APPENDIX II

Habitat Metric Analyses for the Eight Individual Access Options Within Closed Area I, II, and the Nantucket Lightship Closed Area

This appendix provides the habitat metric analyses for the eight individual access options. These individual options have been combined into four packaged alternatives for access for Framework 16/39. For a detailed description of the habitat analyses of the packaged alternatives see Section 6.2.2.2, and for a detailed description of the methods used for the habitat metric analyses see Appendix I. There are six overall metrics: area, substrate, EFH, guild, assemblage and benthic species.

AREA

The size of each access area is described in the last column to the right in Table 1. The individual access options range from 200 square nautical miles (A13/FW13 CAI Combo) to 1,818 square nautical miles (A13 CAII).

ACCESS ALTERNATIVES		AREA (square nautical miles)
Closed Area I	FW13 Access Area	357
	A13 Access Area	415
	A13/FW13 Combo	200
Nantucket Lightship	FW13 Access Area	330
	A13 Access Area (both areas)	1136
	A13 Access Area (east portion only)	683
Closed Area II	FW13 Access Area	1124
	A13 Access Area	1818

Table 1 - Area of individual access options in square nautical miles (nm^2)

SUBSTRATE

Table 2 describes the substrate types found within each access alternative based on the USGS substrate database. The percent composition of each sediment type within each alternative is described as well. The sediment compositions of most of the individual access options are very similar; each is made up of primarily sand followed by gravely sand and a small amount of gravel. A13 NLSP access option is the only option with reported muddy sand and mud substrates.

Access Alternatives		Bedrock	Gravel	Gravely Sand	Sand	Muddy Sand	Mud
CA I	**FW 13**	0	5 (2%)	176 (49%)	179 (49%)	0	0
	A 13	0	21 (5%)	293 (70%)	104 (25%)	0	0
	A13/FW13 Combo	0	5 (3%)	113 (56%)	83 (41%)	0	0
NLSP	**FW 13**	0	4 (1%)	155 (46%)	174 (53%)	0	0
	A13 (both portions)	0	4 (0%)	213 (19%)	755 (66%)	155 (14%)	16 (1%)
	A 13 (eastern portion)	0	4 (1%)	155 (22%)	528 (77%)	0	0
CA II	**FW 13**	0	4 (0%)	47 (4%)	1083 (96%)	0	0
	A 13	0	4 (0%)	171 (9%)	1655 (91%)	0	0

Table 2 - Substrate contained in each access area in square nautical miles and percent composition of each area *(based on Poppe et al 1989)*

EFH

Twenty-three species have been identified as having EFH for at least one life stage moderately or highly vulnerable to the effects of bottom-tending mobile gear (see Gear Effects Evaluation and Adverse Impact Determination in Amendment 10 to the Scallop FMP). In order to evaluate the access areas in terms of what EFH will become available to scallop fishing for limited access programs, the EFH area of

each species with EFH vulnerable to bottom tending gear has been evaluated. The EFH area contained in an access alternative is calculated by summing the geographic area (in square nautical miles) of the ten-minute squares of latitude and longitude (or portions thereof) that are designated as EFH for each species and life stages that is bounded by each proposed closure. Geographic EFH designations are defined in the Omnibus EFH Amendment (NEFMC 1998) and in several species FMPs adopted by the NEFMC and MAFMC. Table 3 summarizes the total and percent-of-total EFH area in the Northwest Atlantic Analysis Area (NAAA) for each of the vulnerable species and life stages (A= Adults, J= Juveniles and E= Eggs) encompassed by each of the access alternatives. The total EFH area for each of these species and life stages is shown in the first column. The sum of EFH area values for all species and life stages in each access alternative and the percent that each alternative makes up the total EFH in the entire NAAA (sum of column 1) are shown at the bottom of the table (Sum of Vuln. EFH in each alternative / Total EFH Area). The last row of this table is the sum of EFH area in each alternative divided by the total area of the alternative, a scaled for area value of EFH area. This is the only scaled for area value in the table.

Overall, none of the individual access options contain a significant portion of the total EFH area for the entire region. A13 CAII option contains the most EFH area, as compared to the other individual access options (about 3.3% of the total EFH area for all species with vulnerable EFH), while A13 CAI Combo option contains the least. When the EFH values are scaled for area, FW13 CAI (24.1) contains the most EFH per-unit-of area, while A13 NL Both option and A13 NL East option rank the lowest (13.1 for both options). The scaled for area EFH value is a measure of relative effectiveness, the higher the value, the more effective that option is at protecting EFH per unit of area. Most of the individual access options contain EFH for species with EFH vulnerable to bottom tending gear, except for species like black sea bass, Rosette skate, tilefish and Witch flounder. Many EFH designations are in every ten-minute square within an individual option; for example, FW13 CAI option has cod A, haddock A, ocean pout A and E, red hake J, Little skate A and J, and Winter skate J designated in all areas within the option (value over 357nm2) 1.

Total EFH Area	Species with EFH Vulnerable to Bottom Tending Gear	FW13 CAI	FW13 CAII	FW NLSP	A13 CAI	A13 CAI Combo	A13 CAII	A13 NL Both	A13 NL East
		357	1124	330	415	200	1818	1136	683
13449	Black sea bass_A	0	0	0	0	0	0	78	0
13503	Black sea bass_J	0	0	0	0	0	0	77	0
22076	Cod_A	360	787	192	418	201	1416	225	225
12968	Cod_J	109	540	77	167	49	1016	152	151
15664	Haddock_A	360	837	192	418	201	1465	225	225
13746	Haddock_J	347	982	154	300	188	1340	304	304
5625	Halibut_A	186	1	0	180	141	75	0	0
5625	Halibut_J	186	1	0	180	141	75	0	0
17891	American plaice_A	200	80	0	67	67	362	0	0
15427	American plaice_J	200	0	0	67	67	45	0	0
14624	Pollock_A	149	82	43	120	36	128	75	75
28685	Ocean Pout A	360	841	257	418	201	1445	909	457
32867	Ocean pout_E	360	841	257	418	201	1445	909	457
18435	Ocean pout_J	86	246	61	156	39	333	304	153

1 Any EFH area value in square nautical miles greater than the total size of the access option is a result of the rounding function of the analysis tool.

21241	Redfish_A	288	0	0	144	142	122	0	0
22009	Redfish_J	144	20	0	47	47	137	76	0
37038	Red hake_A	323	535	1	205	165	593	614	233
43285	Red hake_J	360	831	154	391	201	1340	836	460
20768	Scup_J	0	0	150	0	0	0	299	150
2345	SkateBarndoor_A	0	76	119	0	0	150	229	229
11264	SkateBarndoor_J	323	679	212	220	165	1049	685	383
14232	SkateClearnose_A	87	0	0	21	21	46	0	0
16449	SkateClearnose_J	87	0	0	21	21	0	0	0
36449	SkateLittle_A	359	1136	332	418	201	1790	1141	686
50044	SkateLittle_J	360	1136	332	418	201	1790	1142	687
624	SkateRosette_A	0	0	0	0	0	0	0	0
7903	SkateRosette_J	0	0	0	0	0	0	1	1
11039	SkateSmooth_A	247	85	0	129	90	161	0	0
20929	SkateSmooth_J	247	70	75	129	90	146	150	75
18193	SkateThorny_A	323	0	0	205	165	2	0	0
26586	SkateThorny_J	336	529	136	326	177	1009	303	153
25769	SkateWinter_A	341	1118	332	418	201	1817	836	686
39452	SkateWinter_J	360	1136	332	418	201	1835	1138	686
1466	Tilefish_A	0	0	0	0	0	0	1	0
2852	Tilefish_J	0	0	0	0	0	0	0	0
47268	Silver hake_J	346	829	257	300	188	1367	1064	611
21884	White hake_J	288	447	75	144	142	725	305	154
19285	Winter flounder_A	273	156	192	397	180	797	526	225
19847	Witch flounder_A	0	0	0	0	0	46	230	77
15489	Witch flounder_J	0	0	0	0	0	0	0	0
23102	Yellowtail flounder_A	341	1136	332	418	201	1716	1137	685
20199	Yellowtail flounder_J	260	1060	332	294	168	1342	908	684
827,595	Sum of Vuln. EFH (nm2)	8593	16217	4597	7968	4497	27128	14883	8915
	Sum of Vuln. EFH in each Alternative / Total EFH area	1.0%	2.0%	0.6%	1.0%	0.5%	3.3%	1.8%	1.1%
	Sum of Vuln. EFH in each Alternative / Area of each Alternative	24.1	14.4	13.9	19.2	22.5	14.9	13.1	13.1

Table 3 - Total and percent of total EFH area for species with EFH identified as vulnerable to bottom-tending gear. ***Values are not scaled for area, except for last row of table.***

GUILD

Table 4 describes the total and percent-of-total biomass for each guild that is contained within each access area. Biomass is measured as the sum of the mean wt (kg) per tow from the 1995-2001 bottom trawl surveys for each ten-minute square (or fraction thereof) included within each closure area.

In general, the access areas contain about the same amount of the various guilds. The access areas in the Nantucket Lightship and Closed Area II contain significantly more biomass of the amphipod (shrimp) eating guild. The access areas in Closed Area I and Closed Area II contain significantly more benthivore biomass than the access areas in the Nantucket Lightship closed area.

Access Alternatives		Ampshr	Benthic	Pisc	Plank	Shrfis
CA I	FW 13	24	336	10	151	5
	A 13	27	157	12	125	2
	A13/FW13 Combo	11	129	5	84	1
NLSP	FW 13	107	23	17	25	0
	A13 (both portions)	305	59	68	206	0
	A 13 (eastern portion)	238	49	33	105	0
CA II	FW 13	240	240	66	127	2
	A 13	316	441	81	244	7

Table 4 - Total biomass for each guild within each access alternative. *Values not scaled for area. Benthic = benthivore; Ampshr = amphipod/shrimp eater; Plankt = planktivore; Pisc = piscivore; Shrfis = shrimp/fish eater*

ASSEMBLAGE

Table 5 describes the total and percent-of-total biomass for each species assemblage that is contained within each closure alternative. Biomass is measured as the sum of the mean wt (kg) per tow from the 1995-2001 bottom trawl surveys for each ten-minute square (or fraction thereof) included within each closure area. In general, the larger alternatives contain more biomass of each assemblage; for example, A13 NL Both option contains significantly more biomass of the elasmobranch assemblage than the other access options. FW13 CAII option and A13 CA2 option contain significantly more biomass of species in the principle groundfish assemblage than the other access options.

Access Alternatives		Elasmo	Pringrd	Prinpel	Demersal	Pelagic
CA I	FW 13	173	433	78	1659	156
	A 13	238	257	46	535	132
	A13/FW13 Combo	93	183	36	295	88
NLSP	FW 13	660	140	11	848	28
	A13 (both portions)	2245	360	162	2810	211
	A 13 (eastern portion)	1087	307	84	1506	108
CA II	FW 13	1491	1000	91	2727	130
	A 13	2044	1371	98	3723	251

Table 5 - Total and percent-of-total biomass for each assemblage within each access alternative. *Values not scaled for area Elasmo = elasmobranch, Pringrd = principle groundfish, Prinpel = principle pelagic species*

SPECIES

Six species (longhorn sculpin, sea raven, redfish, ocean pout, jonah crab and American lobster) were chosen for their close association with benthic habitats for both feeding and protection from predators (see Appendix I for spatial distribution of these species). Table 6 describes the total biomass for each species that is contained within each access alternative. Biomass is measured as the sum of the mean wt (kg) per tow from the 1995-2001 bottom trawl surveys for each ten-minute square (or fraction there) included within each alternative. Essentially no redfish or jonah crab biomass is found within any of the access options. However, a significant portion of sculpin and lobster biomass is found within both access options for Closed Area II.

Access Alternatives	Redfish	Sculpin	SeaRaven	OcPout	Lobster	JonahCrb

CA I	**FW 13**	1	18	4	6	5	0
	A 13	0	13	6	4	7	0
	A13/FW13 Combo	0	6	3	2	4	0
NLSP	**FW 13**	0	17	8	13	1	0
	A13 (both portions)	0	86	17	35	1	5
	A 13 (eastern portion)	0	43	14	32	1	1
CA II	**FW 13**	0	105	45	58	21	1
	A 13	3	149	53	61	44	1

Table 6 - Total biomass for each species within each closed area alternative. ***Values not scaled for area.***