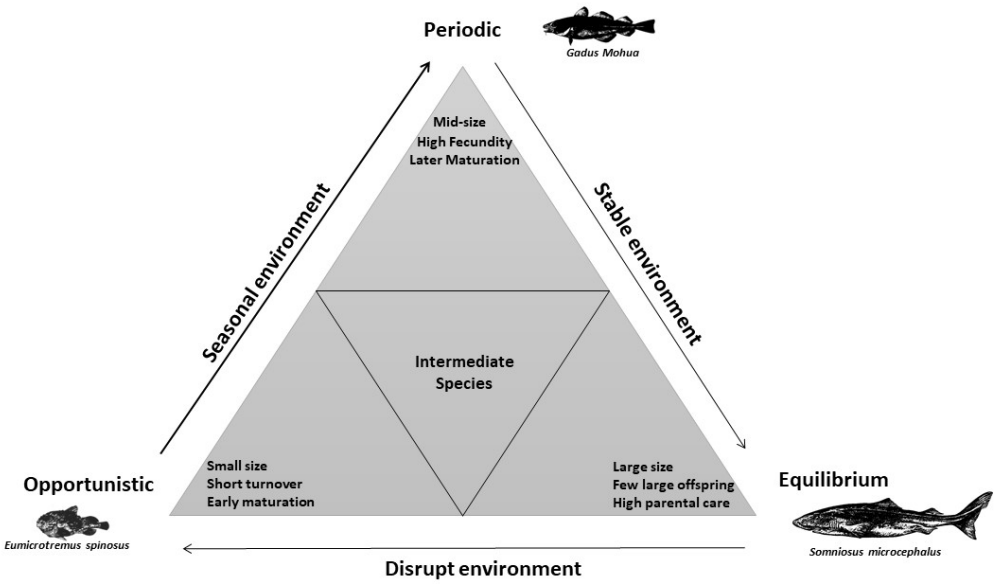

Figure S1. The life history strategy (Equilibrium–Periodic–Opportunistic) framework developed by (Winemiller & Rose 1992). Equilibrium strategists, such as the Greenland shark *Somnious microcephalus,* are more successful in stable environments. Periodic species, such as the Atlantic cod *Gadus morhua*, are more successful in seasonal environments. Opportunistic species, such as the Atlantic spiny lumpsucker *Eumicrotremus spinosus*, thrive in environments with higher disturbance.

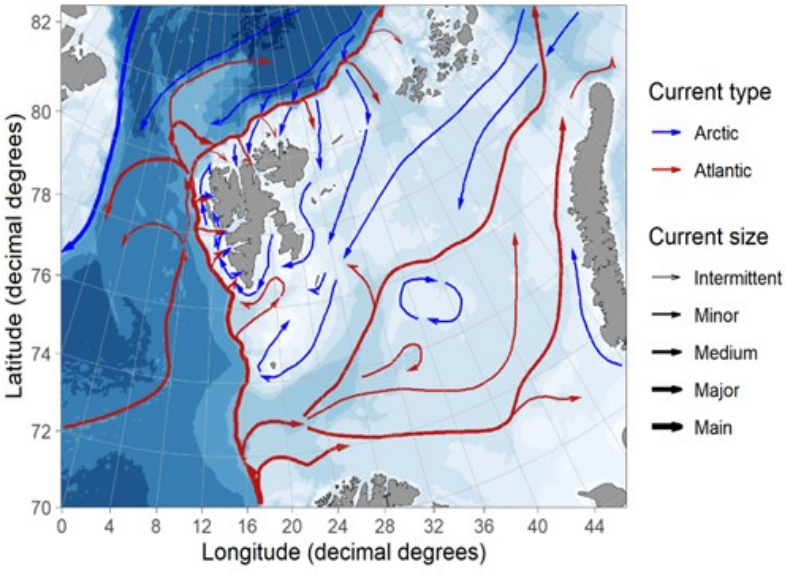

Figure S2. The main sea currents of the Barents Sea. The red arrows indicates waters from Atlantic origin, blue indicates flow of Arctic waters. The Figure was developed using the R package ggOceanMaps (Vihtakari 2022).

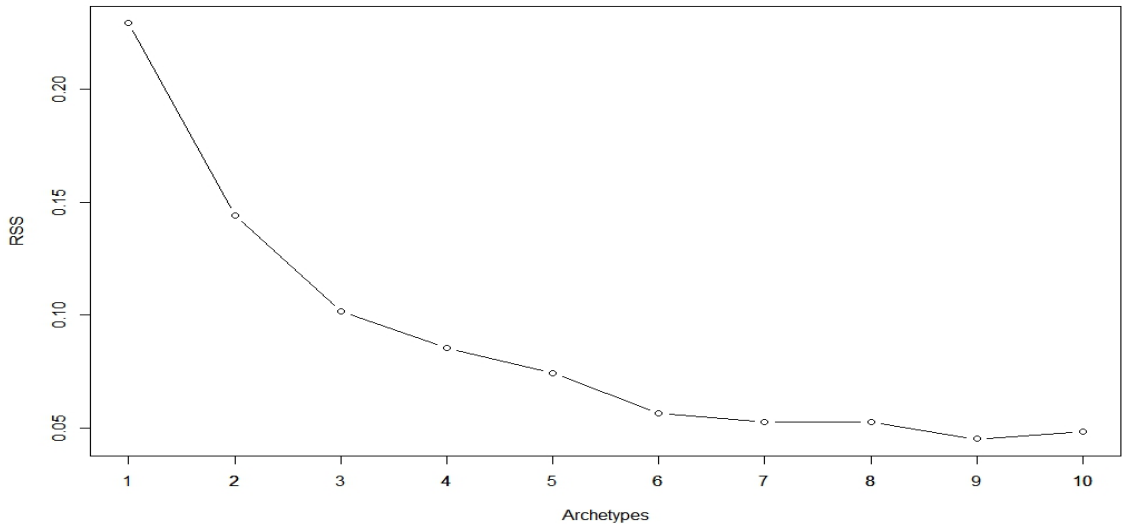

Figure S3. Residual sum of square (RSS) from an archetypal analysis (AA) based on the number of clusters (archetypes). The curve flats out (elbow criteria) indicate that three archetypes (strategies) in the Barents Sea is a good trade-off between the number of strategies and the amount of trait variability accounted for.

Table S1. Fish species' traits, life history strategy (LHS) proportions, and ecological niche. Fish traits were used to calculate the LHS Equilibrium (Equ), Periodic (Per), Opportunistic (Opp) as obtained from the best model of archetype analysis, n = 69*. Parental care is categorized from the least to the highest level of care: (1) non-guarders (2) hiders, (3) guarders, and (4) bearers. The ecological niche is represented by feeding behavior, trophic level, and body shape. Body shape was categorized by species with deep and short bodies (DEEP), eel-shape (EEL), elongated shape (ELS), flat shape (FS) and fusiform shape (NS).

Species	**Traits**							**LHS**			**Ecological niche**		
	Egg size (mm)	**Fecundity (yr)**	**Body size (cm)**	**Longevity (yr)**	**Age at maturity (yr)**	**Length at maturity (cm)**	**Parental care**	**Equ**	**Per**	**Opp**	**Feeding behavior**	**Trophic level**	**Body shape**
Amblyraja hyperborea	102.5	30	89	24	11	45	1	0.77	0	0.23	Generalist	4.31	FS
Amblyraja radiata	55	26.5	68.7	16	11	35	1	0.67	0	0.33	Generalist	4.20	FS
Ammodytes sp.*	0.94	13133	20.5	8.5	2.35	12.13	1	0	0.35	0.65	Intermediate	2.90	EEL
Anarhichas denticulatus	6	46500	162	16	6	80	3	0.43	0.44	0.13	Generalist	3.75	ELS
Anarhichas lupus	6	12740	104	20	6	50	3	0.45	0.34	0.22	Generalist	3.55	ELS
Anarhichas minor	3.35	19700	138.4	40	7	70	3	0.45	0.48	0.07	Generalist	3.62	ELS
Anisarchus medius	2	700	13.2	13	6	9.5	3	0.27	0.05	0.68	Specialist	3.22	EEL
Arctogadus glacialis	1.75	15000	52	11	5	24	1	0.13	0.47	0.4	Specialist	3.82	NS
Arctozenus risso	1.94	100000	29	11	6	14.17	1	0.06	0.48	0.45	Specialist	3.22	ELS
Argentina silus	3.25	10381	49	35	8	26	1	0.28	0.47	0.25	Intermediate	3.32	ELS
Artediellus atlanticus	2.25	62	14.3	10	3.5	5.1	1	0.16	0.01	0.83	Generalist	3.42	ELS
Aspidophoroides olrikii	1.13	180	8.6	4	2	6	1	0	0.02	0.98	Specialist	3.25	ELS
Bathyraja spinicauda	130	47	165	50	12	118	1	0.9	0.08	0.02	Intermediate	4.41	FS
Benthosema glaciale	0.78	1051	8.3	8	2.5	4.75	1	0	0.12	0.88	Specialist	2.99	ELS
Boreogadus saida	1.75	15000	29	5	2	20	1	0	0.36	0.64	Generalist	3.12	NS
Brosme brosme	1.35	2300000	69	20	9	53	1	0.08	0.83	0.09	Intermediate	3.90	ELS
Careproctus sp.*	3.75	112	25	12	4	8	1	0.25	0.07	0.69	Intermediate	3.58	NS
Clupea harengus	1.85	55000	40	25	3	24	1	0.09	0.55	0.37	Generalist	3.38	ELS
Cottunculus microps	4.5	375	15.3	12	4	9.4	1	0.22	0.09	0.7	Specialist	4.14	ELS
Cyclopterus lumpus	2.6	194112	55	15	3	29	3	0.19	0.44	0.37	Intermediate	3.89	DEEP
Enchelyopus cimbrius	0.82	500000	36	9	3	12.7	1	0	0.52	0.48	Specialist	3.53	ELS
Eumicrotremus spinosus	3	636	14	3	1	5.6	3	0.02	0	0.98	Specialist	3.48	DEEP
Gadiculus argenteus	1	2763809	22	4	2	12.6	1	0	0.4	0.6	Intermediate	3.60	NS
Gadus morhua	1.39	5900000	123.1	25	9	69.7	1	0.1	0.9	0	Generalist	4.09	NS
Gaidropsarus argentatus	1.27	500000	42	10	4	25	1	0	0.62	0.38	Intermediate	3.39	ELS
Gasterosteus aculeatus	1.31	307.5	7.5	5	1	5.5	3	0	0	1	Specialist	3.31	NS
Glyptocephalus cynoglossus	1.16	100000	62	18	4.5	30.4	1	0.07	0.64	0.29	Specialist	3.17	FS
Gymnelus sp.*	4.25	16	24	5	2	9.8	3	0.21	0	0.79	Intermediate	3.13	EEL

Species	Traits							LHS			Ecological niche		
	Egg size (mm)	Fecundity (yr)	Body size (cm)	Longevity (yr)	Age at maturity (yr)	Length at maturity (cm)	Parental care	Equ	Per	Opp	Feeding behavior	Trophic level	Body shape
Gymnocanthus tricuspis	1.5	4655	21	8	4	11.8	1	0.05	0.31	0.63	Intermediate	3.46	ELS
Hippoglossoides platessoides	2.44	380000	54	19	2.6	35.2	1	0.06	0.63	0.3	Generalist	4.08	FS
Hippoglossus hippoglossus	3.4	3750000	220	50	12	105	1	0.26	0.74	0	Intermediate	4.00	FS
Icelus sp.*	1.7	564	13.85	9	2	5.5	1	0.03	0.13	0.84	Intermediate	3.62	ELS
Leptagonus decagonus	2	687	21.1	11	3	11.6	1	0.12	0.21	0.67	Intermediate	3.21	ELS
Leptoclinus maculatus	1.5	644	17.6	10	6	8.9	3	0.24	0.07	0.69	Specialist	3.28	EEL
Limanda limanda	1.2	141000	43	13	5	22	1	0.03	0.6	0.37	Intermediate	3.39	FS
Liparidae *	1.58	4147.5	26.4	7	2.69	8.5	1	0.02	0.28	0.69	Intermediate	3.30	NS
Lumpenus fabricii	3	490	23	7	3	14	1	0.16	0.15	0.69	Specialist	3.30	EEL
Lumpenus lampretaeformis	0.8	334	50	16	8	14.5	2	0.25	0.29	0.47	Intermediate	3.60	EEL
Lycenchelys kolthoffi	4.5	32	21	8	2	14	3	0.26	0	0.74	Specialist	3.10	EEL
Lycodes esmarkii	5.5	610	74.5	14	3	29	3	0.42	0.12	0.46	Intermediate	3.91	ELS
Lycodes eudipleurostictus	5.5	216	45	13	3	19.5	3	0.41	0.02	0.58	Specialist	3.50	ELS
Lycodes gracilis	4.45	85	38.6	11	3	13	3	0.36	0	0.64	Intermediate	3.65	ELS
Lycodes pallidus	4.9	80	38.5	9	3	13	3	0.35	0	0.65	Intermediate	3.14	ELS
Lycodes reticulatus	6	459	70	16	4	19	3	0.44	0.08	0.48	Intermediate	3.49	ELS
Lycodes rossi	2.5	337	32.5	13	3	13.5	3	0.3	0.06	0.64	Intermediate	3.54	ELS
Lycodes seminudus	5.5	402	50	15	4	20.2	3	0.42	0.06	0.51	Intermediate	3.79	ELS
Macrourus berglax	2.2	36500	82.5	25	15	28.5	1	0.27	0.59	0.14	Generalist	3.57	ELS
Mallotus villosus	0.52	11855.5	20	5	3	14.6	1	0	0.34	0.66	Generalist	3.15	ELS
Maurolicus muelleri	0.52	8354.5	7.6	3	1	2.5	1	0	0	1	Intermediate	3.01	ELS
Melanogrammus aeglefinus	1.43	9085000	110	20	5.5	37	1	0.02	0.89	0.09	Generalist	4.03	NS
Merlangius merlangus	1.15	120535	42.4	20	2	25	1	0	0.6	0.4	Generalist	4.36	NS
Micromesistius poutassou	1.16	122000	37.1	20	4.5	25.1	1	0.05	0.62	0.34	Generalist	4.13	ELS
Microstomus kitt	1.29	95000	60	10	5	25	1	0.06	0.59	0.36	Specialist	3.21	FS
Molva molva	0.55	40000000	119	30	6	74	1	0	1	0	Intermediate	4.40	ELS
Myoxocephalus scorpius	2.51	5868	38	10	3.5	10	3	0.22	0.18	0.61	Specialist	3.89	ELS
Paraliparis bathybius	4.5	428	25	9	3	10	1	0.2	0.11	0.69	Specialist	3.72	NS
Pleuronectes platessa	2.17	552000	86	36	10	26.6	1	0.18	0.73	0.09	Generalist	3.23	FS
Pollachius virens	1.13	6630000	177.1	30	5.5	55.4	1	0.06	0.94	0	Generalist	4.31	NS
Rajella fyllae	42	47	57	14	5	36	1	0.57	0	0.43	Intermediate	3.37	FS
Reinhardtius hippoglossoides	4.25	28100	111.7	30	7	55	1	0.32	0.57	0.1	Generalist	4.38	FS
Sebastes norvegicus	6.8	85750	50.2	60	11	39.6	4	0.52	0.35	0.12	Intermediate	3.77	NS
Sebastes mentella	6	83900	58	70	11	30.7	4	0.52	0.36	0.12	Generalist	4.12	NS
Sebastes sp.*	6.45	89025	51.5	58.75	10.15	33.35	4	0.5	0.35	0.15	Intermediate	3.99	NS

Species	Traits							LHS			Ecological niche		
	Egg size (mm)	Fecundity (yr)	Body size (cm)	Longevity (yr)	Age at maturity (yr)	Length at maturity (cm)	Parental care	Equ	Per	Opp	Feeding behavior	Trophic level	Body shape
Sebastes viviparus	5.8	15450	34	40	12.5	15	4	0.49	0.19	0.32	Intermediate	4.03	NS
Somniosus microcephalus	550	10	730	100	70	450	4	1	0	0	Generalist	4.22	ELS
Triglops murrayi	2	329	17.2	10	4	7.6	1	0.14	0.14	0.73	Intermediate	3.45	ELS
Triglops nybelini	1.88	541	14.5	7	3	5.6	1	0.06	0.12	0.82	Intermediate	3.29	ELS
Triglops pingelii	2.25	310	17.5	9	4	8.7	1	0.15	0.13	0.72	Intermediate	3.42	ELS
Trisopterus esmarkii	1.1	222938	25	8	2	15	1	0	0.43	0.57	Generalist	3.24	NS

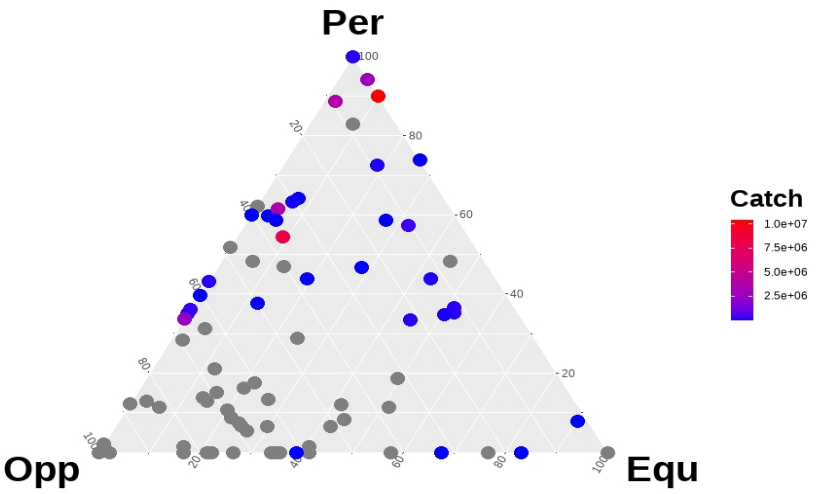

Figure S4. The Barents Sea fisheries catch, a proxy for fishing pressure according to the life history strategy. In the Barents Sea, the majority of species that are fished follow a Periodic strategy. The grey dots represent missing values showing that opportunistic species are not selected for harvesting. The archetype analysis (AA) of the life history strategies was calculated in the (Eugster & Leisch 2009) and superimposed in the ternary plot developed by ggtern R package (Hamilton & Ferry 2018). Total commercial fishing catch per species was assembled and averaged from two sources: (1) the Barents Sea fisheries catch for the years 2004 until 2017: data from Directorate of Fisheries' landing from Norway (Fiskeridirektoratet 2022) that published all catch submitted from Norwegian and foreign vessels, and (2) data from Sea Around Us (Pauly et al. 2020) that reconstructed data from official reported and estimates of unreported data (including discards). Both are available in open access webpages.

Table S2. The environmental affinities of fish from the Barents Sea. The environmental affinities are represented by depth weighted mean (wm), bottom temperature (B.temp) wm, and ice coverage (Ice) wm weighted by the each species abundance, n = 59*.

Species	**Depth (wm)**	**B.temp (wm)**	**Ice (wm)**
Amblyraja hyperborea	581.74	1.78	126.13
Amblyraja radiata	248.44	2.28	55.66
Ammodytes sp.*	125.38	2.31	2.64
Anarhichas denticulatus	299.00	1.98	49.36
Anarhichas lupus	182.73	3.48	88.30
Anarhichas minor	204.42	2.44	60.65
Anisarchus medius	160.34	-0.45	122.62
Arctogadus glacialis	299.60	2.09	155.79
Argentina silus	231.57	6.40	0.53
Artediellus atlanticus	253.69	1.38	164.57
Aspidophoroides olrikii	139.58	-0.96	119.69
Bathyraja spinicauda	416.21	2.02	15.49
Boreogadus saida	237.76	0.23	160.07
Brosme brosme	225.60	6.40	3.94
Chimaera monstrosa	276.28	7.94	1.82
Cottunculus microps	438.79	1.82	131.97
Cyclopterus lumpus	236.44	1.95	78.44
Eleginus nawaga	20.73	0.74	173.34
Enchelyopus cimbrius	287.93	4.20	15.91
Etmopterus spinax	386.98	8.30	1.61
Eumicrotremus derjugini	112.71	-0.56	183.55
Eumicrotremus spinosus	140.80	2.20	137.03
Gadiculus argenteus	249.42	6.26	0.15
Gadus morhua	204.73	1.91	69.42
Gaidropsarus argentatus	665.07	2.44	130.54
Glyptocephalus cynoglossus	247.72	5.54	0.56
Gymnocanthus tricuspis	121.41	-0.53	139.95
Hippoglossoides platessoides	203.95	1.42	86.56
Hippoglossus hippoglossus	163.04	6.44	0.46
Icelus sp.*	187.74	-0.03	191.40
Leptagonus decagonus	257.09	0.67	140.78
Leptoclinus maculatus	186.58	1.24	123.57
Limanda limanda	64.01	6.49	39.43
Liparidae *	308.37	0.13	212.21
Lumpenus fabricii	122.98	0.91	99.71
Lumpenus lampretaeformis	193.65	1.95	99.84
Macrourus berglax	579.38	3.40	75.24
Melanogrammus aeglefinus	158.93	3.88	19.19
Merlangius merlangus	232.41	2.91	4.69
Micromesistius poutassou	326.82	4.28	5.71
Microstomus kitt	146.37	6.51	1.14
Molva molva	191.45	6.14	25.65
Myoxocephalus scorpius	116.09	2.71	99.11
Phycis blennoides	255.72	4.81	0.48
Pleuronectes platessa	79.51	4.46	12.42
Pollachius virens	170.10	6.10	2.93
Rajella fyllae	333.44	3.74	18.16
Reinhardtius hippoglossoides	350.48	1.73	239.86
Sebastes norvegicus	230.30	4.17	24.38
Sebastes mentella	331.06	2.92	61.36
Sebastes sp.*	311.27	3.04	51.33
Sebastes viviparus	225.66	6.94	0.47
Syngnathidae *	302.94	3.81	39.76
Triglops murrayi	154.19	1.38	98.01

Species	Depth (wm)	B.temp (wm)	Ice (wm)
Triglops nybelini	255.92	0.84	239.36
Triglops pingelii	194.96	0.92	210.58
Trisopterus esmarkii	222.72	4.99	1.25
Zeugopterus norvegicus	133.82	7.20	0.62
Zoarcidae *	318.09	1.35	119.54

*There are 69 fish species included in both Table S1 and Table S2, which were used in the analyses in Figure1and Figure 2. In those analyses, *Lycodes species* were treated at the species level because we had available trait data for those specific species. However, when abundance data were used in the analyses (Figure 4 and Figure 6), we focused on 59 fish species, listed in Table S3. This reduction in species count was due to challenges in accurately identifying species, which led to the pooling of *Lycodes, Lycenchelys,* and *Liparis* species (genera *Careproctus*, *Liparis*, and *Paraliparis*) generating data at the family level (*Zoarcidae and Liparidae*). More detailed explanation can be found in the main text and in Johannesen et al. (2012).

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