

**WEIGHT OF HEAD AND DIGESTIVE TRACT CONTENTS AND  
REMARKS ON FEEDING HABITS FOR CERTAIN SPECIES OF  
INDUSTRIAL FISH**

Prepared by members of the Woods Hole  
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62-04

**Bureau of Commercial Fisheries,  
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## WEIGHT OF HEAD AND DIGESTIVE TRACT CONTENTS IN SOME SPECIES OF INDUSTRIAL FISH

### Introduction

This study was undertaken at the request of the Central Office, Bureau of Commercial Fisheries, Washington, D. C. for data concerning head weights, total fish weights and digestive tract weights and contents of species that are primarily classified as industrial fish.

These data are presented for six important industrial species in the southern New England region. In addition to quantitative measures of total stomach and intestinal contents, major kinds of food organisms were identified.

### Methods

One hundred fish of each of the following species were collected within 1/2 to 2 hours after being captured: silver hake, Merluccius bilinearis; red hake, Urophycis chuss; common sea robin, Prionotus carolinus; long horn sculpin, Myoxocephalus octodecimspinosus; eelpout, Macrozoarces americanus; and little skate, Raja erinacea. These species constitute about 80 percent by weight of the industrial fish landed in this region. All fish were taken from otter trawlers and pound trap boats landing their catch at Point Judith, Rhode Island on May 14-16, 1962. The fish were kept in ice until examined.

Except for the little skate, the heads and gills were removed by severing the head along the outline of the gill cover. Because of the broad extension of the pectoral fin musculature along the sides of the

head, the skate head was removed along the dashed line shown in Figure 1. On the little skate, and probably other skates as well, a reasonably clear line is visible running down each side between the pectoral fins and the cranial region. The transverse cut in the posterior region followed a flat cartilaginous structure, the pectoral arch. This was considered to be more representative of the actual head and gill weight than a simple transverse cut behind the gill region.

Digestive tracts were removed from gullet to vent and cleaned of attached glands. The stomach and intestines were separated at the pylorus and stored separately. All the digestive tracts were frozen shortly after being removed for later analysis at the Woods Hole Laboratory.

Stomach contents were examined macroscopically to determine the approximate proportion and to identify the more common food organisms. Basic data from this study are summarized in Appendix A.

Data from individual fish on length, sex, total body weight, head weight, weight of stomach and intestinal contents, and stomach fullness are presented in Appendix B.

#### Head Weight-Total Weight Relationship

The ratio of the head weight to body weight indicates the head is usually a constant proportion of the total weight. Head weights have been plotted against total body weights for the six species in Figures 2-7. The head weight/body weight curve of eelpout in Figure 6 is somewhat curvilinear, indicating the head to body weight ratio is not constant throughout the size range as it is for the other species; however, only

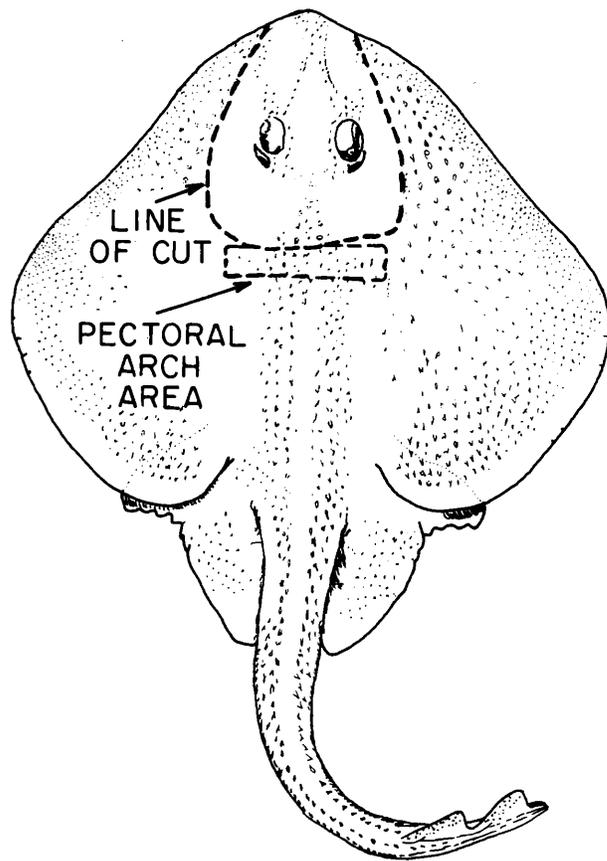


Figure 1--Diagram of skate outlining region defined as the head.

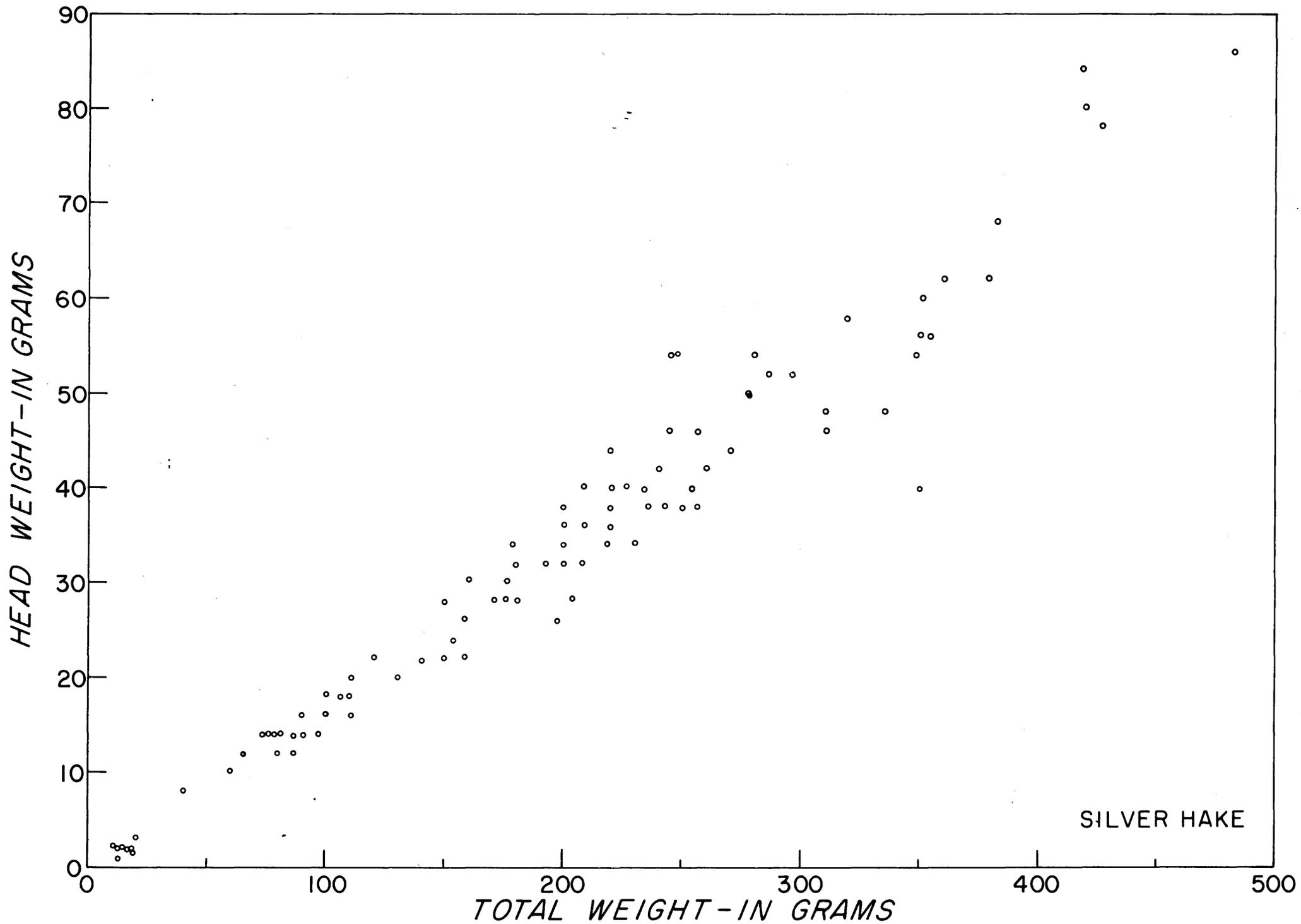


Figure 2--Relationship of head weight to total fish weight

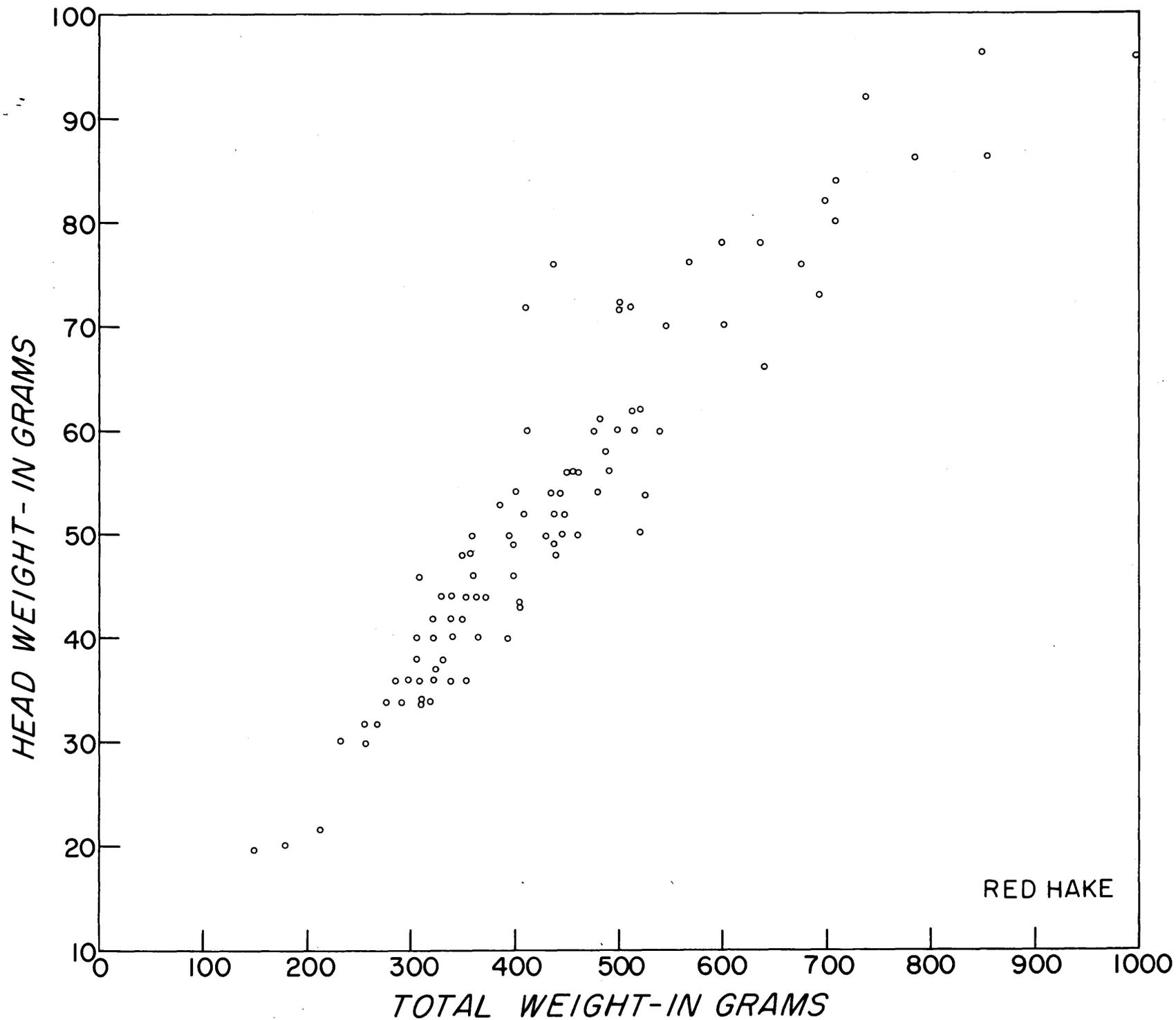


Figure 3--Relationship of head weight to total fish weight

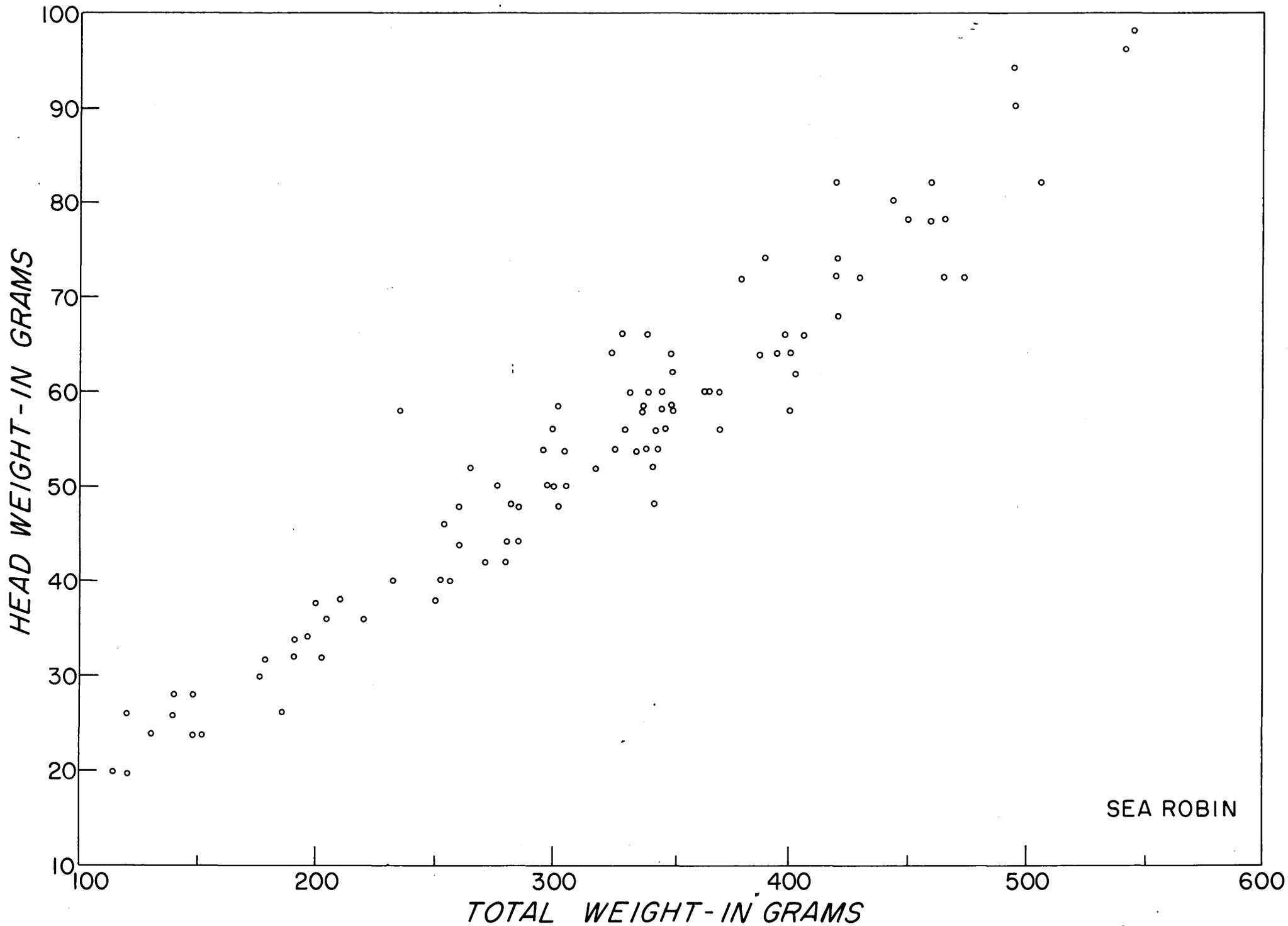


Figure 4--Relationship of head weight to total fish weight

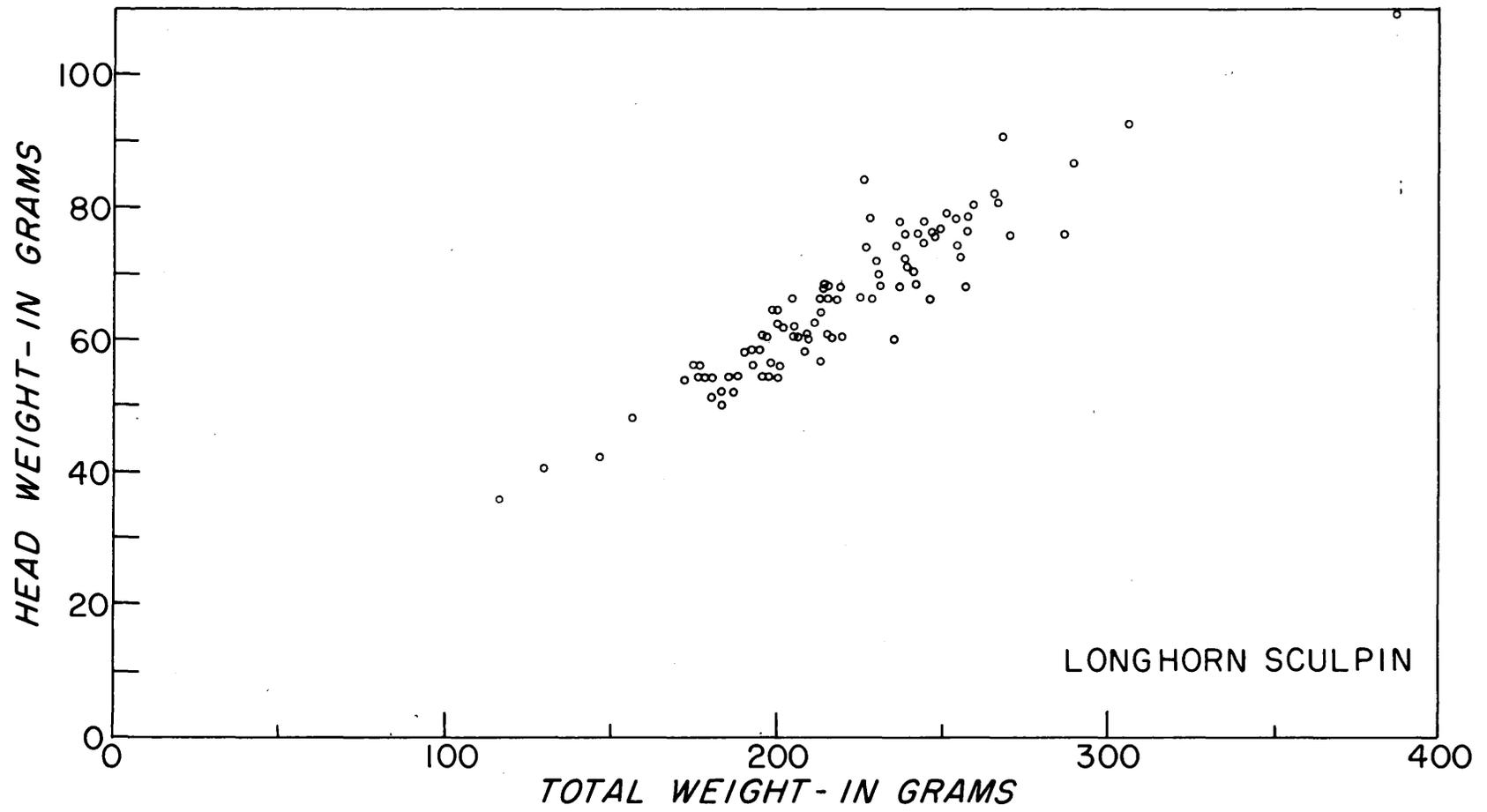


Figure 5--Relationship of head weight to total fish weight

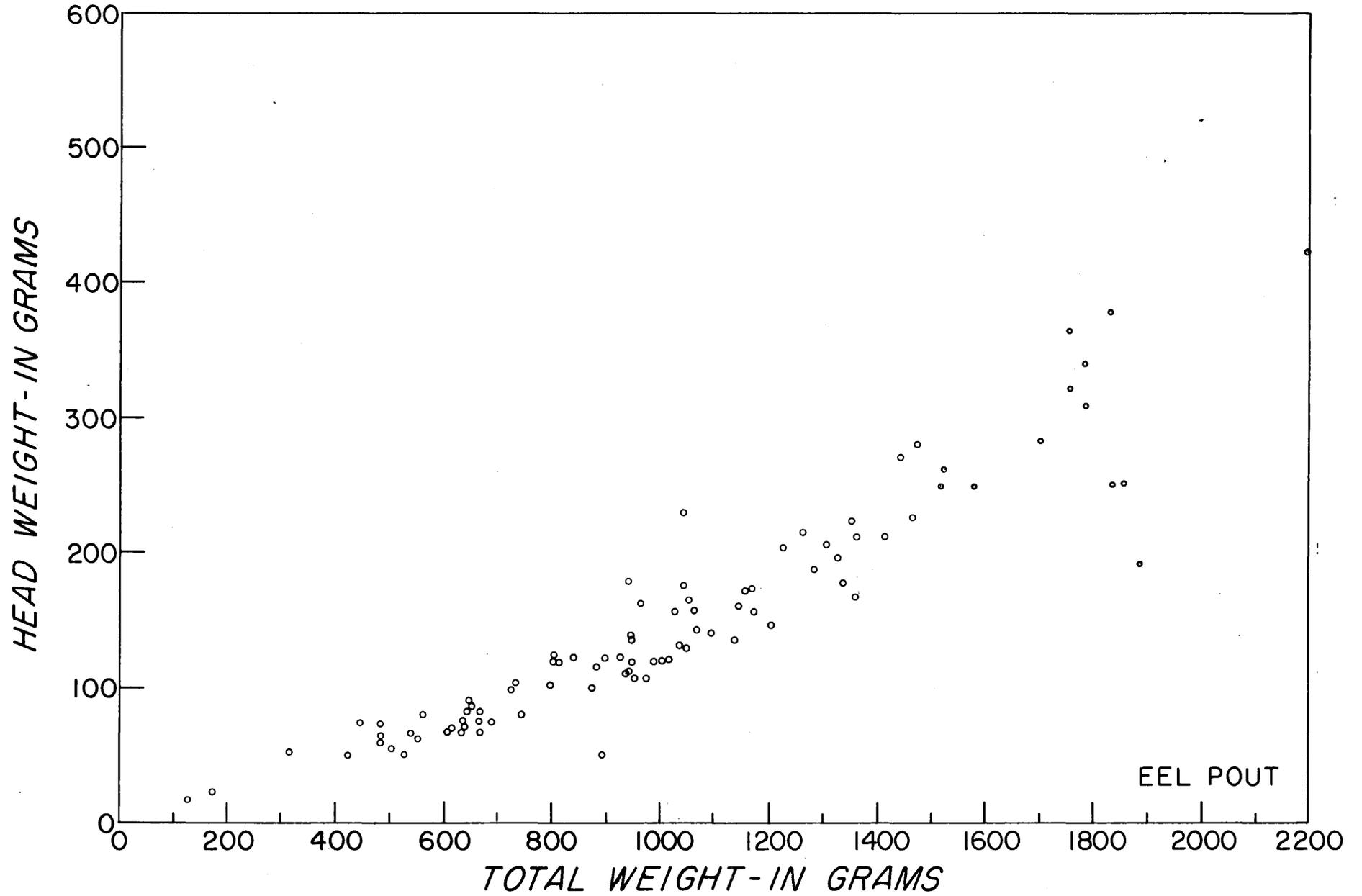


Figure 6--Relationship of head weight to total fish weight

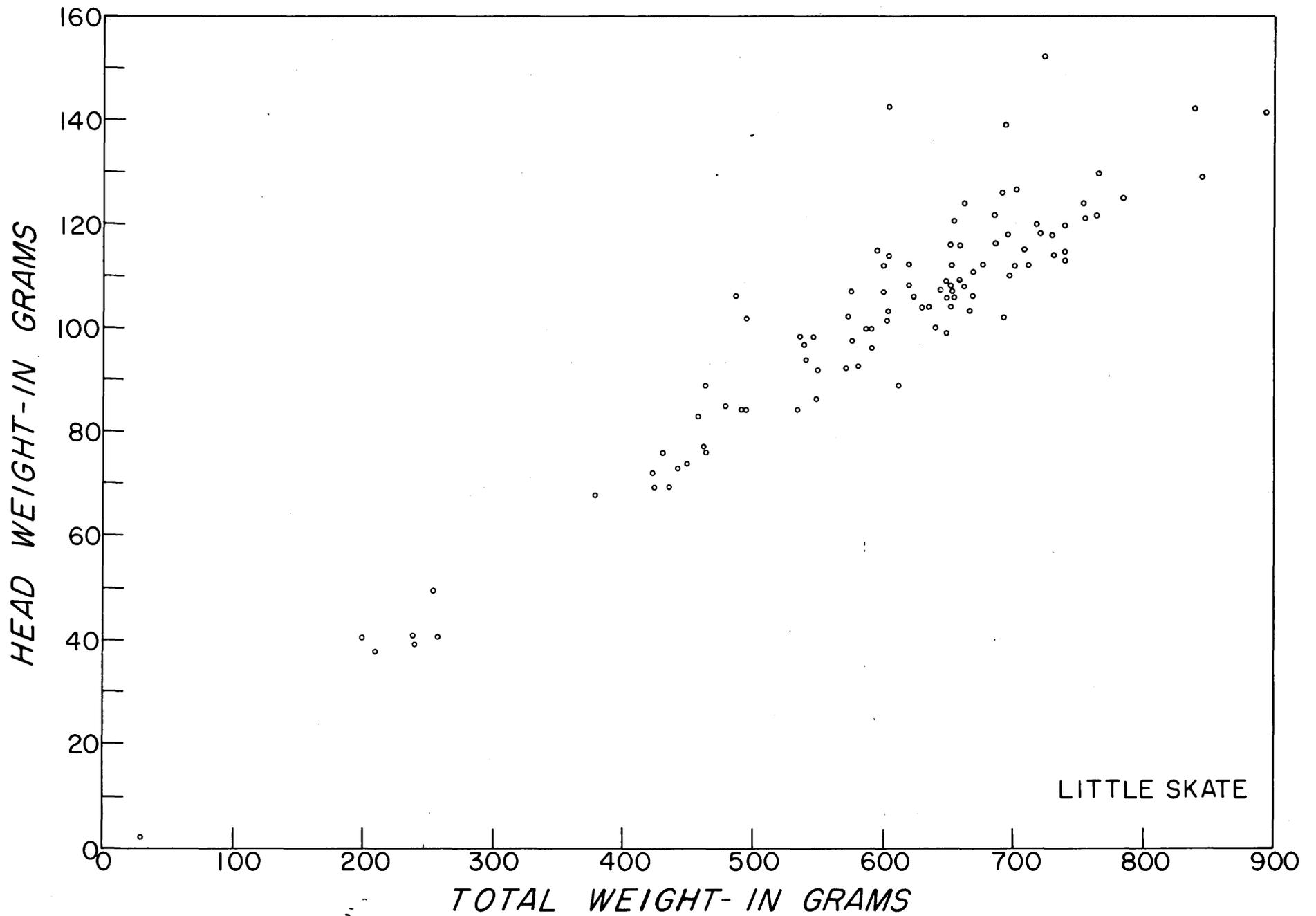


Figure 7--Relationship of head weight to total fish weight

one ratio was derived to represent the relationship. The average head and body weight, and the proportion of the head weight to total weight for each species are summarized in Table 1. The average head weight of all six species constitutes 16.6 percent of the average body weights. The head of the longhorn sculpin is unusually large, being 30.1 percent of the total weight.

### Digestive Tract Analysis

The weight of the contents of the digestive tract is quite variable due to the differences in fullness of the stomach and intestines. Weight of the digestive tract contents have been plotted against total fish weight in Figures 8-13 and the average weight of the digestive tract contents of each species and its relation to total body weight are summarized in Table 2. The average weight of the digestive tract contents for these six species is 3.5 percent of the fish weight. Table 2 also indicates the relation of stomach content and intestinal content weight. The weight of intestinal contents exceeds that of stomach contents for all species presented here.

Table 3 shows the average weight of the stomach and intestines, including the contents, and the proportion it constitutes of the total fish weight. The combined weight of digestive tract and contents comprises 6.6 percent of the average weight for these species.

An interesting relation is shown in Table 4 where the average weight of stomachs and intestines, without contents, and their combined weights are calculated. In some species the average stomach weight

TABLE 1. Relationship of head weight to total weight of fish

SPECIES	AVERAGE TOTAL WEIGHT	AVERAGE HEAD WEIGHT (gms)	RATIO HEAD WEIGHT TO TOTAL WEIGHT (%)
Silver Hake	188.8	32.0	16.9 %
Red Hake	447.0	53.0	11.8 %
Sea Robin	315.6	53.9	17.1 %
Longhorn Sculpin	218.4	65.8	30.1 %
Eelpout	1017.8	153.9	15.1 %
Little Skate	588.2	101.1	17.2 %
GRAND AVERAGE	462.6	76.6	16.6 %

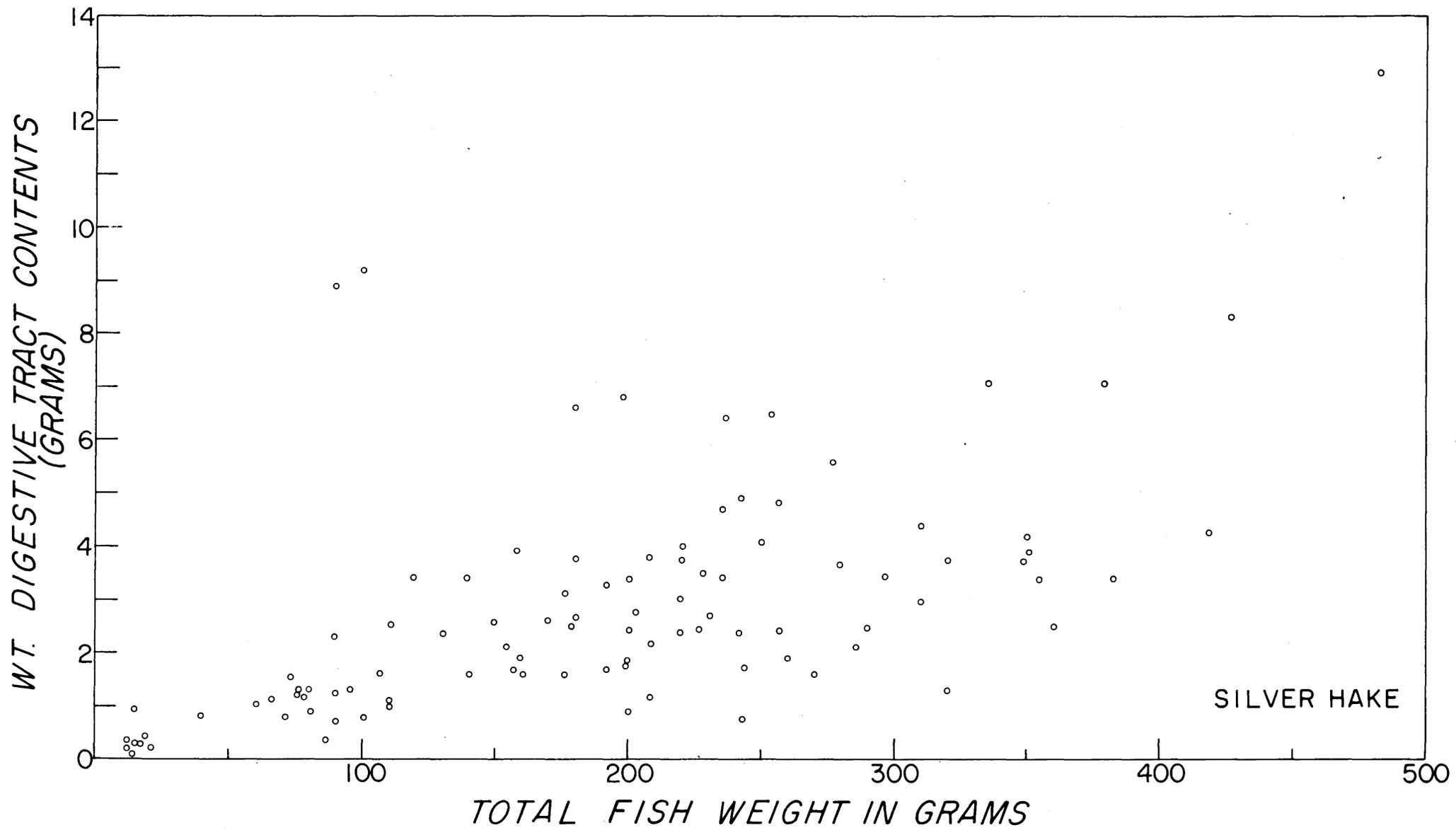


Figure 8--Relationship of weight of digestive tract contents to total fish weight

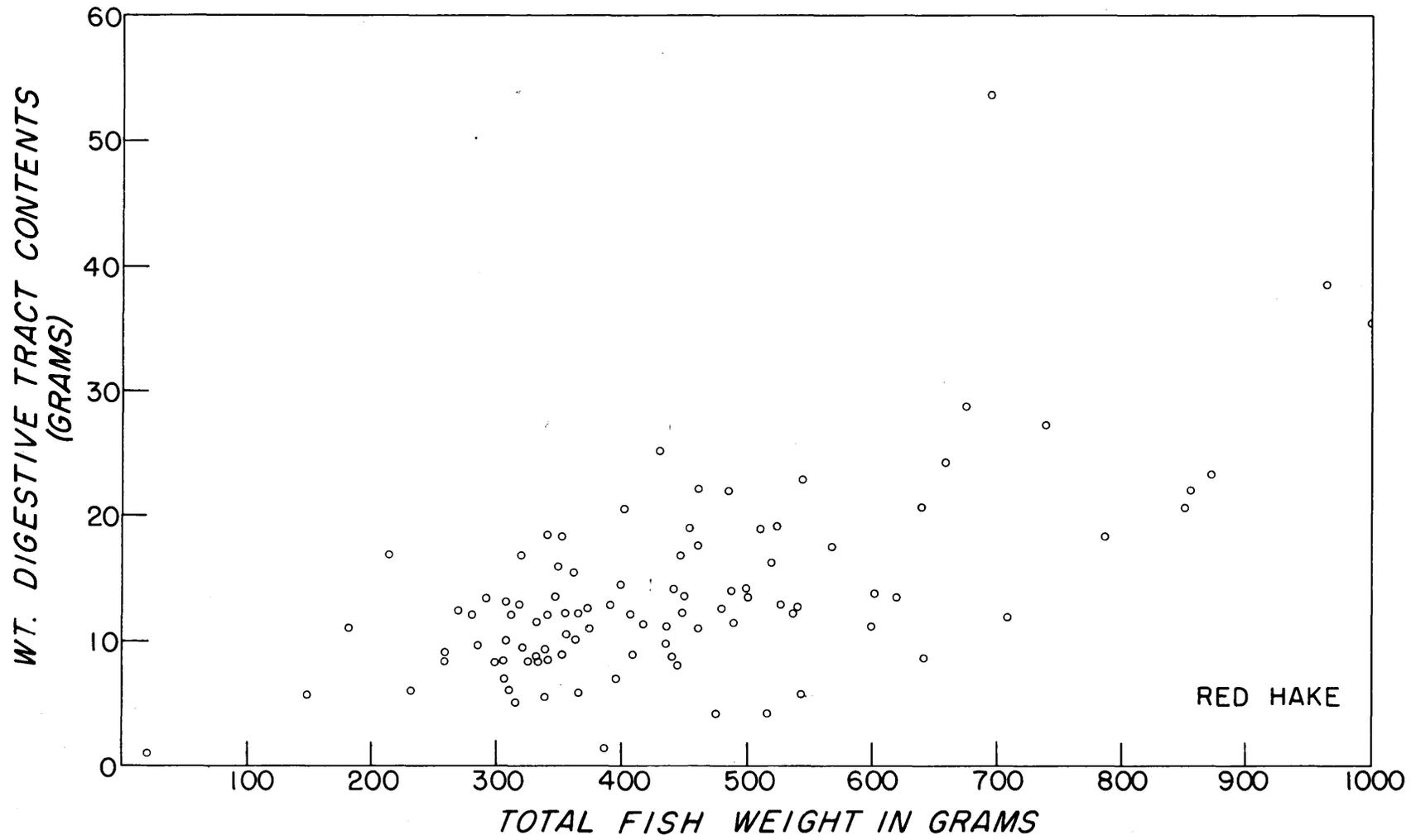


Figure 9--Relationship of weight of digestive tract contents to total fish weight

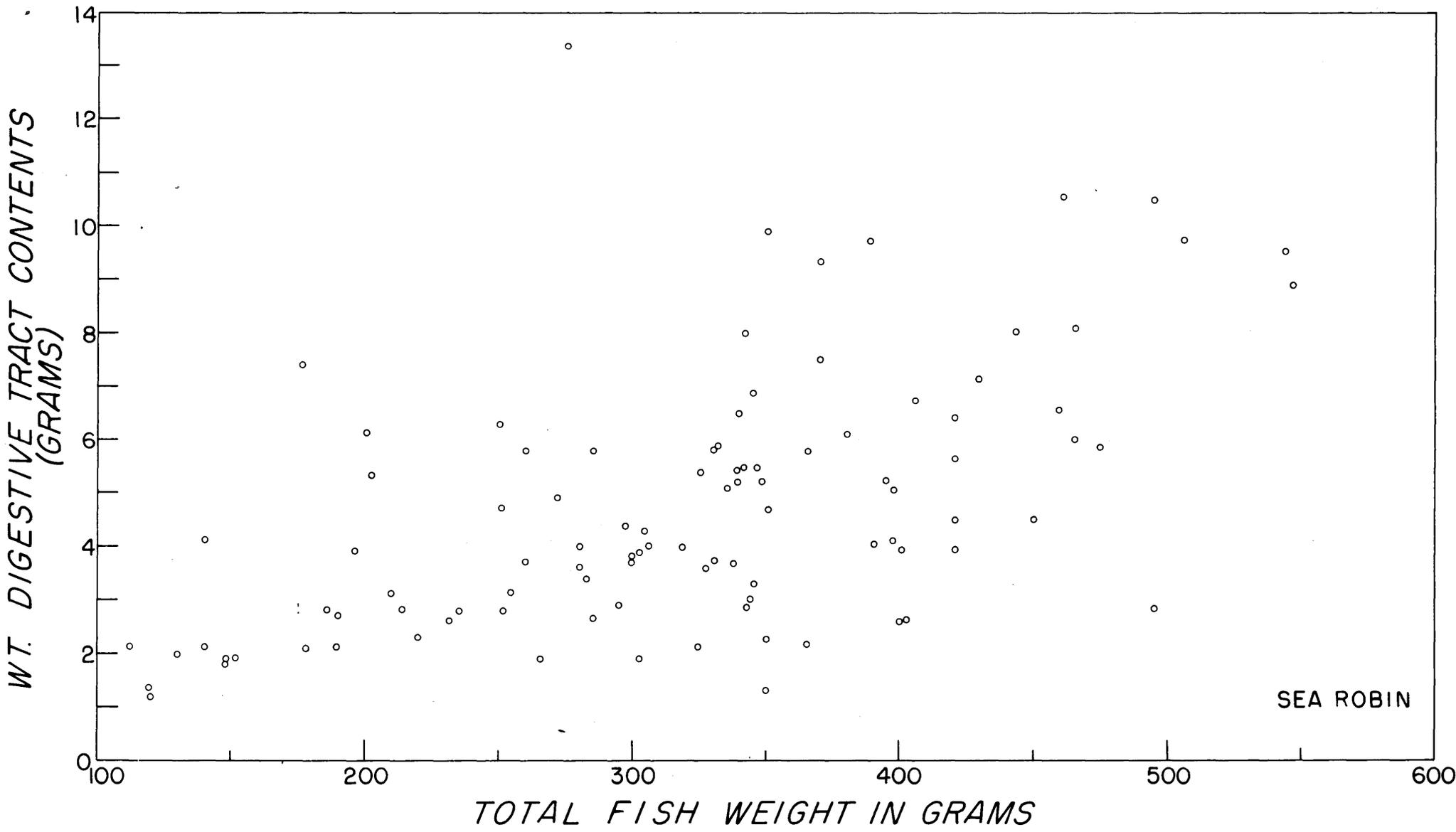


Figure 10--Relationship of weight of digestive tract contents to total fish weight



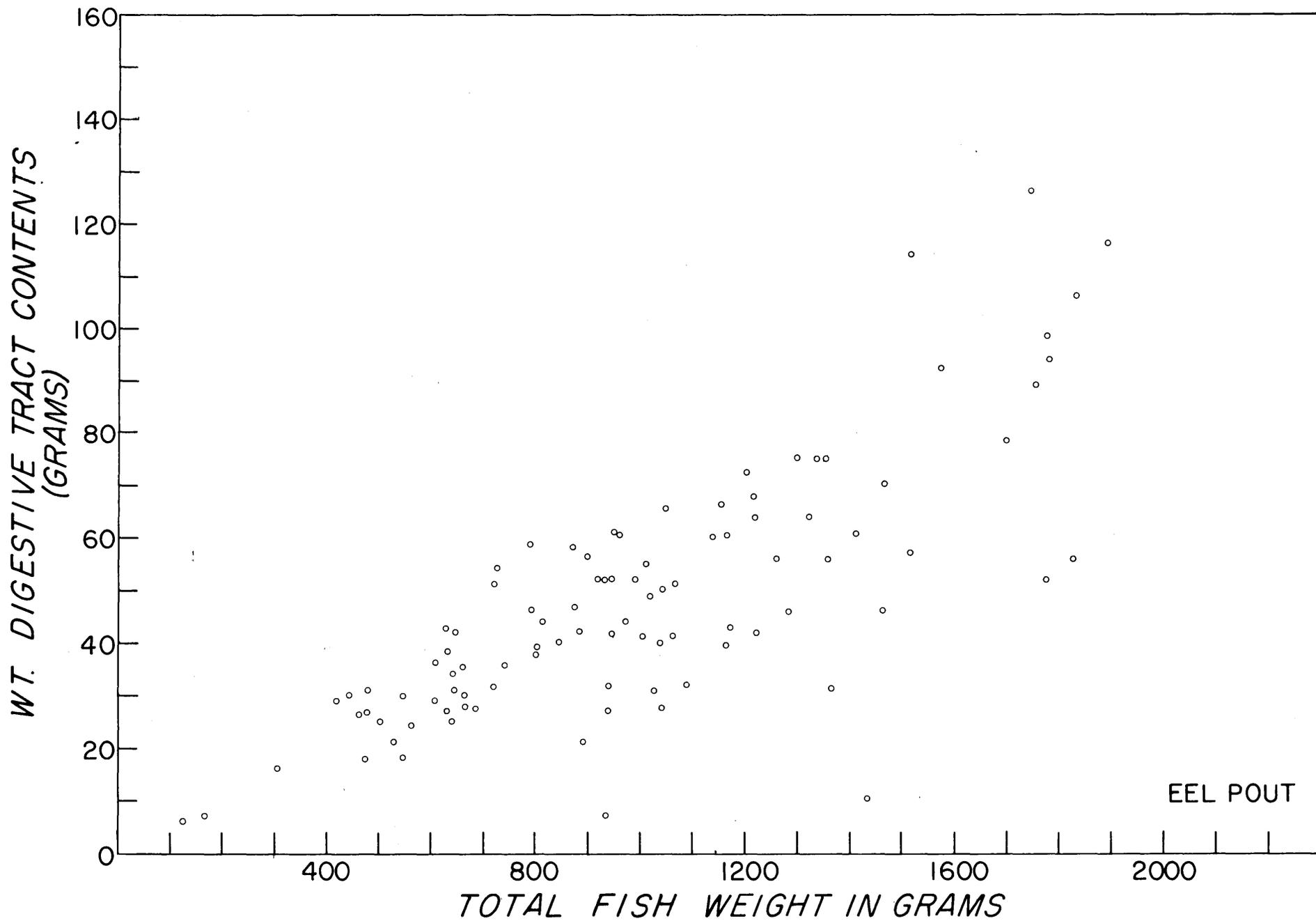


Figure 12--Relationship of weight of digestive tract contents to total fish weight

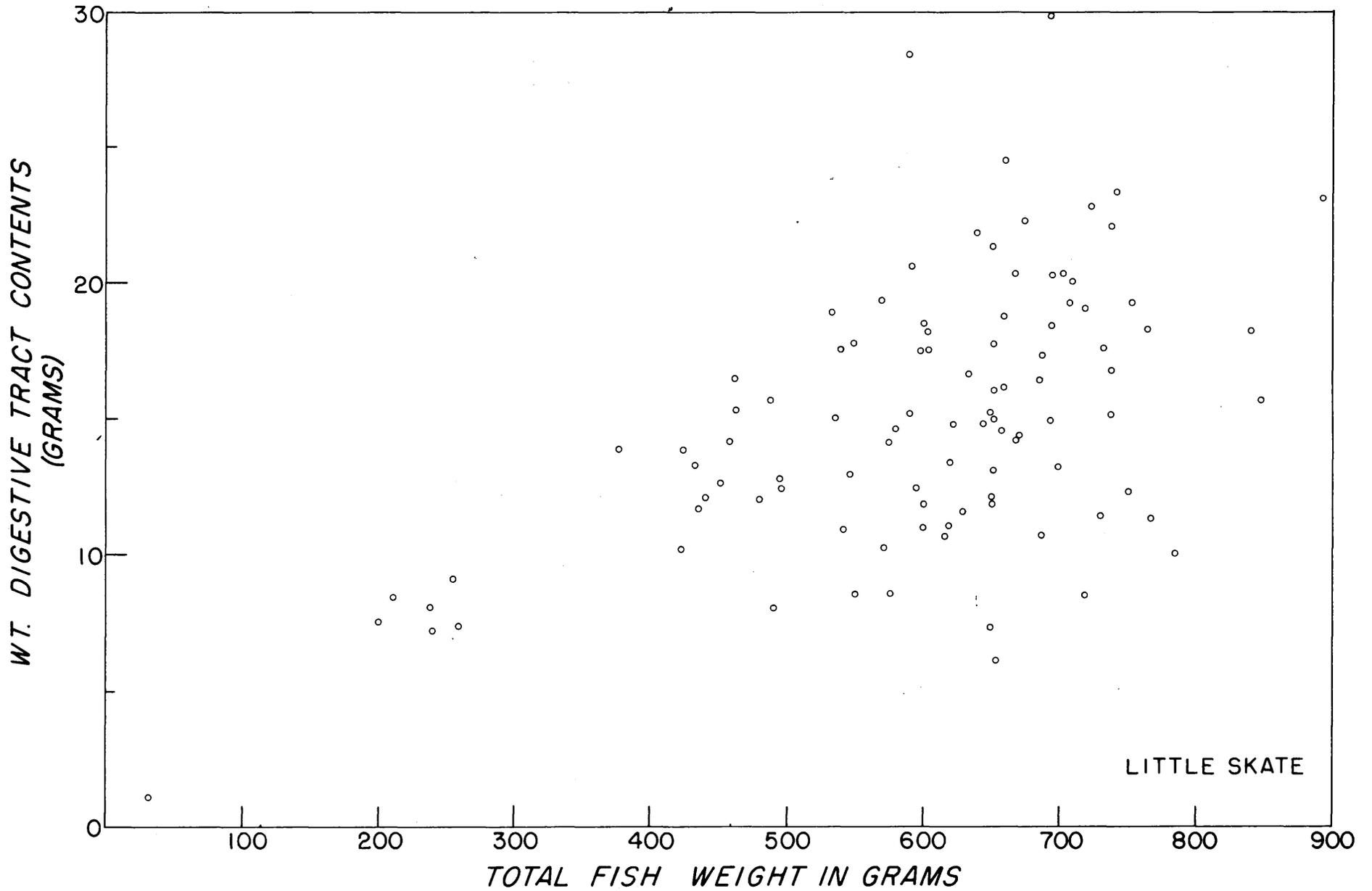


Figure 13--Relationship of weight of digestive tract contents to total fish weight

TABLE 2. Relationship of weight of digestive tract contents to total weight

Species	Average Total Fish Weight (gms)	Average Weight Digestive Tract Contents (gms)	Ratio Digestive Tract Contents To Total Weight (%)
Silver Hake	188.8	2.8	1.5 %
Red Hake	447.0	14.2	3.2 %
Sea Robin	315.6	4.7	1.5 %
Longhorn Sculpin	218.4	10.2	4.7 %
Eelpout	1017.8	49.7	4.9 %
Little Skate	588.2	14.8	2.5 %
AVERAGE	462.6	16.1	3.5 %

\*\*\*\*\*

Relationship of stomach content weight to intestinal content weight

Species	Average Weight Stomach Contents (gms)	Average Weight Intestinal Contents (gms)
Silver Hake	1.0	1.8
Red Hake	6.8	7.4
Sea Robin	1.9	2.8
Longhorn Sculpin	3.5	6.7
Eelpout	10.1	39.6
Little Skate	7.0	7.8
AVERAGE	5.0	11.0

TABLE 3. Combined weight of digestive tract and contents and relationship to total fish weight.

Species	Average Total Fish Weight (gms)	Average Weight of Digestive Tract and Contents (gms)	Ratio of Digestive Tract and Content to Total Fish Weight (%)
Silver Hake	188.8	8.4	4.4 %
Red Hake	447.0	24.3	5.4 %
Sea Robin	315.6	13.5	4.3 %
Longhorn Sculpin	218.4	18.7	8.6 %
Eelpout	1017.8	89.2	8.8 %
Little Skate	588.2	28.8	4.9 %
AVERAGE	462.6	30.5	6.6 %

\*\*\*\*\*

Weight of stomach and contents, and weight of intestine and contents.

Species	Average Weight of Stomach and Contents (gms)	Average Weight of Intestine and Contents (gms)
Silver Hake	4.0	4.4
Red Hake	12.8	11.5
Sea Robin	4.8	8.7
Longhorn Sculpin	7.8	10.9
Eelpout	18.0	71.2
Little Skate	15.3	13.5
AVERAGE	10.4	20.0

TABLE 4. Weight of digestive tract without contents and ratio to total fish weight.

Species	Average Total Fish Weight (gms)	Average Weight of Digestive Tract Without Contents (gms)	Ratio of Empty Digestive Tract to Total Fish Weight (%)
Silver Hake	188.8	5.6	3.0 %
Red Hake	447.0	10.4	2.3 %
Sea Robin	315.6	8.7	2.8 %
Longhorn Sculpin	218.4	8.6	3.9 %
Eelpout	1017.8	39.6	3.9 %
Little Skate	588.2	14.0	2.4 %
AVERAGE	462.6	14.5	3.1 %

\*\*\*\*\*

Weight of stomach and intestine without contents.

Species	Average Weight of Empty Stomach (gms)	Average Weight of Empty Intestines (gms)
Silver Hake	3.0	2.6
Red Hake	6.2	4.2
Sea Robin	2.8	5.9
Longhorn Sculpin	4.4	4.2
Eelpout	8.0	31.6
Little Skate	8.3	5.7
AVERAGE	5.4	9.0

is greater than intestinal weight, but in others intestinal weight is greater, or, as in the case of the longhorn sculpin, they may be nearly equal in weight. The combined average weight, however, of the empty stomach and intestine is nearly a constant ratio of the total weight of the fish. The average weight of the empty digestive tracts shown in Table 4 range from 2.3 percent to 3.9 percent of the total fish weight. This suggests a rough "rule of thumb"- fish with large stomachs have small intestines and fish with small stomachs have large intestines, assuming weight is indicative of size.

#### Degree of Stomach Fullness

Observations on the degree of fullness were made while removing the intact stomachs prior to freezing. The stomachs were placed into the following four subjective categories according to their estimated fullness: Empty, Trace if stomach about 1/4 full, 1/2 to 3/4 as Partly Full, and Full. Approximately half of the 600 fish that were examined had partly full stomachs (Table 5).

From other observations on fish trawled from waters deeper than 40 fathoms, the number of fish with empty stomachs would be greater than those examined for this report, for the stomachs are frequently everted due to pressure changes. This is especially true of the red hake, and silver hake. None of the individuals examined in these samples was everted since all were taken in depths not exceeding 22 fathoms.

TABLE 5. Degree of fullness of stomach

	Silver Hake	Red Hake	Sea Robin	Longhorn Sculpin	Eelpout	Little Skate	No.	%
	No.	No.	No.	No.	No.	No.		
Empty	0	0	1	1	13	0	15	2.5
Trace	20	8	48	20	26	5	127	21.1
Partly Full	53	41	45	58	48	57	302	50.3
Full	27	51	6	21	13	38	156	26.0
TOTAL	100	100	100	100	100	100	600	100.

## Examination of Stomach Contents

### Introduction

Stomach contents from the six species of industrial fish were analyzed to determine the kinds and quantities of principal food organisms that were present. These data contribute to our understanding of a particularly important segment of the food web affecting the demersal marine life inhabiting the southern New England continental shelf region.

### Methods

The contents from each stomach was removed and individually weighed and examined. Since it was impractical to sort and weigh the various organisms in the stomach, the procedure followed in this study was to identify all species in each stomach and then estimate the percentage weight of each. From these values (the stomach content weight and species percentage composition) the weight of each food item in each stomach was calculated. The individual stomach content records are summarized for each of the six fish species in Appendix A.

### Results

The diet composition of each fish species, expressed as percentage weight by major groups, is listed in Table 6. Crustacea represented the dominant component in the diet of these fish, both in terms of weight composition and number of species. Crustaceans made up over 90 percent (by weight) of the food in four of the six fish species and accounted for 82 percent and 59 percent of the food in the other two species (Table 6). Amphipods and decapods were the main crustacean

Table 6.--Diet composition <sup>1/</sup> of six species of industrial fish (expressed as percentage weight).

Fish Species Food Groups	Diet Composition (percentage weight)					
	Eelpout	Longhorn Sculpin	Red Hake	Common Sea Robin	Silver Hake	Little Skate
Crustacea	97.39	97.77	92.04	93.84	58.69	81.92
Amphipoda	45.24	50.56	56.14	18.00	38.71	53.19
Decapoda	50.60	46.44	34.88	75.69	6.97	28.06
Isopoda	1.08	0.46	0.60	0.15	0.21	0.50
Mysidacea		0.09	0.39		9.16	0.09
Cumacea	0.47	0.22	0.03		3.64	0.07
Mollusca	1.61	0.22	0.69			0.03
Echinodermata	0.12		0.41			
Annelida	0.22	1.45	0.39	1.52		12.85
Fish		0.28	5.88	4.06	41.10	4.00
Unidentified Organisms	0.66	0.28	0.59	0.58	0.21	1.20
Total	100.00	100.00	100.00	100.00	100.00	100.00

<sup>1/</sup> Bottom sediment and mucus have been omitted in this tabulation.

components; small quantities of isopods, mysids, and cumaceans were also present. Relatively small amounts of Mollusca, Echinodermata, and Annelida were preyed upon by these fish. Fish was a major dietary item in one species only--the silver hake. The individual species found in the stomachs are listed in Table 7, with the most important ones marked with asterisks.

A synopsis of the stomach-content analysis for each species is as follows:

Eelpout: This species preyed most heavily on crabs and shrimps. Two crab species, Cancer borealis and C. irroratus, were particularly important foods. In nearly all cases the crabs were crushed into fragments less than 2-3 centimeters in greatest dimension. The mud shrimp Axius serratus was also a major dietary item. Amphipods ranked second in importance, the principal species were: Ampelisca compressa, A. spinipes, Leptocheirus pinguis, and Unciola irrorata. Numerous amphipod tubes in the stomachs suggest that eelpouts capture the amphipods simply by grazing on amphipod tubes. Parasitic worms (Nematoda, Acanthocephala) occurred in 15 percent of the stomachs, and these worms were found in approximately 20 percent of the intestines.

Longhorn Sculpin: The diet of this fish species consisted of 98 percent Crustacea. Amphipods were the major component. They occurred in 90 percent of the stomachs and provided 51 percent (by weight) of the food. Nine species of amphipods were noted in the diet, the most important of which were: Aeginina longicornis, Ampelisca

TABLE 7. Species of food organisms preyed upon by industrial fish.  
Dominant organisms are marked with triple asterisks.

Food Organisms	Industrial - Fish - Species				
	Eelpout	Longhorn Sculpin	Red Hake	Sea Silver Robin Hake	Little Skate
<b>CRUSTACEA</b>					
<b>Amphipoda</b>					
<u>Aeginina longicornis</u>	+	***	+	+	+
<u>Ampelisca compressa</u>	***	+			
<u>Ampelisca macrocephala</u>				+	
<u>Ampelisca spinipes</u>	***	+	***	***	+
<u>Anonyx nugax</u>			+	+	
<u>Eyblis serrata</u>				+	+
<u>Calliupius laeviusculus</u>			+	+	+
<u>Casco bigelowi</u>		+	+	+	+
<u>Dulichia sp.</u>		+			+
<u>Gammarus annulatus</u>			+	***	+
<u>Hippomedon serratus</u>			+		
<u>Leptocheirus pinguis</u>	***	***	***	***	***
<u>Monoculodes edwardsi</u>		+	+	+	+
<u>Pontogeneia inermis</u>	+				
<u>Tmetonyx nobilis</u>				+	
<u>Unciola irrorata</u>	***	***	***	+	***
<u>Unciola sp.</u>		+			
<b>Decapoda</b>					
<u>Axius serratus</u>	***	***	***		+
<u>Cancer borealis</u>	***	***	***		+
<u>Cancer irroratus</u>	***	+		+	***
<u>Crangon septemspinosa</u>	+	+	+	***	+
<u>Dichelopandalus leptocerus</u>		+	+		+
<u>Pagurus sp.</u>					+
<b>Isopoda</b>					
<u>Chiridotea arenicola</u>				+	
<u>Cirolana polita</u>	+	+	+		+
<u>Edotea montosa</u>	+	+			+
<u>Idothea baltica</u>					+
<b>Mysidacea</b>					
<u>Neomysis americana</u>		+	+		+
<b>Cumacea</b>					
<u>Diastylis quadrispinosa</u>	+				
<u>Diastylis sculpta</u>	+	+	+		+

TABLE 7. (Cont).

Food Organisms	Industrial - Fish - Species					
	Eelpout	Longhorn Sculpin	Red Hake	Sea Robin	Silver Hake	Little Skate
<b>MOLLUSCA</b>						
<u>Cerastoderma pinnulatum</u>	+					+
<u>Mytilus edulis</u>		+	+			
<u>Nucula proxima</u>	+	+	+			
<u>Polynices duplicata</u>			+			
<u>Yoldia sapotilla</u>	+					
<b>ECHINODERMATA</b>						
<u>Echinarachnius parma</u>	+					
<b>ANNELIDA</b>						
Glyceridae						+
Flabelligeridae		+				+
<u>Nephtys sp.</u>		+				
<b>PISCES</b>						
<u>Anguilla rostrata</u>						+
<u>Merluccius bilinearis</u>			+		***	
<u>Urophycis sp.</u>						+

compressa, A. spinipes, Leptocheirus pinquus, and Unciola irrorata. Aeginina longicornis, a caprellid amphipod, was abundant only in the sculpin's diet. Decapods made up 46 percent (by weight) of the food. The important decapod species were Axius serratus and Cancer borealis. Parasites were rare in both stomachs and the intestinal tracts.

Red Hake: Amphipods were the principal food of this species. They occurred in 92 percent of the specimens and comprised 56 percent of the stomach content weight. Of eleven amphipod species observed in their diet, the following three were most common: Ampelisca spinipes, Leptocheirus pinquus, and Unciola irrorata. Decapod crustaceans provided 35 percent of the red hake's food. Cancer borealis and Axius serratus were especially important. Fish, mainly silver hake, made up 6 percent of the diet and were found in 7 percent of the specimens. Small quantities of mollusks and annelid worms occurred in 5 percent of the stomachs. There was a wide range in the digestive state of the stomach contents. Parasites were rare in both the stomachs and intestinal tracts.

Common Sea Robin: The food of this fish was composed largely (76 percent by weight) of decapod crustaceans, chiefly Crangon septemspinosus. The only other decapod in the diet was Cancer irroratus, and it was present only in small quantities. Amphipods ranked second in importance. Out of five amphipod species, Gammarus annulatus was the only one that was present in considerable quantities. Other animal groups provided only a small portion of the sea robin's diet. A rather large amount of mucus (29 percent of all stomach contents) was found

in nearly all stomachs. This material did not appear to be the remains of partially digested food, but seemed to be the mucus lining of the stomach and secretions from the pharynx and oesophagus that were swallowed with the food.

Silver Hake: Although the food of this species was composed predominantly of crustaceans (57 percent by weight), its diet differed significantly from the other industrial fish species due to the comparatively high proportion of fish it contained. Amphipods were the principal crustacean group. Of the 10 species of amphipods, Ampelisca spinipes, Leptocheirus pinquis, and Unciola irrorata were the most abundant. Mysids were the second most important crustacean group, consisting entirely of Neomysis americana. Decapods were represented only by shrimps. Crabs were preyed on by all other fish species included in this study, and their absence in the silver hake stomachs poses an interesting question. Also, compared with the other fish species, the cumacean Diastylis sculpta, was unusually common in the silver hake's diet. The cannibalistic habit of this species is revealed by the presence of a substantial quantity of silver hake in their stomachs. They also preyed upon other post-larval and juvenile fishes that were digested beyond recognition.

Little Skate: Crustaceans were the principal food of the little skate. Amphipods were the dominant component, providing 53 percent of the diet. Ten species of amphipods occurred in the stomachs, but Leptocheirus pinquis outnumbered all others. Decapods formed 28

percent of the food, and of the five species in the group, only Cancer irroratus was abundant. The diet of the little skate contained a substantial amount of annelid worms, 13 percent by weight, in comparison to less than 2 percent for the other fish species. Unfortunately these worms were so badly digested that species could not be determined; however, the principal components were members of the families Glyceridae and Flabelligeridae. The stomachs of many little skate specimens contained well digested material; none contained freshly eaten contents. Parasitic worms were moderately common.

#### Discussion

The exceedingly large proportion of Crustacea in the diet of all six species of fish indicates a strong dependence upon this group for their nourishment. Additional investigation would be required to determine whether this represents fish preferences or food availability.

There was a striking similarity in the diets of eelpout, long-horn sculpin, red hake, and little skate. The bulk of food supporting these four industrial fishes was provided by the following eight species of crustaceans: Aeginina longicornis, Ampelisca compressa, A. spinipes, Leptocheirus pinguis, Unciola irrorata, Axius serratus, Cancer borealis, and C. irroratus. Three additional major food organisms, particularly for the common sea robin and silver hake, are: Gammarus annulatus, Crangon septemspinosa, and Merluccius bilinearis.

Inasmuch as silver hake are known to be piscivorous feeders and that they make vertical migrations and feed in midwater, it is of interest to note that this species will feed heavily on benthic invertebrates including many infaunal forms.

Length Frequencies and Sex Ratios:

Of the six species, only the samples of silver hake and red hake are stratified by size. The little skate, sea robin, longhorn sculpin, and eelpout can be considered as random samples. The length frequencies by sex and weighted average lengths are presented in Table 8.

In summation of the fish by sex, the ratios of males and females are nearly 1:1 except for red hake where there were significantly more females, a function of size in this case, resulting in approximately a 2:1 ratio.

Table 8.--Summary of length frequencies by sex of each species

Length (cm)	Red Hake		Silver Hake		Sea Robin		Long Horn Sculpin		Little Skate		Eelpout	
	m	f	m	f	m	f	m	f	m	f	m	f
10											32	2
11											39	1
12											42	1
13				3*							43	2
14				3*		1					45	1
15				2*							46	1
16		1*		1*			1	1			47	5
17											48	3
18						1			1		49	1
19						1					50	2
20			1		1						51	2
21					1						52	3
22				3	2	1		2			53	2
23			2	3	2						54	3
24			4	3	3	2	1	2			55	5
25			2	1	3	2	5	3			56	1
26			1	2	2	2	7	8			57	3
27			1	1	1	2	14	11			58	4
28	2		3	1	5	1	15	10			59	1
29			5	2	7	2	8	7	1		60	2
30	1		7	1	7	14		3	1		61	4
31			6	3	15	4	1			1	62	1
32			5	6	2	2		1			63	1
33	2		2	6	2	8					64	2
34	2	2	1	4	1	3			1	1	65	2
35	4	3		4					1	1	66	2
36	6	6		1					1		67	1
37	4	6		4							68	2
38	5	5		2	1						69	1
39	1	7		4						1	72	1
40	1	7							1			
41	2	8							1	4		
42	2	2				1			3	1		
43	1	4							2	2		
44		3							1	7		
45	1	6							2	11		
46		3							4	8		
47									6	8		
48									7	7		
49		2							5	4		
50	1								2	1		
52									2			
54									1			
Average Lengths (cm)	38.9		28.8		29.0		27.0		44.7			54.5

\* Asterisk indicates immature fish

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Appendix A. -- Total weight (grams) of stomach contents by major groups, plus the number of specimens and fish length data, for each industrial fish species.

Fish species	Weight (grams)					
	Stomach Contents	Eelpout	Longhorn Sculpin	Red Hake	Common Sea Robin	Silver Hake
Crustacea	912.1	316.2	613.5	129.3	56.4	552.7
Amphipoda	423.7	163.5	374.2	24.8	37.2	358.9
Decapoda	473.9	150.2	232.5	104.3	6.7	189.3
Isopoda	10.1	1.5	4.0	0.2	0.2	3.4
Mysidacea		0.3	2.6		8.8	0.6
Cumacea	4.4	0.7	0.2		3.5	0.5
Mollusca	15.0	0.7	4.6			0.2
Echinodermata	1.1		2.7			
Annelida	2.1	4.7	2.6	2.1		86.7
Fish		0.9	39.2	5.6	39.5	27.0
Unidentified Organisms	6.2	0.9	3.9	0.8	0.2	8.1
Sand & Gravel	0.2					
Mucus	66.5	24.5	4.7	55.1	1.0	24.4
<b>Total</b>	<b>1003.2</b>	<b>347.9</b>	<b>671.2</b>	<b>192.9</b>	<b>97.1</b>	<b>699.1</b>
Number of Stomachs	100	100	99	100	100	100
Average Stomach Content Weight	10.03	3.48	6.78	1.93	0.97	6.99
Fish Length (cm.) Range	32 - 72	16 - 32	16 - 50	14 - 42	13 - 39	18 - 54

Appendix B. Basic data collected on length, sex, total body weight, head weight, weight of stomach and intestinal contents, and stomach fullness.

BASIC DATA COLLECTED ON EELPOUT

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
670	1888	M	1/2	192	17.1	99.2	116.3
510	792	F	1/2	100	9.9	36.5	46.4
600	1280	M	1/2	188	16.1	43.4	59.5
540	986	F	1/2	120	15.0	37.3	52.3
447	556	F	1/4	80	2.3	22.4	24.7
515	808	F	1/2	118	8.4	35.5	43.9
510	800	M	1/2	122	9.7	29.3	39.0
505	950	F	1/4	108	8.2	52.4	60.6
495	640	M	1/2	82	9.2	21.2	30.4
650	1698	M	1/2	282	17.1	61.8	78.9
610	1462	M	1/2	226	10.8	36.0	46.8
540	940	F	1/4	114	5.3	26.6	31.9
465	608	F	1/2	70	6.5	22.9	29.4
550	1050	F	1/2	164	7.5	58.2	65.7
545	1056	M	3/4	156	8.7	32.9	41.6
570	1260	M	1/2	214	10.5	46.1	56.6
415	526	F	1/4	50	2.0	18.7	20.7
580	1040	M	1/4	174	3.5	24.8	28.3
550	1030	F	1/2	130	11.5	19.6	31.1
480	686	F	1/2	76	8.2	20.7	28.9
565	1166	F	1/2	174	13.5	46.8	60.3
475	644	F	1/2	86	8.9	21.6	30.5
385	305	M	full	52	6.2	10.7	16.9
545	955	M	3/4	162	15.5	44.2	59.7
635	1036	M	1/4	230	7.3	33.0	40.3
445	462	F	1/2	586	8.2	18.5	26.7
320	126	M	full	18	3.4	3.4	6.8
685	1776	M	1/4	338	9.5	42.8	52.3
525	942	F	1/4	120	6.9	35.1	42.0
650	1436	M	1/4	270	1.3	8.5	9.8
540	1020	M	1/2	156	12.4	36.4	48.8
455	545	M	1/2--	62	10.2	20.0	30.2
490	625	F	1/2	66	9.9	27.7	37.6
472	660	F	1/4	68	4.2	31.8	36.0
500	740	F	empty	82	2.1	34.2	36.3
589	1210	F	3/4	58	5.8	62.3	68.1
645	1830	F	full	250	50.9	55.9	106.8
550	1360	F	full	168	22.7	32.8	55.5
470	670	F	full	76	9.1	18.9	28.0
660	1780	M	full	340	48.1	45.4	93.5
520	800	M	1/2	118	5.6	32.6	38.2
504	870	F	1/2	100	8.4	50.1	58.5
450	480	F	1/4	64	4.3	23.1	27.4
545	888	M	1/4	52	5.2	37.5	42.7

BASIC DATA COLLECTED ON EELPOUT  
(CONT)

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
655	1746	M	full	365	47.9	79.0	126.9
685	1780	F	3/4	307	17.7	81.0	98.7
480	644	F	1/4	87	7.5	34.9	42.4
580	1332	F	empty	177	3.6	71.7	75.3
575	936	M	empty	178	1.5	5.5	7.0
607	1320	M	empty	196	3.4	61.0	64.4
607	1510	F	1/4	250	5.0	52.4	57.4
571	1140	F	1/4	160	2.9	57.5	60.4
560	1166	F	empty	156	2.6	37.5	40.1
575	1010	F	1/2	122	14.1	40.9	55.0
565	1200	F	1/2	145	11.7	60.5	72.2
560	920	F	1/4	122	7.2	45.4	52.6
615	1350	M	1/4	223	3.7	71.5	75.2
518	720	F	1/2	100	9.9	45.2	55.1
516	1150	M	1/4	172	2.4	63.5	65.9
625	1468	F	empty	280	3.2	66.4	69.6
536	930	M	1/2	110	3.1	49.2	52.3
545	1000	F	empty	120	2.1	39.2	41.3
640	1300	M	1/2	208	14.7	60.5	75.2
565	1062	M	empty	143	3.1	47.5	50.6
545	1042	F	1/4	130	6.2	43.6	49.8
550	940	M	1/4	135	3.3	49.2	52.5
680	1750	M	full	323	22.5	66.5	89.0
523	900	F	1/2	110	9.3	46.3	55.6
500	630	F	1/2	75	8.5	18.8	27.3
455	538	F	1/2	66	4.4	13.8	18.2
467	602	F	1/2	68	5.8	30.3	36.1
563	1090	M	empty	141	3.6	28.6	32.2
457	500	F	1/4	55	1.9	23.1	25.0
630	1515	M	full	262	37.2	76.8	114.0
500	728	M	full	103	19.5	34.7	54.2
535	970	F	1/2	108	6.7	36.8	43.5
515	890	M	empty	121	1.8	20.0	21.8
460	632	F	1/4	72	3.3	39.7	43.0
610	1360	M	1/4	212	2.7	28.7	31.4
575	1220	M	empty	203	2.8	39.0	41.8
715	2262	M	full	423	64.2	97.0	161.2
430	480	F	1/4	60	5.8	24.9	30.7
570	1280	M	empty	188	2.4	43.5	45.9
324	170	M	3/4	23	2.7	4.3	7.0
655	1850	F	3/4	251	17.2	75.8	93.0
675	1825	M	full	378	19.7	36.9	56.6
510	720	M	full	99	10.1	21.4	31.5

BASIC DATA COLLECTED ON EELPOUT  
(CONT)

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
445	478	M	1/2	73	6.8	11.8	18.6
500	642	F	3/4	90	7.4	26.8	34.2
470	442	F	3/4	74	8.2	21.7	29.9
527	875	F	3/4	116	7.8	39.4	47.2
500	662	F	3/4	81	10.2	19.8	30.0
600	1222	M	3/4	203	16.8	46.8	63.6
545	942	M	1/4	138	3.0	24.4	27.4
555	1138	F	3/4	135	10.6	49.5	60.1
575	1170	M	3/4	156	7.6	35.3	42.9
540	838	M	1/4	123	3.4	36.4	39.8
605	1412	M	empty	211	2.6	58.8	61.4
432	420	F	3/4	50	6.7	22.4	29.1
625	1578	F	3/4	247	18.5	74.2	92.7

BASIC DATA COLLECTED ON LITTLE SKATE

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
495	658	M	3/4	116	6.0	10.2	16.2
450	695	F	full	110	12.7	7.6	20.3
310	210	F	1/2	38	3.6	4.8	8.4
482	644	M	1/2	107	5.9	8.9	14.8
302	200	M	1/2	40	3.0	4.5	7.5
465	548	M	1/2	86	8.3	9.5	17.8
492	650	F	full	107	10.4	11.0	21.4
404	422	M	full	69	6.2	7.6	13.8
442	695	F	full	118	8.5	9.8	18.3
459	590	F	3/4	100	7.5	7.7	15.2
460	730	M	full	114	11.5	6.1	17.6
179	31	M	1/4	2	0.4	0.7	1.1
285	618	M	3/4	112	3.7	6.8	10.5
425	540	F	full	96	9.4	8.2	17.6
480	635	F	3/4	104	3.4	3.3	6.7
455	535	M	full	98	6.5	8.0	14.5
466	600	F	full	112	6.8	10.8	17.6
407	440	M	3/4	72	3.9	8.1	12.0
470	595	M	3/4	115	4.3	8.0	12.3
455	650	M	1/2	116	4.6	7.5	12.1
350	255	M	1/2	49	4.0	5.1	9.1
470	575	F	1/2	107	3.6	5.0	8.6
463	602	M	3/4	114	2.4	9.5	11.9
467	660	F	full	124	14.5	10.0	24.5
468	602	M	full	142	9.4	9.1	18.5
460	660	F	3/4	108	4.8	9.0	13.8
480	690	M	3/4	126	6.6	8.3	14.9
492	668	M	3/4	111	6.6	7.5	14.1
411	480	F	3/4	85	6.4	5.7	12.1
427	462	M	3/4	89	7.9	7.3	15.2
492	754	M	1/2	121	5.9	6.3	12.2
475	658	M	full	109	8.7	5.9	14.6
454	575	M	3/4	98	6.3	7.9	14.2
454	692	F	full	102	20.0	9.8	29.8
344	240	M	1/2	41	3.4	4.7	8.1
480	620	M	3/4	108	5.6	7.7	13.3
442	700	F	1/2	112	5.4	7.9	13.3
454	550	F	1/4	92	3.9	4.6	8.5
515	738	M	full	115	8.4	6.9	15.3
412	435	F	3/4	69	7.3	4.4	11.7
409	448	F	3/4	74	5.5	7.1	12.6
450	650	F	1/2	104	9.1	8.7	17.8
424	486	M	3/4	106	6.0	9.7	15.7

BASIC DATA COLLECTED ON LITTLE SKATE  
(CONT)

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
490	764	F	full	122	8.5	9.7	18.2
490	685	M	3/4	116	6.4	4.4	10.8
480	730	F	1/2	118	4.9	6.5	11.4
450	685	F	full	122	8.8	9.0	17.8
520	845	M	full	129	7.2	8.6	15.8
442	490	F	1/2	85	4.8	3.2	8.0
493	718	F	1/4	120	3.9	4.6	8.5
455	612	F	1/2	89	4.9	5.9	10.8
458	602	F	full	103	9.6	8.6	18.2
474	708	F	full	115	9.7	9.6	19.3
458	648	F	3/4	99	5.5	6.3	11.8
444	602	F	3/4	102	9.0	8.4	17.4
465	652	M	3/4	112	7.2	8.8	16.0
485	622	M	3/4	106	6.4	8.5	14.9
465	668	F	3/4	111	10.6	9.8	20.4
497	785	M	1/4	125	4.1	5.9	10.0
454	648	F	3/4	109	3.2	4.2	7.4
450	570	F	1/2	102	3.2	7.0	10.2
477	600	M	1/2	107	3.9	7.1	11.0
415	422	M	3/4	72	4.3	5.9	10.2
448	532	M	full	84	9.0	9.9	18.9
344	240	F	full	39	2.6	4.7	7.3
457	652	F	full	106	7.1	6.0	13.1
463	640	F	full	100	10.4	11.4	21.8
480	710	M	full	112	10.8	10.2	21.0
467	692	F	1/2	139	4.3	10.7	15.0
478	765	M	3/4	130	4.3	7.0	11.3
482	722	F	3/4	152	10.3	12.4	22.7
468	685	F	full	116	7.5	8.9	16.4
478	648	F	full	106	7.0	8.1	15.1
448	652	F	1/4	120	1.3	4.8	6.1
453	570	F	full	92	9.2	10.2	19.4
473	580	M	1/2	93	9.0	5.7	14.7
451	545	F	3/4	98	4.9	8.0	12.9
477	590	F	full	100	17.9	10.5	28.4
470	738	M	full	113	11.6	10.6	22.2
437	592	F	full	96	7.8	12.9	20.7
458	652	F	3/4	108	4.5	10.4	14.9
500	838	F	full	142	8.7	9.5	18.2
350	258	F	full	41	4.6	2.8	7.4
425	458	F	3/4	83	5.1	9.1	14.2
430	495	M	3/4	84	4.3	8.1	12.4
443	628	F	3/4	104	5.0	6.5	11.5

BASIC DATA COLLECTED ON LITTLE SKATE  
(CONT)

Lenght (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
492	752	M	full	124	11.9	7.4	19.3
420	462	F	full	77	7.7	8.6	16.3
415	432	M	full	76	7.1	6.1	13.2
465	675	F	full	112	13.8	8.4	22.2
414	462	F	full	76	8.8	7.6	16.4
435	540	M	3/4	94	5.3	5.6	10.9
468	702	F	full	127	11.8	8.5	20.3
538	892	M	3/4	141	9.5	13.5	23.0
386	378	F	3/4	68	5.5	8.4	13.9
475	665	F	1/2	103	4.3	10.0	14.3
482	738	F	3/4	115	7.8	8.9	16.7
447	718	F	3/4	118	7.4	11.6	19.0
436	495	F	3/4	102	6.1	6.7	12.8
490	742	F	full	120	10.5	12.8	23.3

BASIC DATA COLLECTED ON LONGHORN SCULPIN

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
275	215	F	full	60	4.7	6.0	10.7
288	256	F	full	68	17.5	7.2	24.7
260	192	F	1/2	56	3.8	4.8	8.6
290	258	M	1/2	80	2.3	7.6	9.9
275	235	F	1/2	60	3.2	10.5	13.7
287	256	F	1/2	76	4.1	7.5	11.6
275	212	M	3/4	56	2.6	8.0	10.6
270	208	M	1/2	60	2.9	7.2	10.1
255	172	F	1/4	54	0.8	3.1	3.9
268	196	F	1/2	60	7.6	5.4	13.0
270	226	M	3/4	74	4.0	5.6	9.6
315	386	F	full	110	20.2	10.1	30.3
275	246	F	1/2	76	3.1	10.3	13.4
293	244	M	1/4	78	2.1	3.5	5.6
290	244	M	full	78	2.7	8.1	10.8
220	116	F	full	36	3.9	3.6	7.5
265	196	M	1/4	60	0.7	3.4	4.1
255	178	F	1/2	54	1.7	6.0	7.7
273	208	F	full	60	4.6	5.3	9.9
265	198	M	1/4	56	1.7	8.8	10.5
286	254	F	1/2	74	2.4	2.5	4.9
272	216	M	1/2	60	3.7	9.1	12.8
270	200	M	1/2	62	2.2	5.4	7.6
272	246	F	1/2	76	2.7	8.0	10.7
267	218	F	1/2	66	2.2	4.0	6.2
265	208	M	1/4	58	1.0	4.0	5.0
274	228	F	1/2	66	4.7	10.8	15.5
266	214	F	1/2	68	1.6	6.4	8.0
268	204	M	1/2	62	2.1	8.6	10.7
277	238	F	3/4	72	3.8	9.1	12.9
269	244	M	full	78	4.5	5.4	9.9
275	204	F	1/4	66	1.1	1.9	3.0
273	248	F	1/2	76	2.8	7.1	9.9
290	254	F	1/2	78	2.2	11.5	13.7
270	229	M	3/4	72	5.4	6.1	11.5
248	176	M	1/4	56	1.3	4.5	5.8
156	186	F	3/4	52	3.3	3.1	6.4
260	218	F	3/4	60	3.9	8.0	11.9
270	218	F	3/4	68	3.2	7.7	10.9
265	194	M	1/4	58	1.7	5.9	7.6
235	146	F	1/2	42	2.4	4.2	6.6
282	238	M	1/2	76	2.5	8.7	11.2
275	278	F	1/4	86	1.2	4.4	5.6

BASIC DATA COLLECTED ON LONGHORN SCULPIN  
(CONT)

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
260	204	F	1/2	62	3.4	6.3	9.7
250	178	F	1/4	58	2.5	3.7	6.2
255	200	M	1/2	54	4.1	6.4	10.5
241	182	F	1/4	50	1.8	6.9	8.7
263	195	M	1/4	54	1.0	6.5	7.5
290	270	F	full	76	8.5	8.2	16.7
264	212	M	full	64	3.3	6.8	10.1
260	200	M	3/4	56	5.5	4.3	9.8
280	242	M	3/4	68	3.1	6.7	9.8
280	230	M	1/2	70	2.0	6.6	8.6
248	182	F	full	52	8.0	6.5	14.5
277	215	M	1/4	66	2.0	5.0	7.0
277	245	F	3/4	66	3.6	10.4	14.0
257	224	F	3/4	66	2.7	8.2	10.9
277	196	M	full	54	4.8	5.6	10.4
272	213	F	1/2	66	1.9	5.0	6.9
293	226	M	full	84	3.8	11.7	15.5
250	185	M	1/4	54	1.9	7.0	8.9
287	255	F	1/2	72	2.2	7.5	9.7
162	202	M	full	60	3.9	9.1	13.0
245	155	F	3/4	48	2.5	5.7	8.2
298	242	F	3/4	76	2.7	4.9	7.6
270	214	F	1/2	68	2.5	7.1	9.6
262	192	M	1/4	58	1.3	6.0	7.3
240	180	M	1/2	54	2.2	7.9	10.1
265	215	M	full	60	7.5	3.7	11.2
284	236	M	1/2	74	2.0	6.8	8.8
253	174	M	1/4	56	0.4	1.9	2.3
220	130	F	full	40	2.3	3.8	6.1
265	190	M	1/2	58	2.1	5.7	7.8
282	243	M	full	74	7.2	5.4	12.6
248	178	M	full	54	2.9	5.7	8.6
260	176	M	full	54	6.6	3.9	10.5
265	196	F	1/2	60	1.4	7.5	8.9
277	215	M	1/2	66	2.5	9.0	11.5
305	266	M	3/4	80	2.1	7.7	9.8
282	236	M	1/4	78	0.8	7.5	8.3
270	200	M	empty	64	0.7	4.1	4.8
300	305	F	full	94	10.1	9.5	19.6
247	175	M	3/4	54	1.3	4.1	5.4
288	267	M	1/4	90	1.2	9.2	10.4
293	256	M	full	78	10.4	6.8	17.2

BASIC DATA COLLECTED ON LONGHORN SCULPIN  
(CONT)

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
290	215	M	1/2	68	2.7	7.3	10.0
280	212	M	3/4	64	3.5	6.8	9.7
280	240	M	3/4	70	2.9	7.1	10.0
275	227	M	1/4	78	0.7	6.4	7.1
260	200	F	1/4	64	0.5	4.7	5.2
285	236	F	full	68	4.9	6.0	10.9
277	214	M	1/2	68	1.2	6.7	7.9
295	286	F	3/4	76	3.3	8.6	11.9
285	265	M	3/4	82	7.9	12.1	20.0
255	205	F	1/2	60	1.9	8.0	9.9
260	202	M	3/4	62	4.0	8.4	12.4
280	250	F	1/2	78	3.9	10.8	14.7
275	210	F	1/2	62	2.0	6.3	8.3
280	230	F	3/4	68	5.1	8.9	14.0
282	250	M	3/4	78	4.6	11.0	15.6

BASIC DATA COLLECTED ON RED HAKE

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
435	640	F	3/4	66	1.8	6.7	8.5
427	540	F	1/2	60	2.0	10.7	12.7
459	700	F	3/4	82	15.8	20.7	36.5
412	535	F	1/4	60	2.1	10.2	12.3
361	350	F	full	42	6.0	9.8	15.8
486	855	F	full	86	11.0	11.1	22.1
464	850	F	3/4	96	7.4	13.2	20.6
453	710	F	1/4	80	4.4	7.8	12.2
398	460	F	3/4	50	8.2	9.5	17.7
356	325	M	3/4	37	5.0	3.4	8.4
389	405	F	full	43	5.2	6.8	12.0
388	440	F	3/4	52	5.2	8.9	14.1
446	695	F	full	73	46.0	7.8	53.8
384	385	M	1/4	53	0.6	1.0	1.6
429	500	F	1/2	72	7.8	6.4	14.2
406	440	F	1/2	48	3.2	5.7	8.9
450	675	F	full	76	19.2	9.7	28.9
388	395	F	1/4	50	1.8	5.2	7.0
431	600	F	1/2	70	0.9	10.4	11.3
394	445	F	1/4	50	1.4	6.6	8.0
410	544	F	3/4	70	13.5	9.5	23.0
370	340	F	1/2	42	3.5	5.7	9.2
374	338	F	1/2	44	4.2	4.2	8.4
374	313	M	1/4	46	1.7	3.5	5.2
394	454	F	1/2	56	8.9	10.1	19.0
406	513	F	3/4	62	9.8	9.5	19.3
380	448	F	1/2	52	4.7	7.5	12.2
376	360	F	1/2	46	3.3	6.7	10.0
396	446	F	3/4	54	10.6	6.2	16.8
367	348	F	1/2	48	5.6	8.0	13.6
425	600	F	1/2	78	8.4	5.3	13.7
358	338	F	1/2	36	2.8	2.9	5.7
356	330	M	1/2	44	4.1	4.6	8.7
401	483	F	full	61	14.4	7.6	22.0
410	543	F	1/4	72	2.7	3.0	5.7
385	418	F	1/2	53	4.8	6.6	11.4
342	298	F	1/4	36	0.8	7.5	8.3
398	438	F	1/2	48	3.3	6.7	10.0
159	20	Imm. *	1/2	4	0.6	0.6	1.2
396	448	F	1/2	56	3.3	10.3	13.6
344	233	M	3/4	30	3.0	3.0	6.0
355	306	M	1/2	38	2.2	4.9	7.1
378	408	M	3/4	52	5.3	3.7	9.0
356	330	F	1/2	38	4.5	7.0	11.5

\* Immature.

BASIC DATA COLLECTED ON SILVER HAKE

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
298	335	M	full	48	4.0	3.1	7.1
262	110	F	1/2	18	0.0	1.1	1.1
370	350	F	1/2	60	1.0	3.2	4.2
277	140	M	3/4	22	0.9	0.7	1.6
355	350	F	full	56	1.2	2.7	3.9
350	277	F	full	50	3.1	2.5	5.6
350	310	F	3/4	46	0.0	3.0	3.0
240	90	F	full	16	0.1	0.6	0.7
335	286	F	full	52	0.2	1.9	2.1
365	320	F	full	58	0.0	1.3	1.3
287	160	M	1/2	30	0.3	1.3	1.6
384	426	F	full	78	4.2	4.1	8.3
330	354	M	full	56	0.4	3.0	3.4
319	230	F	full	34	1.5	1.2	2.7
322	220	M	full	40	1.1	2.9	4.0
334	256	F	1/2	46	0.2	2.2	2.4
330	244	F	1/4	46	0.0	0.8	0.8
270	130	M	3/4	20	0.7	1.7	2.4
237	96	F	1/2	14	0.2	1.1	1.3
254	110	M	1/4	16	0.1	0.9	1.0
277	158	M	1/4	22	0.1	1.6	1.7
320	208	F	1/4	32	0.2	1.0	1.2
302	192	M	3/4	32	0.4	1.3	1.7
377	360	F	1/2	64	0.1	2.4	2.5
226	76	M	1/4	12	0.2	1.1	1.3
287	154	F	1/2	24	0.8	1.3	2.1
305	228	M	3/4	34	0.8	2.7	3.5
300	176	M	full	28	1.5	1.6	3.1
321	256	F	3/4	38	1.4	3.4	4.8
295	180	M	3/4	28	1.8	2.0	3.8
335	260	M	1/2	42	0.0	1.9	1.9
312	220	M	full	36	1.1	1.9	3.0
390	420	F	1/4	80	0.0	3.7	3.7
327	236	F	1/2	38	0.1	4.6	4.7
322	226	M	full	40	0.1	2.3	2.4
246	100	M	full	18	8.5	0.7	9.2
319	234	F	1/2	40	0.7	2.7	3.4
294	158	M	1/2	26	1.5	2.4	3.9
305	208	F	1/2	40	0.9	2.9	3.8
230	80	M	1/2	14	0.1	1.2	1.3
237	86	F	1/4	14	0.1	0.3	0.4
315	220	F	3/4	38	0.9	1.5	2.4
294	192	M	3/4	32	0.9	2.4	3.3

BASIC DATA COLLECTED ON SILVER HAKE  
(CONT)

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
342	270	F	3/4	44	0.0	1.6	1.6
338	244	F	3/4	54	0.3	1.4	1.7
291	200	M	full	30	0.2	2.2	2.4
370	348	F	3/4	54	0.7	3.0	3.7
279	150	M	1/4	22	0.2	1.7	1.9
198	40	M	1/4	8	0.1	0.7	0.8
293	170	M	1/2	28	0.5	2.1	2.6
145	15 Imm. *		1/4	2	0.0	0.3	0.3
296	180	M	full	32	5.2	1.4	6.6
220	65	F	1/2	12	0.1	1.0	1.1
306	200	M	3/4	32	0.5	1.3	1.8
315	208	F	3/4	36	0.5	1.7	2.2
250	100	F	3/4	16	0.1	0.7	0.8
257	110	M	1/2	20	0.2	2.3	2.5
350	310	F	3/4	48	1.2	3.2	4.4
134	12 Imm. *		full	1	0.1	0.2	0.3
226	90	F	full	14	7.2	1.7	8.9
322	250	M	1/2	38	1.2	2.9	4.1
226	73	F	1/4	14	0.1	1.4	1.5
132	14 Imm. *		1/2	2	0.0	0.1	0.1
241	90	M	1/4	16	0.0	1.2	1.2
305	202	M	3/4	28	0.8	2.0	2.8
347	280	F	full	54	0.7	3.0	3.7
244	90	M	1/2	16	1.0	1.3	2.3
222	70	F	1/2	12	0.1	0.7	0.8
334	290	M	1/2	42	0.3	2.2	2.5
152	18 Imm. *		1/4	3	0.0	0.4	0.4
338	296	F	3/4	52	0.6	2.8	3.4
325	240	F	1/2	42	0.8	1.6	2.4
305	200	M	3/4	34	0.3	1.5	1.8
325	220	F	3/4	44	0.6	3.1	3.7
330	254	F	full	40	4.9	1.6	6.5
278	140	F	1/4	24	1.4	2.0	3.4
288	150	F	full	28	1.2	1.4	2.6
256	106	F	1/4	18	0.2	1.4	1.6
317	200	M	3/4	38	0.9	2.5	3.4
320	242	M	1/2	38	0.4	4.5	4.9
392	482	F	full	86	7.0	5.9	12.9
390	418	F	3/4	84	0.0	4.2	4.2
385	382	F	full	68	0.0	3.4	3.4
296	198	M	full	26	5.2	1.6	6.8
310	200	F	1/2	36	0.2	0.7	0.9
273	120	F	full	22	1.4	2.0	3.4

\* Immature.

BASIC DATA COLLECTED ON SILVER HAKE  
(CONT)

Length (mm)	Total Body Weight (gms)	Sex	Stomach Volume	Head Weight (gms)	Weight Stomach Contents (gms)	Weight Intestinal Contents (gms)	Total Weight Digestive Tract Contents (gms)
313	236	M	full	38	3.9	2.5	6.4
220	60	F	3/4	10	0.2	0.8	1.0
295	176	M	1/4	30	0.4	1.2	1.6
369	380	F	3/4	62	1.7	5.4	7.1
307	178	F	1/4	34	0.8	0.7	1.5
304	180	F	full	34	1.2	1.5	2.7
127	10	Imm.*	1/4	2	0.0	0.0	0.0
144	14	Imm.*	1/2	2	0.4	0.4	0.8
140	12	Imm.*	1/4	2	0.0	0.2	0.2
156	20	Imm.*	1/2	3	0.1	0.1	0.2
140	16	Imm.*	1/4	2	0.1	0.2	0.3
235	76	M	1/2	14	0.1	1.2	1.3
243	78	M	1/4	14	0.2	1.0	1.2
234	80	F	1/4	14	0.2	0.7	0.9

\* Immature.