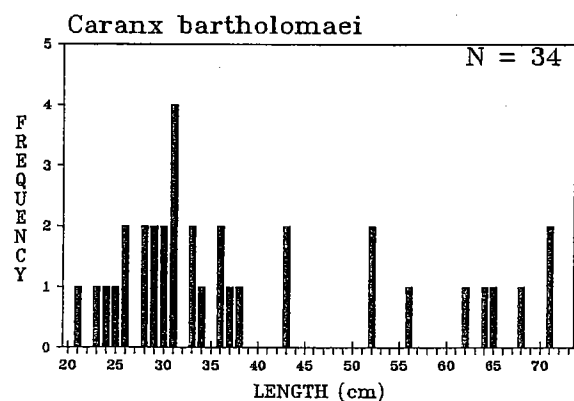
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



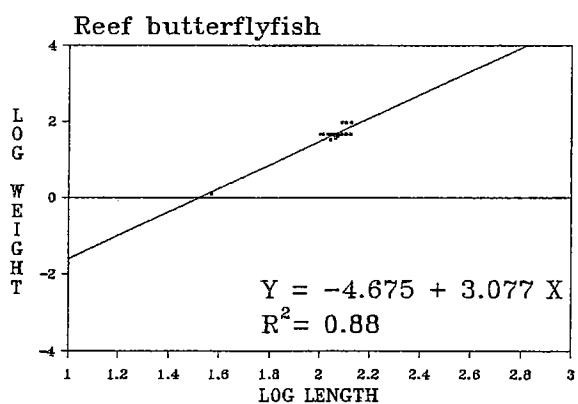
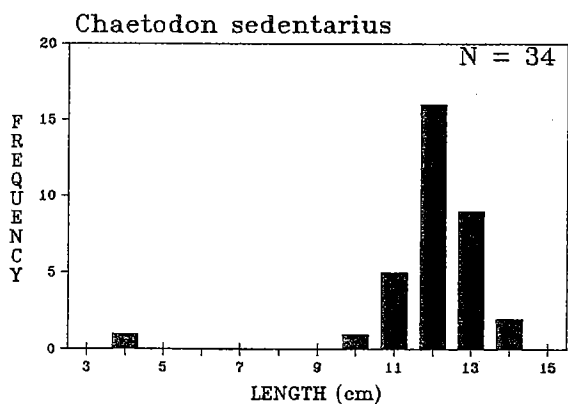
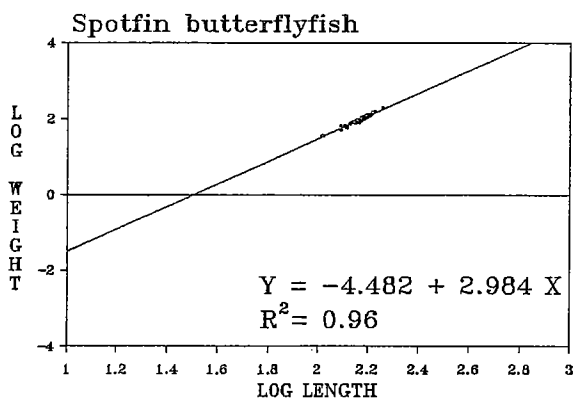
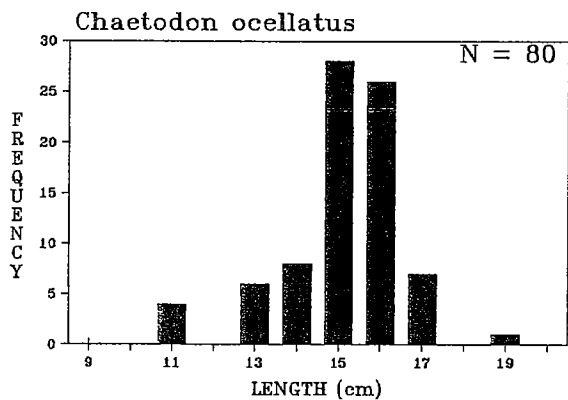
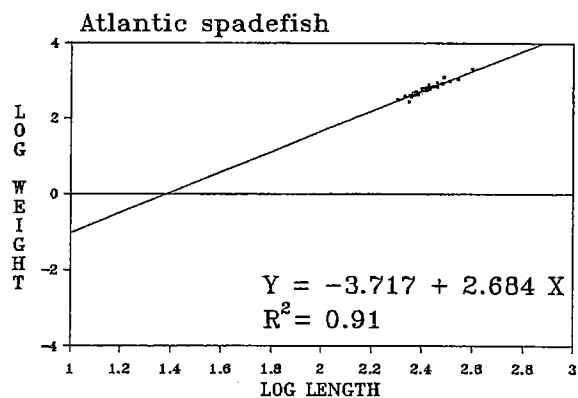
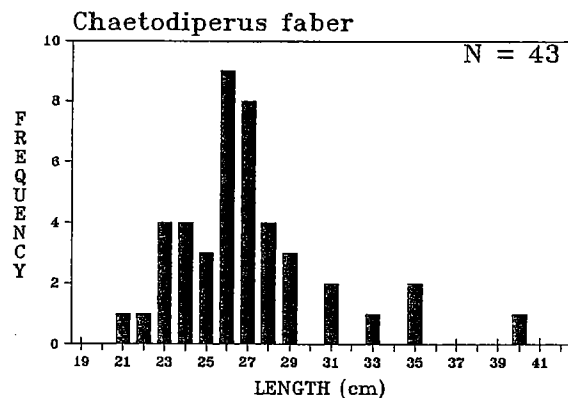
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



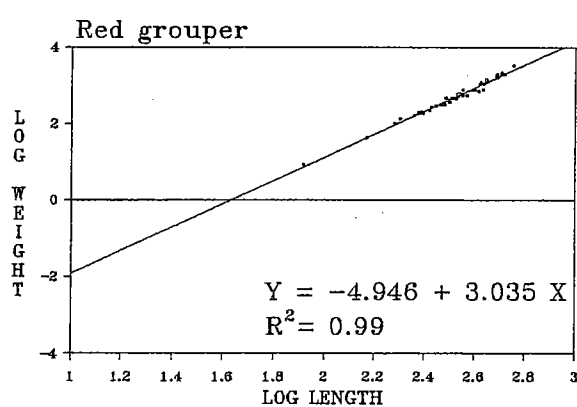
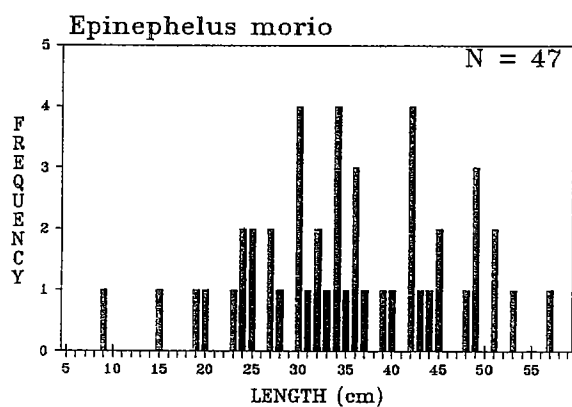
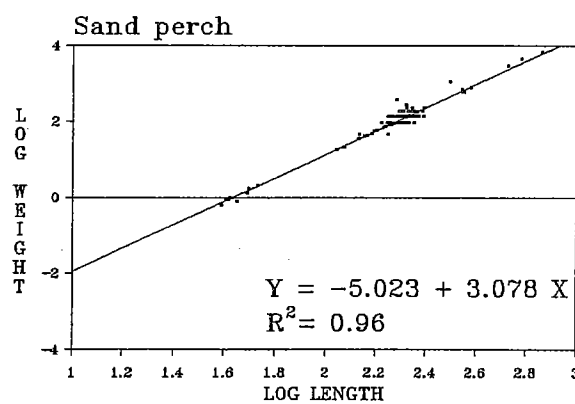
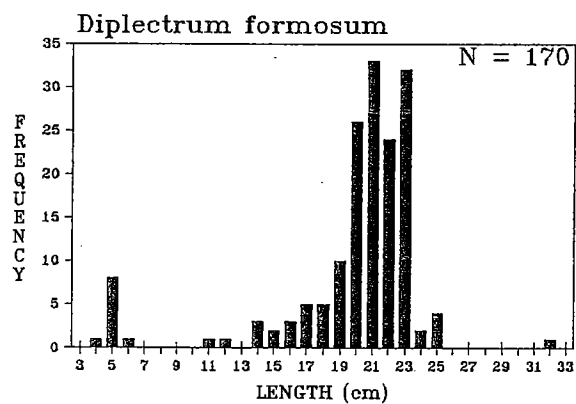
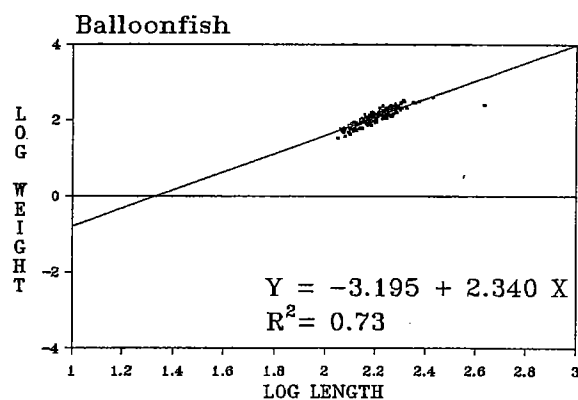
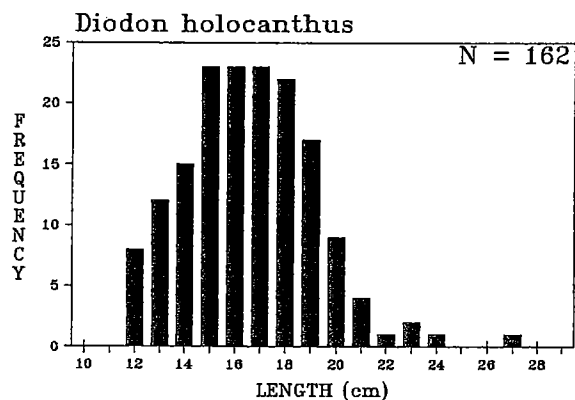
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



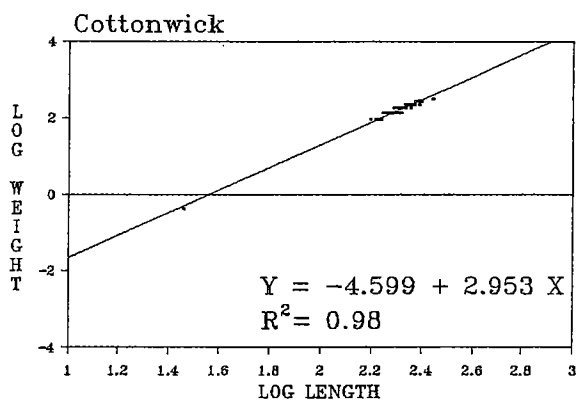
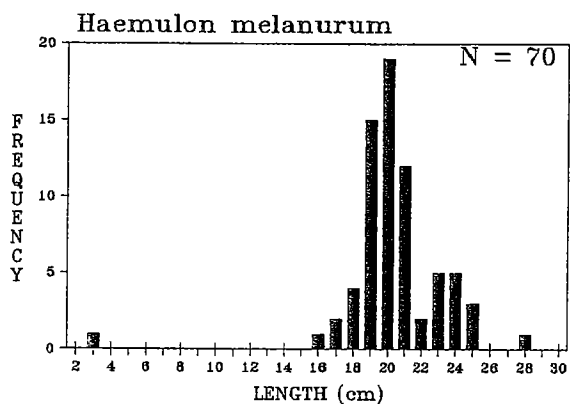
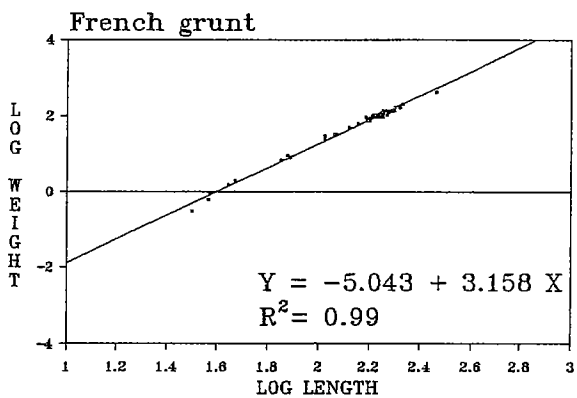
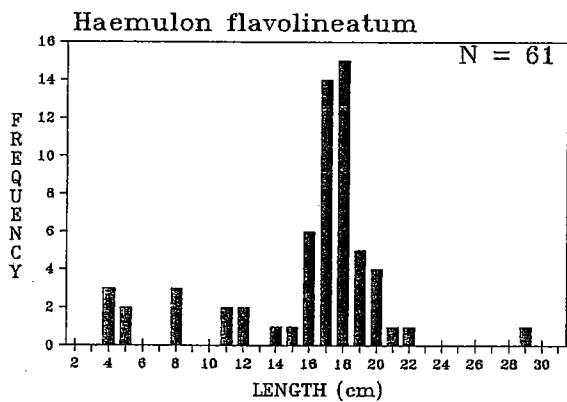
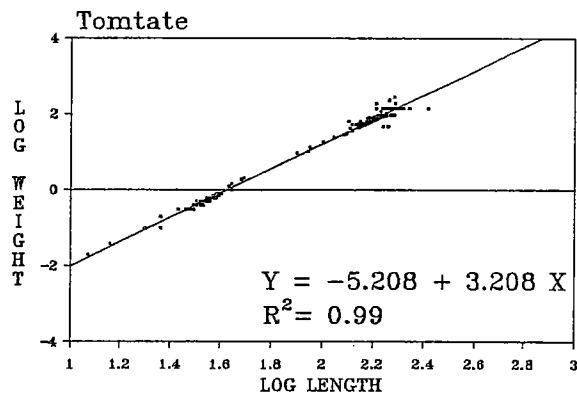
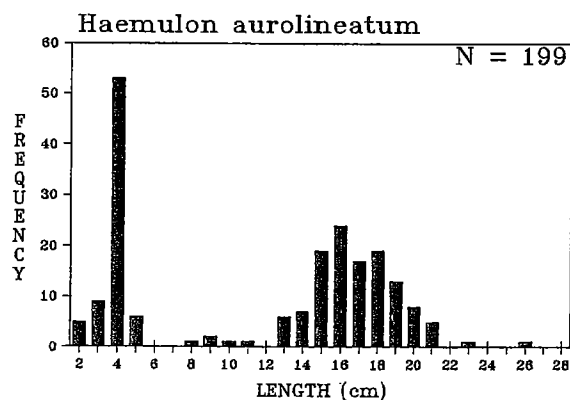
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



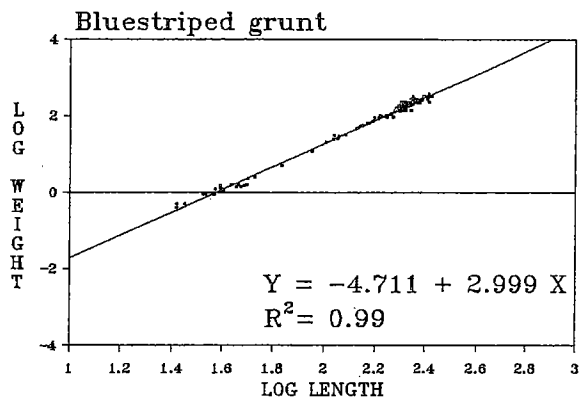
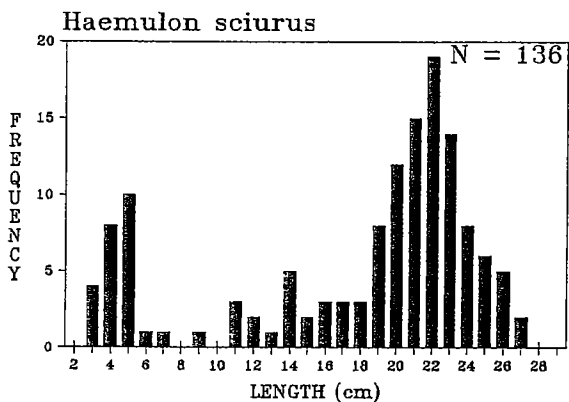
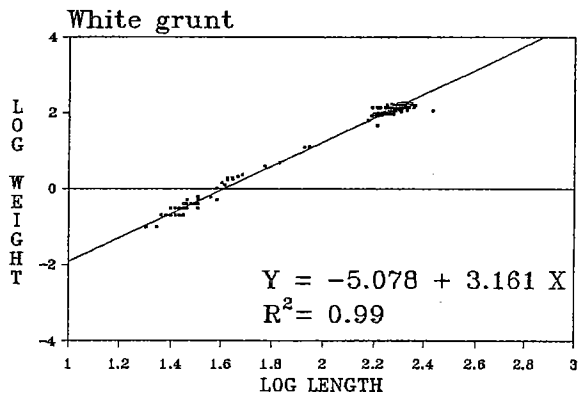
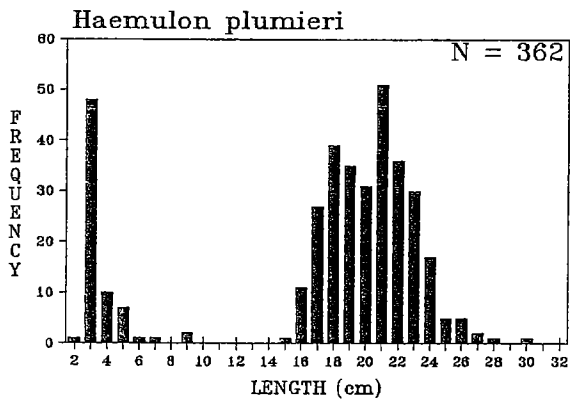
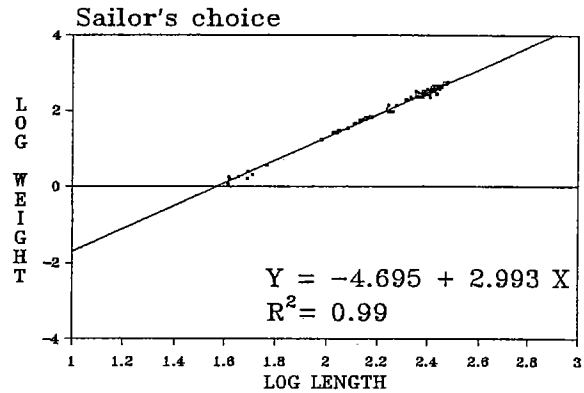
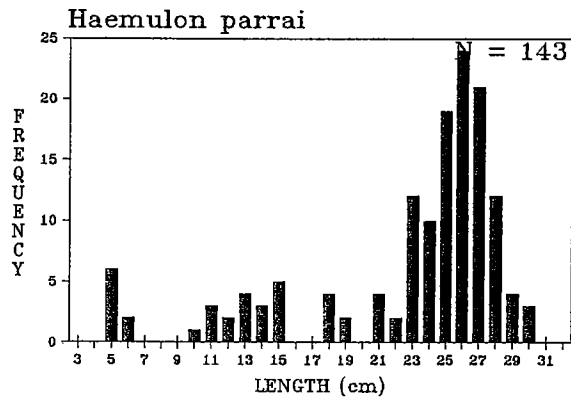
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



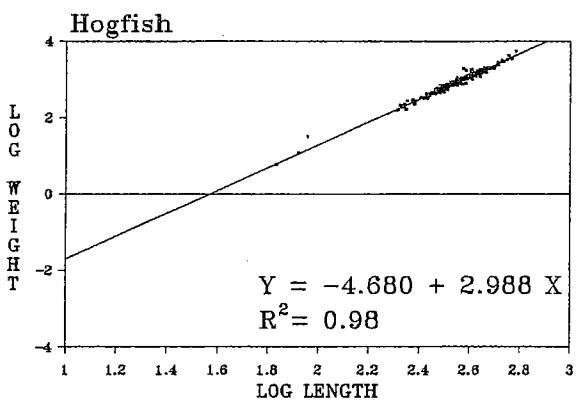
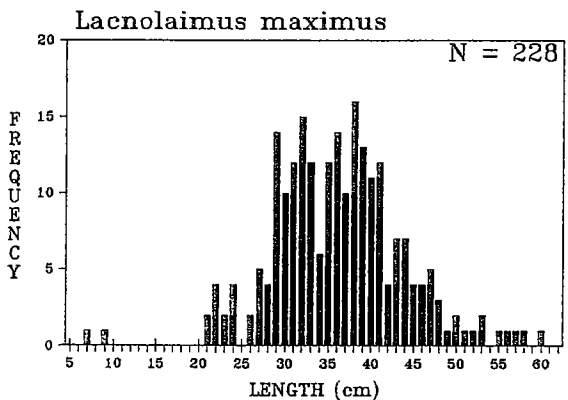
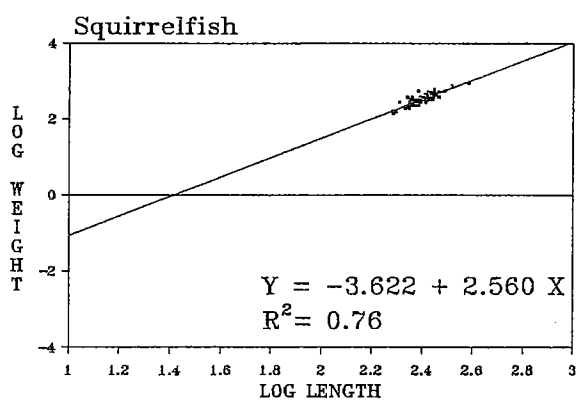
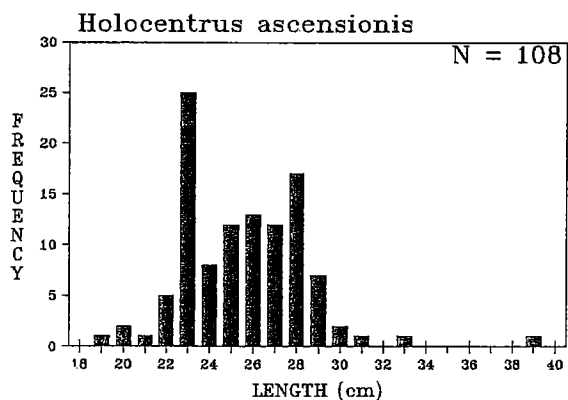
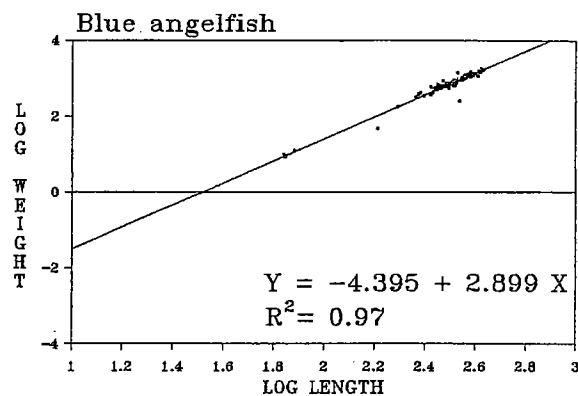
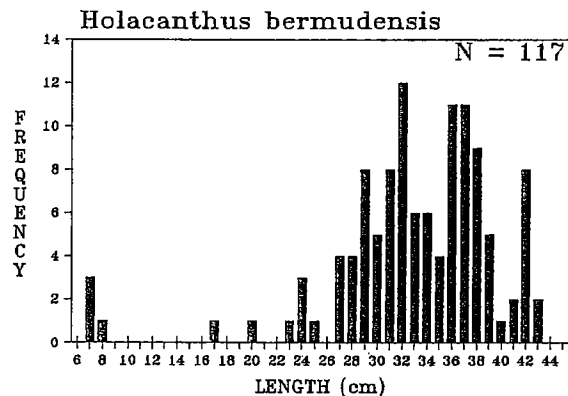
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



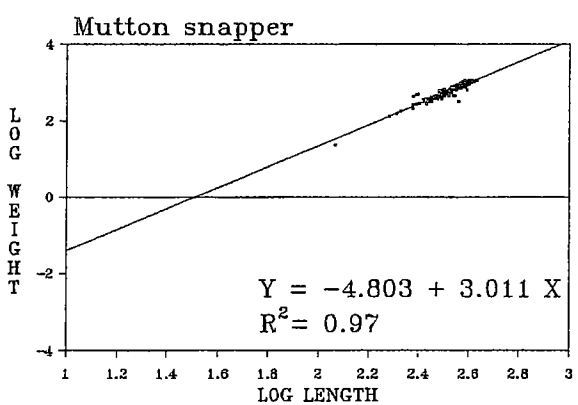
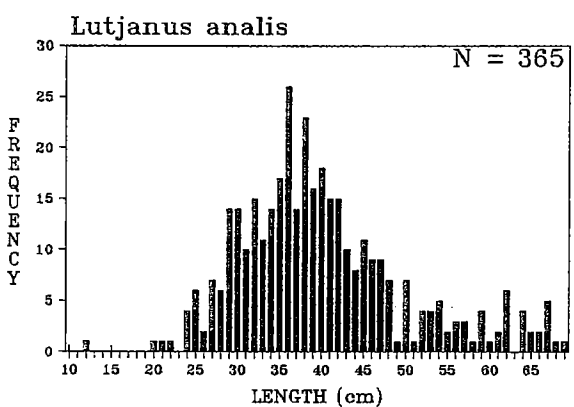
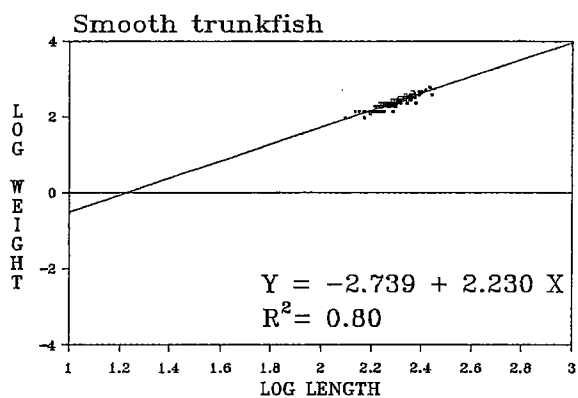
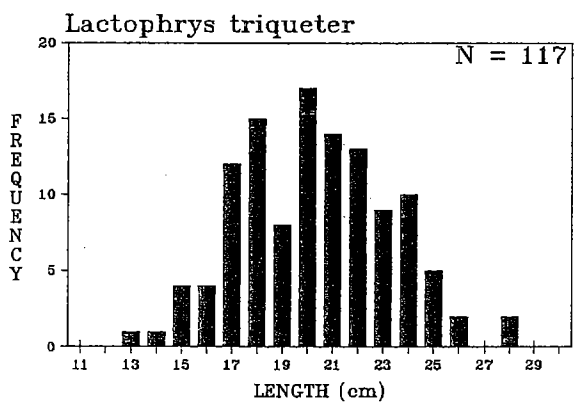
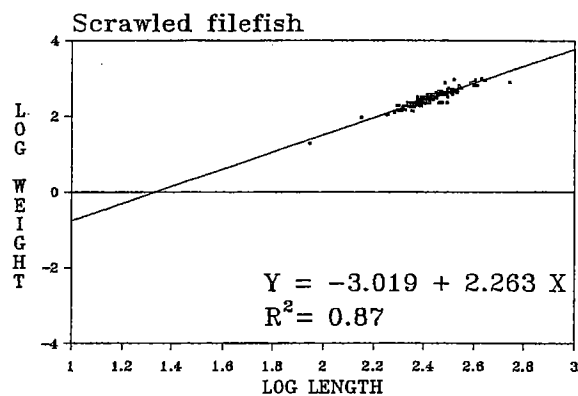
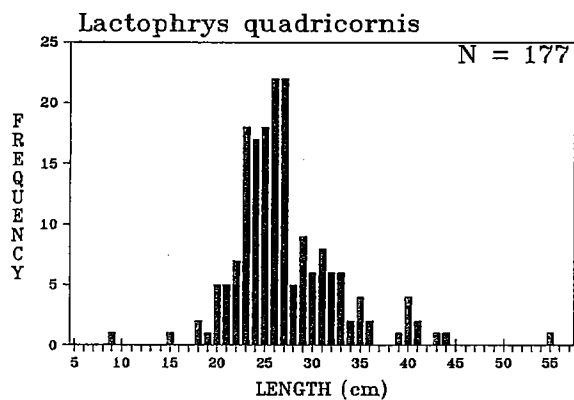
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



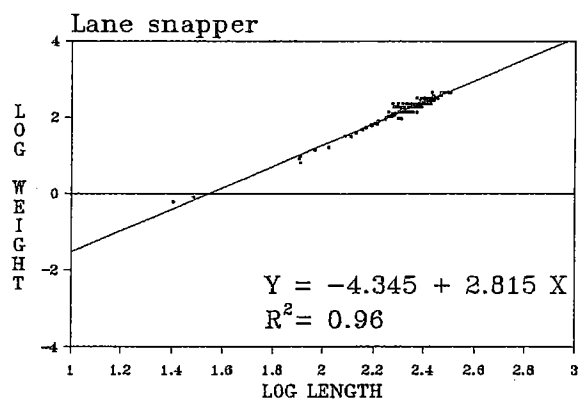
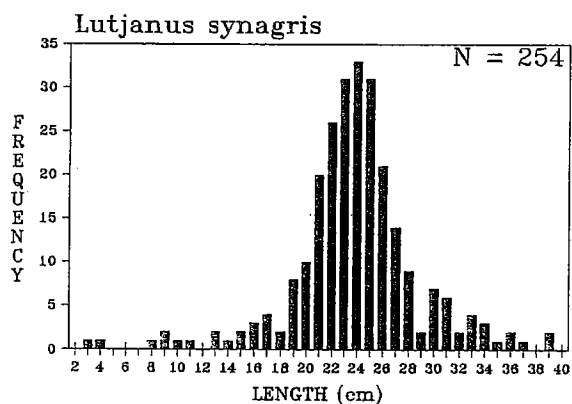
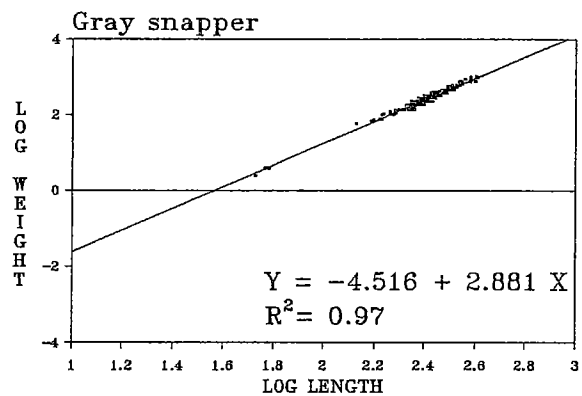
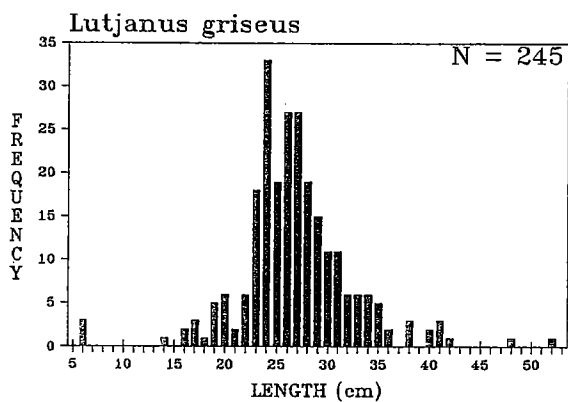
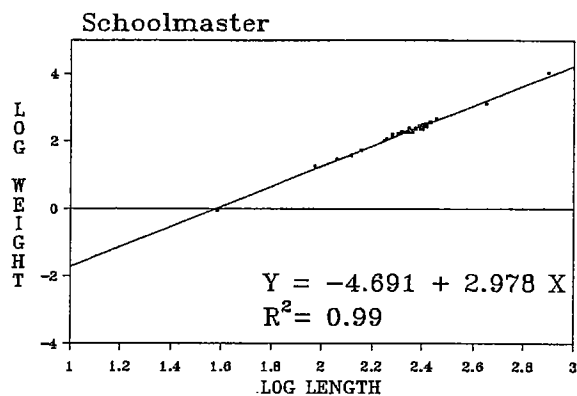
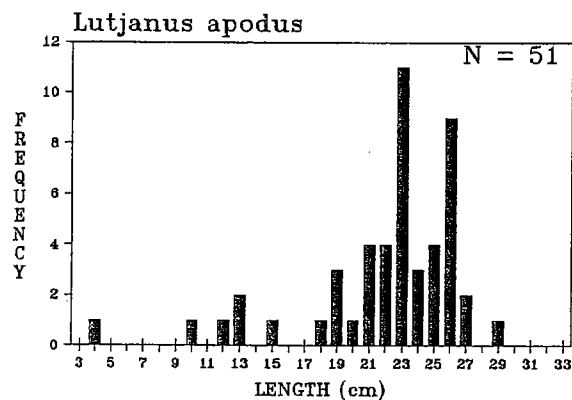
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



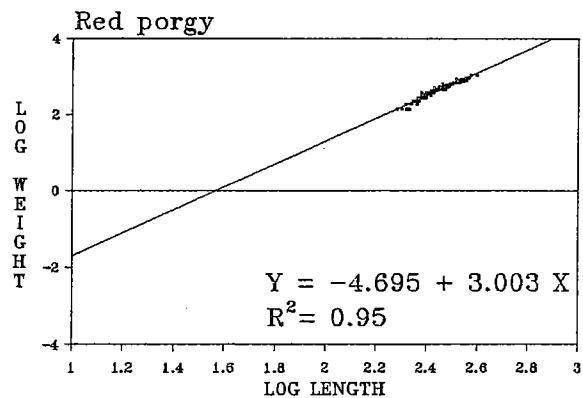
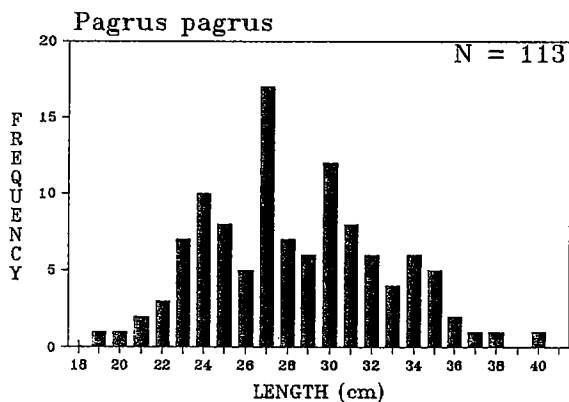
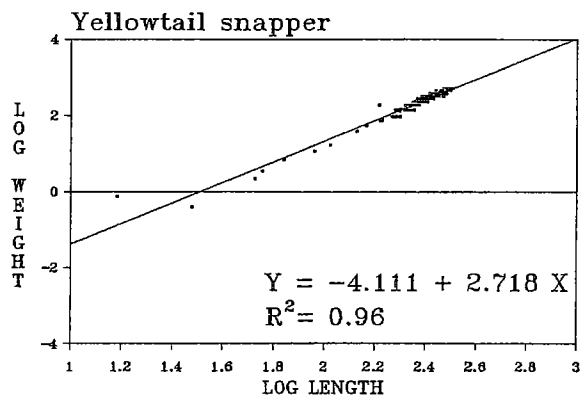
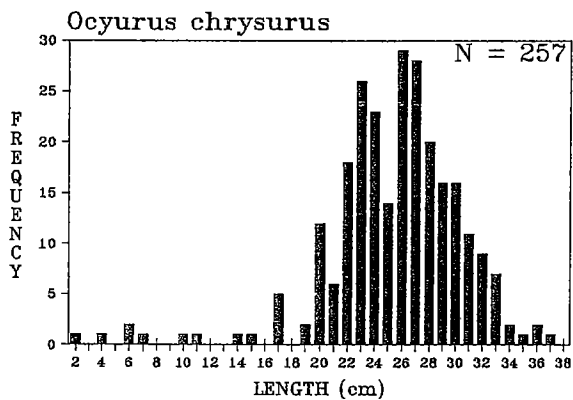
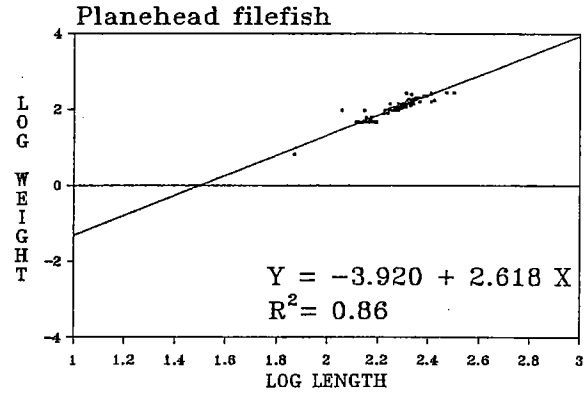
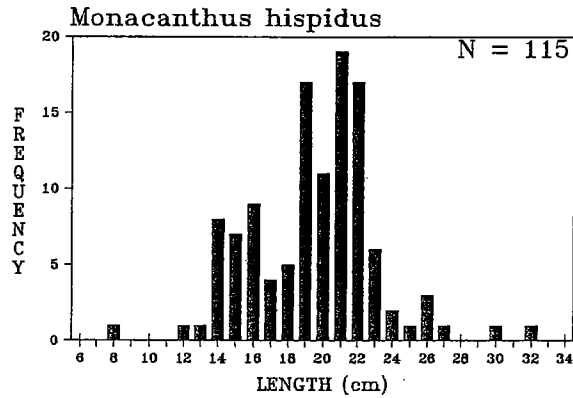
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



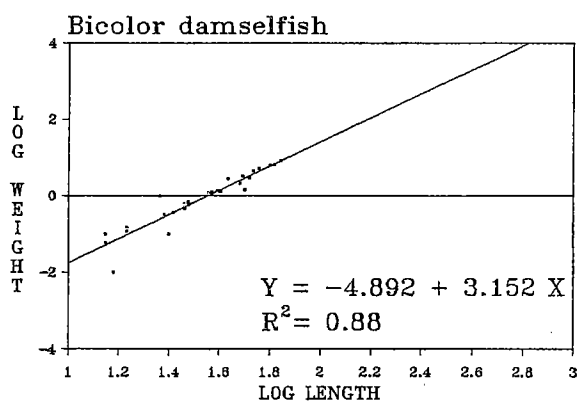
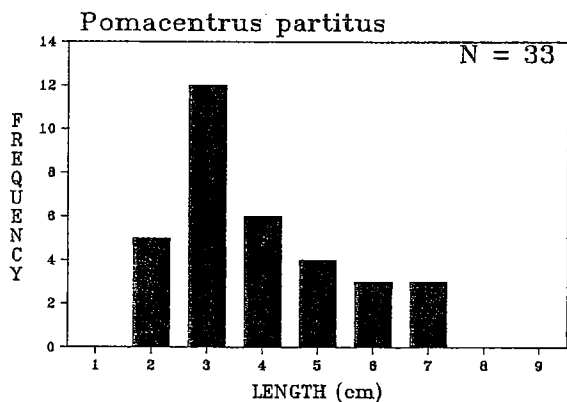
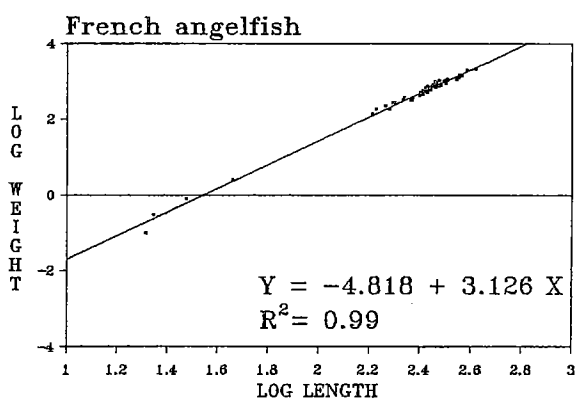
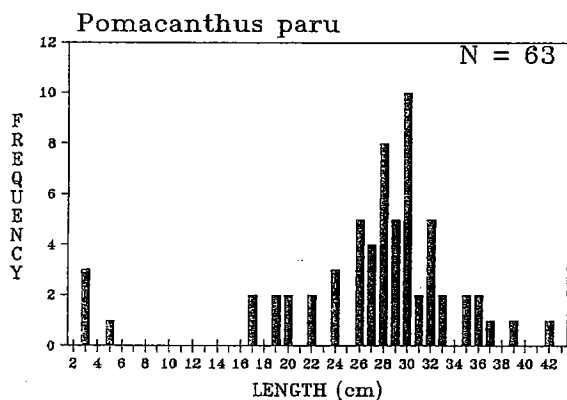
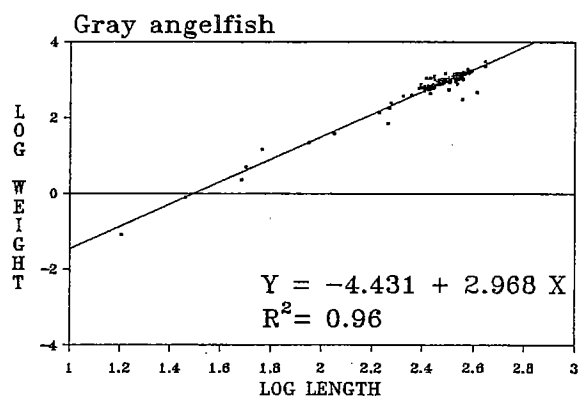
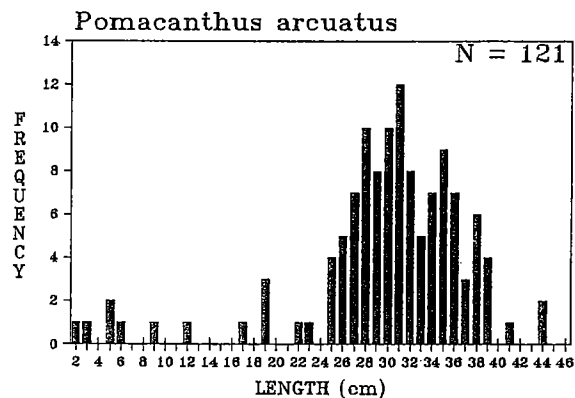
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



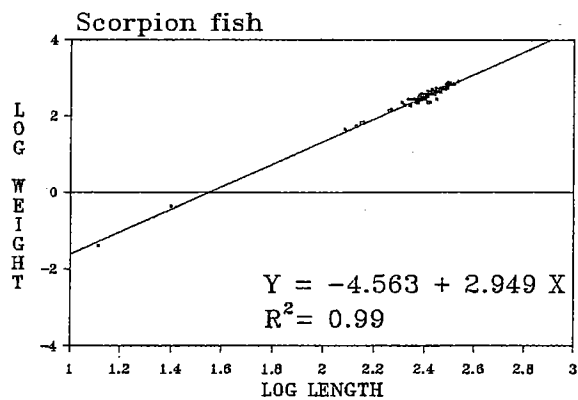
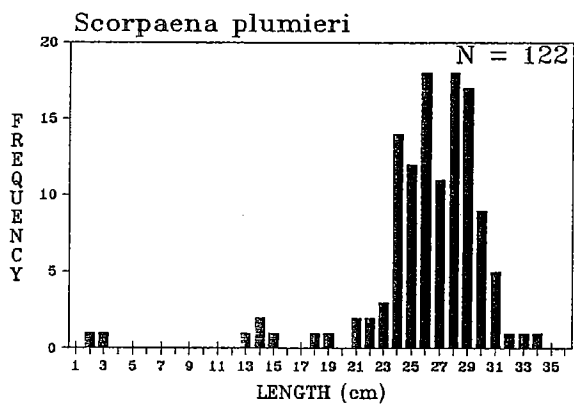
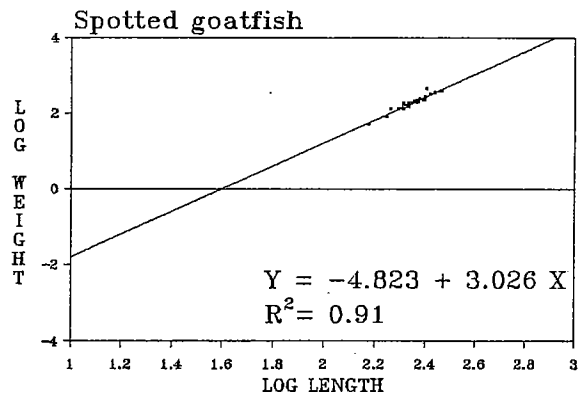
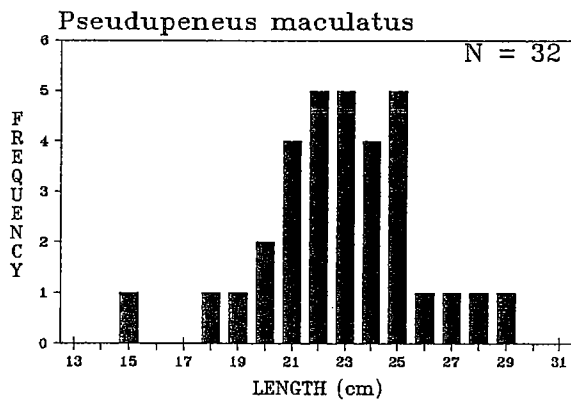
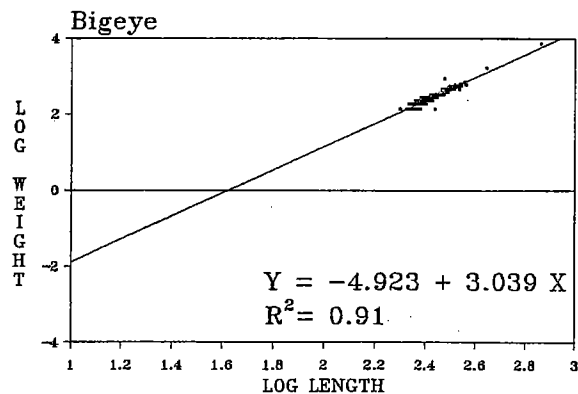
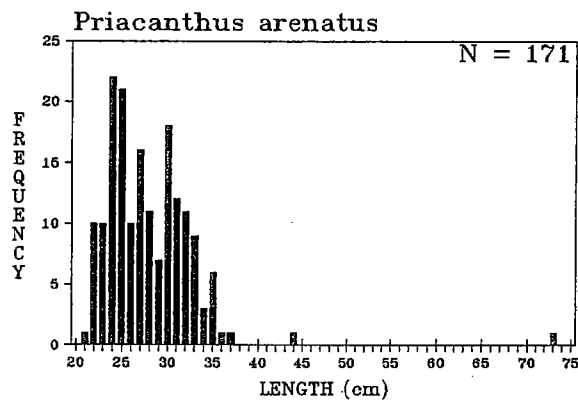
Appendix A.— Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



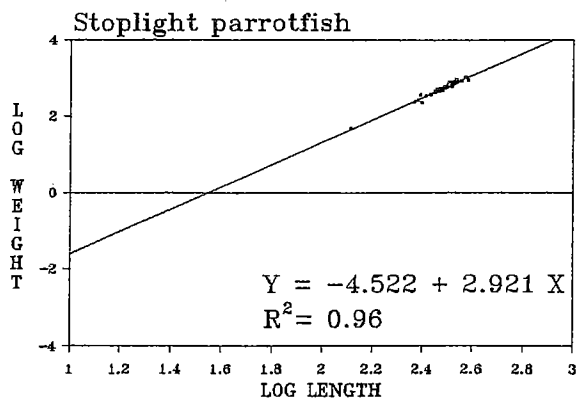
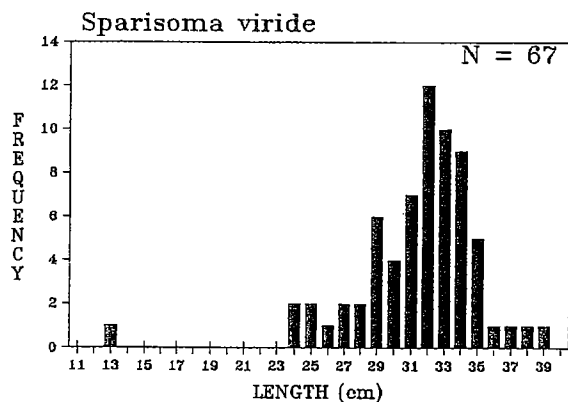
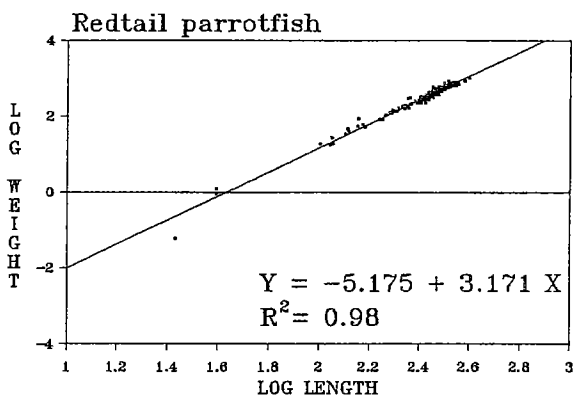
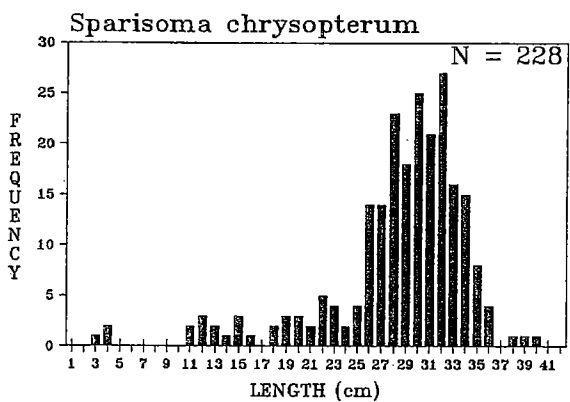
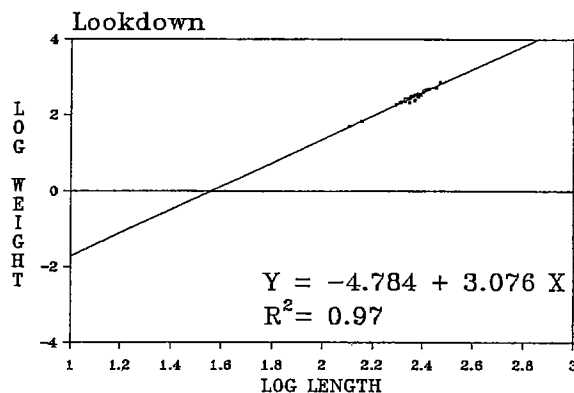
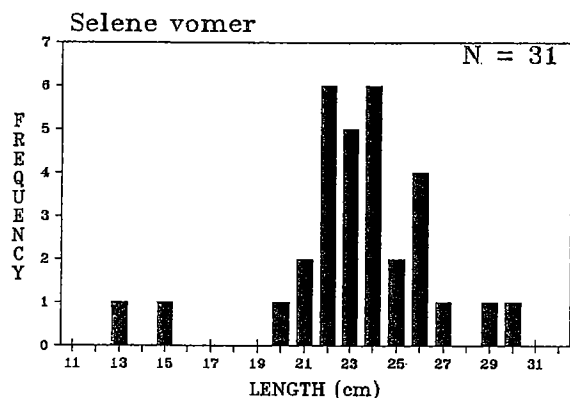
Appendix A.- Frequency distribution and regression graphics for
(cont.) southern Florida fish species with >30 measurements.



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.

