

**APPENDIX C:  
SUPPLEMENTARY MATERIAL FOR CHAPTER 2**

Table S.1: Indicators selected for analysis, with corresponding acronyms (where applicable), potential DPSIR category (or categories), definition, and data source. Indicators are organized alphabetically within each category.

INDICATOR	DPSIR CAT(S)	DEFINITION	DATA SOURCE
<b>Community Indicators</b>			
Abundance	S	Index of total number of individuals in fish community	DFO <sup>1</sup> BTS <sup>2</sup>
Biomass, Total	S	Index of total fish biomass in community	DFO BTS
Large Benthivore (Lbenth)	S	Biomass index of American plaice, haddock, skates, etc.	DFO BTS
Medium Benthivore (Mbenth)	S	Biomass index of blue hake, yellowtail flounder, witch flounder, etc.	DFO BTS
Small Benthivore (Sbenth)	S	Biomass index of Arctic sculpins, roughnose grenadiers, etc.	DFO BTS
Piscivore (Pisc)	S	Biomass index of Atlantic cod, pollock, silver hake, etc.	DFO BTS
Planktivore (Plank)	S	Biomass index of capelin, herring, mackerel, etc.	DFO BTS
Plank-Piscivore (PP)	S	Biomass index of longfin hake, redfish, etc.	DFO BTS
Shellfish (Shell)	S	Biomass index of shrimp and snow crab	DFO BTS
Length	S	Mean length of fish in community, weighted by species biomass	DFO BTS
Marine Trophic Index, Community (MTI <sub>Comm</sub> )	S	Mean trophic level of surveyed species with trophic level $\geq 3.25$ , weighted by species biomass	DFO BTS
Pielou Evenness ( <i>J</i> )	S	Index of community evenness	DFO BTS
Proportion of Predators <sup>9</sup> (PPred)	S	Proportion of species that have trophic level greater than 3.7	DFO BTS
Shannon Diversity ( <i>H</i> )	S	Index of community biodiversity	DFO BTS
Trophic Level, Community (TL <sub>Comm</sub> )	S	Mean trophic level of community, weighted by species biomass	DFO BTS

<b>Human Indicators</b>			
Fishing Index	P, I	Fraction of total community biomass removed by fishing	DFO, NAFO <sup>3</sup>
Household Income	D, I	Real household disposable income per capita (2002 dollars) for Newfoundland and Labrador	<sup>4</sup> Stats Can
Human Population	D, I	Number of people living in Newfoundland and Labrador	Stats Can
Landings, Total	P, I	Fisheries landings of all species from NAFO area 3LNO; also grouped into commercially similar aggregates	NAFO
Groundfish	P, I	Landings of cod, haddock, yellowtail flounder, etc.	NAFO
Pelagic (Pel)	P, I	Landings of Atlantic Herring, capelin, tunas, etc.	NAFO
Shellfish	P, I	Landings of American lobster, clams, shrimp, etc.	NAFO
Other	P, I	Landings of elasmobranches and other groups	NAFO
Marine Trophic Index, Landings (MTI <sub>Land</sub> )	P, I	Mean trophic level of landed species with trophic level $\geq 3.25$ ; weighted by tonnes of each species landed	DFO, NAFO
Trophic Level, Landings (TL <sub>Land</sub> )	P, I	Mean trophic level weighted by tonnes of landed species	DFO, NAFO

INDICATOR	DPSIR CAT(S)	DEFINITION	DATA SOURCE
<b>Environmental Indicators</b>			
Area of sea ice (Area <sub>Ice</sub> )	P	Area of sea ice south of 55 °N	DFO
Atlantic Multidecadal Oscillation (AMO)	D	Index of sea surface temperature variability in the North Atlantic	<sup>5</sup> NOAA ESRL
Composite Env. Index (CEI)	P	Index of environmental indicators in the Northwest Atlantic	DFO
Latitude of sea ice (Lat <sub>Ice</sub> )	P	Southernmost latitude of sea ice	DFO
North Atlantic Oscillation (NAO)	D	Dominant pattern of atmospheric circulation in the North Atlantic	<sup>6</sup> NCAR
Salinity (S0, S75, S150)	P	Average salinity recorded at Station 27 at three depths (surface, 75 m, 150 m)	DFO
Stratification	P	Difference in density at 5 m and 50 m	DFO
Temperature (T0, T75, T150)	P	Average temperature recorded at Station 27 at three depths (surface, 75 m, 150 m)	DFO
Temperature at Fishing (T <sub>Fish</sub> )	P	Temperature at fishing depth	DFO BTS
Timing of Sea Ice Melt (Time <sub>Ice</sub> )	P	Index of timing of the sea ice melt	DFO

<sup>1</sup>DFO BTS = Fisheries and Oceans Canada; <sup>2</sup>Bottom trawl survey; <sup>3</sup>Northwest Atlantic Fisheries Organization STATLANT 21A database; <sup>4</sup>Stats Can = Statistics Canada CANSIM database; <sup>5</sup>NOAA ESRL = National Oceanic and Atmospheric Administration Earth System Research Laboratory; <sup>6</sup>NCAR = National Center for Atmospheric Research: The Climate Data Guide; <sup>9</sup>Predator is defined as any species with a trophic level greater than 3.7 (Koen-Alonso et al, 2010).

Table S.2: All species included in each community functional group, as assigned by Fisheries and Oceans Canada

Large Benthivores	Medium Benthivores	Small Benthivores	Piscivores	Plank-piscivores	Planktivores	Shellfish
AMERICAN PLAICE	BLENNIES (NS)	ALLIGATORFISH (NS)	VIPERFISH	BEARDFISHES (NS)	ARGENTINE,ATLANTIC	CRAB, SNOW OR QUEEN
ANGLER,COMMON(MONKFISH)	DUCKBILL EEL	ALLIGATORFISH,ARCTIC	TURBOT	COD,ARCTIC	ARGENTINES (NS)	SHRIMP PAND.BOR.
CHIMAERA,DEEPWATER	EELPOUT (NS)	ALLIGATORFISH,COMMON	SHARKS,MACKEREL (NS)	GULPER,PELICAN	BILLFISH	SHRIMP PAND.MON.
CHIMAERA,LONGNOSE	EELPOUT,ARCTIC	ALLIGATORFISH,NORTHERN	SHARK,PORTUGUESE	HAKE,LONGFIN	CAPELIN	
CHIMAERAS (NS)	EELPOUT,ESMARK'S	ANGLEMOUTHS (NS)	SHARK,GREENLAND	REDFISH, DEEP WATER	HERRING,ATLANTIC	
CUSK	EELPOUT,VAHL'S	ATLANTIC GYMNAST	SCABBARDFISH,BLACK	REDFISH,GOLDEN(MARINUS)	HERRING,BLACK	
DEEPSEA ANGLER,BIG	FISH DOCTOR (GREEN OCEAN	BATFISH,ATLANTIC	POLLOCK	ROCKFISHES (NS)	LANTERNFISHES (NS)	
GRENADIER,ROUGHHEAD	FLOUNDER,WINTER	BIGSCALEFISHES, RIDGEHEADS	LANCETFISH,LONGNOSE	SCOPELOSAURUS (NS)	MACKEREL,ATLANTIC	
HADDOCK	GRENADIER,LONGNOSE	BLACK SWALLOWER	HALIBUT (ATLANTIC)	SEASNAIL (NS) CAR.SP.	RONDELETIIDAE	
HAGFISH, ATLANTIC	GRENADIER,ROUNDNOSE	BLACKSMELT,GOITRE	HAKE,WHITE (COMMON)		SAND LAUNCE,OFFSHORE	
POUT,OCEAN (COMMON)	HAKE,BLUE	BLACKSMELTS (NS)	HAKE,SILVER		SHANNY,RADIATED	
SEA DEVILS (NS)	HAKE,RED (SQUIRREL)	BUTTERFISH (NS)	HAKE,OFFSHORE SILVER		STICKLEBACK,FOURSPINE	
SKATE, WINTER (SPOTTED)	LIPOGENYS	CARDINALFISH,SHERBORN'S	HAKE (NS) MER.SP.		STICKLEBACK,THREESPINE	
SKATE,JENSEN'S	LONGNOSE EEL	DEEPSEA SCULPIN,PALLID	GULPER (NCN) SAC.AMP.		STICKLEBACKS (NS)	
SKATE,SPINYTAIL	LUMPFISH,COMMON	DEEPSEA SCULPIN,POLAR	GREENEYE,LONGNOSE			
SKATE,THORNY	MORA (NCN) HAL.AFF.	EELPOUT,SOFT	GADOIDS (NS)			
SKATES (NS) RAJA SP.	MORA (NCN) HAL.JOH.	FANGTOOTH (Ogrefish) Ana	DRAGONFISHES,SCALED (NS)			
SMOOTHHEADS (NS)	MORAS	FOURBEARD ROCKLING	DRAGONFISH,BOA			
SNIPE EEL,ATLANTIC	SCULPIN,FOURHORN	FOURLINE SNAKEBLENNY	DOGFISH,SPINY			
SPINY EELS (NS)	SCULPIN,LONGHORN	GRENADIER,COMMON (MARLIN	DOGFISH,BLACK			
STURGEON,ATLANTIC	SCULPIN,SHORTHORN	GRENADIER,ROUGHNOSE	DAGGERTOOTH			
TAPIRFISH,LARGE SCALE	SEA RAVEN	GRENADIERS (NS)	COD,GREENLAND (ROCK)			
WOLFFISH,BROADHEAD	SHARK,DEEPSEA CAT	GRUBBY	COD,ATLANTIC			
WOLFFISH,SPOTTED	SKATE,DEEPWATER (ROUND)	GUNNELS (NS)	BARRACUDINAS (NS)			
WOLFFISH,STRIPED	SKATE,LITTLE	HATCHETFISHES (NS)	ANGLERS			
WOLFFISHES (NS)	SKATE,SMOOTH	HOOKEAR SCULPIN (NS)				
WRYMOUTH	SKATE,SOFT	LEPIDION (NCN)				
	SNAKE BLENNY	LIGHTFISHES (NS)				
	SNIPE EEL,SHORTNOSE	LOOSEJAW				
	SNUBNOSE EEL	LUMPFISH (NS) EUM.SP.				
	WHITING,BLUE	MAILED SCULPINS (NS)				
	WITCH FLOUNDER	MANEFISH, ATLANTIC				
	YELLOWTAIL FLOUNDER	SCULPIN, ARCTIC				
		SCULPIN,ARCTIC STAGHORN				
		SCULPIN,SPATULATE				
		SCULPINS (NS)				
		SEA DEVIL, WARTED				
		SEASNAILS (NS)				
		SHANNY,DAUBED				
		SMELTS, DEEPSEA (NS)				
		TAPIRFISH, SHORTSPINE				
		THREEBEARD ROCKLING (NS)				
		TWOHORN SCULPIN (NS)				
		WOLF EEL (NS)				

Table S.3: All species included in each commercial aggregate group.

Groundfish	Flounder	Pelagics	Shellfish	Others
American Angler	American Plaice	Albacore Tuna	Aesop Shrimp	(northern) Shortfin Squid
Atlantic Cod	Atlantic Halibut	Atlantic Herring	American Lobster	American Conger
Atlantic Redfishes (ns)	Greenland Halibut	Atlantic Mackerel	Atlantic Rock Crab	American Eel
Atlantic Wolffish	Winter Flounder	Bigeye Tuna	Bay Scallop	Arctic Rockling
Beaked Redfish(deep-water)	Witch Flounder	Capelin	Blue Mussel	Argentines (ns)
Blue Antimora	Yellowtail Flounder	Northern Bluefin Tuna	Clams (ns)	Atlantic Blue Marlin
Cusk (tusk)		Pelagic Fishes (ns)	Hard Clam	Atlantic Hagefish
Golden Redfish		Tunas (ns)	Icelandic Scallop	Atlantic Salmon
Greenland Cod		Yellowfin Tuna	Marine Crabs (ns)	Atlantic White Marlin
Groundfishes (ns)			Marine Invertebrates (ns)	Baird's Slickhead
Haddock			Marine Molluscs (ns)	Bay Anchovy
Longfin Hake			Northern Prawn	Black Dogfish
Lumpfish (lumpsucker)			Ocean Quahog	Blue Ling
Polar Cod			Pink (=pandalid) Shrimps	Boreal (greenland) Shark
Pollock (saithe)			Queen Crab	Chars (ns)
Red Hake			Sea Scallop	Dogfishes (ns)
Sandeels (sandlances)			Sea Urchin	Eelpouts (ns)
Sculpins (ns)			Stimpson's Surf Clam	Finfishes (ns)
Silver Hake			Stone King Crab	Flatfishes (ns)
Spotted Wolffish			Surf Clam	Forkbeards (ns)
White Hake			Whelks (ns)	Great Blue Shark
Wolffishes (catfish) (ns)				Lampfishes (ns)
				Large Sharks (ns)
				Ling
				Little Tunny
				Longfin Squid
				Mahi Mahi (dolphinfish)
				Mulletts (ns)
				Northern Puffer
				Northern Wolffish
				Porbeagle
				Rainbow Smelt
				Rays Stingrays Mantas (ns)
				Roughhead Grenadier
				Roundnose Grenadier
				Sailfish
				Shortfin Mako Shark
				Skates (ns)
				Spiny (=picked) Dogfish
				Squids (ns)
				Swordfish
				Threebeard Rockling
				Trouts (ns)

## Grand Bank indicator suite (calculated and synthesized for this manuscript)

Table S.4: Community indicators for the Before time period. See Table S.1 for definitions and data sources.

Year	Abund (# in millions)	Biomass (tonnes)	Lbenth (tonnes)	Mbenth (tonnes)	Sbenth (tonnes)	Pisc (tonnes)	PP (tonnes)	Plank (tonnes)	Shell (tonnes)	Length (cm)	MTI_Comm	Pielou Evenness (J)	PPred	Shannon Index (H)	TL_Comm
1985	1735	1185736	466118	134154	709	470981	109139	4636	0	49.32	3.93	0.43	0.50	1.83	3.86
1986	2694	1065932	394826	121428	231	443351	70537	35558	0	50.08	3.95	0.45	0.49	1.82	3.84
1987	2070	1278163	429475	114980	332	677154	35615	20607	0	49.46	4.00	0.39	0.56	1.58	3.92
1988	1455	1003365	430025	86190	117	455637	26989	4408	0	54.36	3.93	0.44	0.49	1.72	3.88
1989	1296	778961	328773	75435	117	355036	12139	7461	0	53.43	3.93	0.42	0.48	1.62	3.87
1990	1779	807290	257662	78101	245	389066	65436	16781	0	51.25	4.00	0.44	0.57	1.71	3.91
1991	759	409312	161526	76870	750	152736	13885	3546	0	47.51	3.90	0.45	0.42	1.92	3.77
1992	508	238215	92943	47486	915	83040	12613	1217	0	47.35	3.88	0.49	0.41	2.06	3.75
1993	1265	306395	82551	71465	778	83007	54854	13740	0	38.03	3.94	0.51	0.47	2.10	3.73
1994	844	221063	64660	48726	622	29056	77018	980	0	42.51	3.89	0.50	0.50	2.14	3.74
1995	1207	197462	39704	49356	703	17771	87469	1949	510	34.02	3.96	0.43	0.54	1.79	3.73

Table S.5: Full time series of community indicators. Engels data (1985 – 1995) have been scaled to Campelen equivalents where appropriate. See Table S.1 for definitions and data sources.

Year	Abund (# in millions)	Biomass (tonnes)	Lbenth (tonnes)	Mbenth (tonnes)	Sbenth (tonnes)	Pisc (tonnes)	PP (tonnes)	Plank (tonnes)	Shell (tonnes)	Length (cm)	MTI_Comm	Pielou Evenness (J)	PPred	Shannon Index (H)	TL_Comm
1985	-	3618342	1435643	266966	6498	1398812	335057	175365	0	-	3.93	0.54	0.48	1.89	3.85
1986	-	4338274	1216064	241642	2117	1316753	216549	1345149	0	-	3.94	0.52	0.36	1.83	3.65
1987	-	4454676	1322784	228810	3042	2011148	109338	779555	0	-	4.00	0.46	0.48	1.71	3.81
1988	-	3099905	1324476	171519	1069	1353242	82855	166745	0	-	3.93	0.48	0.47	1.77	3.85
1989	-	2537792	1012620	150115	1075	1054457	37267	282258	0	-	3.93	0.43	0.44	1.71	3.80
1990	-	2942487	793597	155422	2241	1155526	200889	634812	0	-	3.99	0.45	0.46	1.79	3.76
1991	-	1287718	497499	152971	6869	453626	42626	134126	0	-	3.89	0.50	0.39	2.02	3.74
1992	-	720537	286264	94498	8384	246629	38722	46039	0	-	3.87	0.54	0.41	2.17	3.75
1993	-	1338302	254256	142215	7131	246531	168403	519765	0	-	3.91	0.49	0.32	2.01	3.54
1994	-	661650	199154	96964	5700	86298	236444	37091	0	-	3.89	0.55	0.50	2.24	3.75
1995	-	624168	122289	98219	6437	52780	268529	73737	2177	-	3.95	0.48	0.52	1.96	3.72
1996	27840	900070	169915	197732	21227	46768	139168	256720	61895	23.92	3.67	0.58	0.20	2.42	3.37
1997	10438	615384	192249	192825	13316	51660	33595	86714	42609	31.04	3.66	0.67	0.15	2.53	3.35
1998	45545	1293617	186566	217199	15683	140048	220863	438030	73045	25.68	3.70	0.56	0.28	2.32	3.46
1999	36571	1411968	315651	396186	17154	129630	198230	222216	132886	28.32	3.74	0.57	0.23	2.47	3.39
2000	50249	1221153	273557	308817	14851	157147	178348	144265	144169	28.57	3.81	0.60	0.27	2.49	3.41
2001	47900	1280886	346989	399042	10392	96989	76612	225295	125554	28.54	3.65	0.59	0.13	2.40	3.30
2002	47136	795704	209365	206438	7667	47622	55686	92304	173508	25.82	3.67	0.61	0.13	2.40	3.21
2003	68574	1260872	272952	427504	12532	68921	61644	197270	220035	26.47	3.63	0.58	0.10	2.30	3.20
2004	65366	1483429	251018	338866	8846	54691	166998	550800	112104	24.47	3.62	0.55	0.15	2.28	3.31
2005	57026	1512579	365758	419987	16161	69193	129920	328486	182881	26.61	3.68	0.55	0.14	2.38	3.28
2006	54077	1429873	363152	535538	13090	92834	36898	196148	192209	28.51	3.67	0.51	0.09	2.20	3.22
2007	76339	1891762	442724	491753	12710	132776	313723	200313	297761	31.07	3.80	0.57	0.25	2.43	3.36
2008	82871	1859341	390542	497388	12579	88667	216627	391293	262242	25.65	3.74	0.53	0.17	2.32	3.28
2009	49934	1360573	262735	304565	8776	208793	276107	172766	126832	28.31	3.86	0.52	0.36	2.41	3.52
2010	57346	1588052	324717	427736	10983	82828	312244	272868	156675	26.57	3.82	0.51	0.25	2.36	3.39
2011	45194	1566953	279470	453349	10262	116264	380577	214652	112379	26.96	3.87	0.49	0.32	2.29	3.46
2012	59589	2140100	324448	533757	8821	166483	559325	438504	108763	27.04	3.91	0.48	0.34	2.24	3.49
2013	39798	1874703	420076	451890	11079	220240	346549	356189	68679	30.07	3.86	0.50	0.31	2.34	3.51

Table S.6: Time series of human indicators. See Table S.1 for definitions and data sources.

Year	Fishing Index	HH Income (2002 dollars)	Human Population (x10 <sup>5</sup> )	Total Landings (tonnes)	Ground (tonnes)	Pel (tonnes)	Shell <sub>Land</sub> (tonnes)	Other (tonnes)	MTI <sub>Land</sub>	TL <sub>Land</sub>
1975	-	10747	55.4	439599	242003	180535	1521	18262	3.99	3.60
1976	-	10999	56.1	394215	218607	161342	2558	12974	3.96	3.61
1977	-	11543	56.4	325119	195974	96663	3661	30659	3.90	3.66
1978	-	11633	56.7	269447	183383	49737	7033	31165	3.88	3.70
1979	-	11954	56.9	325703	221934	36407	10576	57845	3.87	3.74
1980	-	11620	57.2	270514	206390	26417	9049	30071	3.94	3.80
1981	-	11590	57.4	283337	221773	34648	13109	15547	4.00	3.79
1982	-	11836	57.3	280773	234399	28254	11226	7707	4.06	3.84
1983	-	11314	57.8	263691	222992	29054	6530	6435	4.10	3.91
1984	-	11557	58	280512	232123	34742	4733	10940	4.09	3.89
1985	0.090	11914	57.9	325470	271094	31337	2912	30849	4.04	3.88
1986	0.102	12293	57.7	440687	360340	54801	3755	36138	4.06	3.88
1987	0.090	13280	57.6	399245	339473	30181	3403	44695	4.03	3.92
1988	0.137	14178	57.5	424689	317977	73911	5842	45765	4.07	3.86
1989	0.150	14585	57.6	381010	285159	67866	7672	34627	4.08	3.86
1990	0.123	14747	57.7	363288	245009	77217	17299	38554	4.10	3.78
1991	0.233	14598	57.8	300638	218971	32179	13985	63932	4.06	3.85
1992	0.247	14758	58	178102	137618	8008	19490	18140	4.01	3.73
1993	0.132	14781	58	177296	105549	27084	32962	17808	4.00	3.51
1994	0.150	15131	57.6	99382	49158	3673	34211	20521	4.01	3.37
1995	0.106	14996	56.9	66151	18061	2047	35809	17663	3.93	2.97
1996	0.103	14842	56.2	92996	26942	18488	35046	18852	3.92	3.09
1997	0.152	14675	55.3	93734	25490	6508	36061	38038	3.82	3.17
1998	0.080	15079	54.2	103376	39230	20504	27394	26270	3.97	3.32
1999	0.083	15939	53.4	117287	50203	12703	37331	29381	4.00	3.30
2000	0.108	16336	53	131421	57243	13130	36779	42846	3.99	3.35
2001	0.121	17054	52.3	154893	74699	14403	44349	36891	4.00	3.33
2002	0.188	17412	52	149819	75218	9459	48121	29161	3.95	3.29
2003	0.136	17648	51.9	172038	77603	13871	61155	34223	3.96	3.21
2004	0.087	17710	51.8	129315	40180	16692	53874	30721	3.91	3.04
2005	0.087	17943	51.5	131049	44211	23144	54546	12930	3.89	3.05
2006	0.094	22777	51.1	134992	27953	25943	69774	17068	3.88	2.98
2007	0.063	22252	50.9	119330	26992	30382	55012	13185	3.89	3.05
2008	0.062	21317	51.1	115932	32258	18358	56723	16117	3.94	2.97
2009	0.080	22436	51.5	109267	27083	17279	57778	12934	3.93	2.96
2010	0.069	22681	52.1	108919	33251	15241	52706	14434	4.00	3.02
2011	0.064	23206	52.4	100034	32140	12934	47255	14228	4.05	3.07
2012	0.044	24199	52.6	95139	28060	13959	44405	15057	4.04	3.09
2013	0.059	25112	52.8	109672	40738	16774	43527	16490	4.03	3.15

Table S.7: Time series of environmental indicators. See Table S.1 for definitions and data sources.

Year	Area <sub>ice</sub> (km <sup>2</sup> )	AMO	CEI	Lat <sub>ice</sub>	NAO	S0 (PSU)	S75 (PSU)	S150 (PSU)	STRAT (Index)	T0 (°C)	T75 (°C)	T150 (°C)	T <sub>Fish</sub> (Index)	Time <sub>ice</sub> (Index)
1975	420.7	-1.55	1.5	44.91	0.69	31.61	32.50	33.05	-2.31	4.25	-0.18	-1.07	-0.79	71
1976	416.1	-1.88	7.57	46.02	0.82	32.01	32.43	33.02	-5.69	4.42	-0.11	-1.03	-0.01	72
1977	280.3	-0.98	4.37	46.21	-1.52	31.59	32.55	33.07	-2.15	4.57	-0.53	-1.20	-2.07	86
1978	190.6	-0.93	11.84	47.33	-1.04	31.81	32.65	33.08	-3.06	4.41	-0.62	-0.93	0.99	71
1979	285.2	-0.57	15.87	46.21	-1.81	31.87	32.61	33.18	-4.69	5.12	-0.22	-0.97	0.78	56
1980	315.4	-0.10	8.14	44.70	-0.29	31.77	32.58	33.17	-6.19	4.66	-0.16	-0.99	-0.50	66
1981	226.6	-0.40	15.29	48.18	0.71	31.84	32.45	33.05	-1.14	5.17	0.06	-0.94	1.12	48
1982	242.7	-1.10	-4.15	47.27	-0.83	31.81	32.53	33.07	-4.26	4.46	0.36	-1.05	-1.68	56
1983	263.8	-0.37	-18.24	45.79	1.01	31.38	32.55	33.00	0.37	5.42	-0.46	-1.25	-1.40	79
1984	378.3	-1.07	-32.83	46.58	0.75	31.12	32.45	33.01	3.81	4.27	-0.74	-1.30	-1.12	50
1985	438.3	-1.38	-20.62	42.98	-0.94	31.73	32.65	33.08	-2.76	4.09	-0.74	-1.53	-3.12	79
1986	333.8	-1.42	-6.15	43.92	-0.88	31.95	32.46	32.85	-5.88	4.51	-0.36	-1.17	-2.64	78
1987	294.7	0.35	0.58	44.66	-0.55	31.99	32.64	33.09	-0.47	4.75	-0.70	-1.16	-1.57	70
1988	255.3	-0.02	6.66	46.48	-0.32	31.92	32.75	33.05	4.86	4.98	-0.44	-0.94	-0.62	94
1989	335.9	-0.42	-7.21	45.69	1.85	31.97	32.48	33.08	0.23	4.60	-0.47	-1.23	-1.83	72
1990	477.9	-0.19	-18.93	43.99	0.85	31.96	32.77	33.08	-3.40	4.56	-0.37	-1.30	-1.96	92
1991	381.6	-0.67	-35.78	42.48	0.64	30.35	32.47	32.75	4.88	3.47	-1.04	-1.52	-2.37	49
1992	381.6	-1.12	-25.5	43.73	1.19	31.61	32.41	32.64	-0.52	3.97	-0.65	-1.35	-1.71	79
1993	377.3	-1.08	-24.84	44.69	1.36	31.12	32.84	33.10	-2.43	3.87	-0.87	-1.46	-0.84	95
1994	409.0	-0.90	-19.19	44.03	0.07	31.16	32.43	32.95	0.26	4.81	-0.43	-1.39	-0.65	59
1995	329.8	0.71	-7.56	44.97	0.95	31.16	32.45	32.97	8.83	4.29	-0.58	-1.26	0.31	65
1996	223.2	-0.29	1.52	48.32	-1.26	31.73	32.39	32.87	-3.62	4.95	0.37	-0.78	0.32	36
1997	301.7	0.28	4.22	45.42	0.02	31.42	32.63	32.97	3.31	4.68	-0.50	-1.02	-0.18	76
1998	243.3	1.94	10.22	48.01	-0.33	31.42	32.58	33.03	5.48	5.16	-0.65	-0.93	1.38	89
1999	174.7	0.62	15.41	48.01	0.76	31.62	32.53	32.96	3.06	5.70	-0.10	-0.82	2.36	60
2000	260.1	0.16	5.32	47.44	1.35	31.59	32.44	32.98	0.58	5.43	-0.24	-0.84	1.63	59
2001	221.4	0.63	7.04	45.65	-0.69	31.78	32.48	32.90	1.97	5.29	-0.38	-0.82	0.86	99
2002	226.2	0.35	7.66	47.16	0.29	31.95	32.48	32.88	-4.73	4.62	-0.30	-0.94	0.60	77
2003	288.6	1.21	9.92	44.69	-0.40	31.91	32.58	32.91	-1.32	5.29	-0.14	-1.00	0.10	90
2004	166.1	1.09	27.35	48.46	-0.45	31.59	32.40	32.98	-2.72	5.72	0.38	-0.40	0.74	96
2005	234.3	1.53	24.09	47.18	0.75	31.80	32.54	32.93	-1.91	5.75	-0.04	-0.61	1.38	87
2006	174.2	1.40	33.23	48.00	-0.47	31.81	32.56	33.01	0.57	6.31	0.18	-0.47	0.24	30
2007	195.8	0.79	6.25	47.38	0.56	31.71	32.62	32.98	-0.18	4.67	-0.37	-0.90	1.22	113
2008	274.0	0.74	17.63	44.96	0.78	31.74	32.61	33.02	0.21	5.53	-0.69	-1.01	0.39	98
2009	307.1	0.23	1.67	45.43	-0.21	31.72	32.45	32.89	-1.72	4.96	-0.44	-1.07	1.73	89
2010	88.0	1.83	30.8	49.54	-2.58	31.31	32.34	32.92	-3.29	5.59	0.55	-0.57	1.66	39
2011	101.4	0.56	29.95	49.37	-1.11	31.74	32.33	32.86	-6.81	5.33	0.70	0.07	3.00	80
2012	244.5	1.14	14.29	46.68	1.10	31.77	32.45	32.98	-3.89	6.07	0.12	-0.76	2.78	86
2013	130.9	0.89	11.51	48.65	-0.82	31.42	32.43	32.89	0.85	6.12	0.16	-0.73	1.43	56

# Correlation Tables

Table S.8: Pairwise Spearman correlations of the fish community biomass indicators for three time periods (Before, After, Full), with high correlations ( $\rho \geq 0.6$ ) in bold.

	Biomass	Large Benthivores	Med. Benthivores	Small Benthivores	Piscivores	Plank-piscivores	Planktivores
Large benthivores	<b>0.94, 0.75, 0.83</b>						
Medium benthivores	<b>0.93, 0.82, 0.35</b>	<b>0.87, 0.81, 0.2</b>					
Small benthivores	-0.45, -0.22, -0.36	-0.48, -0.03, -0.41	-0.45, -0.19, 0.53				
Piscivores	<b>0.98, 0.49, 0.66</b>	<b>0.96, 0.4, 0.74</b>	<b>0.88, 0.36, -0.19</b>	-0.45, -0.13, -0.58			
Plank-piscivores	0.01, <b>0.75, 0.33</b>	-0.07, 0.33, 0.01	0.25, 0.43, 0.36	0.07, -0.25, 0.01	-0.06, <b>0.69, 0.11</b>		
Planktivores	<b>0.74, 0.60, 0.65</b>	0.53, 0.21, 0.32	<b>0.7, 0.31, 0.32</b>	-0.41, 0.00, -0.01	<b>0.63, 0.15, 0.27</b>	0.01, 0.48, 0.23	
Shellfish	0.23	0.53	0.48	-0.03	-0.07	-0.12	-0.21

Table S.9: Pairwise Spearman correlations of the community trophic level indicators with the fish community indicators over the full time series, with high correlations ( $\rho \geq 0.6$ ) in bold.

	PPred	TL <sub>Comm</sub>	MTI <sub>Comm</sub>
Biomass	0.28	0.37	0.49
Large benthivores	0.28	0.4	0.47
Medium benthivores	-0.57	-0.59	-0.43
Small benthivores	<b>-0.74</b>	<b>-0.75</b>	<b>-0.76</b>
Piscivores	<b>0.64</b>	<b>0.77</b>	<b>0.74</b>
Plank-piscivores	0.33	0.18	0.29
Planktivores	-0.08	-0.01	0.14
Shellfish	<b>-0.78</b>	<b>-0.86</b>	<b>-0.72</b>
PPred	-	-	-
TL <sub>Comm</sub>	<b>0.96</b>	-	-
MTI <sub>Comm</sub>	<b>0.91</b>	<b>0.9</b>	-

Table S.10: Pairwise Spearman correlations of the trophic level indicators for three time periods (Before, After, Full), with high correlations ( $\rho \geq 0.6$ ) in bold.

	TL <sub>Comm</sub>	MTI <sub>Comm</sub>	TL <sub>Land</sub>
MTI <sub>Comm</sub>	0.38, <b>0.8, 0.9</b>		
TL <sub>Land</sub>	<b>0.75, &lt;0.01, 0.63</b>	0.27, -0.21, 0.51	
MTI <sub>Land</sub>	<b>0.76, 0.52, 0.74</b>	0.12, 0.55, <b>0.72</b>	0.55, 0.36, <b>0.71</b>

Table S.11: Pairwise Spearman correlations for the human indicators, with high correlations ( $\rho \geq 0.6$ ) in bold.

	Total Landings	Groundfish	Pelagics	Shellfish	Other	TL <sub>Land</sub>	MTI <sub>Land</sub>	L/B	Population
Groundfish	<b>0.93</b>								
Pelagics	<b>0.82</b>	<b>0.70</b>							
Shellfish	<b>-0.74</b>	<b>-0.79</b>	<b>-0.68</b>						
Other	0.35	0.34	0.12	-0.24					
TL <sub>Land</sub>	<b>0.79</b>	<b>0.91</b>	0.59	<b>-0.85</b>	0.34				
MTI <sub>Land</sub>	0.37	0.58	0.20	-0.39	< 0.01	<b>0.60</b>			
Fishing Index	0.40	0.45	-0.06	-0.42	<b>0.62</b>	0.53	0.16		
Population	0.53	<b>0.69</b>	0.37	<b>-0.78</b>	0.23	<b>0.83</b>	0.59	0.54	
Income	<b>-0.72</b>	<b>-0.73</b>	<b>-0.66</b>	<b>0.91</b>	-0.17	<b>-0.79</b>	-0.19	<b>-0.62</b>	<b>-0.70</b>

Table S.12: Pairwise Spearman correlations for the environmental indicators, with high correlations ( $\rho \geq 0.6$ ) in bold.

	AMO	CEI	NAO	S0	S75	S150	STRAT	T0	T75	T150	T <sub>Fish</sub>	Area <sub>Ice</sub>	Lat <sub>Ice</sub>
CEI	<b>0.65</b>												
NAO	-0.40	-0.39											
S0	-0.06	0.26	0.01										
S75	-0.05	-0.1	-0.10	0.26									
S150	-0.27	-0.03	-0.15	0.26	<b>0.65</b>								
STRAT	0.27	-0.21	0.01	-0.46	0.11	-0.13							
T0	<b>0.77</b>	<b>0.77</b>	-0.32	0.06	-0.21	-0.21	0.11						
T75	0.35	<b>0.65</b>	-0.11	0.24	-0.47	-0.24	-0.45	<b>0.6</b>					
T150	<b>0.69</b>	<b>0.87</b>	-0.33	0.15	-0.26	-0.23	-0.13	<b>0.78</b>	<b>0.74</b>				
T <sub>Fish</sub>	<b>0.61</b>	<b>0.78</b>	-0.32	-0.1	-0.3	-0.16	-0.05	<b>0.69</b>	<b>0.53</b>	<b>0.78</b>			
Area <sub>Ice</sub>	<b>-0.65</b>	<b>-0.76</b>	0.41	-0.01	0.2	0.25	0.01	<b>-0.71</b>	<b>-0.59</b>	<b>-0.88</b>	<b>-0.71</b>		
Lat <sub>Ice</sub>	0.49	<b>0.69</b>	-0.28	-0.06	-0.35	-0.12	-0.03	<b>0.61</b>	<b>0.65</b>	<b>0.82</b>	<b>0.72</b>	<b>-0.86</b>	
Time <sub>Ice</sub>	0.19	0.02	0.10	0.13	0.35	0.04	-0.03	0.04	-0.24	-0.02	0.05	0.06	-0.22



# Lag Figures

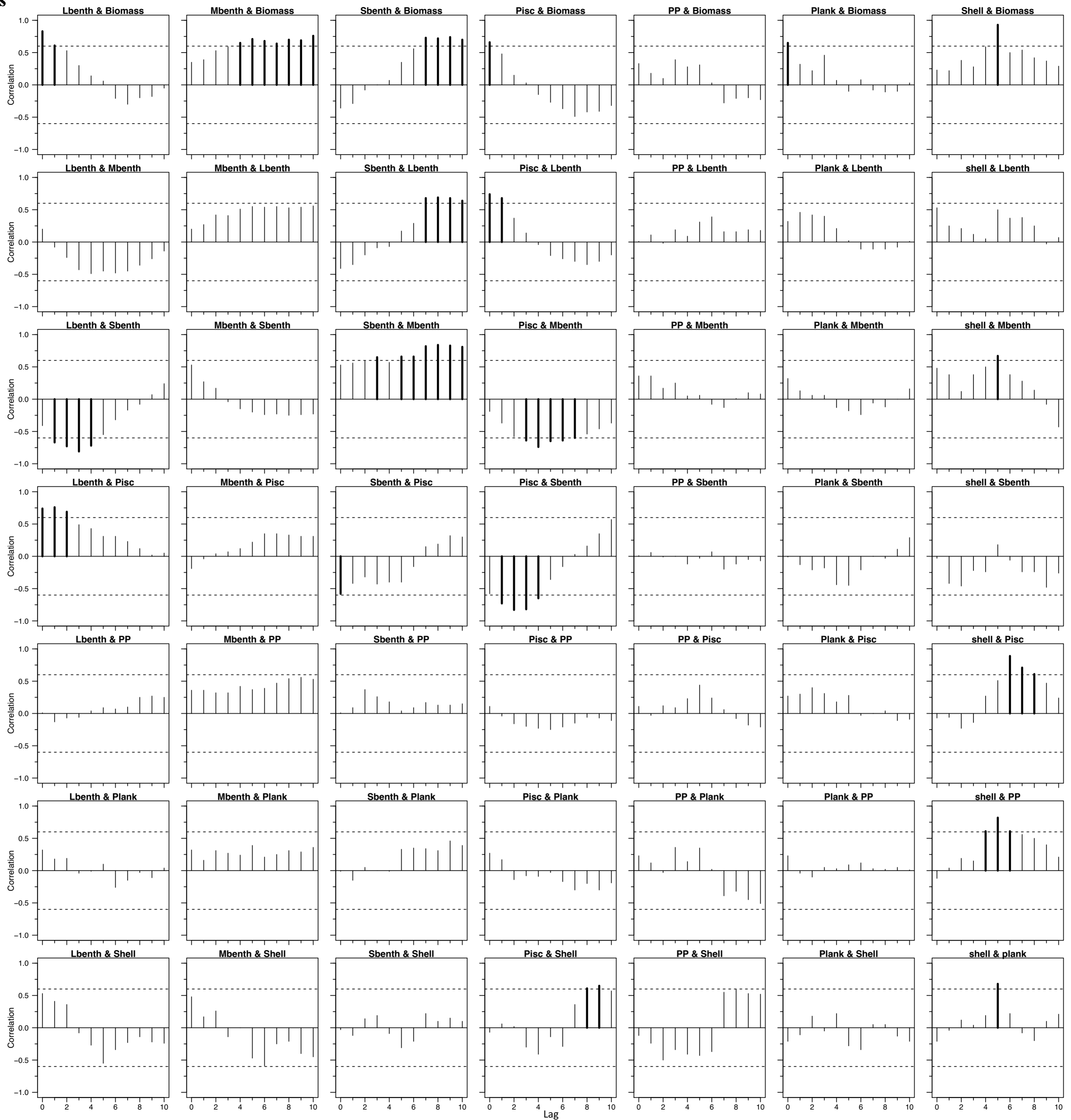


Figure S.1: Lagged correlations between functional groups (first group in title is lagged). Bold lines indicate "high" correlations ( $\rho \geq 0.6$ ); dashed lines indicate where  $\rho \geq 0.6$  (and  $\rho \leq -0.6$ ).

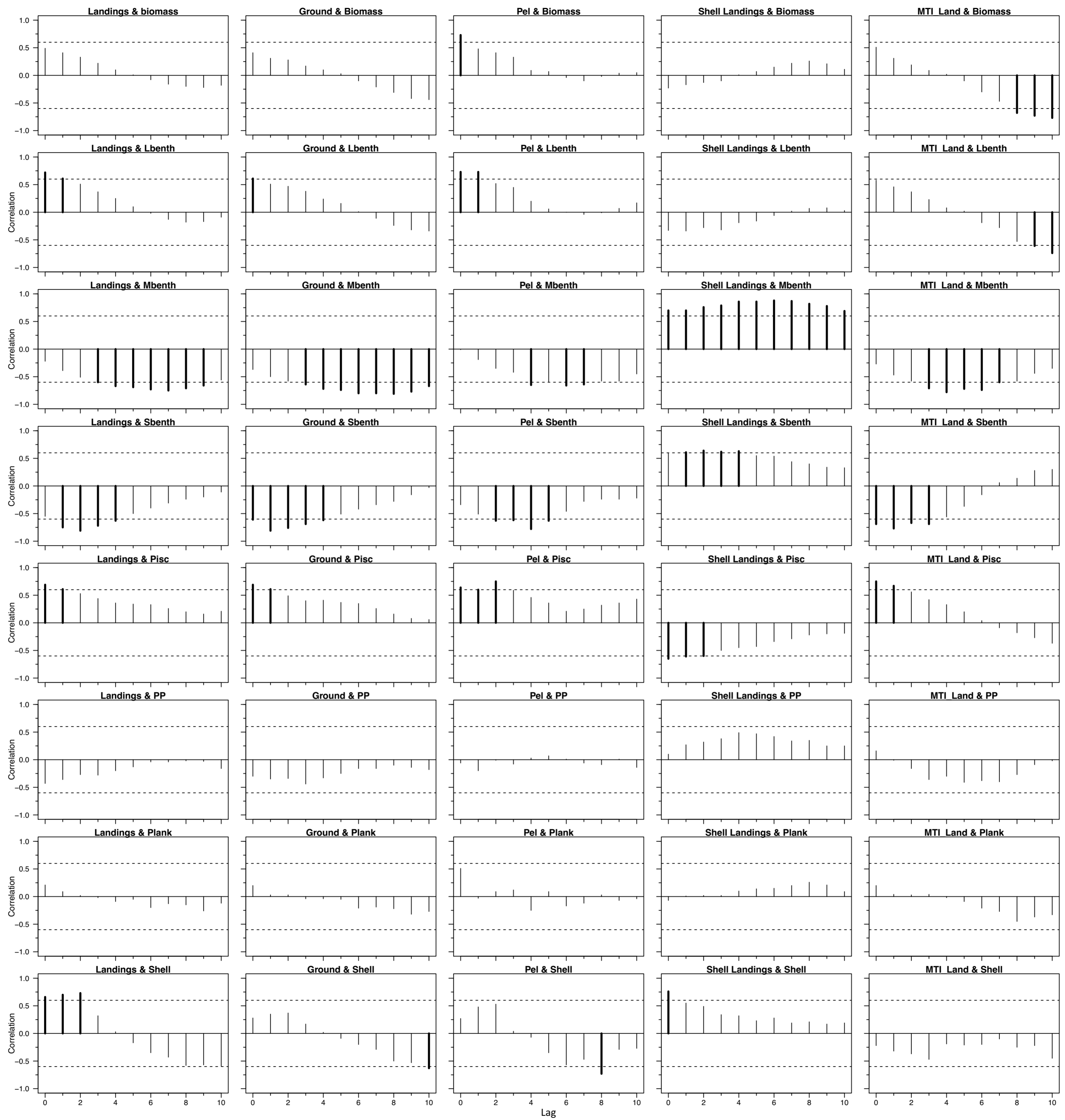


Figure S.2: Lagged correlations between select lagged human pressures and functional groups. Bold lines indicate “high” correlations ( $\rho \geq 0.6$ ); dashed lines indicate where  $\rho \geq 0.6$  (and  $\rho \leq -0.6$ ).

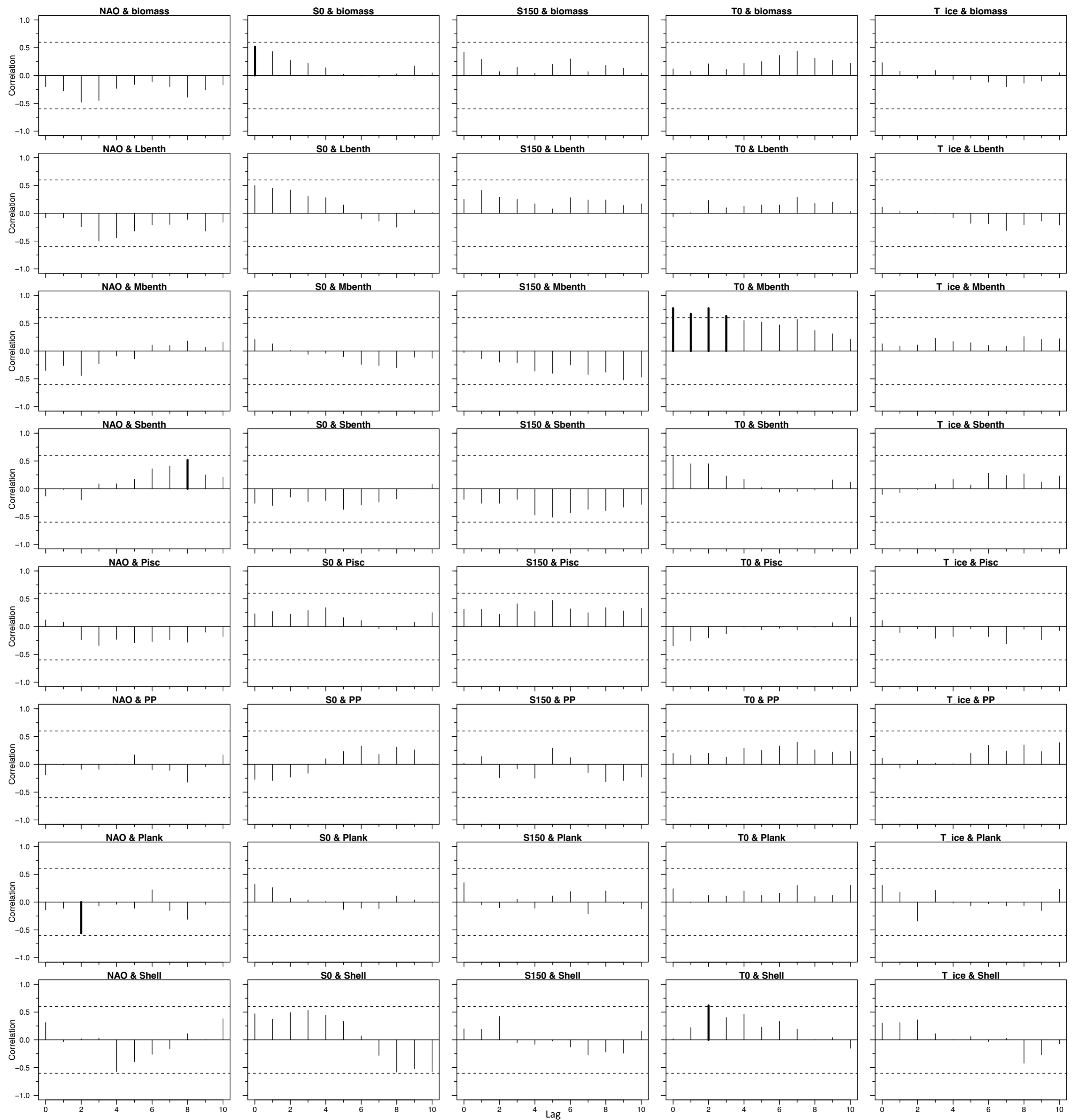


Figure S.3: Lagged correlations between select lagged environmental pressures and functional groups. Bold lines indicate “high” correlations ( $\rho \geq 0.6$ ); dashed lines indicate where  $\rho \geq 0.6$  (and  $\rho \leq -0.6$ ).