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December 2003

Final Report

SUMMER 2003 FINFISH SURVEY AND DATA REPORT

**RHODE ISLAND REGION LONG-TERM DREDGED
MATERIAL DISPOSAL SITE EVALUATION PROJECT**

FINAL

Summer 2003 Finfish Survey and Data Report

**Rhode Island Region
Long-Term Dredged Material Disposal Site Evaluation Project**

**Contract Number DACW33-01-D-0004
Delivery Order No. 02**

to

**U.S. Army Corps of Engineers
North Atlantic Division
New England District
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TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	SURVEY METHODS	1
2.1	Methods.....	1
2.2	Deviations	4
3.0	SURVEY CHRONOLOGY.....	5
4.0	SURVEY RESULTS	6
4.1	Overview.....	6
5.0	PROBLEMS EXPERIENCED AND CORRECTIVE ACTIONS	8
5.1	Technical.....	8
5.2	Schedule.....	9
6.0	REFERENCES	9

LIST OF TABLES

Table 1.	Survey Personnel.....	1
Table 2.	Summary Information for Otter Trawl Tows in RIS July 22 and 23, 2003.....	4
Table 3.	CPUE and Number of Species Collected by Trawl.....	6
Table 4.	CPUE for Species Collected in Otter Trawls from Alternative Area E and Alternative Area W.....	7
Table 5.	Average Length of Fish Species Collected in Otter Tows from Alternative Area E and Alternative Area W.....	8

LIST OF FIGURES

Figure 1.	Trawl Locations for Area E.....	2
Figure 2.	Trawl Locations for Area W.....	3

APPENDICES

- Appendix A: Finfish Species Count Data by Trawl
- Appendix B: Finfish Length Data

1.0 INTRODUCTION

In response to requests from former Governor Almond and Senator Reed, the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps) will consider designation of a long-term disposal site in Rhode Island Sound (RIS) and adjacent waters, referred to here as the Rhode Island Region (RIR) under section 102(c) of the MPRSA in a forthcoming EIS. The EIS will include an evaluation of alternatives including open water disposal, other disposal and dredged material management options, as well as the no action alternative.

This survey is one of a series of surveys being conducted during the summer of 2003 to collect additional biological and physical data to better characterize two areas within RIR (Alternative Area E and Alternative Area W) that are being considered as potential dredged material disposal sites. This survey will provide finfish population information that can be used to evaluate and compare the two potential locations.

This is the fourth finfish survey conducted under this project in an attempt to characterize the fishery resources in terms of finfish species abundance and distribution in several regions within RIS. In this report, field survey methods are described in Section 2. A chronological summary of survey activities and observations is provided in Section 3. Section 4 presents survey results. Survey problems encountered, corrective actions taken, and recommendations for future surveys are described in Section 5.

2.0 SURVEY METHODS

The sampling methods used for this field survey are described in detail in the Quality Assurance Project Plan (QAPP) (Battelle, 2001) and are summarized below in Section 2.1.

2.1 Methods

The *F/V Glenna and Jacob*, owned and operated by Captain Robert Kohl, served as the sampling platform during the survey. The survey personnel are listed in Table 1.

Table 1. Survey Personnel.

Battelle	July 2003 Survey	
	C. Gagnon	Physical Oceanographer
R. Hillman	Senior Fisheries Biologist	
S. Lachance	Marine Ecologist	
Subcontractors	Robert Kohl	Captain, <i>F/V Glenna and Jacob</i>
	Ernest Loane	Mate, <i>F/V Glenna and Jacob</i>

Otter trawl tows were conducted at Alternative Area E (Figure 1) and Alternative Area W (Figure 2) in RIS. A total of eleven stations were designated for sampling. Eight tows were conducted at Alternative Area E and three tows at Alternative Area W. Each tow was labeled as a different station. Differential Global Positioning System (dGPS) coordinates were recorded electronically

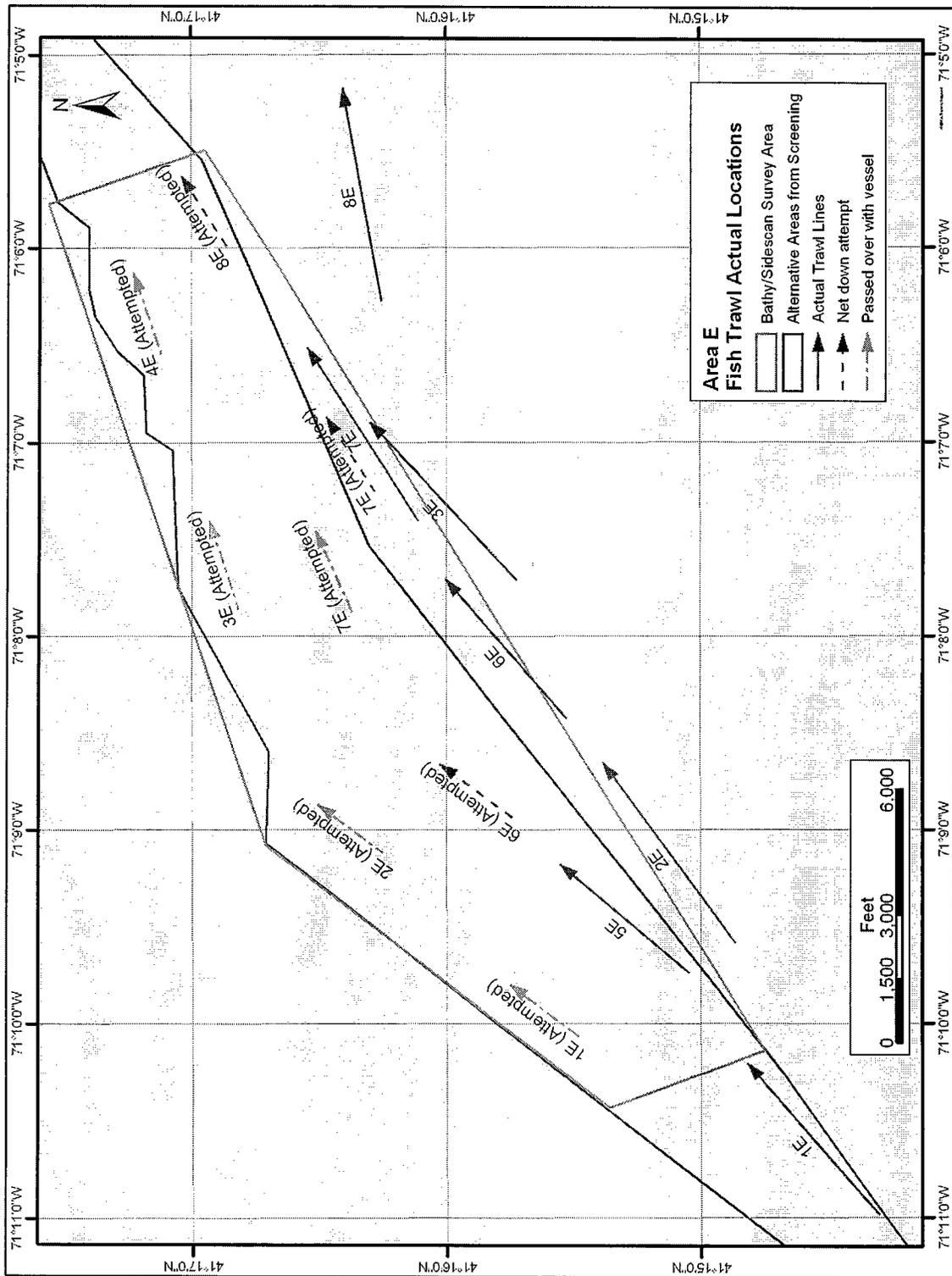


Figure 1. Trawl Locations for Area E.

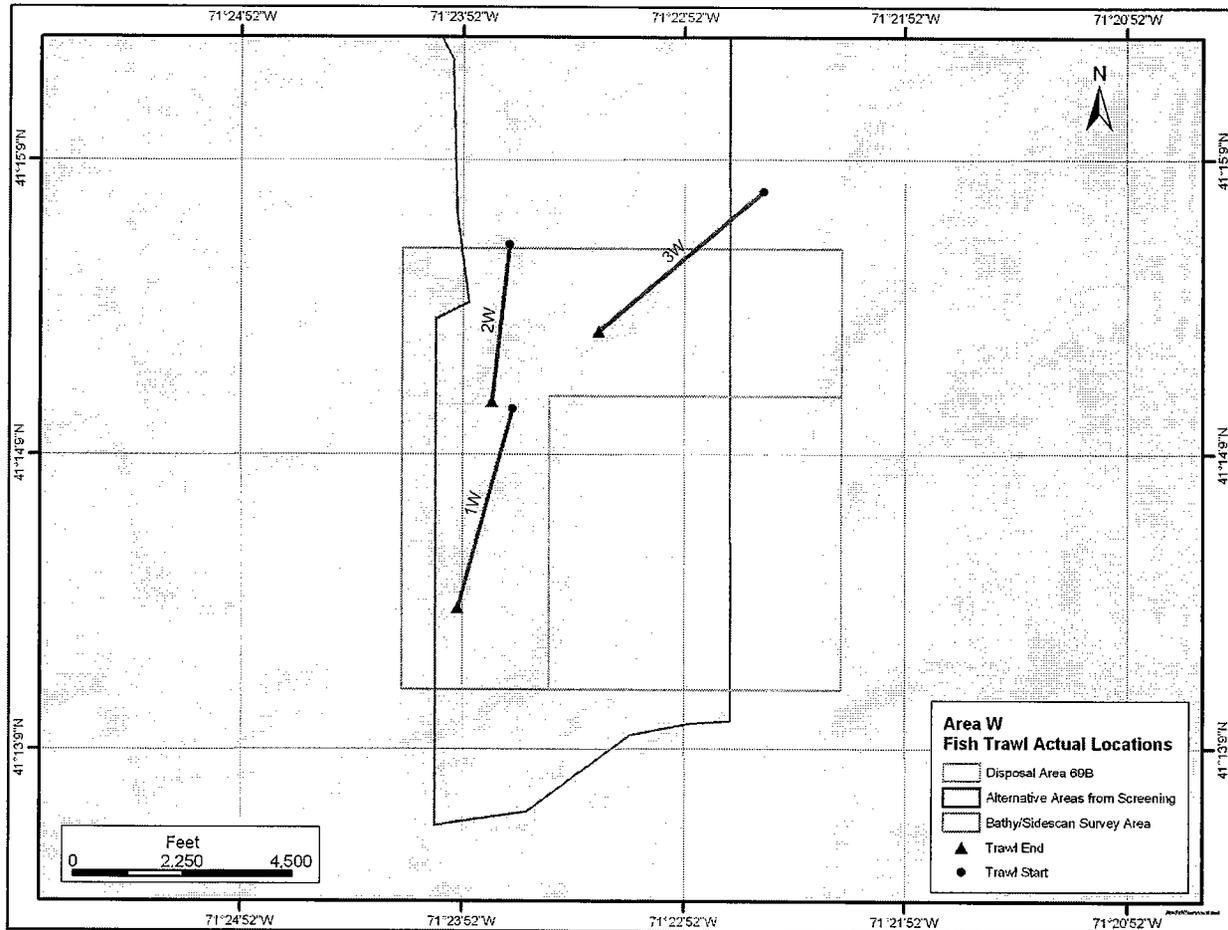


Figure 2. Trawl Locations for Area W.

for the start and stop of each trawl tow. Trawl coordinates represent the actual start and end locations for each tow. The length of time for each tow (actual bottom time) and the water depth during each tow were recorded. The duration of the tows was approximately 15 minutes, with some exceptions due to bottom snags. Deviations are reported in section 2.2 and often resulted in tows slightly shorter or longer than 15 minutes. All tows were conducted at an average tow speed of 3 knots.

The net used for all tows was a commercial $\frac{3}{4}$ whiting net with a 51' sweep, 39' headrope, and 10 fathom legs. The net consisted of 6" mesh in the wings and square, and 2" mesh in the belly. The cod end of the net contained a 0.25-in. mesh liner enabling capture of juvenile fish in addition to larger individuals. The summary information for the trawls, including date, time, and location can be found in Table 2.

Table 2. Summary Information for Otter Trawl Tows in RIS July 22 and 23, 2003.

Date	Time	Latitude	Longitude	Area	Comments
07/22/2003	0832	41° 15.047'N	071° 09.742'W	E	Begin Trawl 5E
	0847	41° 15.553'N	071° 09.180'W		End Trawl 5E
	1001	41° 15.527'N	071° 08.423'W		Begin Trawl 6E
	1016	41° 16.005'N	071° 07.703'W		End Trawl 6E
	1200	41° 14.303'N	071° 10.985'W		Begin Trawl 1E
	1215	41° 14.820'N	071° 10.202'W		End Trawl 1E
	1246	41° 16.110'N	071° 07.402'W		Begin Trawl 7E
	1302	41° 16.547'N	071° 06.512'W		End Trawl 7E
	1334	41° 15.721'N	071° 07.710'W		Begin Trawl 3E
	1351	41° 16.302'N	071° 06.894'W		End Trawl 3E
	1437	41° 14.865'N	071° 09.590'W		Begin Trawl 2E
	1455	41° 15.384'N	071° 08.652'W		End Trawl 2E
	1617	41° 16.254'N	071° 06.277'W		Begin Trawl 8E
	1635	41° 16.407'N	071° 05.170'W		End Trawl 8E
07/23/2003	0850	41° 13.634'N	071° 23.893'W	W	Begin Trawl 1W
	0905	41° 14.312'N	071° 23.646'W		End Trawl 1W
	0938	41° 14.337'N	071° 23.737'W		Begin Trawl 2W
	0949	41° 14.868'N	071° 23.660'W		End Trawl 2W
	1012	41° 14.573'N	071° 23.255'W		Begin Trawl 3W
	1027	41° 15.049'N	071° 22.509'W		End Trawl 3W

Following each tow, the contents of the trawl were emptied onto the vessel's deck and all fish and invertebrates (lobster and squid) were sorted by species. All individuals of each species were then counted and measured. All individuals were discarded overboard after length and count information was recorded.

2.2 Deviations

Trawl 2W was terminated after eleven minutes due to a hang down (i.e., trawl caught on something during the tow). The tow was deemed acceptable and the contents measured and counted. Only seven of the eight tows were conducted at Alternative Area E due to rocky bottom

that made trawling difficult. Attempts were made to re-locate trawl 4E, but no other suitable locations for trawling were found.

3.0 SURVEY CHRONOLOGY

Tuesday, July 22, 2003 (Eastern Daylight Time)

0545	Depart Newport, RI for Area E.
0820	Arrive at Area E.
0832	Start trawl at 5E.
0847	Stop trawl.
0903	Start trawl at 6E. Net hangs down half way through tow. Repairs needed to net.
1001	Start trawl at 6E again slightly southeast of original coordinates to avoid rough bottom.
1016	Stop trawl.
1039	Start trawl at 7E. Net hangs down almost immediately.
1100	Spend 60 minutes looking for trawlable bottom.
1200	Start trawl at 1E. New location in southwest corner of Area E, good bottom.
1215	Stop trawl.
1246	Start trawl at 7E slightly southeast of original coordinates to avoid rough bottom.
1302	Stop trawl.
1334	Start trawl at 3E considerably south of original coordinates to avoid rough bottom. Trawl conducted outside of the designated area.
1351	Stop trawl.
1437	Start trawl at 2E considerably south of original coordinates to avoid rough bottom. Trawl conducted outside of the designated area.
1455	Stop trawl.
1522	Start trawl at 8E slightly southeast of original coordinates to avoid rough bottom.
1532	Net hangs down. Hole in net needs repairs.
1617	Start trawl at 8E again, this time considerably south of original coordinates to avoid rough bottom. Trawl conducted outside of the designated area.
1635	Stop trawl.
1645	Finished for the day. Head for Newport.
2015	Arrive Newport.

Wednesday, July 23, 2003

0600	Depart Newport for Area W.
0845	Arrive at Area W.
0850	Start trawl at 1W
0905	Stop trawl.
0938	Start trawl at 2W.
0949	Net hangs down after 11 minutes of towing. Tow deemed good by chief scientist -- retained.
1012	Start trawl at 3W slightly east of original coordinates to avoid rough bottom.
1027	Stop trawl.
1040	Survey complete, head for Newport.
1240	Arrive Newport. Offload equipment.

4.0 SURVEY RESULTS

4.1 Overview

The Summer 2003 Finfish survey was successfully completed on July 22 and 23, 2003. All data including species collected, the numbers of individuals of a given species, and the lengths of those individuals are included as Appendix A.

Catch Per Unit Effort (CPUE) was calculated for each tow. CPUE was calculated on a 15 minute basis; therefore, tows that were slightly longer or shorter were standardized to 15 minutes. The CPUE and number of species collected in any given tow are presented in Table 3. The average CPUE is also presented for both Alternative Area E and Alternative Area W. Results of a t-test analysis between CPUE in Alternative Area E and Alternative Area W suggest that CPUE did not vary significantly between the two regions ($p > 0.05$). Within Alternative Area E, individual CPUE ranged from a low of 15 fish/tow to a high of 55.83 fish/tow. Individual CPUEs ranged from a low of 25 fish/tow to a high of 41 fish/tow within Alternative Area W.

Table 3. CPUE and Number of Species Collected by Trawl.

Trawl	15-minute CPUE	No. Species
1E	15	7
2E	22.5	9
3E	25.59	9
5E	29	7
6E	39	7
7E	39.38	10
8E	55.83	7
<i>Area E</i>		
<i>Average</i>	<i>32.33 ± 13.54</i>	<i>8 ± 1.29</i>
1W	41	9
2W	40.91	9
3W	25	9
<i>Area W</i>		
<i>Average</i>	<i>35.64 ± 9.21</i>	<i>9</i>

A total of 15 finfish species, as well as squid and lobster, were observed in otter trawls conducted during this survey. However, the overall number of species collected in any given tow did not vary significantly between Alternative Area E and Alternative Area W ($p > 0.05$). An average of 8 species was collected in the tows from Alternative Area E, while an average of 9 species was collected in the tows from Alternative Area W. Four species were unique to Alternative Area E and included blueback herring, haddock, smooth dogfish and yellowtail. Scup, sea raven and white hake were unique to Alternative Area W.

The average 15-minute CPUE for the individual species collected in Alternative Area E and Alternative Area W is presented in Table 4. In alternative Area E, the most frequently caught species were skate (average CPUE = 13.92 fish/tow) followed by winter flounder (average CPUE = 5.33 fish/tow) and silver hake (average CPUE = 4.19 fish/tow). Skate were also the most frequently caught species in Alternative Area W (average CPUE = 9.7 fish/tow). Butterfish (average CPUE = 8.12) and winter flounder (average CPUE = 5.27) were also within the top three most frequently caught species in Alternative Area W.

Table 4. CPUE for Species Collected in Otter Trawls from Alternative Area E and Alternative Area W.

Species Name	Alternative Area E Average 15-minute CPUE	Alternative Area W Average 15-minute CPUE
Blueback herring <i>Alosa aestivalis</i>	0.13	0
Butterfish <i>Peprilus triacanthus</i>	2.45	8.12
Dogfish-not specified <i>Squalus sp/Mustelus sp</i>	0.14	0
Fourspot flounder <i>Paralichthys oblongus</i>	1.23	1.12
Haddock <i>Melanogrammus aeglefinus</i>	0.27	0
Lobster <i>Homarus americanus</i>	0.14	0.33
Red hake <i>Urophycis chuss</i>	0.13	1.79
Scup <i>Stenotomus chrysops</i>	0	0.67
Sea raven <i>Hemirhamphus americanus</i>	0	0.45
Silver hake <i>Merluccius bilinearis</i>	4.19	1.45
Skates Not specified	13.92	9.70
Smooth dogfish <i>Mustelus canis</i>	0.53	0
Spiny dogfish <i>Squalus acanthias</i>	1.67	4.61
Squid <i>Illex sp/Loligo sp</i>	0.89	1.45
Summer flounder <i>Paralichthys dentatus</i>	1.04	0.33
White hake <i>Urophycis regia</i>	0	0.33
Winter flounder <i>Pseudopleuronectes americanus</i>	5.33	5.27
Yellowtail <i>Limanda ferruginea</i>	0.26	0

The average lengths of the species collected from otter trawls in Alternative Area E and Alternative Area W are presented in Table 5. In general, for those species collected in both areas, the size of the fish were similar. For example, winter flounder collected in Alternative Area E averaged 25.83 cm Total Length while those collected from Alternative Area W averaged 24.79 cm Total Length. Spiny dogfish from Alternative Area E and Alternative Area W were also of similar sizes (average length = 80.64 cm and 82.08 cm, respectively). Only fourspot flounder appeared to have a distinct size difference between the two areas. Fourspot flounder collected in tows in Alternative area W were significantly larger (average length = 29.33 cm) than those collected from Alternative Area E (average length = 21.40 cm; $p < 0.05$).

Table 5. Average Length of Fish Species Collected in Otter Tows from Alternative Area E and Alternative Area W.

Species Name	Alternative Area E			Alternative Area W		
	N	Average Length (cm)	Std. Dev.	N	Average Length (cm)	Std. Dev.
Blueback	1	15	n/a	0	n/a	n/a
Butterfish	18	10.11	3.14	20	13.70	3.53
Dogfish	1	67	n/a	0	n/a	n/a
Fourspot flounder	10	21.40	10.92	3	29.33	2.08
Haddock	2	9.50	0.71	0	n/a	n/a
Lobster	1	9	n/a	1	9	n/a
Red hake	1	16	n/a	5	19.40	3.36
Scup	0	n/a	n/a	2	21	1.41
Sea raven	0	n/a	n/a	1	52	n/a
Silver hake	32	18.25	3.53	4	19.50	1.29
Skate	106	45.26	7.48	28	40.21	11.18
Smooth dogfish	3	92.67	19.14	0	n/a	n/a
Spiny dogfish	14	80.64	4.68	12	82.08	5.99
Summer flounder	8	29.13	20.48	1	12	n/a
White hake	0	n/a	n/a	1	32	n/a
Winter flounder	42	25.83	6.46	14	24.79	8.12
Yellowtail	2	24.50	12.02	0	n/a	n/a

n/a – not applicable

5.0 PROBLEMS EXPERIENCED AND CORRECTIVE ACTIONS

5.1 Technical

Several trawl locations in Area E (1E, 2E, 3E, 8E) had to be relocated several meters to the south of the original coordinates to avoid rough, rocky bottom. Trawl locations 6E and 7E were relocated slightly to the southeast of the original coordinates. Because fish are mobile organisms,

the relocation of these trawls is not expected to affect the characterization of the finfish population within Area E. Trawl 4E was not conducted.

Trawl 3W was moved slightly to the east of the original coordinates to avoid rough, rocky bottom.

5.2 Schedule

None

6.0 REFERENCES

Battelle. 2001. Final Quality Assurance Project Plan Rhode Island Sound Disposal Site Study. Tasks 5 and 7 QAPP: Field Sampling, Chemical, and Toxicity Testing. Prepared under Contract No. DACW33-01-D-0004, Delivery Order No. 02. September 2001.

Appendix A

Finfish Species Count Data by Trawl

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Month	Date	Area	Trawl ID	Tow Duration (minutes)	Start Depth (m)	End Depth (m)	Start Latitude	Start Longitude	End Latitude	End Longitude	Species Name	Number Harvested	CPUE (15 min)	CPUE (30 min)
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Smooth dogfish	1	0.83	1.67
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Spiny dogfish	1	0.83	1.67
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Winter flounder	4	3.33	6.67
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Yellowtail	1	0.83	1.67
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Fourspot flounder	1	0.83	1.67
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Butterfish	1	0.83	1.67
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Silver hake	6	5	10
July	7/22/2003	East	8E	18	40.2	42.1	41°16.254'	071°06.277'	41°16.407'	071°05.170'	Spiny dogfish	3	2.50	5
July	7/22/2003	East	8E	18	40.2	42.1	41°16.254'	071°06.277'	41°16.407'	071°05.170'	Summer flounder	3	2.50	5
July	7/22/2003	East	8E	18	40.2	42.1	41°16.254'	071°06.277'	41°16.407'	071°05.170'	Fourspot flounder	7	5.83	11.67
July	7/22/2003	East	8E	18	40.2	42.1	41°16.254'	071°06.277'	41°16.407'	071°05.170'	Silver hake	6	5	10
July	7/22/2003	East	8E	18	40.2	42.1	41°16.254'	071°06.277'	41°16.407'	071°05.170'	Butterfish	1	0.83	1.67
July	7/22/2003	East	8E	18	40.2	42.1	41°16.254'	071°06.277'	41°16.407'	071°05.170'	Winter flounder	19	15.83	31.67
July	7/22/2003	East	8E	18	40.2	42.1	41°16.254'	071°06.277'	41°16.407'	071°05.170'	Skate	28	23.33	46.67
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Spiny dogfish	4	4	8
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Winter flounder	3	3	6
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Fourspot flounder	1	1	2
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Butterfish	8	8	16
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Scup	2	2	4
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Red hake	1	1	2
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Silver hake	3	3	6
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Skate	18	18	36
July	7/23/2003	West	1W	15	36.6	36.6	41°13.634'	071°23.893'	41°14.312'	071°23.646'	Squid	1	1	2
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Spiny dogfish	5	6.82	13.64
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Skate	3	4.09	8.18
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Sea raven	1	1.36	2.73
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Butterfish	12	16.36	32.73
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Winter flounder	5	6.82	13.64
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Fourspot flounder	1	1.36	2.73
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Red hake	1	1.36	2.73
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Silver hake	1	1.36	2.73
July	7/23/2003	West	2W	11	34.7	34.7	41°14.337'	071°23.737'	41°14.868'	071°23.660'	Squid	1	1.36	2.73
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Lobster	1	1	2
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Skate	7	7	14
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Spiny dogfish	3	3	6
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Winter flounder	6	6	12
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Fourspot flounder	1	1	2
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Summer flounder	1	1	2
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	White hake	1	1	2
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Red hake	3	3	6
July	7/23/2003	West	3W	15	34.7	36.6	41°14.573'	071°23.255'	41°15.049'	071°22.509'	Squid	2	2	4

Month	Date	Area	Trawl ID	Tow Duration (minutes)	Start Depth (m)	End Depth (m)	Start Latitude	Start Longitude	End Latitude	End Longitude	Species Name	Number Harvested	CPUE (15 min)	CPUE (30 min)
July	7/22/2003	East	5E	15	38.4	38.4	41°15.04'	071°09.742'	41°15.553'	071°09.180'	Spiny dogfish	1	1	2
July	7/22/2003	East	5E	15	38.4	38.4	41°15.04'	071°09.742'	41°15.553'	071°09.180'	Skate	14	14	28
July	7/22/2003	East	5E	15	38.4	38.4	41°15.04'	071°09.742'	41°15.553'	071°09.180'	Winter flounder	3	3	6
July	7/22/2003	East	5E	15	38.4	38.4	41°15.04'	071°09.742'	41°15.553'	071°09.180'	Fourspot flounder	1	1	2
July	7/22/2003	East	5E	15	38.4	38.4	41°15.04'	071°09.742'	41°15.553'	071°09.180'	Silver hake	5	5	10
July	7/22/2003	East	5E	15	38.4	38.4	41°15.04'	071°09.742'	41°15.553'	071°09.180'	Butterfish	4	4	8
July	7/22/2003	East	5E	15	38.4	38.4	41°15.04'	071°09.742'	41°15.553'	071°09.180'	Haddock	1	1	2
July	7/22/2003	East	6E	15	40.2	40.2	41°15.527'	071°08.423'	41°16.005'	071°07.703'	Lobster	1	1	2
July	7/22/2003	East	6E	15	40.2	40.2	41°15.527'	071°08.423'	41°16.005'	071°07.703'	Dogfish	1	1	2
July	7/22/2003	East	6E	15	40.2	40.2	41°15.527'	071°08.423'	41°16.005'	071°07.703'	Butterfish	2	2	4
July	7/22/2003	East	6E	15	40.2	40.2	41°15.527'	071°08.423'	41°16.005'	071°07.703'	Winter flounder	4	4	8
July	7/22/2003	East	6E	15	40.2	40.2	41°15.527'	071°08.423'	41°16.005'	071°07.703'	Silver hake	3	3	6
July	7/22/2003	East	6E	15	40.2	40.2	41°15.527'	071°08.423'	41°16.005'	071°07.703'	Summer flounder	2	2	4
July	7/22/2003	East	6E	15	40.2	40.2	41°15.527'	071°08.423'	41°16.005'	071°07.703'	Skate	26	26	52
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Summer flounder	2	1.88	3.75
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Fourspot flounder	1	0.94	1.88
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Winter flounder	4	3.75	7.50
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Silver hake	9	8.44	16.88
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Butterfish	3	2.81	5.63
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Red hake	1	0.94	1.88
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Skate	13	12.19	24.38
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Blueback	1	0.94	1.88
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Spiny dogfish	5	4.69	9.38
July	7/22/2003	East	7E	16	40.2	40.2	41°16.110'	071°07.402'	41°16.547'	071°06.512'	Squid	3	2.81	5.63
July	7/22/2003	East	1E	15	40.2	40.2	41°14.303'	071°10.985'	41°14.820'	071°10.202'	Silver hake	2	2	4
July	7/22/2003	East	1E	15	40.2	40.2	41°14.303'	071°10.985'	41°14.820'	071°10.202'	Butterfish	4	4	8
July	7/22/2003	East	1E	15	40.2	40.2	41°14.303'	071°10.985'	41°14.820'	071°10.202'	Yellowtail	1	1	2
July	7/22/2003	East	1E	15	40.2	40.2	41°14.303'	071°10.985'	41°14.820'	071°10.202'	Winter flounder	3	3	6
July	7/22/2003	East	1E	15	40.2	40.2	41°14.303'	071°10.985'	41°14.820'	071°10.202'	Smooth dogfish	1	1	2
July	7/22/2003	East	1E	15	40.2	40.2	41°14.303'	071°10.985'	41°14.820'	071°10.202'	Spiny dogfish	1	1	2
July	7/22/2003	East	1E	15	40.2	40.2	41°14.303'	071°10.985'	41°14.820'	071°10.202'	Skate	3	3	6
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Skate	12	10.59	21.18
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Spiny dogfish	3	2.65	5.29
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Smooth dogfish	1	0.88	1.76
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Winter flounder	5	4.41	8.82
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Summer flounder	1	0.88	1.76
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Butterfish	3	2.65	5.29
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Haddock	1	0.88	1.76
July	7/22/2003	East	3E	17	42.1	40.2	41°15.721'	071°07.710'	41°16.302'	071°06.894'	Silver hake	1	0.88	1.76
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Squid	2	1.67	3.33
July	7/22/2003	East	2E	18	40.2	42.1	41°14.865'	071°09.590'	41°15.384'	071°08.652'	Skate	10	8.33	16.67

Appendix B

Finfish Length Data

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/22/03	East	5E	Spiny dogfish	77
July	07/22/03	East	5E	Skate	44
July	07/22/03	East	5E	Skate	43
July	07/22/03	East	5E	Skate	37
July	07/22/03	East	5E	Skate	42
July	07/22/03	East	5E	Skate	47
July	07/22/03	East	5E	Skate	43
July	07/22/03	East	5E	Skate	45
July	07/22/03	East	5E	Skate	35
July	07/22/03	East	5E	Skate	48
July	07/22/03	East	5E	Skate	39
July	07/22/03	East	5E	Skate	49
July	07/22/03	East	5E	Skate	49
July	07/22/03	East	5E	Skate	46
July	07/22/03	East	5E	Skate	45
July	07/22/03	East	5E	Winter flounder	39
July	07/22/03	East	5E	Winter flounder	31
July	07/22/03	East	5E	Winter flounder	21
July	07/22/03	East	5E	Fourspot flounder	30
July	07/22/03	East	5E	Silver hake	20
July	07/22/03	East	5E	Silver hake	18
July	07/22/03	East	5E	Silver hake	17
July	07/22/03	East	5E	Silver hake	14
July	07/22/03	East	5E	Silver hake	17
July	07/22/03	East	5E	Butterfish	10
July	07/22/03	East	5E	Butterfish	10
July	07/22/03	East	5E	Butterfish	10
July	07/22/03	East	5E	Butterfish	10
July	07/22/03	East	5E	Haddock	10
July	07/22/03	East	6E	Lobster	9
July	07/22/03	East	6E	Dogfish	67
July	07/22/03	East	6E	Butterfish	10
July	07/22/03	East	6E	Butterfish	10
July	07/22/03	East	6E	Winter flounder	21
July	07/22/03	East	6E	Winter flounder	25
July	07/22/03	East	6E	Winter flounder	26
July	07/22/03	East	6E	Winter flounder	18
July	07/22/03	East	6E	Silver hake	19
July	07/22/03	East	6E	Silver hake	22
July	07/22/03	East	6E	Silver hake	17
July	07/22/03	East	6E	Summer flounder	50
July	07/22/03	East	6E	Summer flounder	14
July	07/22/03	East	6E	Skate	36
July	07/22/03	East	6E	Skate	37

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/22/03	East	6E	Skate	37
July	07/22/03	East	6E	Skate	39
July	07/22/03	East	6E	Skate	40
July	07/22/03	East	6E	Skate	42
July	07/22/03	East	6E	Skate	42
July	07/22/03	East	6E	Skate	42
July	07/22/03	East	6E	Skate	43
July	07/22/03	East	6E	Skate	43
July	07/22/03	East	6E	Skate	44
July	07/22/03	East	6E	Skate	44
July	07/22/03	East	6E	Skate	44
July	07/22/03	East	6E	Skate	45
July	07/22/03	East	6E	Skate	45
July	07/22/03	East	6E	Skate	45
July	07/22/03	East	6E	Skate	46
July	07/22/03	East	6E	Skate	46
July	07/22/03	East	6E	Skate	47
July	07/22/03	East	6E	Skate	47
July	07/22/03	East	6E	Skate	47
July	07/22/03	East	6E	Skate	48
July	07/22/03	East	6E	Skate	49
July	07/22/03	East	6E	Skate	49
July	07/22/03	East	6E	Skate	50
July	07/22/03	East	6E	Skate	57
July	07/22/03	East	7E	Summer flounder	62
July	07/22/03	East	7E	Summer flounder	14
July	07/22/03	East	7E	Fourspot flounder	31
July	07/22/03	East	7E	Winter flounder	26
July	07/22/03	East	7E	Winter flounder	19
July	07/22/03	East	7E	Winter flounder	29
July	07/22/03	East	7E	Winter flounder	18
July	07/22/03	East	7E	Silver hake	19
July	07/22/03	East	7E	Silver hake	24
July	07/22/03	East	7E	Silver hake	31
July	07/22/03	East	7E	Silver hake	16
July	07/22/03	East	7E	Silver hake	15
July	07/22/03	East	7E	Silver hake	18
July	07/22/03	East	7E	Silver hake	18
July	07/22/03	East	7E	Silver hake	17
July	07/22/03	East	7E	Silver hake	17
July	07/22/03	East	7E	Butterfish	17
July	07/22/03	East	7E	Butterfish	9
July	07/22/03	East	7E	Butterfish	16
July	07/22/03	East	7E	Red hake	16
July	07/22/03	East	7E	Skate	47

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/22/03	East	7E	Skate	46
July	07/22/03	East	7E	Skate	44
July	07/22/03	East	7E	Skate	35
July	07/22/03	East	7E	Skate	50
July	07/22/03	East	7E	Skate	45
July	07/22/03	East	7E	Skate	29
July	07/22/03	East	7E	Skate	44
July	07/22/03	East	7E	Skate	48
July	07/22/03	East	7E	Skate	47
July	07/22/03	East	7E	Skate	47
July	07/22/03	East	7E	Skate	48
July	07/22/03	East	7E	Skate	45
July	07/22/03	East	7E	Blueback	15
July	07/22/03	East	7E	Spiny dogfish	81
July	07/22/03	East	7E	Spiny dogfish	85
July	07/22/03	East	7E	Spiny dogfish	75
July	07/22/03	East	7E	Spiny dogfish	86
July	07/22/03	East	7E	Spiny dogfish	90
July	07/22/03	East	1E	Silver hake	15
July	07/22/03	East	1E	Silver hake	12
July	07/22/03	East	1E	Butterfish	8
July	07/22/03	East	1E	Butterfish	8
July	07/22/03	East	1E	Butterfish	10
July	07/22/03	East	1E	Butterfish	3
July	07/22/03	East	1E	Yellowtail	16
July	07/22/03	East	1E	Winter flounder	33
July	07/22/03	East	1E	Winter flounder	25
July	07/22/03	East	1E	Winter flounder	43
July	07/22/03	East	1E	Smooth dogfish	114
July	07/22/03	East	1E	Spiny dogfish	82
July	07/22/03	East	1E	Skate	84
July	07/22/03	East	1E	Skate	48
July	07/22/03	East	1E	Skate	82
July	07/22/03	East	3E	Skate	40
July	07/22/03	East	3E	Skate	48
July	07/22/03	East	3E	Skate	46
July	07/22/03	East	3E	Skate	46
July	07/22/03	East	3E	Skate	48
July	07/22/03	East	3E	Skate	35
July	07/22/03	East	3E	Skate	46
July	07/22/03	East	3E	Skate	45
July	07/22/03	East	3E	Skate	49
July	07/22/03	East	3E	Skate	48
July	07/22/03	East	3E	Skate	43
July	07/22/03	East	3E	Skate	40

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/22/03	East	3E	Spiny dogfish	80
July	07/22/03	East	3E	Spiny dogfish	84
July	07/22/03	East	3E	Spiny dogfish	74
July	07/22/03	East	3E	Smooth dogfish	77
July	07/22/03	East	3E	Winter flounder	16
July	07/22/03	East	3E	Winter flounder	29
July	07/22/03	East	3E	Winter flounder	33
July	07/22/03	East	3E	Winter flounder	25
July	07/22/03	East	3E	Winter flounder	19
July	07/22/03	East	3E	Summer flounder	15
July	07/22/03	East	3E	Butterfish	8
July	07/22/03	East	3E	Butterfish	11
July	07/22/03	East	3E	Butterfish	8
July	07/22/03	East	3E	Haddock	9
July	07/22/03	East	3E	Silver hake	18
July	07/22/03	East	2E	Skate	38
July	07/22/03	East	2E	Skate	44
July	07/22/03	East	2E	Skate	58
July	07/22/03	East	2E	Skate	35
July	07/22/03	East	2E	Skate	46
July	07/22/03	East	2E	Skate	44
July	07/22/03	East	2E	Skate	45
July	07/22/03	East	2E	Skate	34
July	07/22/03	East	2E	Skate	42
July	07/22/03	East	2E	Skate	41
July	07/22/03	East	2E	Smooth dogfish	87
July	07/22/03	East	2E	Spiny dogfish	81
July	07/22/03	East	2E	Winter flounder	25
July	07/22/03	East	2E	Winter flounder	21
July	07/22/03	East	2E	Winter flounder	23
July	07/22/03	East	2E	Winter flounder	25
July	07/22/03	East	2E	Yellowtail	33
July	07/22/03	East	2E	Fourspot flounder	29
July	07/22/03	East	2E	Butterfish	10
July	07/22/03	East	2E	Silver hake	17
July	07/22/03	East	2E	Silver hake	23
July	07/22/03	East	2E	Silver hake	15
July	07/22/03	East	2E	Silver hake	22
July	07/22/03	East	2E	Silver hake	20
July	07/22/03	East	2E	Silver hake	18
July	07/22/03	East	8E	Spiny dogfish	77
July	07/22/03	East	8E	Spiny dogfish	82
July	07/22/03	East	8E	Spiny dogfish	75
July	07/22/03	East	8E	Summer flounder	48
July	07/22/03	East	8E	Summer flounder	13

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/22/03	East	8E	Summer flounder	17
July	07/22/03	East	8E	Fourspot flounder	27
July	07/22/03	East	8E	Fourspot flounder	27
July	07/22/03	East	8E	Fourspot flounder	31
July	07/22/03	East	8E	Fourspot flounder	20
July	07/22/03	East	8E	Fourspot flounder	5
July	07/22/03	East	8E	Fourspot flounder	9
July	07/22/03	East	8E	Fourspot flounder	5
July	07/22/03	East	8E	Silver hake	19
July	07/22/03	East	8E	Silver hake	16
July	07/22/03	East	8E	Silver hake	18
July	07/22/03	East	8E	Silver hake	21
July	07/22/03	East	8E	Silver hake	16
July	07/22/03	East	8E	Silver hake	15
July	07/22/03	East	8E	Butterfish	14
July	07/22/03	East	8E	Winter flounder	16
July	07/22/03	East	8E	Winter flounder	17
July	07/22/03	East	8E	Winter flounder	19
July	07/22/03	East	8E	Winter flounder	20
July	07/22/03	East	8E	Winter flounder	20
July	07/22/03	East	8E	Winter flounder	21
July	07/22/03	East	8E	Winter flounder	21
July	07/22/03	East	8E	Winter flounder	26
July	07/22/03	East	8E	Winter flounder	27
July	07/22/03	East	8E	Winter flounder	27
July	07/22/03	East	8E	Winter flounder	28
July	07/22/03	East	8E	Winter flounder	28
July	07/22/03	East	8E	Winter flounder	29
July	07/22/03	East	8E	Winter flounder	29
July	07/22/03	East	8E	Winter flounder	30
July	07/22/03	East	8E	Winter flounder	30
July	07/22/03	East	8E	Winter flounder	34
July	07/22/03	East	8E	Winter flounder	36
July	07/22/03	East	8E	Winter flounder	37
July	07/22/03	East	8E	Skate	38
July	07/22/03	East	8E	Skate	39
July	07/22/03	East	8E	Skate	39
July	07/22/03	East	8E	Skate	39
July	07/22/03	East	8E	Skate	40
July	07/22/03	East	8E	Skate	40
July	07/22/03	East	8E	Skate	41
July	07/22/03	East	8E	Skate	42
July	07/22/03	East	8E	Skate	42
July	07/22/03	East	8E	Skate	43
July	07/22/03	East	8E	Skate	44

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/22/03	East	8E	Skate	44
July	07/22/03	East	8E	Skate	45
July	07/22/03	East	8E	Skate	45
July	07/22/03	East	8E	Skate	45
July	07/22/03	East	8E	Skate	46
July	07/22/03	East	8E	Skate	47
July	07/22/03	East	8E	Skate	47
July	07/22/03	East	8E	Skate	49
July	07/22/03	East	8E	Skate	49
July	07/22/03	East	8E	Skate	49
July	07/22/03	East	8E	Skate	49
July	07/22/03	East	8E	Skate	49
July	07/22/03	East	8E	Skate	50
July	07/22/03	East	8E	Skate	50
July	07/22/03	East	8E	Skate	50
July	07/22/03	East	8E	Skate	50
July	07/22/03	East	8E	Skate	71
July	07/22/03	West	1W	Spiny dogfish	79
July	07/22/03	West	1W	Spiny dogfish	75
July	07/22/03	West	1W	Spiny dogfish	71
July	07/22/03	West	1W	Spiny dogfish	82
July	07/22/03	West	1W	Winter flounder	32
July	07/22/03	West	1W	Winter flounder	19
July	07/22/03	West	1W	Winter flounder	38
July	07/22/03	West	1W	Fourspot flounder	31
July	07/22/03	West	1W	Butterfish	17
July	07/22/03	West	1W	Butterfish	19
July	07/22/03	West	1W	Butterfish	16
July	07/22/03	West	1W	Butterfish	16
July	07/22/03	West	1W	Butterfish	8
July	07/22/03	West	1W	Butterfish	15
July	07/22/03	West	1W	Butterfish	9
July	07/22/03	West	1W	Butterfish	16
July	07/22/03	West	1W	Scup	20
July	07/22/03	West	1W	Scup	22
July	07/22/03	West	1W	Red hake	20
July	07/22/03	West	1W	Silver hake	18
July	07/22/03	West	1W	Silver hake	21
July	07/22/03	West	1W	Silver hake	19
July	07/22/03	West	1W	Skate	27
July	07/22/03	West	1W	Skate	32
July	07/22/03	West	1W	Skate	36
July	07/22/03	West	1W	Skate	38
July	07/22/03	West	1W	Skate	39
July	07/22/03	West	1W	Skate	41

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/22/03	West	1W	Skate	42
July	07/22/03	West	1W	Skate	43
July	07/22/03	West	1W	Skate	44
July	07/22/03	West	1W	Skate	45
July	07/22/03	West	1W	Skate	46
July	07/22/03	West	1W	Skate	47
July	07/22/03	West	1W	Skate	47
July	07/22/03	West	1W	Skate	47
July	07/22/03	West	1W	Skate	43
July	07/22/03	West	1W	Skate	44
July	07/22/03	West	1W	Skate	45
July	07/22/03	West	1W	Skate	64
July	07/23/03	West	2W	Spiny dogfish	79
July	07/23/03	West	2W	Spiny dogfish	85
July	07/23/03	West	2W	Spiny dogfish	80
July	07/23/03	West	2W	Spiny dogfish	87
July	07/23/03	West	2W	Spiny dogfish	94
July	07/23/03	West	2W	Skate	45
July	07/23/03	West	2W	Skate	47
July	07/23/03	West	2W	Skate	46
July	07/23/03	West	2W	Sea raven	52
July	07/23/03	West	2W	Butterfish	15
July	07/23/03	West	2W	Butterfish	16
July	07/23/03	West	2W	Butterfish	10
July	07/23/03	West	2W	Butterfish	15
July	07/23/03	West	2W	Butterfish	17
July	07/23/03	West	2W	Butterfish	16
July	07/23/03	West	2W	Butterfish	9
July	07/23/03	West	2W	Butterfish	12
July	07/23/03	West	2W	Butterfish	15
July	07/23/03	West	2W	Butterfish	8
July	07/23/03	West	2W	Butterfish	9
July	07/23/03	West	2W	Butterfish	16
July	07/23/03	West	2W	Winter flounder	35
July	07/23/03	West	2W	Winter flounder	34
July	07/23/03	West	2W	Winter flounder	26
July	07/23/03	West	2W	Winter flounder	16
July	07/23/03	West	2W	Winter flounder	20
July	07/23/03	West	2W	Fourspot flounder	30
July	07/23/03	West	2W	Red hake	18
July	07/23/03	West	2W	Silver hake	20
July	07/23/03	West	3W	Lobster	9
July	07/23/03	West	3W	Skate	16
July	07/23/03	West	3W	Skate	46
July	07/23/03	West	3W	Skate	14

Month	Date	Area	Trawl ID	Species Name	Length (cm)
July	07/23/03	West	3W	Skate	12
July	07/23/03	West	3W	Skate	45
July	07/23/03	West	3W	Skate	38
July	07/23/03	West	3W	Skate	47
July	07/23/03	West	3W	Spiny dogfish	85
July	07/23/03	West	3W	Spiny dogfish	86
July	07/23/03	West	3W	Spiny dogfish	82
July	07/23/03	West	3W	Winter flounder	16
July	07/23/03	West	3W	Winter flounder	18
July	07/23/03	West	3W	Winter flounder	23
July	07/23/03	West	3W	Winter flounder	34
July	07/23/03	West	3W	Winter flounder	19
July	07/23/03	West	3W	Winter flounder	17
July	07/23/03	West	3W	Fourspot flounder	27
July	07/23/03	West	3W	Summer flounder	12
July	07/23/03	West	3W	White hake	32
July	07/23/03	West	3W	Red hake	17
July	07/23/03	West	3W	Red hake	25
July	07/23/03	West	3W	Red hake	17