

**Framework 38
to the
Northeast Multispecies FMP**

**APPENDIX I:
HISTORY OF THE GRATE RAISED FOOTROPE TRAWL FISHERY**

Currently, the Maine whiting fishery is at a very low ebb. While there was a comparatively large whiting fishery along the coast during the 1950s and 1960s, averaging 8,800 tons, and a reasonable fishery during the 1980s, there were only about 62 tons per year landed in Maine from 1990 through 1993.

In 1994, an innovation that helped reduce finfish bycatch in the shrimp fishery, the Nordmore grate, was modified to allow a slightly larger-sized whiting through the grate, yet keep the bycatch of regulated species below 5%. The grate bar spacing was widened to 40 mm from 25 mm, and testing at sea showed good success at catching whiting and keeping bycatch low. There was no whiting management plan in place at that time, and the whiting targeted by this gear – 1- $\frac{3}{4}$ " mesh net and 40 mm bar space grate – was salable in the Spanish whiting market if properly handled on deck to preserve quality.

An experimental fishery utilizing this gear was conducted in 1995 under National Marine Fisheries Service (NMFS) regulation with the proviso that it demonstrate that bycatch is less than 5%. Landings averaged 948 tons from 1994 through 1997, but data between sea sampling and logbooks differed as to bycatch percentage. As this work progressed, the whiting management program (Amendment 12 to the Northeast Multispecies Fishery Management Plan (FMP)) was put into place in 2000. This plan encouraged the fishery to catch larger fish by restricting catch if vessels used less than three-inch mesh in the cod end.

Concern over bycatch of regulated species limited the whiting fishery to only two locations in the Gulf of Maine during the 1990's – Small Mesh Area 1 off Cape Ann, Massachusetts and Small Mesh Area 2 outside Jeffrey's Ledge. Neither area was easily accessible to the inshore Maine whiting fleet. As a result, landings in Maine averaged only 42 tons between 1998 and 2001. Recently, Framework Adjustment 35 to the Multispecies FMP established an additional whiting fishery north of Cape Cod through use of a raised footrope net. This area has recently been expanded, but is also relatively inaccessible to Maine's fleet.

Further testing of the Nordmore style net with grant support from the NMFS FIG program (1996) and the Maine Fishery Development Commission (1999) showed continued low bycatch while using grates with up to 63.5 mm (2- $\frac{1}{2}$ ") bar spacing and cod ends with up to 66 mm (2.5 inches) diamond mesh and/or 55 mm (2- $\frac{5}{32}$ inches) knotless square mesh. The larger bar spacing in the grate and the larger cod end mesh would bring the fishery into compliance with the objectives of Amendment 12 by reducing the fishing mortality on juvenile (pre-spawning) whiting. During these experiments, the percent bycatch of regulated species, while consistently low, was not uniformly under 5%, due primarily to the retention of flatfish.

In the summer of 1999, four combinations of grate bar spacing and cod end mesh were tested against control nets with no grate and 1.75" diamond cod end mesh, or 1.6" bar space grate and 1.75" cod end mesh. The tests were conducted with: (1) 2.5" bar spacing with 2.5" cod end mesh; (2) 2" bar spacing and 2.25" diamond cod end mesh; (3) 2.5" bar spacing and 2.2" square cod end mesh; and (4) 2" bar spacing and 2.2" square cod end mesh. These tests used both control nets towed by paired vessels at the same time and control nets towed by the same vessel on the same day in the same area. Catch was generally lower for the nets with larger cod end mesh and larger grate bar spacing than for the controls. Percent bycatch of regulated species averaged over 6% for the 2.5" bar space grate/2.5" diamond cod end, over 8% for the 2.5" bar space grate/2.2" square mesh cod end, and 3.5% for the 2" grate and 2.25" diamond cod end. The catches of flatfish were consistently high, keeping the percent bycatch generally over 5%.

In 1999, investigation of increased mesh sizes in the cod end and increased bar spacing in the Nordmore style grate was continued with the addition of a modified Massachusetts-style raised footrope to the trawl in an attempt to reduce the bycatch of flatfish. The modified raised footrope retained a roller sweep and had either 30-inch, or 42-inch dropper chains between the sweep and the footrope. This work met with good success in reducing the catch of small whiting and the bycatch of regulated species, but not all of the trials produced bycatch less than 5%. The bycatch of regulated species is calculated as the ratio of the weight of regulated species and the total weight of fish caught. Thus, greatly reducing the total weight of fish caught by increasing the cod end mesh to release the small whiting increases the percentage bycatch of regulated species, even if the actual amount of bycatch has been reduced.

In 2001, the sweep was removed from the trawl and the 30, or 42 inch dropper chains were retained, making the trawl a sweepless trawl. This work, done with NMFS grant support, built on the successes in 1999 and essentially completed development of a net that better targets whiting by meeting the double criteria of conservation of the whiting resource and minimization of bycatch of regulated species.

The raised footrope trawl with 30-inch dropper chains and no roller frame also was compared to a net with no dropper chains and a 10-inch roller frame in two sets of paired tows in 2001. Both nets had a 50 mm bar space grate and 2.5-inch diamond cod end. The total catch, bycatch of regulated species and percent bycatch are presented on a per tow and per trip basis (Table 1). In the first set of tows, the raised footrope without a sweep reduced the bycatch of regulated species by an order of magnitude from 48.9 kg/hr to 4.5 kg/hr. In the second set of tows, the bycatch was reduced by three times from 8.1 kg/hr to 2.6 kg/hr. The percent bycatch of regulated species was reduced from 18.5% to 2.9% in the first set of tows and from 4.6% to 2.7% in the second set with the raised footrope sweepless trawl. On a per-trip basis, the first set percent bycatch was reduced from 19.6% to 4.8%, and the second set was reduced from 4.6% to 3.0% by using the raised footrope sweepless trawl. Mean catch in weight per hour tow by species for the two sets of tows with the raised footrope sweepless trawl is presented in Table 2.

Table 1 Comparison of Total Catch Weight/Hour Towing, Regulated Species Weight/Hour Towing and Percent of Regulated Species Bycatch for Sweepless Trawl Versus Control Net with No Droppers and 10" Roller Frame (Fall 2001, Area 2B)

	Vessel	Grate (in)	Cod End (in)	Dropper (in)	Roller Dia. (in)	Total Wt./Hr (kg)	Reg.Sp./Hr (kg)	% Reg.Sp.	% Reg.Sp (Per Trip Basis)
30" Droppers with No Frame vs. Control									
1st Trial	Tenacious	2	2.5	0	10	2371.97	439.89	18.55	
	Mean					263.55	48.88	19.94	19.66
	StdDev					85.59	6.42		4.86
	N					9	9		2
	North Star	2	2.5	30	0	933.60	27.22	2.92	
	Mean					155.60	4.54	2.62	2.88
	StdDev					55.72	3.06		0.22
	N					6	6		2
2nd Trial	North Star	2	2.5	0	10	1760.04	81.27	4.62	
	Mean					176.00	8.13	5.92	4.59
	StdDev					59.95	4.02		1.03
	N					10	10		2
	Tenacious	2	2.5	30	0	875.67	26.21	2.99	
	Mean					87.57	2.62	2.76	2.96
	StdDev					39.70	2.41		0.70
	N					10	10		2

Note: All nets had a 50 mm bar space grate and 2.5-inch diamond codend.

Table 2 Mean Catch (kg) Per Hour Tow by Species for Two Trials: 30" Dropper Chain with No Roller Frame Versus Control Net with Footrope Down on 10" Roller Frame (Fall 2001, Area 2B)

	Trial 1	(Control)	Trial 2	(Control)
	North Star	Tenacious	Tenacious	North Star
Dropper Chain Length	30	0	30	0
Roller Frame Diameter	0	10	0	10
Number of Tows	N = 7	N = 7	N = 10	N = 10
Shrimp	0.0	0.0	0.0	0.0
Whiting/Silver Hake	139.6	122.1	70.8	122.5
Red Hake (Ling)	6.8	27.9	2.6	13.9
White Hake	3.6	6.9	1.6	4.4
Redfish	0.0	0.0	0.0	0.0
American Plaice (Dab)	1.2	9.6	0.7	3.0
Gray Sole (Witch Flounder)	0.8	20.0	0.0	0.0
Windowpane Flounder (Sand Dab)	0.0	0.0	0.0	0.0
Winter Flounder (Blackback)	0.0	0.0	0.1	0.3
Yellowtail Flounder	0.0	0.0	0.1	0.1
Cod	0.0	0.6	0.0	0.0
Haddock	0.1	0.0	0.1	0.0
Pollock	0.0	0.0	0.0	0.0
Scallop	0.0	0.1	0.3	3.8
Ocean Pout	0.0	0.1	0.0	0.1
Mackerel	0.0	0.1	0.1	0.2
Herring	1.7	0.2	8.2	6.3
Alewife	7.2	3.2	0.2	0.3
Cusk (Spotted)	0.0	0.0	0.0	0.0
Monkfish/Goosefish	0.2	1.7	0.2	2.5
Sculpin	0.0	0.0	0.6	3.4
Spiny Dog/Dogfish	0.0	0.0	0.0	0.0
Butterfish	0.6	0.4	0.3	0.1
Loligo Squid	0.0	0.0	0.0	0.0
Illex	1.1	2.1	1.0	0.7
Octopus	0.0	0.0	0.0	0.0
Lobster	0.0	0.0	2.5	9.6
Jonah Crab	0.0	0.0	0.0	0.4
Rock Crab	0.0	0.0	0.1	0.0
All Species Total	162.9	195.2	89.3	171.6
Reg. Species Total	5.7	37.2	2.6	7.8
Percent Reg. Sp. Bycatch	3.5	19.0	2.9	4.5

Note: Both trials used a 50 mm bar space grate and 2.5"-diamond codends in paired tows.

The majority of the catch in all tows was whiting and red hake. White hake, American plaice and gray sole comprised the bulk of the bycatch of regulated species. Despite differences in overall catch between the two vessels, the percent bycatch of regulated species was below 5% for the sweepless trawl in both sets of tows.

Paired tow comparisons in 2001 showed a slightly better size selectivity for whiting with the 2.2-inch knotless square mesh cod end than with the 2.5-inch diamond mesh cod end (Figure 1). Eight paired tows were made, with the square mesh towed for four tows by each vessel. Both vessels used the raised footrope sweepless trawl, the raised footrope with sweep, and the footrope down on the sweep in various tow pairings (Table 3). All nets used the 50 mm Nordmore style grate. Length frequency comparisons for selected species showed no striking differences in selectivity for any species, although there may have been some increased release of small gray sole through the diamond mesh (Figure 2). Where few appreciable differences in size selectivity were observed between experimental nets for any of the trials, and those that did occur showed more favorable selection with the square mesh over the diamond mesh, an option to equate 2.2-inch knotless square mesh with 2.5-inch diamond mesh and permit landings at the 2.5-inch level of 7,500 pounds per trip rather than limiting the catch to 3,500 pounds per trip is included for consideration in this framework.

The F/V North Star used the sweepless trawl for another 20 days in October and November 2001 to test the net under commercial conditions. A total of 71 tows were made of which 65 were good, clear tows without problems. The per tow information as well as the catch, bycatch of regulated species and percent bycatch are found in Table 4 and show very low bycatch (2.2 kg/hr) and percent bycatch (2.5%) of regulated species even though the whiting are no longer available inshore in any appreciable numbers at this time of the year (69.6 kg/hr). Length frequencies for selected species from these tows show the range of sizes of retained fish (Figure 3).

The research towing conducted in 1999 and 2001 and the testing of the sweepless raised footrope net with a grate under commercial conditions in 2001 were all conducted within 15 miles of shore (see Figure 2 in Framework 38 document). In 2002, tows with this gear were made along the outer edge of the same general area (see Figure 2 in Framework 38 document, starred tows). Two vessels were employed, and one vessel made 39 tows over ten days, while the other made 22 tows over seven days. Catch, bycatch and percent bycatch by tow are seen in Table 5 and Table 6 for the two vessels and by trip in Table 7 and Table 8. Overall, the percent bycatch of regulated species shows a continuing pattern of averaging less than 5%. Catch by species showed very occasional high catches of small redfish in deeper water and in some of these instances, when combined with a low catch of whiting, the percent bycatch of regulated species was over 5% (see Table 6).

The results to date for research on nets with a grate have shown gradual improvement in reduction of bycatch to the point where a sweepless raised footrope net with a 50 mm bar space Nordmore style grate and either 2.5" diamond, or 2.2" square mesh cod end can be utilized in a coastal Maine fishery with assurance of a low bycatch fishery.

Figure 1 Whiting Cumulative Length Frequency of 1.75 Inch and 2.5 Inch Diamond Cod Ends and 2.2 Inch Knotless Square Mesh Cod End (Fall 1999, Area 2B)

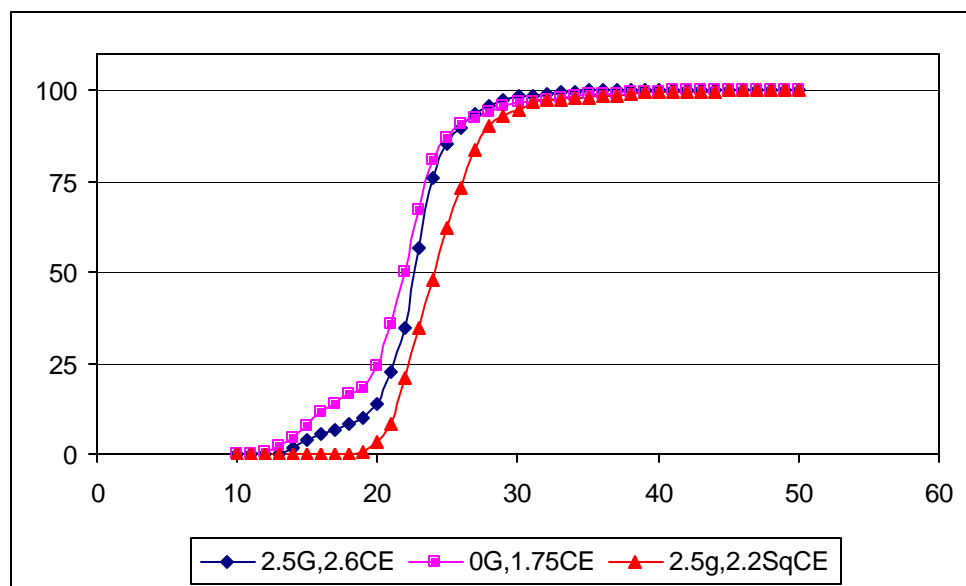
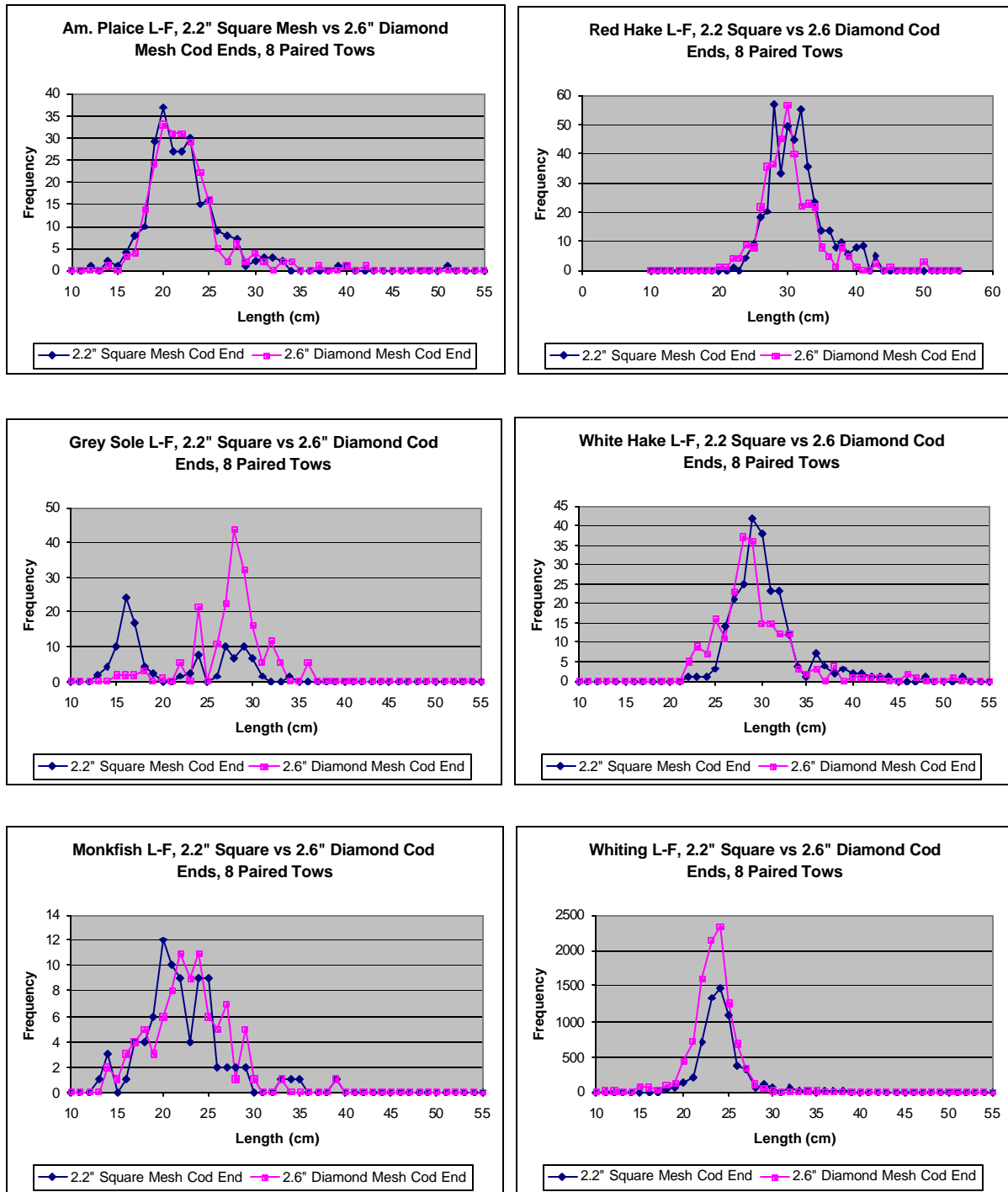


Table 3 Tow Information for Comparison of Square Mesh and Diamond Mesh Cod Ends in Conjunction with Raised Footrope with and without a Roller Frame, or with Footrope Down on Roller Frame Net Configurations (Fall 2001, Area 2B)

Vessel	Date	Grate (in)	Cod End (in)	Dropper (in)	Roller Dia (in)	Depth Haul (fm)	Total Weight (kg)	Reg. Sp. Wt. (kg)	% Reg.Sp.
North Star	10/5/2001	2	2.2	0	10	41	115.8	15.3	13.2
North Star	10/5/2001	2	2.2	0	10	45	106.9	10.7	10.0
Tenacious	10/3/2001	2	2.2	30	0	66.7-65.1	69.7	16.6	23.8
Tenacious	10/3/2001	2	2.2	30	0	48-38	132.8	6.3	4.7
North Star	10/3/2001	2	2.2	30	10	27	151.7	4.2	2.8
North Star	10/3/2001	2	2.2	30	10	44	146.1	7.4	5.1
Tenacious	10/5/2001	2	2.2	30	10	46-49.5	69.4	7.3	10.5
Tenacious	10/5/2001	2	2.2	30	10	49-48.5	61.0	3.4	5.6
						Mean	106.7	8.9	8.3
North Star	10/5/2001	2	2.5	0	10	48	198.8	17.4	8.8
North Star	10/5/2001	2	2.5	0	10	48	96.8	5.6	5.8
Tenacious	10/3/2001	2	2.5	30	0	39-46.5	107.8	3.2	3.0
Tenacious	10/3/2001	2	2.5	30	0	49-48.5	83.1	1.2	1.4
North Star	10/3/2001	2	2.5	30	10	65	100.4	33.8	33.7
North Star	10/3/2001	2	2.5	30	10	46	186.2	7.9	4.2
Tenacious	10/5/2001	2	2.5	30	10	47.5-47	147.2	11.2	7.6
Tenacious	10/5/2001	2	2.5	30	10	47-48	110.8	5.3	4.8
						Mean	128.9	10.7	8.3

Figure 2 Length Frequency of Selected Species from 2.5-Inch Diamond Mesh and 2.2-Inch Square Mesh Cod Ends (Fall 2001, Area 2B)



Eight Paired Tows between F/V Tenacious and F/V North Star using a variety of raised footrope with and without a Roller Frame and a Footrope down on the Roller Frame. Frequencies are in numbers of fish.

Table 4 Tows with Sweepless Trawl, 50 mm Grate and 2.5" Diamond Mesh Cod End, October, November, 2001

Date	Tow #	Tot.Catch kg	Whiting kg	Reg Sp kg	RegSp% Tot Cat	Tow Time	Depth (F)	Tow Time Dec Hrs	Tot.Cat/Hr kg	Reg.Sp/Hr kg	%Reg.Sp
10/9/2001	1	186.0	140	5.4	2.9	1:20	55-64	1.33	139.5	4.1	2.9
10/9/2001	2	216.0	190	3.3	1.5	1:35	61-63	1.58	136.4	2.1	1.5
10/9/2001	3	236.9	200	4.2	1.8	1:42	63-60	1.70	139.4	2.4	1.8
10/11/2001	4	0.0	0	0.0	0.0	1:00	58-62	1.00			
10/11/2001	5	19.9	19	0.0	0.0	1:30	65-70	1.50			
10/11/2001	6	162.7	100	6.5	4.0	1:30	68-59	1.50			
10/11/2001	7	106.1	65	9.2	8.7	1:20	60-51	1.33	79.6	6.9	8.7
10/12/2001	8	64.0	35	2.4	3.8	2:00	60-68	2.00	32.0	1.2	3.8
10/12/2001	9	54.6	40	1.1	2.0	1:22	68.00	1.37	40.0	0.8	2.0
10/12/2001	10	48.2	36	0.8	1.7	1:20	71-74	1.33	36.2	0.6	1.7
10/12/2001	11	91.6	64	3.7	4.0	1:30	64-58	1.50	61.1	2.5	4.0
10/16/2001	12	176.0	140	6.0	3.4	1:55	64-61	1.92	91.8	3.1	3.4
10/16/2001	13	216.0	175	5.0	2.3	1:27	62-63	1.45	149.0	3.4	2.3
10/16/2001	14	139.3	115	3.5	2.5	1:04	63-68	1.07	130.5	3.3	2.5
10/16/2001	15	113.4	85	2.7	2.3	1:45	66-58	1.75	64.8	1.5	2.3
10/19/2001	16	262.5	210	4.8	1.8	2:00	51-68	2.00	131.2	2.4	1.8
10/19/2001	17	221.1	183	3.3	1.5	2:00	68-59	2.00	110.6	1.6	1.5
10/19/2001	18	0.0	0	0.0	0.0	1:15	59-62	1.25			
10/20/2001	19	223.8	175	4.3	1.9	1:30	63-64	1.50	149.2	2.8	1.9
10/20/2001	20	158.1	135	3.3	2.1	1:33	64-70	1.55	102.0	2.1	2.1
10/20/2001	21	128.6	100	3.4	2.6	1:47	72-64	1.78	72.1	1.9	2.6
10/22/2001	22	128.2	120	2.5	2.0	1:30	59-63	1.50	85.5	1.7	2.0
10/22/2001	23	95.5	85	2.8	2.9	1:28	63-62	1.47	65.1	1.9	2.9
10/22/2001	24	235.3	200	6.8	2.9	1:27	62-61	1.45	162.2	4.7	2.9
10/22/2001	25	69.8	60	2.4	3.4	1:35	64-57	1.58	44.1	1.5	3.4
10/23/2001	26	67.1	60	1.2	1.7	1:43	63-66	1.73	38.7	0.7	1.7
10/23/2001	27	90.6	80	2.8	3.1	1:30	63-64	1.50	60.4	1.9	3.1
10/23/2001	28	82.0	72	2.1	2.6	1:53	63-65	1.88	43.5	1.1	2.6
10/28/2001	29	32.8	13	0.1	0.3	0:23	37-39	0.38	85.6	0.3	0.3

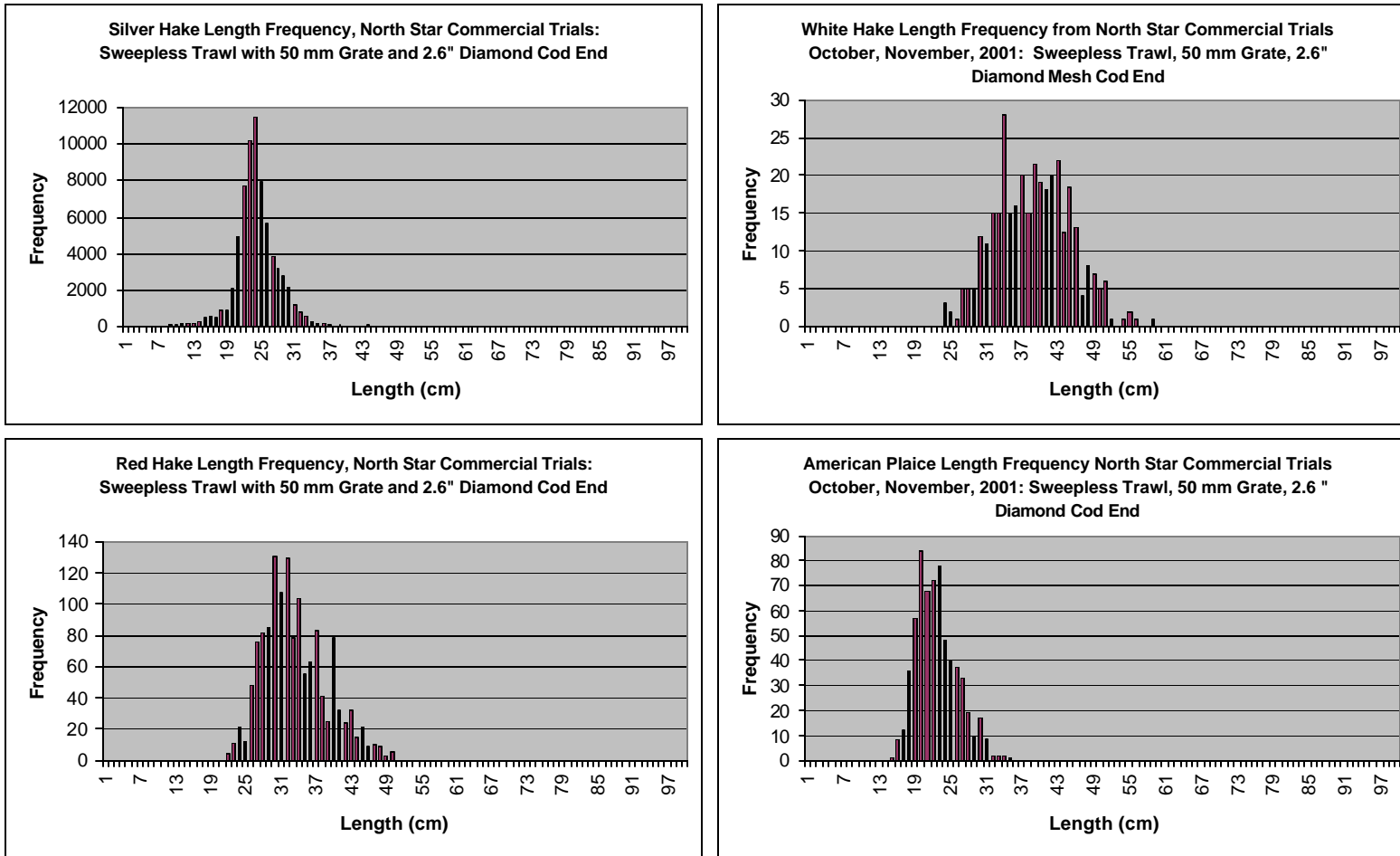
Table 4 Continued - Tows with Sweepless Trawl, 50 mm Grate and 2.5" Diamond Mesh Cod End, October, November, 2001

Date	Tow #	Tot.Catch kg	Whiting kg	Reg Sp kg	RegSp% Tot Cat	Tow Time	Depth (F)	Tow Time Dec Hrs	Tot.Cat/Hr kg	Reg.Sp/Hr kg	%Reg.Sp
10/28/2001	30	30.7	25	0.8	2.6	0:36	48-55	0.60	51.2	1.3	2.6
10/28/2001	31	103.4	65	3.3	3.1	1:30	65-70	1.50	68.9	2.2	3.1
10/28/2001	32	81.4	72	0.5	0.7	1:25	58-56	1.42	57.5	0.4	0.6
10/29/2001	33	71.6	62	2.1	2.9	1:21	58-63	1.35	53.0	1.5	2.9
10/29/2001	34	96.4	80	0.9	0.9	1:17	66-67	1.28	75.1	0.7	0.9
10/29/2001	35	84.0	70	2.0	2.4	1:25	73-72	1.42	59.3	1.4	2.4
10/29/2001	36	71.3	58	2.2	3.0	1:25	71-60	1.42	50.3	1.5	3.0
10/31/2001	37	96.1	85	3.3	3.4	1:15	62-64	1.25	76.9	2.6	3.4
10/31/2001	38	141.3	100	4.0	2.8	1:19	63-60	1.32	107.3	3.0	2.8
10/31/2001	39	116.0	72	2.8	2.4	1:28	63-60	1.47	79.1	1.9	2.4
10/31/2001	40	84.4	60	1.3	1.5	1:15	61-58	1.25	67.5	1.0	1.5
11/4/2001	41	176.6	144	4.2	2.4	2:00	67-64	2.00	88.3	2.1	2.4
11/4/2001	42	78.1	70	1.1	1.3	1:15	65-64	1.25			
11/4/2001	43	108.7	95	4.4	4.0	1:20	69-66	1.33	81.5	3.3	4.0
11/4/2001	44	108.7	100	0.7	0.6	1:15	67-63	1.25	87.0	0.5	0.6
11/8/2001	45	84.2	72	3.0	3.6	1:35	65-60	1.58	53.2	1.9	3.6
11/8/2001	46	102.1	90	3.8	3.7	1:30	64-59	1.50	68.0	2.5	3.7
11/8/2001	47	106.8	100	1.5	1.4	1:30	60-68	1.50	71.2	1.0	1.4
11/8/2001	48	31.4	30	0.0	0.0	1:35	68-66	1.58			
11/10/2001	49	123.9	100	2.5	2.0	1:15	59-68	1.25	99.1	2.0	2.0
11/10/2001	50	110.8	90	2.4	2.2	1:50	69-72	1.83	60.4	1.3	2.2
11/10/2001	51	77.6	68	1.3	1.7	1:40	68-60	1.67	46.5	0.8	1.7
11/11/2001	52	174.4	145	4.6	2.6	1:40	64-67	1.67	104.6	2.8	2.6
11/11/2001	53	127.7	108	2.3	1.8	1:40	68-60	1.67	76.6	1.4	1.8
11/11/2001	54	107.4	92	2.3	2.1	2:08	64-65	2.13	50.4	1.1	2.1
11/15/2001	55	167.2	144	6.2	3.7	1:20	69-62	1.33	125.4	4.7	3.7
11/15/2001	56	99.8	84	3.8	3.8	1:23	61-62	1.38	72.1	2.7	3.8
11/15/2001	57	270.8	210	12.0	4.4	1:35	64-65	1.58	171.0	7.6	4.4
11/15/2001	58	198.7	155	6.8	3.4	1:32	64-60	1.53	129.6	4.4	3.4
11/17/2001	59	126.3	105	2.8	2.2	1:35	65-63	1.58	79.8	1.8	2.2

Table 4 Continued – Tows with Sweepless Trawl, 50 mm Grate and 2.5" Diamond Mesh Cod End, October, November, 2001

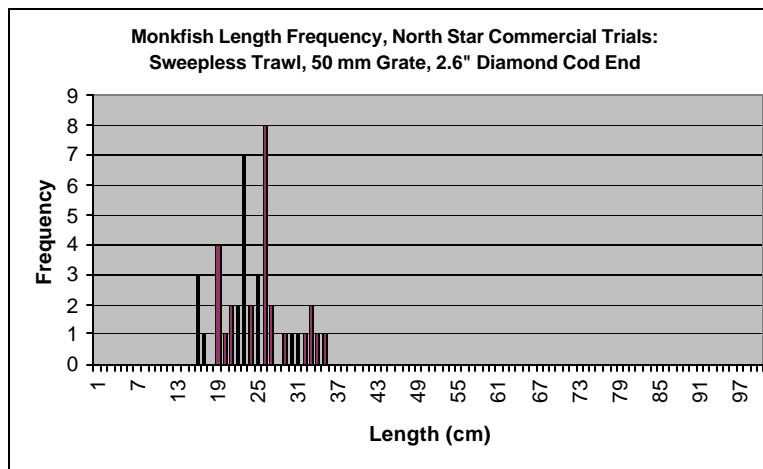
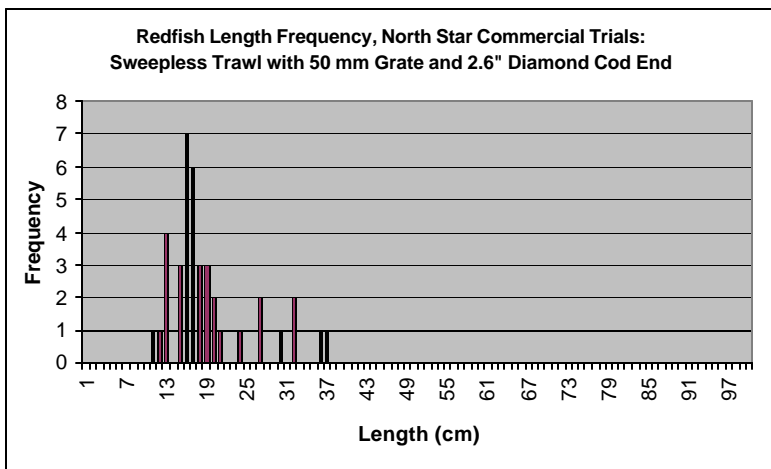
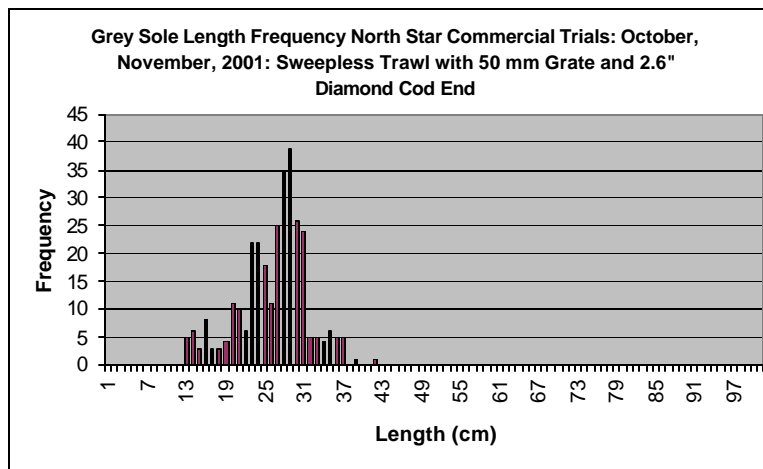
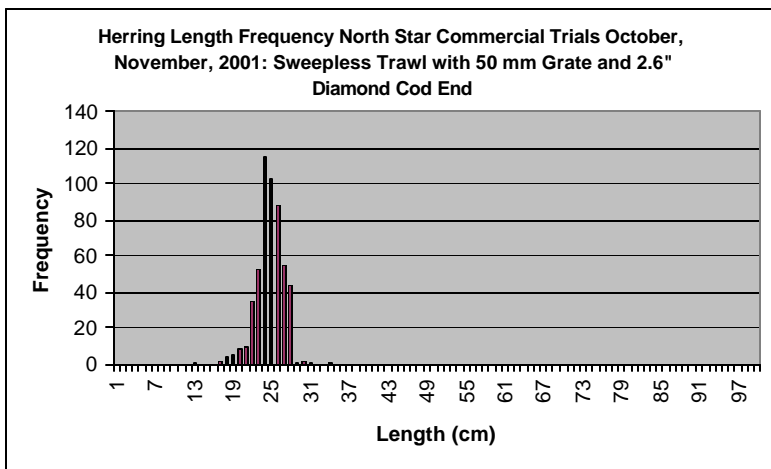
Date	Tow #	Tot.Catch kg	Whiting kg	Reg Sp kg	RegSp% Tot Cat	Tow Time	Depth (F)	Tow Time Dec Hrs	Tot.Cat/Hr kg	Reg.Sp/Hr kg	%Reg.Sp
11/17/2001	60	97.6	83	2.2	2.3	1:43	64-67	1.72	56.8	1.3	2.3
11/17/2001	61	98.5	85	3.3	3.3	1:33	67-62	1.55	63.5	2.1	3.3
11/21/2001	62	74.9	60	0.4	0.5	1:30	40-57	1.50	49.9	0.3	0.5
11/21/2001	63	118.2	95	2.7	2.2	1:24	68-70	1.40	84.4	1.9	2.2
11/21/2001	64	140.5	108	3.3	2.3	1:20	68-60	1.33	105.4	2.5	2.3
11/24/2001	65	175.8	150	3.4	1.9	1:29	64-66	1.48	118.5	2.3	1.9
11/24/2001	66	137.9	122	1.9	1.4	1:26	67-62	1.43	96.2	1.3	1.4
11/24/2001	67	113.8	93	2.9	2.6	1:13	63-67	1.22	93.5	2.4	2.5
11/24/2001	68	193.1	175	5.3	2.8	1:34	66-63	1.57	123.2	3.4	2.7
11/27/2001	69	234.5	185	7.4	3.2	1:33	67-64	1.55	151.3	4.8	3.2
11/27/2001	70	156.0	140	4.2	2.7	1:43	63-68	1.72	90.9	2.4	2.7
11/27/2001	71	143.4	118	3.4	2.4	1:46	67-61	1.77	81.2	1.9	2.4
											%Reg.Sp.
							Mean Kg/Hr		85.8	2.2	2.5
Highlighted = Tows with problems, discounted.								Std. Deviation	34.39	1.4	1.18
							Number of Tows	65			

Figure 3 Length Frequencies for Selected Species from 65 Commercial Tows, October - November, 2001



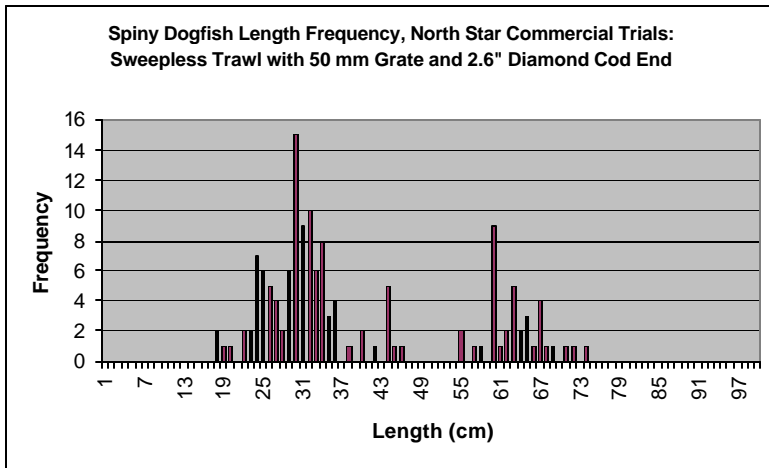
Frequencies are in numbers of fish.

Figure 3 Continued - Length Frequencies for Selected Species from 65 Commercial Tows, October - November, 2001



Frequencies are in numbers of fish.

Figure 3 Continued - Length Frequencies for Selected Species from 65 Commercial Tows, October - November, 2001



Frequencies are in numbers of fish.

Table 5 Catch in Weight per Tow by Species for 22 Tows with Sweepless Raised Footrope Net with 50 mm Bar Space Grate and 2.5" Diamond Cod End (F/V Tenacious, Fall 2002)

Species	Tow 1 Wt. kg.	Tow 2 Wt. kg.	Tow 3 Wt. kg.	Tow 4 Wt. kg.	Tow 5 Wt. kg.	Tow 6 Wt. kg.	Tow 7 Wt. kg.	Tow 8 Wt. kg.	Tow 9 Wt. kg.	Tow 10 Wt. kg.	Tow 11 Wt. kg.	Tow 12 Wt. kg.	Tow 13 Wt. kg.
Shrimp	0	0	0	0	0	0	0	0	0	0	0	0	0
Whiting/Silver Hake	28	3.4	50.4	39	7.2	113.8	31	27.4	2.0	10.5	22	56	59.5
EXP Whiting	28	3.4	50.4	39	7.2	113.8	31	27.4	2.0	10.5	22	56	59.5
Red Hake (Ling)	9	1.4	2	2.2	0	4.6	1.2	2.4	0.7	3.0	1.5	0.3	0.2
White Hake	0.5	0	1.2	0.3	0	0.3	0.2	0.4	0.05	0	0	0.2	0
Redfish	0.1	0	0	0	0	0	0	0	0	0	0	0	0
American Plaice	1	0	1	0.5	0.1	1.05	0	0.6	0	0.1	0	0.3	0.1
Witch Flounder	0.2	0	0.1	0.4	0.05	0.15	0	0	0	0	0.1	0	0.1
Windowpane Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0
Winter Flounder	0.05	0	0	0	0	0	0	0	0	0	0	0	0
Yellowtail Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0
Cod	0	0	0	0	0	0	0	0	0	0	0	0	0
Haddock	0	0	0	0.15	0	0	0	0	0	0	0	0	0
Pollock	0	0	0.2	0	0	0	0	0	0	0	0	0	0
Herring	0	6.8	16.6	10	4.6	3.6	8	2.6	4.3	96	6.5	3.8	4.1
Alewife	4.6	1.4	2.4	0	2.4	3	2.9	2.2	1.2	0.5	3.5	2.7	2
Illex	0.2	0.6	0.2	0.4	0.3	0.5	0.6	0.4	0	1.3	0.6	0.9	1.1
Butterfish	0.9	0.4	0	0	0	0.2	0	0.05	0.05	0.1	0.1	0.2	0.15
Sculpin	0.3	0	0	0	0	0	0	0	0	0	0	0	0
Skate	0	0	0	0	0	0	0	0	0	0.6	0	0	0
Spiny Dog/Dogfish	0	0	0	0.3	0	0	0	0	0	0	0	0	0
Monkfish/Goosefish	0.3	0	0	0.5	0	0	0	0	0	0	0	0	0
Scallop	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Four Spot	0.2	0	0	0	0.1	0.4	0.1	0.1	0.2	0	0	0	0
Shad	0.1	0	0	0	0	0	0	0	0	0	0	0	0
Lobster	0.9	0	0	0	0	0	0	0	0.2	0	0	0	0
Jonah Crab	0.2	0.1	0	0.2	0	0	0	0	0	0	0	0	0
Rock Crab	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculated Total	46.4	14.1	74.1	54.0	14.7	127.5	43.9	36.1	8.5	112.0	34.3	64.3	67.3
Observer Total													
Reg. Sp. Bycatch (kg)	1.8	0.0	2.3	1.3	0.2	1.5	0.2	1.0	0.1	0.1	0.1	0.5	0.2
Reg. Sp. Bycatch %	3.88	0.00	3.11	2.41	1.02	1.14	0.34	2.63	0.59	0.09	0.29	0.70	0.30

*EXP Whiting represents an expansion made from the measured sample to the total catch (if necessary).

Table 5 Continued – Catch in Weight per Tow by Species for 22 Tows with Sweepless Raised Footrope Net with 50 mm Bar Space Grate and 2.5" Diamond Cod End (F/V Tenacious, Fall 2002)

Species	Tow 14 Wt. kg.	Tow 15 Wt. kg.	Tow 16 Wt. kg.	Tow 17 Wt. kg.	Tow 18 Wt. kg.	Tow 19 Wt. kg.	Tow 20 Wt. kg.	Tow 21 Wt. kg.	Tow 22 Wt. kg.	Sum	Wt./Tow	Std.Dev.
Shrimp	0	0	0	0	0.2	0	0	0	0	0.0	0.0	0.000
Whiting/Silver Hake	102.9	28	9.4	26	5.8	62	84	13.6	23.8	450.2	20.5	30.629
EXP Whiting	102.9	28	9.4	26	5.8	62	84	13.6	23.8	450.2	20.5	30.629
Red Hake (Ling)	13.8	0.4	1.7	6.4	4.2	2	5.6	4.4	0.9	28.4	1.3	2.411
White Hake	1.6	0	0.7	0.45	0	1.3	3	0.4	0	3.1	0.1	0.336
Redfish	0.2	0	0	0	0.05	0	0.05	0	0	0.1	0.0	0.028
American Plaice	0.7	0.1	0.6	1.7	0.2	0.4	1.9	0.3	0.5	4.7	0.2	0.417
Witch Flounder	1.05	0	0.3	0.3	0.4	0.2	0.05	0.05	0.3	1.0	0.0	0.101
Windowpane Flounder	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Winter Flounder	0	0	0	0	0	0	0	0	0	0.1	0.0	0.014
Yellowtail Flounder	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Cod	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Haddock	0	0	0	0	0.6	0.8	0	0	0	0.2	0.0	0.042
Pollock	0	0	0	0	0	0	0.1	0	0	0.2	0.0	0.042
Herring	0.1	1	0	0	0	0.5	0.05	1.4	1.2	166.8	7.6	25.321
Alewife	5.4	7	1.0	3.7	0.05	8.8	6.6	7.4	2.8	28.8	1.3	1.239
Illex	2.2	1.1	0.3	1.9	0.05	1.05	2.6	1.8	0.5	7.0	0.3	0.366
Butterfish	0.05	0	0.3	0.9	0.05	0.05	0.05	0.4	0.5	2.2	0.1	0.249
Sculpin	0	0	0	0	0	0	0	0	0	0.3	0.0	0.083
Skate	0	0	0	0	0	0	0	0	0	0.6	0.0	0.166
Spiny Dog/Dogfish	0	0	2.6	2	0	11.6	3.4	25.4	20.2	0.3	0.0	0.083
Monkfish/Goosefish	0	0	0	0	0	0	0	0	0	0.8	0.0	0.156
Scallop	0	0	0.3	0.2	0.2	0	0.05	0	0	0.1	0.0	0.028
Four Spot	0.1	0	0	0	0	1.9	3.0	0.8	0	1.0	0.0	0.103
Shad	0	0	0	0	0	0	0	0	0	0.1	0.0	0.028
Lobster	0	0	0	0	0	0	0	0	0	1.1	0.0	0.250
Jonah Crab	0	0	0	0	0.05	0	0	0	0	0.4	0.0	0.060
Rock Crab	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Calculated Total	128.0	37.6	17.0	43.4	11.7	90.4	110.4	55.7	50.5	697.0	31.7	35.971
Observer Total												
Reg. Sp. Bycatch (kg)	3.5	0.1	1.6	2.4	1.1	2.6	5.0	0.7	0.7	9.0	0.4	0.780
Reg. Sp. Bycatch %	2.73	0.27	9.12	5.42	9.40	2.88	4.53	1.26	1.39	1.27	1.29	

*EXP Whiting represents an expansion made from the measured sample to the total catch (if necessary).

Table 6 Catch in Weight per Tow by Species for 39 Tows with a Sweepless Raised Footrope Net with 50 mm Bar Space Grate and 2.5" Diamond Cod End (F/V North Star, Fall 2002)

Species	Tow 1 Wt. kg.	Tow 2 Wt. kg.	Tow 3 Wt. kg.	Tow 4 Wt. kg.	Tow 5 Wt. kg.	Tow 6 Wt. kg.	Tow 7 Wt. kg.	Tow 8 Wt. kg.	Tow 9 Wt. kg.	Tow 10 Wt. kg.	Tow 11 Wt. kg.	Tow 12 Wt. kg.	Tow 13 Wt. kg.	Tow 14 Wt. kg.	Tow 15 Wt. kg.
Shrimp	0.05	0.3	0.7	0.05	0.05	0	0.1	0.4	0.3	0.05	0.01	0.01	0.45	3	0
Whiting/Silver Hake	60	70.7	98	195.6	54.9	80.3	76.6	22.7	176.6	52.7	15	6.6	42.6	148.8	105.8
EXP Whiting	60	70.7	98	195.6	54.9	80.3	76.6	22.7	176.6	52.7	15	6.6	42.6	148.8	105.8
Red Hake (Ling)	3.8	15.9	42.2	9	4.9	3.8	9.4	7.7	12.2	22.8	2.05	0.9	2.8	15.6	10.1
White Hake	1.35	3	2	2.35	0.7	1.1	2.5	1.4	4.7	4.2	1.5	2.25	0	3.1	2.1
Redfish	0	0.2	1.5	1.2	0.05	0	0	21.6	0.2	0.7		0	0	0	0
American Plaice	0.8	0.4	1.5	1.3	0.3	0	0.15	0.2	0.4	3.4	0.05	0.2	0.4	1.7	0.2
Witch Flounder	0	1	2.1	0.7	0	0	0.2	0.2	0.8	6		0.3	0.5	0.6	0.1
Windowpane Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Winter Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellowtail Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haddock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pollock	0.7	0	0	0	0	0	0	0	0.2	0	0	0	0.2	0	0
Herring	0	0.8	0	0.2	4.3	2.4	6.2	4.4	1.3	2.8	0.3	2.6	15.2	20	1.4
Alewife	0.4	0	0	0	0	2.9	6	0.3	0	0.8	2.8	4.1	6.8	8.4	4.2
Illex	0.2	0.1	0.2	0	0.6	0.5	0.2	0.3	0.2	0.1	0.1	0.1	0	1.0	1.1
Butterfish	0	0.05	0	0	0	0	0	0	0	0	0	0.05	0	0.2	0
Sculpin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny Dog/Dogfish	1.6	1.4	0	2	0	3.3	0	1.0	1.3	1.3	0	1.9	0	0	0
Monkfish/Goosefish	0	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0
Scallop	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0
Four Spot	0	0	0	0	0	0	0	0	0	0	0	0.7	0.9	0	0.1
Shad	0	0	0	0	0.5	0.2	0.7	0	0	0.2	0	0	0	0	0
Lobster	0	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0
Jonah Crab	0	0	0.05	0.05	0	0	0	0	0	0	0	0	0	0.2	0
Rock Crab	0	0	0	0	0.05	0	0	0	0	0.15	0	0	0	0	0.2
Calculated Total	68.7	93.6	148.2	212.4	66.2	94.5	102.0	59.9	198.6	95.8	21.7	19.5	69.8	202.5	125.3
Observer Total															
Reg.Sp.Bycatch (kg)	2.1	4.5	7.0	5.5	1.0	1.1	2.9	23.3	6.0	14.3	1.6	2.7	0.9	5.4	2.4
Reg.Sp.Bycatch %	3.06	4.81	4.72	2.59	1.51	1.16	2.79	38.93	3.02	14.88	7.14	13.58	1.29	2.64	1.92

*EXP Whiting represents an expansion made from the measured sample to the total catch (if necessary).

Table 6 Continued – Catch in Weight per Tow by Species for 39 Tows with a Sweepless Raised Footrope Net with 50 mm Bar Space Grate and 2.5" Diamond Cod End (F/V North Star, Fall 2002)

Species	Tow 16 Wt. kg.	Tow 17 Wt. kg.	Tow 18 Wt. kg.	Tow 19 Wt. kg.	Tow 20 Wt. kg.	Tow 21 Wt. kg.	Tow 22 Wt. kg.	Tow 23 Wt. kg.	Tow 24 Wt. kg.	Tow 25 Wt. kg.	Tow 26 Wt. kg.	Tow 27 Wt. kg.	Tow 28 Wt. kg.
Shrimp	0.01	0.1	0.01	0		0	0	0	0	0.01	1	0	0
Whiting/Silver Hake	40.8	163.9	98.7	21.2	121.5	79.3	96.9	37.6	23.5	34.3	68.7	47.3	47.2
EXP Whiting	40.8	163.9	98.7	21.2	121.5	79.3	96.9	37.6	23.5	34.3	68.7	47.3	47.2
Red Hake (Ling)	5.7	11.9	7.1	0.6	6.5	2.2	1.6	2.0	0.9	4.4	15.7	1.6	2.7
White Hake	0	1.3	1.3	0	3.4	1.5	0.6	1.7	0.7	1.2	2	0.4	0
Redfish	0.5	0.1	0	0		0	0	0	0	0	2.6	0	0
American Plaice	0.4	1.5	0.5	0.2	1	0.2	0.3	0.6	0.6	0.1	0.7	0.2	0.1
Witch Flounder	0	1.6	0.4	0		0	0	0	0	0	0.1	0	0
Windowpane Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0
Winter Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellowtail Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0
Cod	0	0	0.6	0	0	0	0	0	0	0	0	0	0
Haddock	0	0	0	0	0	0	0	0	0	0	0	0	0
Pollock	0	0.5	0	0	0	0	0	0	0	0	0	0	0
Herring	1.2	0.8	0.9	0.4	0.5	12.8	14.4	8.6	0.2	0.7	27.2	2.6	3.2
Alewife	0.4	0.3	3.1	0.1	0.9	4.3	7.4	15.4	5.5	1.9	1.6	2.5	8.4
Illex	0.5	0.5	1.05	0	0.9	1.9	1.4	0.8	2.05	0.3	0.7	0	0.8
Butterfish	0	0	0	0	0	0	0	0.2	0.1	0.1	0.05	0.05	0.3
Sculpin	0	0	0	0	0	0	0	0	0	0	0	0	0
Skate	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny Dog/Dogfish	0.3	0.1	1.3	0	0	0	0.4	3.6	0	0.1	0.3	0	0
Monkfish/Goosefish	0	0.6	0	0	0	0	0	0	0	0	0	0	0
Scallop	0	0.05	0	0	0	0	0	0	0.05	0	0	0.05	0
Four Spot	0.2	0.1	0	0	0	0.1	0.9	1.0	0.1	0.1	0.4	0.7	0.3
Shad	0	0	0	0	0	0.6	0	0	0	0.1	0.3	0	0
Lobster	0	0	0	0	0	0	0	0	0	0	0	0	0
Jonah Crab	0	0	0	0	0	0	0	0	0	0	0	0	0
Rock Crab	0	2.1	0.1	0	0	0	0	0	0	0	0.1	0	0
Calculated Total	50.0	185.4	115.0	22.4	134.5	102.7	123.8	71.3	33.7	43.3	121.4	55.4	62.8
Observer Total													
Reg.Sp.Bycatch (kg)	0.9	4.5	2.8	0.2	4.4	1.6	0.9	2.2	1.3	1.3	5.4	0.6	0.1
Reg.Sp.Bycatch %	1.80	2.43	2.39	0.67	3.24	1.56	0.69	3.09	3.86	3.01	4.45	1.08	0.16

*EXP Whiting represents an expansion made from the measured sample to the total catch (if necessary).

Table 6 Continued – Catch in Weight per Tow by Species for 39 Tows with a Sweepless Raised Footrope Net with 50 mm Bar Space Grate and 2.5" Diamond Cod End (F/V North Star, Fall 2002)

Species	Tow 29 Wt. kg.	Tow 30 Wt. kg.	Tow 31 Wt. kg.	Tow 32 Wt. kg.	Tow 33 Wt. kg.	Tow 34 Wt. kg.	Tow 35 Wt. kg.	Tow 36 Wt. kg.	Tow 37 Wt. kg.	Tow 38 Wt. kg.	Tow 39 Wt. kg.	Sum	Wt./Tow	Std.Dev.
Shrimp	0	0	0	0.05	1.45	0		0	0	0.05	0.05	1.6	0.2	0.454
Whiting/Silver Hake	114.8	56.4	35.7	118.9	36.1	73.9	148	43.2	140	97.2	85.8	949.9	86.4	40.832
EXP Whiting	114.8	56.4	35.7	118.9	36.05	73.9	148	43.2	140	97.2	85.8	949.9	86.4	40.832
Red Hake (Ling)	9.4	1.1	1.2	18.8	24.4	11.2	19.6	9.5	12.2	7.2	11.4	126.0	11.5	7.260
White Hake	2.9	0.3	0	4.8	2.4	2.7	0.5	0.7	0.7	0.7	0.8	16.5	1.5	1.487
Redfish	0	0	0	0	0.2	0	0	0.05	0	0.05	0.05	0.4	0.0	0.060
American Plaice	0.7	0.1	0.5	1.2	0.3	0.3	1.6	0.3	0.5	0.3	1.3	7.0	0.6	0.502
Witch Flounder	0.2	0	0	0.1	1.1	0.1	1.3	0	0.7	0.8	1	5.3	0.5	0.504
Windowpane Flounder	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Winter Flounder	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Yellowtail Flounder	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Cod	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Haddock	0	0	0	0	0	0	0	0	0	0	0.2	0.2	0.0	0.060
Pollock	0	0.3	0	0	0	0.3	0	0	0	0	0	0.6	0.1	0.121
Herring	0.3	8	3.6	0.4	0	1.5	22	32.3	4	3.6	0.5	76.2	6.9	10.530
Alewife	1.3	1.7	1.7	3	0	0.8	1.1	0.5	0.7	1.2	1.0	12.9	1.2	0.787
Illex	1.6	0.6	0.2	1.7	1.6	1.6	2.2	0.7	0.4	0.2	0.9	11.6	1.1	0.691
Butterfish	0.1	0	0.05	0.05	0	0.2	0	0	0.05	0	0	0.5	0.0	0.063
Sculpin	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.0	0.030
Skate	0	0	0	0	0.5	0	0	0	0	0	0	0.5	0.0	0.151
Spiny Dog/Dogfish	0	0	0	0	1.5	0	0	0	0	0	0	1.5	0.1	0.437
Monkfish/Goosefish	0	0	0	0	0	0.3	0	0	0	0	0	0.3	0.0	0.075
Scallop	0.1	0.05	0	0	0	0.05	0.05	0	0	0	0	0.3	0.0	0.034
Four Spot	0.1	0.3	0.7	0	0	0.2	0	0.2	0.5	0.1	0.3	2.4	0.2	0.223
Shad	0.7	0	0	0	0	0	0	0.3	0	0	0	1.0	0.1	0.221
Lobster	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Jonah Crab	0	0	0	0	0.5	0	0	0	0	0	0.05	0.6	0.1	0.150
Rock Crab	0	0.05	0	0	0	0	0.05	0	0.05	0	0	0.2	0.0	0.023
Calculated Total	132.2	68.9	43.7	148.9	69.9	93.1	196.4	87.8	159.8	111.4	103.4	1215.1	110.5	45.243
Observer Total														
Reg.Sp.Bycatch (kg)	3.8	0.4	0.5	6.1	4.0	3.1	3.4	1.1	1.9	1.8	3.4	29.3	2.7	1.722
Reg.Sp.Bycatch %	2.84	0.58	1.15	4.10	5.65	3.33	1.73	1.20	1.16	1.62	3.24	2.42	2.41	

*EXP Whiting represents an expansion made from the measured sample to the total catch (if necessary).

Table 7 Catch in Weight per Trip by Species for Six Trips with a Sweepless Raised Footrope Net with 50 mm Bar Space Grate and 2.5" Diamond Cod End (F/V Tenacious, Fall 2002)

Species	Trip 1 Wt. kg.	Trip 2 Wt. kg.	Trip 3 Wt. kg.	Trip 4 Wt. kg.	Trip 5 Wt. kg.	Trip 6 Wt. kg.	Sum	Wt./Trip	Std.Dev.
Shrimp	0	0	0	0	0.2	0	0.2	0.0	0.082
Whiting/Silver Hake	120.8	181.4	148	130.9	41.2	183.4	805.7	134.3	52.295
EXP Whiting	120.8	181.4	148	130.9	41.2	183.4	805.7	134.3	52.295
Red Hake (Ling)	14.6	8.9	4.9	14.2	12.3	12.85	67.6	11.3	3.722
White Hake	2	0.9	0.2	1.6	1.15	4.7	10.5	1.8	1.572
Redfish	0.1	0	0	0.15	0.05	0.05	0.4	0.1	0.058
American Plaice (Dab)	2.5	1.7	0.45	0.8	2.4	2.95	10.8	1.8	1.000
Gray Sole (Witch Flounder)	0.6	0.2	0.2	1.05	0.85	0.55	3.5	0.6	0.342
Windowpane Flounder (Sand Dab)	0	0	0	0	0	0	0.0	0.0	0.000
Winter Flounder (Blackback)	0.05	0	0	0	0	0	0.1	0.0	0.020
Yellowtail Flounder	0	0	0	0	0	0	0.0	0.0	0.000
Cod	0	0	0	0	0	0	0.0	0.0	0.000
Haddock	0.15	0	0	0	0.55	0.75	1.5	0.2	0.328
Pollock	0.15	0	0	0	0	0.1	0.3	0.0	0.066
Herring	33.4	23.1	110.4	1.1	0	3	170.9	28.5	42.347
Alewife	8.4	11.7	8.7	12.4	4.7	25.6	71.4	11.9	7.224
Illex	1.4	1.8	3.9	3.3	2.2	5.9	18.3	3.1	1.652
Butterfish	1.3	0.3	0.6	0.05	1.25	0.9	4.4	0.7	0.511
Sculpin	0.3	0	0	0	0	0	0.3	0.1	0.122
Skate	0	0	0.6	0	0	0	0.6	0.1	0.245
Spiny Dog/Dogfish	0.3	0	0	0	4.6	60.6	65.5	10.9	24.407
Monkfish/Goosefish	0.8	0	0	0	0	0	0.8	0.1	0.327
Scallop	0.1	0	0	0	0.6	0.05	0.8	0.1	0.236
Four Spot	0.15	0.8	0	0.1	0	5.6	6.7	1.1	2.221
Shad	0.1	0	0	0	0	0	0.1	0.0	0.041
Lobster	0.9	0.15	0	0	0	0	1.1	0.2	0.360
Jonah Crab	0.4	0	0	0	0.05	0	0.5	0.1	0.160
Rock Crab	0	0	0	0	0	0	0.0	0.0	0.000
Calculated Total	188.5	230.7	277.8	165.6	72.1	306.9	1241.5	206.9	84.645
Observer Total									
Reg.Sp.Bycatch (kg)	5.4	2.8	0.9	3.6	5.0	9.0	26.6	4.4	2.774
Reg.Sp.Bycatch %	2.86	1.19	0.31	2.17	6.94	2.93	2.73	2.14	

*EXP Whiting represents an expansion made from the measured sample to the total catch (if necessary).

Table 8 Catch in Weight per Trip by Species for Ten Trips with a Sweepless Raised Footrope Net with 50 mm Bar Space Grate and 2.5" Diamond Cod End (F/V North Star, Fall 2002)

Species	Trip 1 Wt. kg.	Trip 2 Wt. kg.	Trip 3 Wt. kg.	Trip 4 Wt. kg.	Trip 5 Wt. kg.	Trip 6 Wt. kg.	Trip 7 Wt. kg.	Trip 8 Wt. kg.	Trip 9 Wt. kg.	Trip 10 Wt. kg.	Sum	Wt./Trip	Std.Dev.
Shrimp	1	0.05	0.8	3.47	0.12	0	1.01	0	1.5	0.1	8.1	0.8	1.080
Whiting/Silver Hake	424.3	135.1	328.5	213	430.4	335.3	126.5	301.4	228.8	514.2	3037.4	303.7	129.174
EXP Whiting	424.3	135.1	328.5	213	430.4	335.3	126.5	301.4	228.8	514.2	3037.4	303.7	129.174
Red Hake (Ling)	70.8	8.7	52.1	21.3	35.4	12.3	21.0	16.0	54.4	59.9	351.7	35.2	22.429
White Hake	8.7	1.8	12.8	6.9	4.7	7	3.9	3.6	9.9	3.4	62.6	6.3	3.426
Redfish	2.8	0.05	22.4	0	0.6	0	2.6	0	0.2	0.2	28.8	2.9	6.943
American Plaice	3.8	0.3	4.05	2.3	2.8	2	1.4	1.6	1.8	3.9	23.8	2.4	1.244
Witch Flounder	3.8	0	7.2	1.3	2.05	0	0.1	0.2	1.3	3.8	19.7	2.0	2.329
Windowpane Flounder	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Winter Flounder	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Yellowtail Flounder	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.000
Cod	0	0	0	0	0.6	0	0	0	0	0	0.6	0.1	0.190
Haddock	0	0	0	0	0	0	0	0	0	0.2	0.2	0.0	0.063
Pollock	0.7	0	0.2	0.15	0.5	0	0	0.3	0.3	0	2.2	0.2	0.240
Herring	1.0	6.7	14.6	38.05	4.7	36.3	28.05	17.7	1.9	62.4	211.2	21.1	19.946
Alewife	0.4	2.9	7	22.05	8.1	27.9	9	15.6	3.8	4.5	101.1	10.1	8.968
Illex	0.5	1.1	0.8	1.2	3.2	4.8	3.05	3.2	4.8	4.4	26.8	2.7	1.696
Butterfish	0.05	0	0	0.2	0	0.2	0.25	0.5	0.3	0.05	1.5	0.1	0.150
Sculpin	0	0	0	0	0	0	0	0	0	0.1	0.1	0.0	0.032
Skate	0	0	0	0	0	0	0	0	0.5	0	0.5	0.1	0.158
Spiny Dog/Dogfish	5.0	3.3	3.5	1.9	1.7	4	0.4	0	1.5	0	21.1	2.1	1.753
Monkfish/Goosefish	0	0	0.9	0	0.6	0	0	0	0.3	0	1.7	0.2	0.308
Scallop	0.2	0	0	0	0.05	0	0.05	0.2	0.05	0.05	0.6	0.1	0.069
Four Spot	0	0	0	1.6	0.4	2.0	0.6	2.05	0.2	1.1	7.9	0.8	0.818
Shad	0	0.7	0.8	0	0	0.6	0.4	0.7	0	0.3	3.5	0.4	0.334
Lobster	0	0	0.6	0	0	0	0	0	0	0	0.6	0.1	0.174
Jonah Crab	0.1	0	0	0.2	0	0	0	0	0.5	0.05	0.9	0.1	0.160
Rock Crab	0	0.05	0.2	0	2.4	0	0.1	0.05	0	0.1	2.9	0.3	0.745
Calculated Total	522.9	160.7	456.2	313.4	498.1	432.2	199.3	362.9	311.8	658.6	3916.0	391.6	152.511
Observer Total													
Reg.Sp.Bycatch (kg)	19.1	2.1	46.4	10.5	10.7	9.0	8.0	5.4	13.2	11.5	135.7	13.6	12.392
Reg.Sp.Bycatch %	3.65	1.31	10.17	3.33	2.15	2.08	4.01	1.47	4.22	1.74	3.41	3.47	

*EXP Whiting represents an expansion made from the measured sample to the total catch (if necessary).

