

## Supplementary Materials for

### **Codweb: Whole-genome sequencing uncovers extensive reticulations fueling adaptation among Atlantic, Arctic, and Pacific gadids**

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#### **This PDF file includes:**

Fig. S1. Principal components analysis of whole-genome variation among Pacific, Arctic, and Atlantic cods.

Fig. S2. Phylogenetic networks, root mismatch, and ghost effects.

Fig. S3. Phylogenetic networks, further examples.

Fig. S4. Sampling localities of Pacific, Arctic, and Atlantic gadids on a world map centered on the Arctic.

Table S1. ABBA-BABA *D* test for the whole genome of six gadid species with Arctic cod as the root.

Table S2. ABBA-BABA *D* test for the whole genome of six gadid species with Polar cod as the root.

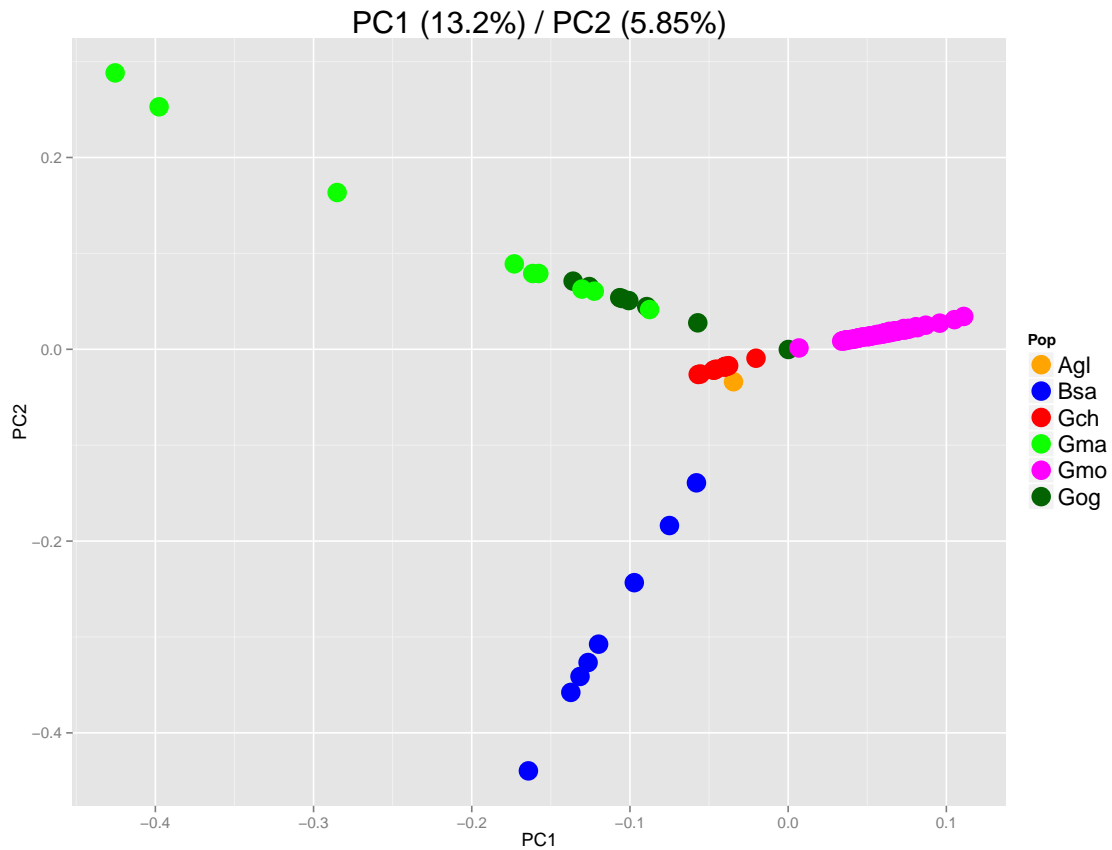
Table S3. ABBA-BABA *D* test for individual linkage groups of six gadid species with Arctic cod as the root.

Table S4.  $D_{\text{FOIL}}$  statistics of admixture and introgression.

Table S5. Summary statistics of sequencing coverage.

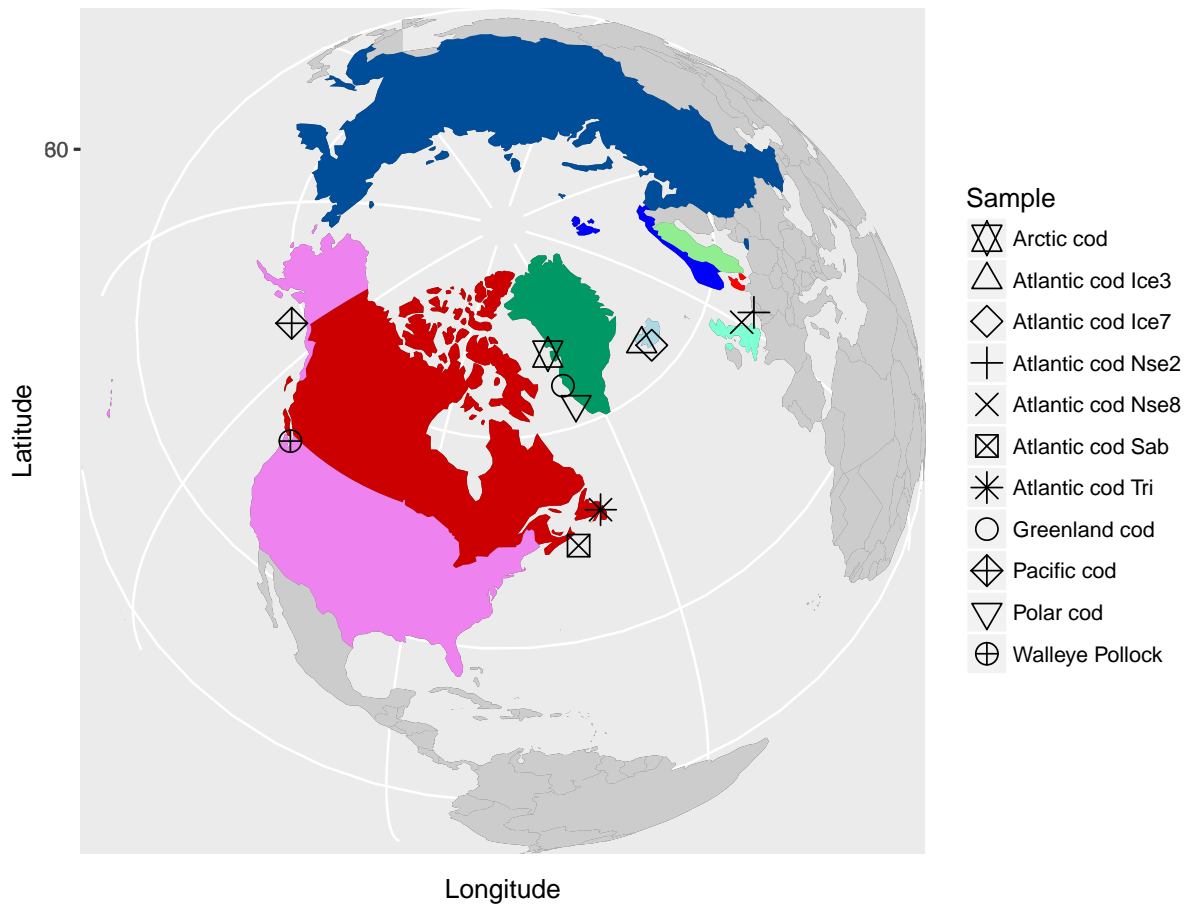
Table S6. Number of parsimony informative sites, number of blocks of 5000 parsimony-informative characters, and number of mdl generated “recombinational genes” used in the SNaQ (32) analysis of different linkage groups.

## SI Figs









**Fig. S4. Sampling localities of Pacific, Arctic, and Atlantic gadids on a world map centered on the Arctic.** Except for Polar cod these individuals were sequenced at high coverage. The Atlantic cod individuals from Sable Bank (Sab) of Nova Scotia, Trinity Bay (Tri) off Newfoundland, Iceland (Ice), and North Sea (Nse) were combined to represent Atlantic cod in the ABBA-BABA tests and treated individually in the phylonetwork analysis.

## SI Tables

**Table S1. ABBA-BABA  $D$  test for the whole genome of six gadid species with Arctic cod as the root.**  $D$  is the ABBA-BABA four-taxon test statistic, JK  $D$  is the jackknife estimate of  $D$ , VJK  $D$  is the variance of the JK  $D$ ,  $Z$  is  $Z$  score,  $P_{BY}$  is the probability of the  $Z$  score adjusted to account for multiple testing using the method of (57),  $nABBA$  and  $nBABA$  are the numbers of ABBA and BABA patterns respectively, Bl is the number of 5 Mb blocks,  $H^*$  are the names of the four populations in the specific tree with  $H_4$  as the outgroup ( $((H_1, H_2), H_3), H_4$ ). The taxa are Atlantic cod, Walleye Pollock, Greenland cod, Pacific cod, Polar cod, and Arctic cod as outgroup. Based on high coverage data (with lower coverage for Polar cod) using the ANGSD multi population ABBA-BABA test (`-doAbbababa2 1`).  $D$  is the standardized difference  $D = nABBA - nBABA$ . A negative value of  $D$  means that  $H_1$  is closer to  $H_3$  than  $H_2$  is. A positive value of  $D$  means that  $H_2$  is closer to  $H_3$  than  $H_1$  is. Based on transversions with transitions removed.

	$D$	JK $D$	VJK $D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	Bl	$H_1$	$H_2$	$H_3$	$H_4$
Whole genome	0.06	0.06	0.0000	15.38	0.000	195392	174832	131	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0000	10.14	0.000	190539	176573	131	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0000	-46.25	0.000	32168	46338	131	Atlantic	Walleye	Polar	Arctic
	-0.57	-0.57	0.0001	-58.70	0.000	195392	709836	131	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0000	434.10	0.000	1751048	70781	131	Atlantic	Pacific	Greenland	Arctic
	-0.19	-0.19	0.0000	-46.27	0.000	45170	65686	131	Atlantic	Pacific	Polar	Arctic
	-0.57	-0.57	0.0001	-58.95	0.000	190539	698147	131	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0000	443.71	0.000	1751048	63843	131	Atlantic	Greenland	Pacific	Arctic
	-0.19	-0.19	0.0000	-47.31	0.000	44217	64852	131	Atlantic	Greenland	Polar	Arctic
	-0.80	-0.80	0.0000	-161.67	0.000	32168	291864	131	Atlantic	Polar	Walleye	Arctic
	-0.63	-0.63	0.0000	-97.00	0.000	45170	199157	131	Atlantic	Polar	Pacific	Arctic
	-0.64	-0.64	0.0000	-98.31	0.000	44217	199538	131	Atlantic	Polar	Greenland	Arctic
	-0.60	-0.60	0.0001	-76.71	0.000	174832	709836	131	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0000	408.75	0.000	1689437	64981	131	Walleye	Pacific	Greenland	Arctic
	-0.06	-0.06	0.0000	-17.31	0.000	47394	53704	131	Walleye	Pacific	Polar	Arctic
	-0.60	-0.60	0.0001	-75.28	0.000	176573	698147	131	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0000	400.71	0.000	1689437	63010	131	Walleye	Greenland	Pacific	Arctic
	-0.07	-0.07	0.0000	-17.48	0.000	46593	53193	131	Walleye	Greenland	Polar	Arctic
	-0.73	-0.73	0.0000	-123.97	0.000	46338	291864	131	Walleye	Polar	Atlantic	Arctic
	-0.62	-0.62	0.0000	-100.18	0.000	47394	204504	131	Walleye	Polar	Pacific	Arctic
	-0.63	-0.63	0.0000	-100.10	0.000	46593	203908	131	Walleye	Polar	Greenland	Arctic
	0.05	0.05	0.0000	21.00	0.000	70781	63843	131	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0000	6.56	0.000	64981	63010	131	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0000	-1.09	1.000	12084	12217	131	Pacific	Greenland	Polar	Arctic
	-0.50	-0.50	0.0001	-70.02	0.000	65686	199157	131	Pacific	Polar	Atlantic	Arctic
	-0.58	-0.58	0.0000	-92.42	0.000	53704	204504	131	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-601.77	0.000	12084	561269	131	Pacific	Polar	Greenland	Arctic
	-0.51	-0.51	0.0001	-71.22	0.000	64852	199538	131	Greenland	Polar	Atlantic	Arctic
	-0.59	-0.59	0.0000	-93.06	0.000	53193	203908	131	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-587.45	0.000	12217	561269	131	Greenland	Polar	Pacific	Arctic

**Table S2. ABBA-BABA  $D$  test for the whole genome of six gadid species with Polar cod as the root.**  $D$  is the ABBA-BABA four-taxon test statistic, JK  $D$  is the jackknife estimate of  $D$ , VJK  $D$  is the variance of the JK  $D$ ,  $Z$  is  $Z$  score,  $P_{BY}$  is the probability of the  $Z$  score adjusted to account for multiple testing using the method of (57),  $nABBA$  and  $nBABA$  are the number of ABBA and BABA patterns respectively, Bl is the number of 5 Mb blocks,  $H^*$  are the names of the four populations in the specific tree with  $H_4$  as the outgroup ( $((H_1, H_2), H_3), H_4$ ). The taxa are Atlantic cod, Walleye Pollock, Greenland cod, Pacific cod, Arctic cod, and Polar cod as the outgroup in accordance with the mtDNA tree (Fig. 2). Based on high coverage data using the ANGSD multi population ABBA-BABA test (`-doAbbababa2 1`).  $D$  is the standardized difference  $D = nABBA - nBABA$ . A negative value of  $D$  means that  $H_1$  is closer to  $H_3$  than  $H_2$  is. A positive value of  $D$  means that  $H_2$  is closer to  $H_3$  than  $H_1$  is. Based on transversions with transitions removed.

	$D$	JK $D$	VJK $D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	Bl	$H_1$	$H_2$	$H_3$	$H_4$
	0.21	0.21	0.0000	55.66	0.000	60553	39873	131	Atlantic	Walleye	Pacific	Polar
	0.19	0.19	0.0000	53.55	0.000	59512	40171	131	Atlantic	Walleye	Greenland	Polar
	0.18	0.18	0.0000	46.25	0.000	46338	32168	131	Atlantic	Walleye	Arctic	Polar
	-0.42	-0.42	0.0001	-42.49	0.000	60553	147944	131	Atlantic	Pacific	Walleye	Polar
	0.94	0.94	0.0000	422.05	0.000	456701	15065	131	Atlantic	Pacific	Greenland	Polar
	0.19	0.19	0.0000	46.27	0.000	65686	45170	131	Atlantic	Pacific	Arctic	Polar
	-0.42	-0.42	0.0001	-42.19	0.000	59512	146033	131	Atlantic	Greenland	Walleye	Polar
	0.94	0.94	0.0000	421.42	0.000	456701	13716	131	Atlantic	Greenland	Pacific	Polar
	0.19	0.19	0.0000	47.31	0.000	64852	44217	131	Atlantic	Greenland	Arctic	Polar
	-0.73	-0.73	0.0000	-123.97	0.000	46338	291864	131	Atlantic	Arctic	Walleye	Polar
	-0.50	-0.50	0.0001	-70.02	0.000	65686	199157	131	Atlantic	Arctic	Pacific	Polar
	-0.51	-0.51	0.0001	-71.22	0.000	64852	199538	131	Atlantic	Arctic	Greenland	Polar
	-0.58	-0.58	0.0001	-73.62	0.000	39873	147944	131	Walleye	Pacific	Atlantic	Polar
	0.93	0.93	0.0000	358.19	0.000	429131	14774	131	Walleye	Pacific	Greenland	Polar
	0.06	0.06	0.0000	17.31	0.000	53704	47394	131	Walleye	Pacific	Arctic	Polar
	-0.57	-0.57	0.0001	-73.31	0.000	40171	146033	131	Walleye	Greenland	Atlantic	Polar
	0.94	0.94	0.0000	362.58	0.000	429131	14396	131	Walleye	Greenland	Pacific	Polar
	0.07	0.07	0.0000	17.48	0.000	53193	46593	131	Walleye	Greenland	Arctic	Polar
	-0.80	-0.80	0.0000	-161.67	0.000	32168	291864	131	Walleye	Arctic	Atlantic	Polar
	-0.58	-0.58	0.0000	-92.42	0.000	53704	204504	131	Walleye	Arctic	Pacific	Polar
	-0.59	-0.59	0.0000	-93.06	0.000	53193	203908	131	Walleye	Arctic	Greenland	Polar
	0.05	0.05	0.0000	10.31	0.000	15065	13716	131	Pacific	Greenland	Atlantic	Polar
	0.01	0.01	0.0000	2.96	0.013	14774	14396	131	Pacific	Greenland	Walleye	Polar
	0.01	0.01	0.0000	1.09	1.000	12217	12084	131	Pacific	Greenland	Arctic	Polar
	-0.63	-0.63	0.0000	-97.00	0.000	45170	199157	131	Pacific	Arctic	Atlantic	Polar
	-0.62	-0.62	0.0000	-100.18	0.000	47394	204504	131	Pacific	Arctic	Walleye	Polar
	-0.96	-0.96	0.0000	-587.45	0.000	12217	561269	131	Pacific	Arctic	Greenland	Polar
	-0.64	-0.64	0.0000	-98.31	0.000	44217	199538	131	Greenland	Arctic	Atlantic	Polar
	-0.63	-0.63	0.0000	-100.10	0.000	46593	203908	131	Greenland	Arctic	Walleye	Polar
	-0.96	-0.96	0.0000	-601.77	0.000	12084	561269	131	Greenland	Arctic	Pacific	Polar

All linkage groups combined

**Table S3. ABBA-BABA  $D$  test for each linkage group of six gadid species with Arctic cod as the root.**  $D$  is the ABBA-BABA four-taxon test statistic,  $JK D$  is the jackknife estimate of  $D$ ,  $VJK D$  is the variance of the  $JK D$ ,  $Z$  is  $Z$  score,  $P_{BY}$  is the probability of the  $Z$  score adjusted to account for multiple testing using the method of (57),  $nABBA$  and  $nBABA$  are the number of ABBA and BABA patterns respectively,  $Bl$  is the number of 5 Mb blocks,  $H^*$  are the names of the four populations in the specific tree with  $H_4$  as outgroup ( $(H_1, H_2), H_3, H_4$ ). The taxa are Atlantic cod, Walleye Pollock, Greenland cod, Pacific cod, Polar cod, and Arctic cod as outgroup. Based on high coverage data for all taxa but Polar cod which was low coverage using the ANGSD multi population ABBA-BABA test (`-doAbbababa2 1`).  $D$  is the standardized difference  $D = nABBA - nBABA$ . A negative value of  $D$  means that  $H_1$  is closer to  $H_3$  than  $H_2$  is. A positive value of  $D$  means that  $H_2$  is closer to  $H_3$  than  $H_1$  is. Based on transversions with transitions removed.

$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$Bl$	$H_1$	$H_2$	$H_3$	$H_4$
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Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.05	0.05	0.0004	2.33	0.156	9601	8711	6	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0004	1.83	0.516	9440	8762	6	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0001	-16.69	0.000	1652	2390	6	Atlantic	Walleye	Polar	Arctic
	-0.55	-0.55	0.0027	-10.59	0.000	9601	33232	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0000	160.76	0.000	82006	3306	6	Atlantic	Pacific	Greenland	Arctic
	-0.20	-0.20	0.0002	-12.82	0.000	2275	3387	6	Atlantic	Pacific	Polar	Arctic
	-0.55	-0.55	0.0026	-10.84	0.000	9440	32797	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0000	137.19	0.000	82006	3125	6	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0001	-17.01	0.000	2222	3358	6	Atlantic	Greenland	Polar	Arctic
	-0.79	-0.79	0.0005	-35.08	0.000	1652	14286	6	Atlantic	Polar	Walleye	Arctic
	-0.62	-0.62	0.0007	-23.13	0.000	2275	9668	6	Atlantic	Polar	Pacific	Arctic
	-0.63	-0.63	0.0008	-22.58	0.000	2222	9648	6	Atlantic	Polar	Greenland	Arctic
	-0.58	-0.58	0.0014	-15.54	0.000	8711	33232	6	Walleye	Pacific	Atlantic	Arctic
	0.92	0.92	0.0000	141.55	0.000	79144	3084	6	Walleye	Pacific	Greenland	Arctic
	-0.08	-0.08	0.0003	-4.35	0.000	2427	2843	6	Walleye	Pacific	Polar	Arctic
	-0.58	-0.58	0.0014	-15.43	0.000	8762	32797	6	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0001	120.44	0.000	79144	3011	6	Walleye	Greenland	Pacific	Arctic
	-0.08	-0.08	0.0003	-4.81	0.000	2400	2817	6	Walleye	Greenland	Polar	Arctic
	-0.71	-0.71	0.0009	-23.46	0.000	2390	14286	6	Walleye	Polar	Atlantic	Arctic
	-0.61	-0.61	0.0006	-23.96	0.000	2427	9930	6	Walleye	Polar	Pacific	Arctic
	-0.61	-0.61	0.0007	-23.08	0.000	2400	9877	6	Walleye	Polar	Greenland	Arctic
	0.03	0.03	0.0002	2.07	0.295	3306	3125	6	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0001	1.03	1.000	3084	3011	6	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0007	-0.21	1.000	619	626	6	Pacific	Greenland	Polar	Arctic
	-0.48	-0.48	0.0015	-12.23	0.000	3387	9668	6	Pacific	Polar	Atlantic	Arctic
	-0.55	-0.55	0.0010	-17.54	0.000	2843	9930	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-162.13	0.000	619	27790	6	Pacific	Polar	Greenland	Arctic
	-0.48	-0.48	0.0016	-11.96	0.000	3358	9648	6	Greenland	Polar	Atlantic	Arctic
	-0.56	-0.56	0.0011	-16.84	0.000	2817	9877	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-144.34	0.000	626	27790	6	Greenland	Polar	Pacific	Arctic

LG01

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.09	0.09	0.0005	4.13	0.000	9437	7817	5	Atlantic	Walleye	Pacific	Arctic
	0.07	0.07	0.0006	3.04	0.019	9167	7902	5	Atlantic	Walleye	Greenland	Arctic
	-0.21	-0.21	0.0003	-11.76	0.000	1322	2015	5	Atlantic	Walleye	Polar	Arctic
	-0.49	-0.49	0.0038	-8.06	0.000	9437	27849	5	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0000	222.17	0.000	73238	3011	5	Atlantic	Pacific	Greenland	Arctic
	-0.21	-0.21	0.0004	-10.29	0.000	1780	2701	5	Atlantic	Pacific	Polar	Arctic
	-0.50	-0.50	0.0039	-7.94	0.000	9167	27364	5	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0000	196.67	0.000	73238	2726	5	Atlantic	Greenland	Pacific	Arctic
	-0.21	-0.21	0.0004	-9.92	0.000	1753	2669	5	Atlantic	Greenland	Polar	Arctic
	-0.79	-0.79	0.0004	-37.82	0.000	1322	11209	5	Atlantic	Polar	Walleye	Arctic
	-0.63	-0.63	0.0009	-20.87	0.000	1780	7905	5	Atlantic	Polar	Pacific	Arctic
	-0.64	-0.64	0.0009	-21.29	0.000	1753	7926	5	Atlantic	Polar	Greenland	Arctic
	-0.56	-0.56	0.0019	-12.98	0.000	7817	27849	5	Walleye	Pacific	Atlantic	Arctic
	0.92	0.92	0.0000	173.50	0.000	69788	2753	5	Walleye	Pacific	Greenland	Arctic
	-0.05	-0.05	0.0002	-3.87	0.001	1868	2084	5	Walleye	Pacific	Polar	Arctic
	-0.55	-0.55	0.0020	-12.33	0.000	7902	27364	5	Walleye	Greenland	Atlantic	Arctic
	0.92	0.92	0.0000	163.58	0.000	69788	2722	5	Walleye	Greenland	Pacific	Arctic
	-0.06	-0.06	0.0005	-2.60	0.075	1847	2066	5	Walleye	Greenland	Polar	Arctic
	-0.70	-0.70	0.0012	-20.48	0.000	2015	11209	5	Walleye	Polar	Atlantic	Arctic
	-0.63	-0.63	0.0007	-24.36	0.000	1868	8237	5	Walleye	Polar	Pacific	Arctic
	-0.63	-0.63	0.0007	-23.70	0.000	1847	8226	5	Walleye	Polar	Greenland	Arctic
	0.05	0.05	0.0002	3.22	0.011	3011	2726	5	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0002	0.38	1.000	2753	2722	5	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0006	-0.29	1.000	503	510	5	Pacific	Greenland	Polar	Arctic
	-0.49	-0.49	0.0015	-12.62	0.000	2701	7905	5	Pacific	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0005	-26.97	0.000	2084	8237	5	Pacific	Polar	Walleye	Arctic
	-0.95	-0.95	0.0000	-387.68	0.000	503	21746	5	Pacific	Polar	Greenland	Arctic
	-0.50	-0.50	0.0014	-13.47	0.000	2669	7926	5	Greenland	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0005	-26.90	0.000	2066	8226	5	Greenland	Polar	Walleye	Arctic
	-0.95	-0.95	0.0000	-328.24	0.000	510	21746	5	Greenland	Polar	Pacific	Arctic

LG02

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.06	0.06	0.0002	4.96	0.000	9285	8180	6	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0002	3.01	0.021	9030	8279	6	Atlantic	Walleye	Greenland	Arctic
	-0.21	-0.21	0.0002	-13.24	0.000	1466	2233	6	Atlantic	Walleye	Polar	Arctic
	-0.56	-0.56	0.0012	-16.48	0.000	9285	32985	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0001	104.40	0.000	84129	3279	6	Atlantic	Pacific	Greenland	Arctic
	-0.20	-0.20	0.0001	-17.64	0.000	2078	3125	6	Atlantic	Pacific	Polar	Arctic
	-0.56	-0.56	0.0012	-16.02	0.000	9030	32395	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0001	110.73	0.000	84129	2899	6	Atlantic	Greenland	Pacific	Arctic
	-0.21	-0.21	0.0001	-17.99	0.000	2002	3076	6	Atlantic	Greenland	Polar	Arctic
	-0.82	-0.82	0.0005	-36.27	0.000	1466	14705	6	Atlantic	Polar	Walleye	Arctic
	-0.66	-0.66	0.0011	-19.81	0.000	2078	10314	6	Atlantic	Polar	Pacific	Arctic
	-0.68	-0.68	0.0011	-19.94	0.000	2002	10342	6	Atlantic	Polar	Greenland	Arctic
	-0.60	-0.60	0.0009	-19.97	0.000	8180	32985	6	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0001	97.53	0.000	80694	3002	6	Walleye	Pacific	Greenland	Arctic
	-0.06	-0.06	0.0002	-4.65	0.000	2177	2473	6	Walleye	Pacific	Polar	Arctic
	-0.59	-0.59	0.0009	-19.91	0.000	8279	32395	6	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0001	107.86	0.000	80694	2894	6	Walleye	Greenland	Pacific	Arctic
	-0.08	-0.08	0.0001	-6.48	0.000	2122	2468	6	Walleye	Greenland	Polar	Arctic
	-0.74	-0.74	0.0008	-26.05	0.000	2233	14705	6	Walleye	Polar	Atlantic	Arctic
	-0.66	-0.66	0.0011	-20.23	0.000	2177	10646	6	Walleye	Polar	Pacific	Arctic
	-0.67	-0.67	0.0011	-20.18	0.000	2122	10604	6	Walleye	Polar	Greenland	Arctic
	0.06	0.06	0.0002	4.44	0.000	3279	2899	6	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0000	2.71	0.054	3002	2894	6	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0003	-0.45	1.000	554	563	6	Pacific	Greenland	Polar	Arctic
	-0.53	-0.53	0.0018	-12.62	0.000	3125	10314	6	Pacific	Polar	Atlantic	Arctic
	-0.62	-0.62	0.0012	-17.62	0.000	2473	10646	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-196.84	0.000	554	27959	6	Pacific	Polar	Greenland	Arctic
	-0.54	-0.54	0.0018	-12.79	0.000	3076	10342	6	Greenland	Polar	Atlantic	Arctic
	-0.62	-0.62	0.0013	-17.43	0.000	2468	10604	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-206.52	0.000	563	27959	6	Greenland	Polar	Pacific	Arctic

LG03

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.11	0.11	0.0005	5.04	0.000	15779	12690	7	Atlantic	Walleye	Pacific	Arctic
	0.09	0.09	0.0004	4.54	0.000	15336	12686	7	Atlantic	Walleye	Greenland	Arctic
	-0.19	-0.19	0.0004	-8.83	0.000	1799	2620	7	Atlantic	Walleye	Polar	Arctic
	-0.43	-0.43	0.0033	-7.44	0.000	15779	39433	7	Atlantic	Pacific	Walleye	Arctic
	0.90	0.90	0.0001	126.38	0.000	105352	5273	7	Atlantic	Pacific	Greenland	Arctic
	-0.18	-0.18	0.0004	-8.96	0.000	2332	3362	7	Atlantic	Pacific	Polar	Arctic
	-0.43	-0.43	0.0033	-7.49	0.000	15336	38549	7	Atlantic	Greenland	Walleye	Arctic
	0.91	0.91	0.0000	131.15	0.000	105352	4909	7	Atlantic	Greenland	Pacific	Arctic
	-0.18	-0.18	0.0004	-8.81	0.000	2292	3298	7	Atlantic	Greenland	Polar	Arctic
	-0.74	-0.74	0.0015	-19.42	0.000	1799	12208	7	Atlantic	Polar	Walleye	Arctic
	-0.58	-0.58	0.0015	-15.13	0.000	2332	8736	7	Atlantic	Polar	Pacific	Arctic
	-0.58	-0.58	0.0015	-15.05	0.000	2292	8719	7	Atlantic	Polar	Greenland	Arctic
	-0.51	-0.51	0.0018	-11.95	0.000	12690	39433	7	Walleye	Pacific	Atlantic	Arctic
	0.90	0.90	0.0001	102.91	0.000	99413	5062	7	Walleye	Pacific	Greenland	Arctic
LG04	-0.04	-0.04	0.0002	-3.07	0.017	2461	2655	7	Walleye	Pacific	Polar	Arctic
	-0.50	-0.50	0.0019	-11.66	0.000	12686	38549	7	Walleye	Greenland	Atlantic	Arctic
	0.90	0.90	0.0001	105.32	0.000	99413	4981	7	Walleye	Greenland	Pacific	Arctic
	-0.04	-0.04	0.0001	-3.06	0.018	2429	2606	7	Walleye	Greenland	Polar	Arctic
	-0.65	-0.65	0.0023	-13.45	0.000	2620	12208	7	Walleye	Polar	Atlantic	Arctic
	-0.58	-0.58	0.0010	-18.18	0.000	2461	9245	7	Walleye	Polar	Pacific	Arctic
	-0.58	-0.58	0.0011	-17.90	0.000	2429	9206	7	Walleye	Polar	Greenland	Arctic
	0.04	0.04	0.0000	5.98	0.000	5273	4909	7	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0001	0.93	1.000	5062	4981	7	Pacific	Greenland	Walleye	Arctic
	0.01	0.01	0.0006	0.47	1.000	879	860	7	Pacific	Greenland	Polar	Arctic
	-0.44	-0.44	0.0022	-9.56	0.000	3362	8736	7	Pacific	Polar	Atlantic	Arctic
	-0.55	-0.55	0.0010	-17.34	0.000	2655	9245	7	Pacific	Polar	Walleye	Arctic
	-0.93	-0.93	0.0001	-77.30	0.000	879	24212	7	Pacific	Polar	Greenland	Arctic
	-0.45	-0.45	0.0022	-9.54	0.000	3298	8719	7	Greenland	Polar	Atlantic	Arctic
	-0.56	-0.56	0.0011	-17.16	0.000	2606	9206	7	Greenland	Polar	Walleye	Arctic
	-0.93	-0.93	0.0002	-75.17	0.000	860	24212	7	Greenland	Polar	Pacific	Arctic

Table S3. (continued)

	$D$	JK $D$	V.JK $D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	BI	$H_1$	$H_2$	$H_3$	$H_4$
	0.06	0.06	0.0001	6.50	0.000	8207	7280	5	Atlantic	Walleye	Pacific	Arctic
	0.05	0.05	0.0001	4.44	0.000	8072	7362	5	Atlantic	Walleye	Greenland	Arctic
	-0.16	-0.16	0.0000	-23.67	0.000	1356	1881	5	Atlantic	Walleye	Polar	Arctic
	-0.56	-0.56	0.0020	-12.35	0.000	8207	28712	5	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0001	92.63	0.000	70392	2933	5	Atlantic	Pacific	Greenland	Arctic
	-0.17	-0.17	0.0001	-16.95	0.000	1936	2753	5	Atlantic	Pacific	Polar	Arctic
	-0.56	-0.56	0.0022	-11.82	0.000	8072	28219	5	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0001	95.17	0.000	70392	2598	5	Atlantic	Greenland	Pacific	Arctic
	-0.18	-0.18	0.0002	-13.60	0.000	1897	2707	5	Atlantic	Greenland	Polar	Arctic
	-0.80	-0.80	0.0007	-31.44	0.000	1356	12356	5	Atlantic	Polar	Walleye	Arctic
	-0.63	-0.63	0.0004	-32.92	0.000	1936	8402	5	Atlantic	Polar	Pacific	Arctic
	-0.63	-0.63	0.0004	-30.87	0.000	1897	8440	5	Atlantic	Polar	Greenland	Arctic
	-0.60	-0.60	0.0021	-13.04	0.000	7280	28712	5	Walleye	Pacific	Atlantic	Arctic
	0.92	0.92	0.0001	86.02	0.000	67869	2697	5	Walleye	Pacific	Greenland	Arctic
LG05	-0.06	-0.06	0.0001	-5.65	0.000	2019	2283	5	Walleye	Pacific	Polar	Arctic
	-0.59	-0.59	0.0020	-13.01	0.000	7362	28219	5	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0001	93.43	0.000	67869	2560	5	Walleye	Greenland	Pacific	Arctic
	-0.06	-0.06	0.0001	-5.42	0.000	1977	2240	5	Walleye	Greenland	Polar	Arctic
	-0.74	-0.74	0.0010	-23.44	0.000	1881	12356	5	Walleye	Polar	Atlantic	Arctic
	-0.62	-0.62	0.0005	-26.73	0.000	2019	8610	5	Walleye	Polar	Pacific	Arctic
	-0.63	-0.63	0.0005	-27.67	0.000	1977	8609	5	Walleye	Polar	Greenland	Arctic
	0.06	0.06	0.0001	8.23	0.000	2933	2598	5	Pacific	Greenland	Atlantic	Arctic
	0.03	0.03	0.0001	3.56	0.003	2697	2560	5	Pacific	Greenland	Walleye	Arctic
	0.02	0.02	0.0003	1.51	0.985	525	501	5	Pacific	Greenland	Polar	Arctic
	-0.51	-0.51	0.0009	-16.81	0.000	2753	8402	5	Pacific	Polar	Atlantic	Arctic
	-0.58	-0.58	0.0009	-19.64	0.000	2283	8610	5	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-129.33	0.000	525	23206	5	Pacific	Polar	Greenland	Arctic
	-0.51	-0.51	0.0009	-16.92	0.000	2707	8440	5	Greenland	Polar	Atlantic	Arctic
	-0.59	-0.59	0.0009	-19.92	0.000	2240	8609	5	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-150.13	0.000	501	23206	5	Greenland	Polar	Pacific	Arctic

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.02	0.02	0.0001	1.75	0.605	6862	6575	6	Atlantic	Walleye	Pacific	Arctic
	0.00	0.00	0.0003	0.18	1.000	6704	6661	6	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0003	-11.08	0.000	1257	1821	6	Atlantic	Walleye	Polar	Arctic
	-0.65	-0.65	0.0038	-10.57	0.000	6862	32330	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0002	71.94	0.000	73694	2965	6	Atlantic	Pacific	Greenland	Arctic
	-0.18	-0.18	0.0005	-7.89	0.000	1815	2599	6	Atlantic	Pacific	Polar	Arctic
	-0.65	-0.65	0.0037	-10.67	0.000	6704	31834	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0002	66.64	0.000	73694	2634	6	Atlantic	Greenland	Pacific	Arctic
	-0.19	-0.19	0.0005	-8.61	0.000	1760	2566	6	Atlantic	Greenland	Polar	Arctic
	-0.84	-0.84	0.0004	-42.18	0.000	1257	14755	6	Atlantic	Polar	Walleye	Arctic
	-0.69	-0.69	0.0005	-29.59	0.000	1815	9840	6	Atlantic	Polar	Pacific	Arctic
	-0.70	-0.70	0.0005	-31.39	0.000	1760	9835	6	Atlantic	Polar	Greenland	Arctic
	-0.66	-0.66	0.0030	-12.15	0.000	6575	32330	6	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0002	69.29	0.000	71769	2654	6	Walleye	Pacific	Greenland	Arctic
	-0.05	-0.05	0.0003	-2.90	0.029	1916	2130	6	Walleye	Pacific	Polar	Arctic
	-0.65	-0.65	0.0027	-12.62	0.000	6661	31834	6	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0002	64.17	0.000	71769	2559	6	Walleye	Greenland	Pacific	Arctic
	-0.07	-0.07	0.0002	-4.57	0.000	1846	2105	6	Walleye	Greenland	Polar	Arctic
	-0.78	-0.78	0.0006	-31.53	0.000	1821	14755	6	Walleye	Polar	Atlantic	Arctic
	-0.68	-0.68	0.0006	-27.45	0.000	1916	9889	6	Walleye	Polar	Pacific	Arctic
	-0.68	-0.68	0.0004	-32.43	0.000	1846	9863	6	Walleye	Polar	Greenland	Arctic
	0.06	0.06	0.0005	2.79	0.042	2965	2634	6	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0003	1.14	1.000	2654	2559	6	Pacific	Greenland	Walleye	Arctic
	-0.03	-0.03	0.0005	-1.47	1.000	481	514	6	Pacific	Greenland	Polar	Arctic
	-0.58	-0.58	0.0004	-28.60	0.000	2599	9840	6	Pacific	Polar	Atlantic	Arctic
	-0.65	-0.65	0.0004	-33.39	0.000	2130	9889	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-147.72	0.000	481	26271	6	Pacific	Polar	Greenland	Arctic
	-0.59	-0.59	0.0004	-27.73	0.000	2566	9835	6	Greenland	Polar	Atlantic	Arctic
	-0.65	-0.65	0.0004	-34.37	0.000	2105	9863	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-117.83	0.000	514	26271	6	Greenland	Polar	Pacific	Arctic

LG06

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.06	0.06	0.0001	6.75	0.000	11101	9895	7	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0001	5.24	0.000	10865	9995	7	Atlantic	Walleye	Greenland	Arctic
	-0.15	-0.15	0.0003	-8.73	0.000	1704	2293	7	Atlantic	Walleye	Polar	Arctic
	-0.51	-0.51	0.0014	-13.81	0.000	11101	34145	7	Atlantic	Pacific	Walleye	Arctic
	0.91	0.91	0.0003	54.15	0.000	90081	4111	7	Atlantic	Pacific	Greenland	Arctic
	-0.19	-0.19	0.0005	-8.40	0.000	2172	3197	7	Atlantic	Pacific	Polar	Arctic
	-0.51	-0.51	0.0014	-13.90	0.000	10865	33557	7	Atlantic	Greenland	Walleye	Arctic
	0.92	0.92	0.0003	55.24	0.000	90081	3714	7	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0004	-10.30	0.000	2138	3181	7	Atlantic	Greenland	Polar	Arctic
	-0.77	-0.77	0.0009	-25.99	0.000	1704	13382	7	Atlantic	Polar	Walleye	Arctic
	-0.62	-0.62	0.0015	-15.92	0.000	2172	9397	7	Atlantic	Polar	Pacific	Arctic
	-0.63	-0.63	0.0014	-17.01	0.000	2138	9434	7	Atlantic	Polar	Greenland	Arctic
	-0.55	-0.55	0.0014	-14.82	0.000	9895	34145	7	Walleye	Pacific	Atlantic	Arctic
	0.92	0.92	0.0003	52.63	0.000	86646	3828	7	Walleye	Pacific	Greenland	Arctic
	-0.08	-0.08	0.0002	-5.03	0.000	2284	2675	7	Walleye	Pacific	Polar	Arctic
	-0.54	-0.54	0.0015	-14.16	0.000	9995	33557	7	Walleye	Greenland	Atlantic	Arctic
	0.92	0.92	0.0003	51.44	0.000	86646	3719	7	Walleye	Greenland	Pacific	Arctic
	-0.08	-0.08	0.0002	-6.62	0.000	2264	2678	7	Walleye	Greenland	Polar	Arctic
	-0.71	-0.71	0.0009	-24.16	0.000	2293	13382	7	Walleye	Polar	Atlantic	Arctic
	-0.62	-0.62	0.0016	-15.63	0.000	2284	9670	7	Walleye	Polar	Pacific	Arctic
	-0.62	-0.62	0.0014	-16.36	0.000	2264	9685	7	Walleye	Polar	Greenland	Arctic
	0.05	0.05	0.0002	4.07	0.000	4111	3714	7	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0001	1.67	0.728	3828	3719	7	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0004	-0.38	1.000	651	660	7	Pacific	Greenland	Polar	Arctic
	-0.49	-0.49	0.0011	-15.01	0.000	3197	9397	7	Pacific	Polar	Atlantic	Arctic
	-0.57	-0.57	0.0013	-16.00	0.000	2675	9670	7	Pacific	Polar	Walleye	Arctic
	-0.95	-0.95	0.0002	-63.04	0.000	651	26637	7	Pacific	Polar	Greenland	Arctic
	-0.50	-0.50	0.0011	-14.89	0.000	3181	9434	7	Greenland	Polar	Atlantic	Arctic
	-0.57	-0.57	0.0013	-15.89	0.000	2678	9685	7	Greenland	Polar	Walleye	Arctic
	-0.95	-0.95	0.0003	-58.36	0.000	660	26637	7	Greenland	Polar	Pacific	Arctic

LG07

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.05	0.05	0.0001	5.47	0.000	8517	7635	6	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0002	3.09	0.016	8315	7690	6	Atlantic	Walleye	Greenland	Arctic
	-0.16	-0.16	0.0001	-21.03	0.000	1426	1971	6	Atlantic	Walleye	Polar	Arctic
	-0.59	-0.59	0.0015	-15.46	0.000	8517	33493	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0002	64.76	0.000	76421	3323	6	Atlantic	Pacific	Greenland	Arctic
	-0.19	-0.19	0.0004	-8.90	0.000	1973	2883	6	Atlantic	Pacific	Polar	Arctic
	-0.60	-0.60	0.0016	-14.78	0.000	8315	32856	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0002	69.51	0.000	76421	2947	6	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0007	-7.69	0.000	1900	2842	6	Atlantic	Greenland	Polar	Arctic
	-0.79	-0.79	0.0003	-42.81	0.000	1426	12047	6	Atlantic	Polar	Walleye	Arctic
	-0.60	-0.60	0.0007	-22.76	0.000	1973	7813	6	Atlantic	Polar	Pacific	Arctic
	-0.61	-0.61	0.0009	-20.52	0.000	1900	7853	6	Atlantic	Polar	Greenland	Arctic
	-0.63	-0.63	0.0011	-18.55	0.000	7635	33493	6	Walleye	Pacific	Atlantic	Arctic
	0.92	0.92	0.0002	61.55	0.000	73770	3063	6	Walleye	Pacific	Greenland	Arctic
	-0.07	-0.07	0.0005	-3.38	0.006	2082	2411	6	Walleye	Pacific	Polar	Arctic
	-0.62	-0.62	0.0012	-18.17	0.000	7690	32856	6	Walleye	Greenland	Atlantic	Arctic
	0.92	0.92	0.0002	63.46	0.000	73770	2922	6	Walleye	Greenland	Pacific	Arctic
	-0.08	-0.08	0.0008	-2.82	0.038	2018	2376	6	Walleye	Greenland	Polar	Arctic
	-0.72	-0.72	0.0005	-33.70	0.000	1971	12047	6	Walleye	Polar	Atlantic	Arctic
	-0.59	-0.59	0.0007	-22.58	0.000	2082	8073	6	Walleye	Polar	Pacific	Arctic
	-0.60	-0.60	0.0008	-20.72	0.000	2018	8043	6	Walleye	Polar	Greenland	Arctic
	0.06	0.06	0.0001	5.03	0.000	3323	2947	6	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0000	3.89	0.001	3063	2922	6	Pacific	Greenland	Walleye	Arctic
	-0.00	-0.00	0.0015	-0.07	1.000	539	542	6	Pacific	Greenland	Polar	Arctic
	-0.46	-0.46	0.0006	-19.33	0.000	2883	7813	6	Pacific	Polar	Atlantic	Arctic
	-0.54	-0.54	0.0004	-28.14	0.000	2411	8073	6	Pacific	Polar	Walleye	Arctic
	-0.95	-0.95	0.0001	-126.57	0.000	539	22830	6	Pacific	Polar	Greenland	Arctic
	-0.47	-0.47	0.0006	-19.57	0.000	2842	7853	6	Greenland	Polar	Atlantic	Arctic
	-0.54	-0.54	0.0003	-29.55	0.000	2376	8043	6	Greenland	Polar	Walleye	Arctic
	-0.95	-0.95	0.0000	-147.97	0.000	542	22830	6	Greenland	Polar	Pacific	Arctic

LG08



Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.05	0.05	0.0001	4.55	0.000	7505	6724	6	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0002	3.15	0.013	7354	6795	6	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0000	-31.90	0.000	1455	2097	6	Atlantic	Walleye	Polar	Arctic
	-0.64	-0.64	0.0017	-15.39	0.000	7505	34318	6	Atlantic	Pacific	Walleye	Arctic
	0.93	0.93	0.0000	205.63	0.000	76723	2684	6	Atlantic	Pacific	Greenland	Arctic
	-0.17	-0.17	0.0002	-10.92	0.000	2271	3214	6	Atlantic	Pacific	Polar	Arctic
	-0.64	-0.64	0.0017	-15.34	0.000	7354	33657	6	Atlantic	Greenland	Walleye	Arctic
	0.94	0.94	0.0000	260.92	0.000	76723	2324	6	Atlantic	Greenland	Pacific	Arctic
	-0.17	-0.17	0.0003	-10.30	0.000	2236	3173	6	Atlantic	Greenland	Polar	Arctic
	-0.81	-0.81	0.0003	-46.58	0.000	1455	13896	6	Atlantic	Polar	Walleye	Arctic
	-0.59	-0.59	0.0004	-28.95	0.000	2271	8820	6	Atlantic	Polar	Pacific	Arctic
	-0.60	-0.60	0.0004	-31.31	0.000	2236	8833	6	Atlantic	Polar	Greenland	Arctic
	-0.67	-0.67	0.0011	-19.85	0.000	6724	34318	6	Walleye	Pacific	Atlantic	Arctic
	0.94	0.94	0.0000	193.07	0.000	74451	2474	6	Walleye	Pacific	Greenland	Arctic
LG09	-0.06	-0.06	0.0003	-3.56	0.003	2343	2654	6	Walleye	Pacific	Polar	Arctic
	-0.66	-0.66	0.0012	-19.12	0.000	6795	33657	6	Walleye	Greenland	Atlantic	Arctic
	0.94	0.94	0.0000	213.42	0.000	74451	2246	6	Walleye	Greenland	Pacific	Arctic
	-0.06	-0.06	0.0004	-3.18	0.012	2317	2632	6	Walleye	Greenland	Polar	Arctic
	-0.74	-0.74	0.0005	-34.54	0.000	2097	13896	6	Walleye	Polar	Atlantic	Arctic
	-0.59	-0.59	0.0004	-27.99	0.000	2343	9035	6	Walleye	Polar	Pacific	Arctic
	-0.59	-0.59	0.0004	-29.83	0.000	2317	9028	6	Walleye	Polar	Greenland	Arctic
	0.07	0.07	0.0001	6.01	0.000	2684	2324	6	Pacific	Greenland	Atlantic	Arctic
	0.05	0.05	0.0001	4.75	0.000	2474	2246	6	Pacific	Greenland	Walleye	Arctic
	0.02	0.02	0.0003	1.26	1.000	505	485	6	Pacific	Greenland	Polar	Arctic
	-0.47	-0.47	0.0003	-24.91	0.000	3214	8820	6	Pacific	Polar	Atlantic	Arctic
	-0.55	-0.55	0.0004	-26.66	0.000	2654	9035	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-276.76	0.000	505	26567	6	Pacific	Polar	Greenland	Arctic
	-0.47	-0.47	0.0004	-23.02	0.000	3173	8833	6	Greenland	Polar	Atlantic	Arctic
	-0.55	-0.55	0.0004	-25.89	0.000	2632	9028	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-295.56	0.000	485	26567	6	Greenland	Polar	Pacific	Arctic

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.05	0.05	0.0002	3.30	0.008	7520	6829	6	Atlantic	Walleye	Pacific	Arctic
	0.03	0.03	0.0002	1.95	0.393	7289	6866	6	Atlantic	Walleye	Greenland	Arctic
	-0.14	-0.14	0.0007	-5.30	0.000	1506	1984	6	Atlantic	Walleye	Polar	Arctic
	-0.62	-0.62	0.0004	-32.70	0.000	7520	32285	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0001	95.58	0.000	76767	3020	6	Atlantic	Pacific	Greenland	Arctic
	-0.17	-0.17	0.0005	-7.75	0.000	2140	3009	6	Atlantic	Pacific	Polar	Arctic
	-0.63	-0.63	0.0004	-33.01	0.000	7289	31818	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0001	96.40	0.000	76767	2756	6	Atlantic	Greenland	Pacific	Arctic
	-0.18	-0.18	0.0006	-7.35	0.000	2085	2986	6	Atlantic	Greenland	Polar	Arctic
	-0.79	-0.79	0.0003	-49.65	0.000	1506	12993	6	Atlantic	Polar	Walleye	Arctic
	-0.61	-0.61	0.0005	-27.58	0.000	2140	8712	6	Atlantic	Polar	Pacific	Arctic
	-0.62	-0.62	0.0005	-28.81	0.000	2085	8764	6	Atlantic	Polar	Greenland	Arctic
	-0.65	-0.65	0.0003	-38.18	0.000	6829	32285	6	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0001	92.26	0.000	74334	2774	6	Walleye	Pacific	Greenland	Arctic
	-0.09	-0.09	0.0002	-6.17	0.000	2151	2565	6	Walleye	Pacific	Polar	Arctic
	-0.65	-0.65	0.0003	-40.44	0.000	6866	31818	6	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0001	89.06	0.000	74334	2715	6	Walleye	Greenland	Pacific	Arctic
	-0.10	-0.10	0.0002	-6.82	0.000	2104	2555	6	Walleye	Greenland	Polar	Arctic
	-0.74	-0.74	0.0003	-45.77	0.000	1984	12993	6	Walleye	Polar	Atlantic	Arctic
	-0.61	-0.61	0.0003	-34.92	0.000	2151	8908	6	Walleye	Polar	Pacific	Arctic
	-0.62	-0.62	0.0003	-37.39	0.000	2104	8880	6	Walleye	Polar	Greenland	Arctic
	0.05	0.05	0.0001	4.60	0.000	3020	2756	6	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0000	1.92	0.424	2774	2715	6	Pacific	Greenland	Walleye	Arctic
	-0.03	-0.03	0.0001	-2.62	0.070	543	578	6	Pacific	Greenland	Polar	Arctic
	-0.49	-0.49	0.0002	-39.62	0.000	3009	8712	6	Pacific	Polar	Atlantic	Arctic
	-0.55	-0.55	0.0002	-40.81	0.000	2565	8908	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-107.06	0.000	543	25307	6	Pacific	Polar	Greenland	Arctic
	-0.49	-0.49	0.0001	-43.60	0.000	2986	8764	6	Greenland	Polar	Atlantic	Arctic
	-0.55	-0.55	0.0002	-41.08	0.000	2555	8880	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-111.18	0.000	578	25307	6	Greenland	Polar	Pacific	Arctic

LG10

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.03	0.03	0.0002	2.05	0.313	7865	7442	6	Atlantic	Walleye	Pacific	Arctic
	0.01	0.01	0.0003	0.39	1.000	7762	7653	6	Atlantic	Walleye	Greenland	Arctic
	-0.20	-0.20	0.0004	-10.00	0.000	1498	2251	6	Atlantic	Walleye	Polar	Arctic
	-0.61	-0.61	0.0031	-10.92	0.000	7865	32165	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0001	90.62	0.000	80688	3175	6	Atlantic	Pacific	Greenland	Arctic
	-0.21	-0.21	0.0003	-12.90	0.000	2038	3109	6	Atlantic	Pacific	Polar	Arctic
	-0.61	-0.61	0.0032	-10.68	0.000	7762	31662	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0001	107.49	0.000	80688	2717	6	Atlantic	Greenland	Pacific	Arctic
	-0.21	-0.21	0.0001	-17.34	0.000	2005	3079	6	Atlantic	Greenland	Polar	Arctic
	-0.83	-0.83	0.0007	-32.02	0.000	1498	15809	6	Atlantic	Polar	Walleye	Arctic
	-0.68	-0.68	0.0011	-20.53	0.000	2038	10847	6	Atlantic	Polar	Pacific	Arctic
	-0.69	-0.69	0.0010	-21.52	0.000	2005	10880	6	Atlantic	Polar	Greenland	Arctic
	-0.62	-0.62	0.0023	-12.90	0.000	7442	32165	6	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0001	93.56	0.000	78651	2866	6	Walleye	Pacific	Greenland	Arctic
	-0.07	-0.07	0.0001	-7.19	0.000	2174	2485	6	Walleye	Pacific	Polar	Arctic
	-0.61	-0.61	0.0024	-12.49	0.000	7653	31662	6	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0001	103.24	0.000	78651	2687	6	Walleye	Greenland	Pacific	Arctic
	-0.07	-0.07	0.0001	-9.14	0.000	2152	2483	6	Walleye	Greenland	Polar	Arctic
	-0.75	-0.75	0.0008	-26.87	0.000	2251	15809	6	Walleye	Polar	Atlantic	Arctic
	-0.67	-0.67	0.0009	-21.88	0.000	2174	11069	6	Walleye	Polar	Pacific	Arctic
	-0.67	-0.67	0.0010	-21.84	0.000	2152	11048	6	Walleye	Polar	Greenland	Arctic
	0.08	0.08	0.0002	6.17	0.000	3175	2717	6	Pacific	Greenland	Atlantic	Arctic
	0.03	0.03	0.0001	3.43	0.005	2866	2687	6	Pacific	Greenland	Walleye	Arctic
	-0.02	-0.02	0.0005	-1.05	1.000	566	594	6	Pacific	Greenland	Polar	Arctic
	-0.55	-0.55	0.0012	-15.78	0.000	3109	10847	6	Pacific	Polar	Atlantic	Arctic
	-0.63	-0.63	0.0011	-19.39	0.000	2485	11069	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-196.32	0.000	566	29481	6	Pacific	Polar	Greenland	Arctic
	-0.56	-0.56	0.0012	-15.94	0.000	3079	10880	6	Greenland	Polar	Atlantic	Arctic
	-0.63	-0.63	0.0011	-18.73	0.000	2483	11048	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-189.25	0.000	594	29481	6	Greenland	Polar	Pacific	Arctic

LG11

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.05	0.05	0.0001	4.17	0.000	9084	8255	6	Atlantic	Walleye	Pacific	Arctic
	0.03	0.03	0.0001	3.62	0.002	8903	8393	6	Atlantic	Walleye	Greenland	Arctic
	-0.17	-0.17	0.0002	-13.09	0.000	1557	2192	6	Atlantic	Walleye	Polar	Arctic
	-0.57	-0.57	0.0004	-29.57	0.000	9084	33489	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0001	120.10	0.000	81285	3212	6	Atlantic	Pacific	Greenland	Arctic
	-0.20	-0.20	0.0005	-9.13	0.000	2205	3291	6	Atlantic	Pacific	Polar	Arctic
	-0.57	-0.57	0.0004	-28.99	0.000	8903	32932	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0000	141.46	0.000	81285	2806	6	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0004	-9.56	0.000	2177	3250	6	Atlantic	Greenland	Polar	Arctic
	-0.80	-0.80	0.0002	-63.93	0.000	1557	13769	6	Atlantic	Polar	Walleye	Arctic
	-0.62	-0.62	0.0012	-17.82	0.000	2205	9459	6	Atlantic	Polar	Pacific	Arctic
	-0.63	-0.63	0.0012	-18.41	0.000	2177	9459	6	Atlantic	Polar	Greenland	Arctic
	-0.60	-0.60	0.0004	-29.12	0.000	8255	33489	6	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0001	113.52	0.000	78672	2970	6	Walleye	Pacific	Greenland	Arctic
	-0.09	-0.09	0.0003	-5.29	0.000	2291	2736	6	Walleye	Pacific	Polar	Arctic
	-0.59	-0.59	0.0004	-29.06	0.000	8393	32932	6	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0001	109.52	0.000	78672	2821	6	Walleye	Greenland	Pacific	Arctic
	-0.09	-0.09	0.0003	-5.09	0.000	2278	2718	6	Walleye	Greenland	Polar	Arctic
	-0.73	-0.73	0.0004	-38.35	0.000	2192	13769	6	Walleye	Polar	Atlantic	Arctic
	-0.62	-0.62	0.0013	-17.33	0.000	2291	9730	6	Walleye	Polar	Pacific	Arctic
	-0.62	-0.62	0.0013	-17.40	0.000	2278	9704	6	Walleye	Polar	Greenland	Arctic
	0.07	0.07	0.0000	17.02	0.000	3212	2806	6	Pacific	Greenland	Atlantic	Arctic
	0.03	0.03	0.0001	2.36	0.142	2970	2821	6	Pacific	Greenland	Walleye	Arctic
	0.01	0.01	0.0002	0.48	1.000	543	536	6	Pacific	Greenland	Polar	Arctic
	-0.48	-0.48	0.0014	-12.71	0.000	3291	9459	6	Pacific	Polar	Atlantic	Arctic
	-0.56	-0.56	0.0011	-17.01	0.000	2736	9730	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-283.56	0.000	543	27047	6	Pacific	Polar	Greenland	Arctic
	-0.49	-0.49	0.0014	-13.06	0.000	3250	9459	6	Greenland	Polar	Atlantic	Arctic
	-0.56	-0.56	0.0010	-17.66	0.000	2718	9704	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-246.84	0.000	536	27047	6	Greenland	Polar	Pacific	Arctic

LG12

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.04	0.04	0.0004	2.08	0.292	7809	7188	6	Atlantic	Walleye	Pacific	Arctic
	0.02	0.02	0.0004	1.19	1.000	7662	7301	6	Atlantic	Walleye	Greenland	Arctic
	-0.16	-0.16	0.0003	-9.16	0.000	1484	2055	6	Atlantic	Walleye	Polar	Arctic
	-0.61	-0.61	0.0008	-21.86	0.000	7809	31734	6	Atlantic	Pacific	Walleye	Arctic
	0.93	0.93	0.0001	131.63	0.000	77030	2824	6	Atlantic	Pacific	Greenland	Arctic
	-0.19	-0.19	0.0004	-10.29	0.000	2028	3006	6	Atlantic	Pacific	Polar	Arctic
	-0.61	-0.61	0.0008	-21.91	0.000	7662	31308	6	Atlantic	Greenland	Walleye	Arctic
	0.94	0.94	0.0000	144.18	0.000	77030	2531	6	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0004	-10.31	0.000	1968	2947	6	Atlantic	Greenland	Polar	Arctic
	-0.81	-0.81	0.0003	-46.56	0.000	1484	13942	6	Atlantic	Polar	Walleye	Arctic
	-0.64	-0.64	0.0010	-19.88	0.000	2028	9284	6	Atlantic	Polar	Pacific	Arctic
	-0.65	-0.65	0.0010	-21.03	0.000	1968	9317	6	Atlantic	Polar	Greenland	Arctic
	-0.63	-0.63	0.0003	-34.40	0.000	7188	31734	6	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0001	130.21	0.000	74553	2536	6	Walleye	Pacific	Greenland	Arctic
	-0.09	-0.09	0.0002	-6.19	0.000	2111	2523	6	Walleye	Pacific	Polar	Arctic
	-0.62	-0.62	0.0004	-31.53	0.000	7301	31308	6	Walleye	Greenland	Atlantic	Arctic
	0.94	0.94	0.0001	128.28	0.000	74553	2414	6	Walleye	Greenland	Pacific	Arctic
	-0.10	-0.10	0.0003	-5.75	0.000	2058	2491	6	Walleye	Greenland	Polar	Arctic
	-0.74	-0.74	0.0003	-41.68	0.000	2055	13942	6	Walleye	Polar	Atlantic	Arctic
	-0.64	-0.64	0.0008	-22.58	0.000	2111	9483	6	Walleye	Polar	Pacific	Arctic
	-0.64	-0.64	0.0008	-22.77	0.000	2058	9496	6	Walleye	Polar	Greenland	Arctic
	0.05	0.05	0.0002	4.38	0.000	2824	2531	6	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0001	2.52	0.093	2536	2414	6	Pacific	Greenland	Walleye	Arctic
	-0.02	-0.02	0.0006	-0.73	1.000	489	508	6	Pacific	Greenland	Polar	Arctic
	-0.51	-0.51	0.0009	-16.98	0.000	3006	9284	6	Pacific	Polar	Atlantic	Arctic
	-0.58	-0.58	0.0007	-22.32	0.000	2523	9483	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-273.96	0.000	489	26555	6	Pacific	Polar	Greenland	Arctic
	-0.52	-0.52	0.0008	-18.38	0.000	2947	9317	6	Greenland	Polar	Atlantic	Arctic
	-0.58	-0.58	0.0006	-23.21	0.000	2491	9496	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-243.38	0.000	508	26555	6	Greenland	Polar	Pacific	Arctic

LG13

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.02	0.02	0.0002	1.79	0.557	7861	7489	6	Atlantic	Walleye	Pacific	Arctic
	0.01	0.01	0.0002	0.56	1.000	7690	7559	6	Atlantic	Walleye	Greenland	Arctic
	-0.25	-0.25	0.0002	-18.41	0.000	1368	2261	6	Atlantic	Walleye	Polar	Arctic
	-0.66	-0.66	0.0014	-17.64	0.000	7861	38059	6	Atlantic	Pacific	Walleye	Arctic
	0.93	0.93	0.0000	170.49	0.000	85819	2942	6	Atlantic	Pacific	Greenland	Arctic
	-0.21	-0.21	0.0001	-18.27	0.000	2199	3382	6	Atlantic	Pacific	Polar	Arctic
	-0.66	-0.66	0.0015	-17.11	0.000	7690	37533	6	Atlantic	Greenland	Walleye	Arctic
	0.94	0.94	0.0000	200.32	0.000	85819	2591	6	Atlantic	Greenland	Pacific	Arctic
	-0.21	-0.21	0.0002	-16.83	0.000	2177	3326	6	Atlantic	Greenland	Polar	Arctic
	-0.84	-0.84	0.0003	-47.89	0.000	1368	16201	6	Atlantic	Polar	Walleye	Arctic
	-0.66	-0.66	0.0010	-20.93	0.000	2199	10587	6	Atlantic	Polar	Pacific	Arctic
	-0.66	-0.66	0.0011	-19.96	0.000	2177	10592	6	Atlantic	Polar	Greenland	Arctic
	-0.67	-0.67	0.0010	-21.07	0.000	7489	38059	6	Walleye	Pacific	Atlantic	Arctic
	0.94	0.94	0.0000	159.14	0.000	83623	2670	6	Walleye	Pacific	Greenland	Arctic
	-0.06	-0.06	0.0001	-6.02	0.000	2393	2698	6	Walleye	Pacific	Polar	Arctic
	-0.66	-0.66	0.0011	-20.37	0.000	7559	37533	6	Walleye	Greenland	Atlantic	Arctic
	0.94	0.94	0.0000	191.57	0.000	83623	2557	6	Walleye	Greenland	Pacific	Arctic
	-0.06	-0.06	0.0001	-6.57	0.000	2364	2670	6	Walleye	Greenland	Polar	Arctic
	-0.76	-0.76	0.0007	-28.96	0.000	2261	16201	6	Walleye	Polar	Atlantic	Arctic
	-0.64	-0.64	0.0010	-19.82	0.000	2393	10783	6	Walleye	Polar	Pacific	Arctic
	-0.64	-0.64	0.0011	-19.05	0.000	2364	10757	6	Walleye	Polar	Greenland	Arctic
	0.06	0.06	0.0000	9.06	0.000	2942	2591	6	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0001	2.27	0.180	2670	2557	6	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0007	-0.27	1.000	524	531	6	Pacific	Greenland	Polar	Arctic
	-0.52	-0.52	0.0016	-12.76	0.000	3382	10587	6	Pacific	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0012	-17.03	0.000	2698	10783	6	Pacific	Polar	Walleye	Arctic
	-0.97	-0.97	0.0000	-303.64	0.000	524	29863	6	Pacific	Polar	Greenland	Arctic
	-0.52	-0.52	0.0015	-13.48	0.000	3326	10592	6	Greenland	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0012	-17.68	0.000	2670	10757	6	Greenland	Polar	Walleye	Arctic
	-0.97	-0.97	0.0000	-375.95	0.000	531	29863	6	Greenland	Polar	Pacific	Arctic

LG14

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.04	0.04	0.0003	2.33	0.153	7851	7291	6	Atlantic	Walleye	Pacific	Arctic
	0.02	0.02	0.0003	0.92	1.000	7622	7370	6	Atlantic	Walleye	Greenland	Arctic
	-0.17	-0.17	0.0006	-6.88	0.000	1489	2096	6	Atlantic	Walleye	Polar	Arctic
	-0.57	-0.57	0.0015	-14.96	0.000	7851	28827	6	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0002	68.31	0.000	73241	3061	6	Atlantic	Pacific	Greenland	Arctic
	-0.17	-0.17	0.0002	-12.83	0.000	1979	2784	6	Atlantic	Pacific	Polar	Arctic
	-0.58	-0.58	0.0013	-15.75	0.000	7622	28485	6	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0002	72.64	0.000	73241	2830	6	Atlantic	Greenland	Pacific	Arctic
	-0.17	-0.17	0.0004	-9.28	0.000	1952	2775	6	Atlantic	Greenland	Polar	Arctic
	-0.80	-0.80	0.0009	-27.18	0.000	1489	13105	6	Atlantic	Polar	Walleye	Arctic
	-0.64	-0.64	0.0013	-17.44	0.000	1979	8990	6	Atlantic	Polar	Pacific	Arctic
	-0.64	-0.64	0.0016	-15.90	0.000	1952	8981	6	Atlantic	Polar	Greenland	Arctic
	-0.60	-0.60	0.0014	-16.04	0.000	7291	28827	6	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0002	69.81	0.000	70946	2737	6	Walleye	Pacific	Greenland	Arctic
	-0.04	-0.04	0.0003	-2.16	0.240	2104	2268	6	Walleye	Pacific	Polar	Arctic
	-0.59	-0.59	0.0014	-15.54	0.000	7370	28485	6	Walleye	Greenland	Atlantic	Arctic
	0.92	0.92	0.0002	65.90	0.000	70946	2781	6	Walleye	Greenland	Pacific	Arctic
	-0.05	-0.05	0.0004	-2.40	0.129	2067	2275	6	Walleye	Greenland	Polar	Arctic
	-0.72	-0.72	0.0009	-23.95	0.000	2096	13105	6	Walleye	Polar	Atlantic	Arctic
	-0.63	-0.63	0.0014	-16.74	0.000	2104	9213	6	Walleye	Polar	Pacific	Arctic
	-0.63	-0.63	0.0016	-15.77	0.000	2067	9115	6	Walleye	Polar	Greenland	Arctic
	0.04	0.04	0.0001	3.40	0.006	3061	2830	6	Pacific	Greenland	Atlantic	Arctic
	-0.01	-0.01	0.0002	-0.50	1.000	2737	2781	6	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0003	-0.71	1.000	559	573	6	Pacific	Greenland	Polar	Arctic
	-0.53	-0.53	0.0014	-13.98	0.000	2784	8990	6	Pacific	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0012	-17.27	0.000	2268	9213	6	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-102.79	0.000	559	25076	6	Pacific	Polar	Greenland	Arctic
	-0.53	-0.53	0.0014	-13.94	0.000	2775	8981	6	Greenland	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0013	-16.88	0.000	2275	9115	6	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-104.18	0.000	573	25076	6	Greenland	Polar	Pacific	Arctic

LG15

Table S3. (continued)

	$D$	JK $D$	V.JK $D$	$Z$	$P_{BY}$	$n_{ABBA}$	$n_{BABA}$	BI	$H_1$	$H_2$	$H_3$	$H_4$
	0.04	0.04	0.0001	5.09	0.000	8976	8240	7	Atlantic	Walleye	Pacific	Arctic
	0.02	0.02	0.0001	2.22	0.207	8749	8327	7	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0005	-7.97	0.000	1646	2365	7	Atlantic	Walleye	Polar	Arctic
	-0.59	-0.59	0.0012	-17.12	0.000	8976	35112	7	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0002	72.81	0.000	86871	3540	7	Atlantic	Pacific	Greenland	Arctic
	-0.16	-0.16	0.0009	-5.42	0.000	2426	3357	7	Atlantic	Pacific	Polar	Arctic
	-0.60	-0.60	0.0012	-17.25	0.000	8749	34610	7	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0002	75.39	0.000	86871	3271	7	Atlantic	Greenland	Pacific	Arctic
	-0.16	-0.16	0.0007	-6.00	0.000	2378	3310	7	Atlantic	Greenland	Polar	Arctic
	-0.81	-0.81	0.0006	-33.25	0.000	1646	15596	7	Atlantic	Polar	Walleye	Arctic
	-0.63	-0.63	0.0016	-15.89	0.000	2426	10634	7	Atlantic	Polar	Pacific	Arctic
	-0.64	-0.64	0.0016	-16.04	0.000	2378	10668	7	Atlantic	Polar	Greenland	Arctic
	-0.62	-0.62	0.0009	-21.03	0.000	8240	35112	7	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0002	66.75	0.000	84071	3275	7	Walleye	Pacific	Greenland	Arctic
	-0.05	-0.05	0.0006	-1.81	0.534	2496	2735	7	Walleye	Pacific	Polar	Arctic
	-0.61	-0.61	0.0009	-20.77	0.000	8327	34610	7	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0002	67.57	0.000	84071	3252	7	Walleye	Greenland	Pacific	Arctic
	-0.04	-0.04	0.0005	-1.91	0.431	2467	2696	7	Walleye	Greenland	Polar	Arctic
	-0.74	-0.74	0.0006	-30.53	0.000	2365	15596	7	Walleye	Polar	Atlantic	Arctic
	-0.63	-0.63	0.0014	-16.71	0.000	2496	10854	7	Walleye	Polar	Pacific	Arctic
	-0.63	-0.63	0.0015	-16.41	0.000	2467	10823	7	Walleye	Polar	Greenland	Arctic
	0.04	0.04	0.0001	4.63	0.000	3540	3271	7	Pacific	Greenland	Atlantic	Arctic
	0.00	0.00	0.0001	0.39	1.000	3275	3252	7	Pacific	Greenland	Walleye	Arctic
	-0.00	-0.00	0.0007	-0.05	1.000	628	630	7	Pacific	Greenland	Polar	Arctic
	-0.52	-0.52	0.0014	-14.01	0.000	3357	10634	7	Pacific	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0014	-16.09	0.000	2735	10854	7	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-145.57	0.000	628	29638	7	Pacific	Polar	Greenland	Arctic
	-0.53	-0.53	0.0013	-14.75	0.000	3310	10668	7	Greenland	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0013	-16.55	0.000	2696	10823	7	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-130.73	0.000	630	29638	7	Greenland	Polar	Pacific	Arctic

LG16



Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.08	0.08	0.0003	4.89	0.000	7478	6335	4	Atlantic	Walleye	Pacific	Arctic
	0.06	0.06	0.0003	3.45	0.005	7198	6343	4	Atlantic	Walleye	Greenland	Arctic
	-0.15	-0.15	0.0004	-7.22	0.000	1091	1467	4	Atlantic	Walleye	Polar	Arctic
	-0.48	-0.48	0.0003	-25.77	0.000	7478	21381	4	Atlantic	Pacific	Walleye	Arctic
	0.91	0.91	0.0001	95.42	0.000	55103	2591	4	Atlantic	Pacific	Greenland	Arctic
	-0.18	-0.18	0.0006	-7.51	0.000	1347	1931	4	Atlantic	Pacific	Polar	Arctic
	-0.49	-0.49	0.0003	-26.93	0.000	7198	20853	4	Atlantic	Greenland	Walleye	Arctic
	0.92	0.92	0.0001	95.37	0.000	55103	2348	4	Atlantic	Greenland	Pacific	Arctic
	-0.19	-0.19	0.0004	-9.19	0.000	1299	1899	4	Atlantic	Greenland	Polar	Arctic
	-0.74	-0.74	0.0003	-43.00	0.000	1091	7221	4	Atlantic	Polar	Walleye	Arctic
	-0.58	-0.58	0.0004	-28.30	0.000	1347	5099	4	Atlantic	Polar	Pacific	Arctic
	-0.59	-0.59	0.0007	-21.83	0.000	1299	5061	4	Atlantic	Polar	Greenland	Arctic
	-0.54	-0.54	0.0001	-63.33	0.000	6335	21381	4	Walleye	Pacific	Atlantic	Arctic
	0.91	0.91	0.0001	101.02	0.000	52376	2388	4	Walleye	Pacific	Greenland	Arctic
	-0.06	-0.06	0.0006	-2.32	0.158	1430	1600	4	Walleye	Pacific	Polar	Arctic
	-0.53	-0.53	0.0001	-50.57	0.000	6343	20853	4	Walleye	Greenland	Atlantic	Arctic
	0.92	0.92	0.0001	82.71	0.000	52376	2310	4	Walleye	Greenland	Pacific	Arctic
	-0.06	-0.06	0.0007	-2.34	0.151	1394	1572	4	Walleye	Greenland	Polar	Arctic
	-0.66	-0.66	0.0003	-38.28	0.000	1467	7221	4	Walleye	Polar	Atlantic	Arctic
	-0.58	-0.58	0.0009	-19.59	0.000	1430	5320	4	Walleye	Polar	Pacific	Arctic
	-0.58	-0.58	0.0011	-17.45	0.000	1394	5281	4	Walleye	Polar	Greenland	Arctic
	0.05	0.05	0.0001	4.34	0.000	2591	2348	4	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0002	1.24	1.000	2388	2310	4	Pacific	Greenland	Walleye	Arctic
	-0.01	-0.01	0.0020	-0.30	1.000	416	428	4	Pacific	Greenland	Polar	Arctic
	-0.45	-0.45	0.0019	-10.35	0.000	1931	5099	4	Pacific	Polar	Atlantic	Arctic
	-0.54	-0.54	0.0016	-13.28	0.000	1600	5320	4	Pacific	Polar	Walleye	Arctic
	-0.94	-0.94	0.0000	-487.49	0.000	416	14296	4	Pacific	Polar	Greenland	Arctic
	-0.45	-0.45	0.0018	-10.79	0.000	1899	5061	4	Greenland	Polar	Atlantic	Arctic
	-0.54	-0.54	0.0015	-13.89	0.000	1572	5281	4	Greenland	Polar	Walleye	Arctic
	-0.94	-0.94	0.0000	-209.43	0.000	428	14296	4	Greenland	Polar	Pacific	Arctic

LG17

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.04	0.04	0.0002	2.93	0.027	7783	7224	5	Atlantic	Walleye	Pacific	Arctic
	0.02	0.02	0.0003	0.88	1.000	7545	7316	5	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0002	-13.82	0.000	1217	1765	5	Atlantic	Walleye	Polar	Arctic
	-0.57	-0.57	0.0007	-21.12	0.000	7783	28116	5	Atlantic	Pacific	Walleye	Arctic
	0.93	0.93	0.0001	90.42	0.000	69880	2544	5	Atlantic	Pacific	Greenland	Arctic
	-0.21	-0.21	0.0001	-17.39	0.000	1712	2598	5	Atlantic	Pacific	Polar	Arctic
	-0.57	-0.57	0.0007	-21.93	0.000	7545	27634	5	Atlantic	Greenland	Walleye	Arctic
	0.94	0.94	0.0001	95.10	0.000	69880	2277	5	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0001	-17.06	0.000	1700	2529	5	Atlantic	Greenland	Polar	Arctic
	-0.79	-0.79	0.0003	-47.36	0.000	1217	10570	5	Atlantic	Polar	Walleye	Arctic
	-0.62	-0.62	0.0005	-28.41	0.000	1712	7392	5	Atlantic	Polar	Pacific	Arctic
	-0.63	-0.63	0.0005	-28.32	0.000	1700	7408	5	Atlantic	Polar	Greenland	Arctic
	-0.59	-0.59	0.0005	-25.84	0.000	7224	28116	5	Walleye	Pacific	Atlantic	Arctic
	0.94	0.94	0.0001	95.29	0.000	67876	2270	5	Walleye	Pacific	Greenland	Arctic
	-0.09	-0.09	0.0001	-9.12	0.000	1816	2158	5	Walleye	Pacific	Polar	Arctic
	-0.58	-0.58	0.0006	-24.73	0.000	7316	27634	5	Walleye	Greenland	Atlantic	Arctic
	0.94	0.94	0.0001	91.52	0.000	67876	2216	5	Walleye	Greenland	Pacific	Arctic
	-0.08	-0.08	0.0001	-7.47	0.000	1807	2103	5	Walleye	Greenland	Polar	Arctic
	-0.71	-0.71	0.0005	-30.79	0.000	1765	10570	5	Walleye	Polar	Atlantic	Arctic
	-0.61	-0.61	0.0004	-29.83	0.000	1816	7568	5	Walleye	Polar	Pacific	Arctic
	-0.61	-0.61	0.0005	-27.26	0.000	1807	7535	5	Walleye	Polar	Greenland	Arctic
	0.06	0.06	0.0002	3.68	0.002	2544	2277	5	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0002	0.89	1.000	2270	2216	5	Pacific	Greenland	Walleye	Arctic
	0.03	0.03	0.0003	1.52	0.982	427	405	5	Pacific	Greenland	Polar	Arctic
	-0.48	-0.48	0.0007	-17.66	0.000	2598	7392	5	Pacific	Polar	Atlantic	Arctic
	-0.56	-0.56	0.0005	-25.24	0.000	2158	7568	5	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-148.37	0.000	427	21086	5	Pacific	Polar	Greenland	Arctic
	-0.49	-0.49	0.0007	-18.08	0.000	2529	7408	5	Greenland	Polar	Atlantic	Arctic
	-0.56	-0.56	0.0005	-25.63	0.000	2103	7535	5	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-148.95	0.000	405	21086	5	Greenland	Polar	Pacific	Arctic

LG18

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.05	0.05	0.0001	4.21	0.000	7525	6861	5	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0001	4.06	0.000	7368	6837	5	Atlantic	Walleye	Greenland	Arctic
	-0.20	-0.20	0.0001	-16.31	0.000	1102	1649	5	Atlantic	Walleye	Polar	Arctic
	-0.56	-0.56	0.0011	-16.41	0.000	7525	26308	5	Atlantic	Pacific	Walleye	Arctic
	0.93	0.93	0.0001	112.32	0.000	67172	2359	5	Atlantic	Pacific	Greenland	Arctic
	-0.19	-0.19	0.0001	-17.83	0.000	1535	2266	5	Atlantic	Pacific	Polar	Arctic
	-0.56	-0.56	0.0011	-16.45	0.000	7368	25946	5	Atlantic	Greenland	Walleye	Arctic
	0.94	0.94	0.0001	113.87	0.000	67172	2198	5	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0001	-26.00	0.000	1493	2262	5	Atlantic	Greenland	Polar	Arctic
	-0.79	-0.79	0.0002	-55.15	0.000	1102	9469	5	Atlantic	Polar	Walleye	Arctic
	-0.62	-0.62	0.0003	-33.81	0.000	1535	6542	5	Atlantic	Polar	Pacific	Arctic
	-0.63	-0.63	0.0003	-34.46	0.000	1493	6543	5	Atlantic	Polar	Greenland	Arctic
	-0.59	-0.59	0.0013	-16.08	0.000	6861	26308	5	Walleye	Pacific	Atlantic	Arctic
	0.94	0.94	0.0001	108.23	0.000	64873	2166	5	Walleye	Pacific	Greenland	Arctic
	-0.05	-0.05	0.0003	-2.92	0.028	1686	1854	5	Walleye	Pacific	Polar	Arctic
	-0.58	-0.58	0.0013	-15.99	0.000	6837	25946	5	Walleye	Greenland	Atlantic	Arctic
	0.94	0.94	0.0001	127.64	0.000	64873	2103	5	Walleye	Greenland	Pacific	Arctic
	-0.06	-0.06	0.0002	-4.07	0.000	1635	1853	5	Walleye	Greenland	Polar	Arctic
	-0.70	-0.70	0.0004	-36.37	0.000	1649	9469	5	Walleye	Polar	Atlantic	Arctic
	-0.60	-0.60	0.0005	-27.63	0.000	1686	6764	5	Walleye	Polar	Pacific	Arctic
	-0.61	-0.61	0.0005	-27.47	0.000	1635	6741	5	Walleye	Polar	Greenland	Arctic
	0.04	0.04	0.0001	3.50	0.004	2359	2198	5	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0002	1.06	1.000	2166	2103	5	Pacific	Greenland	Walleye	Arctic
	-0.04	-0.04	0.0007	-1.67	0.724	347	379	5	Pacific	Greenland	Polar	Arctic
	-0.49	-0.49	0.0003	-27.61	0.000	2266	6542	5	Pacific	Polar	Atlantic	Arctic
	-0.57	-0.57	0.0002	-37.99	0.000	1854	6764	5	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-279.53	0.000	347	18971	5	Pacific	Polar	Greenland	Arctic
	-0.49	-0.49	0.0003	-27.26	0.000	2262	6543	5	Greenland	Polar	Atlantic	Arctic
	-0.57	-0.57	0.0002	-37.28	0.000	1853	6741	5	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-212.54	0.000	379	18971	5	Greenland	Polar	Pacific	Arctic

LG19

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.01	0.01	0.0003	0.32	1.000	6140	6072	5	Atlantic	Walleye	Pacific	Arctic
	-0.02	-0.02	0.0002	-1.08	1.000	5962	6148	5	Atlantic	Walleye	Greenland	Arctic
	-0.21	-0.21	0.0001	-18.89	0.000	1143	1735	5	Atlantic	Walleye	Polar	Arctic
	-0.61	-0.61	0.0016	-15.42	0.000	6140	25588	5	Atlantic	Pacific	Walleye	Arctic
	0.93	0.93	0.0001	83.41	0.000	67635	2407	5	Atlantic	Pacific	Greenland	Arctic
	-0.14	-0.14	0.0004	-7.45	0.000	1756	2330	5	Atlantic	Pacific	Polar	Arctic
	-0.62	-0.62	0.0015	-16.00	0.000	5962	25123	5	Atlantic	Greenland	Walleye	Arctic
	0.94	0.94	0.0001	90.47	0.000	67635	2163	5	Atlantic	Greenland	Pacific	Arctic
	-0.13	-0.13	0.0004	-6.75	0.000	1763	2310	5	Atlantic	Greenland	Polar	Arctic
	-0.83	-0.83	0.0006	-34.78	0.000	1143	12236	5	Atlantic	Polar	Walleye	Arctic
	-0.66	-0.66	0.0022	-14.10	0.000	1756	8465	5	Atlantic	Polar	Pacific	Arctic
	-0.66	-0.66	0.0020	-14.80	0.000	1763	8496	5	Atlantic	Polar	Greenland	Arctic
	-0.62	-0.62	0.0019	-14.22	0.000	6072	25588	5	Walleye	Pacific	Atlantic	Arctic
	0.94	0.94	0.0001	79.85	0.000	66013	2180	5	Walleye	Pacific	Greenland	Arctic
	0.00	0.00	0.0001	0.21	1.000	1837	1828	5	Walleye	Pacific	Polar	Arctic
LG20	-0.61	-0.61	0.0019	-14.01	0.000	6148	25123	5	Walleye	Greenland	Atlantic	Arctic
	0.94	0.94	0.0001	91.48	0.000	66013	2077	5	Walleye	Greenland	Pacific	Arctic
	0.01	0.01	0.0002	0.78	1.000	1849	1804	5	Walleye	Greenland	Polar	Arctic
	-0.75	-0.75	0.0009	-25.31	0.000	1735	12236	5	Walleye	Polar	Atlantic	Arctic
	-0.65	-0.65	0.0020	-14.50	0.000	1837	8568	5	Walleye	Polar	Pacific	Arctic
	-0.64	-0.64	0.0020	-14.54	0.000	1849	8548	5	Walleye	Polar	Greenland	Arctic
	0.05	0.05	0.0000	11.23	0.000	2407	2163	5	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0004	1.28	1.000	2180	2077	5	Pacific	Greenland	Walleye	Arctic
	0.03	0.03	0.0012	0.99	1.000	451	422	5	Pacific	Greenland	Polar	Arctic
	-0.57	-0.57	0.0024	-11.72	0.000	2330	8465	5	Pacific	Polar	Atlantic	Arctic
	-0.65	-0.65	0.0017	-15.84	0.000	1828	8568	5	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-156.25	0.000	451	23974	5	Pacific	Polar	Greenland	Arctic
	-0.57	-0.57	0.0024	-11.79	0.000	2310	8496	5	Greenland	Polar	Atlantic	Arctic
	-0.65	-0.65	0.0017	-15.61	0.000	1804	8548	5	Greenland	Polar	Walleye	Arctic
	-0.97	-0.97	0.0000	-165.43	0.000	422	23974	5	Greenland	Polar	Pacific	Arctic

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.06	0.06	0.0000	8.42	0.000	7077	6329	5	Atlantic	Walleye	Pacific	Arctic
	0.04	0.04	0.0000	7.56	0.000	6948	6433	5	Atlantic	Walleye	Greenland	Arctic
	-0.17	-0.17	0.0006	-6.82	0.000	1132	1591	5	Atlantic	Walleye	Polar	Arctic
	-0.58	-0.58	0.0008	-20.81	0.000	7077	26862	5	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0001	99.14	0.000	65485	2655	5	Atlantic	Pacific	Greenland	Arctic
	-0.19	-0.19	0.0004	-10.05	0.000	1598	2351	5	Atlantic	Pacific	Polar	Arctic
	-0.58	-0.58	0.0009	-19.69	0.000	6948	26402	5	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0001	99.25	0.000	65485	2367	5	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0002	-13.29	0.000	1557	2325	5	Atlantic	Greenland	Polar	Arctic
	-0.82	-0.82	0.0002	-62.07	0.000	1132	11228	5	Atlantic	Polar	Walleye	Arctic
	-0.67	-0.67	0.0003	-36.59	0.000	1598	7946	5	Atlantic	Polar	Pacific	Arctic
	-0.67	-0.67	0.0003	-39.11	0.000	1557	7975	5	Atlantic	Polar	Greenland	Arctic
	-0.62	-0.62	0.0007	-22.68	0.000	6329	26862	5	Walleye	Pacific	Atlantic	Arctic
	0.93	0.93	0.0001	90.69	0.000	63157	2433	5	Walleye	Pacific	Greenland	Arctic
	-0.09	-0.09	0.0000	-13.83	0.000	1633	1938	5	Walleye	Pacific	Polar	Arctic
	-0.61	-0.61	0.0008	-21.67	0.000	6433	26402	5	Walleye	Greenland	Atlantic	Arctic
	0.93	0.93	0.0001	91.12	0.000	63157	2346	5	Walleye	Greenland	Pacific	Arctic
	-0.09	-0.09	0.0001	-10.62	0.000	1601	1927	5	Walleye	Greenland	Polar	Arctic
	-0.75	-0.75	0.0005	-35.10	0.000	1591	11228	5	Walleye	Polar	Atlantic	Arctic
	-0.66	-0.66	0.0005	-29.37	0.000	1633	8062	5	Walleye	Polar	Pacific	Arctic
	-0.67	-0.67	0.0005	-30.83	0.000	1601	8036	5	Walleye	Polar	Greenland	Arctic
	0.06	0.06	0.0001	6.74	0.000	2655	2367	5	Pacific	Greenland	Atlantic	Arctic
	0.02	0.02	0.0001	2.11	0.273	2433	2346	5	Pacific	Greenland	Walleye	Arctic
	-0.02	-0.02	0.0011	-0.71	1.000	403	423	5	Pacific	Greenland	Polar	Arctic
	-0.54	-0.54	0.0007	-20.61	0.000	2351	7946	5	Pacific	Polar	Atlantic	Arctic
	-0.61	-0.61	0.0005	-27.35	0.000	1938	8062	5	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-147.47	0.000	403	21166	5	Pacific	Polar	Greenland	Arctic
	-0.55	-0.55	0.0007	-21.49	0.000	2325	7975	5	Greenland	Polar	Atlantic	Arctic
	-0.61	-0.61	0.0005	-27.45	0.000	1927	8036	5	Greenland	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-149.48	0.000	423	21166	5	Greenland	Polar	Pacific	Arctic

LG21

Table S3. (continued)

	$D$	$JK D$	$VJK D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	$BI$	$H_1$	$H_2$	$H_3$	$H_4$
	0.09	0.09	0.0005	3.68	0.002	7629	6427	5	Atlantic	Walleye	Pacific	Arctic
	0.06	0.06	0.0005	2.49	0.101	7276	6492	5	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0004	-8.38	0.000	1143	1635	5	Atlantic	Walleye	Polar	Arctic
	-0.56	-0.56	0.0045	-8.31	0.000	7629	26996	5	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0003	54.94	0.000	64365	2667	5	Atlantic	Pacific	Greenland	Arctic
	-0.19	-0.19	0.0003	-11.36	0.000	1635	2389	5	Atlantic	Pacific	Polar	Arctic
	-0.57	-0.57	0.0042	-8.82	0.000	7276	26638	5	Atlantic	Greenland	Walleye	Arctic
	0.93	0.93	0.0003	52.07	0.000	64365	2461	5	Atlantic	Greenland	Pacific	Arctic
	-0.20	-0.20	0.0003	-11.31	0.000	1575	2347	5	Atlantic	Greenland	Polar	Arctic
	-0.79	-0.79	0.0014	-21.50	0.000	1143	10000	5	Atlantic	Polar	Walleye	Arctic
	-0.61	-0.61	0.0014	-16.58	0.000	1635	6844	5	Atlantic	Polar	Pacific	Arctic
	-0.63	-0.63	0.0014	-17.04	0.000	1575	6849	5	Atlantic	Polar	Greenland	Arctic
	-0.62	-0.62	0.0023	-12.84	0.000	6427	26996	5	Walleye	Pacific	Atlantic	Arctic
	0.92	0.92	0.0003	52.34	0.000	61734	2413	5	Walleye	Pacific	Greenland	Arctic
	-0.07	-0.07	0.0002	-5.27	0.000	1687	1952	5	Walleye	Pacific	Polar	Arctic
	-0.61	-0.61	0.0023	-12.69	0.000	6492	26638	5	Walleye	Greenland	Atlantic	Arctic
	0.92	0.92	0.0004	43.80	0.000	61734	2488	5	Walleye	Greenland	Pacific	Arctic
	-0.08	-0.08	0.0001	-7.57	0.000	1632	1929	5	Walleye	Greenland	Polar	Arctic
	-0.72	-0.72	0.0015	-18.57	0.000	1635	10000	5	Walleye	Polar	Atlantic	Arctic
	-0.62	-0.62	0.0011	-18.60	0.000	1687	7084	5	Walleye	Polar	Pacific	Arctic
	-0.62	-0.62	0.0011	-19.15	0.000	1632	7041	5	Walleye	Polar	Greenland	Arctic
	0.04	0.04	0.0001	3.39	0.006	2667	2461	5	Pacific	Greenland	Atlantic	Arctic
	-0.02	-0.02	0.0002	-1.09	1.000	2413	2488	5	Pacific	Greenland	Walleye	Arctic
	-0.03	-0.03	0.0009	-0.97	1.000	433	460	5	Pacific	Greenland	Polar	Arctic
	-0.48	-0.48	0.0011	-14.42	0.000	2389	6844	5	Pacific	Polar	Atlantic	Arctic
	-0.57	-0.57	0.0009	-19.00	0.000	1952	7084	5	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0001	-80.00	0.000	433	19599	5	Pacific	Polar	Greenland	Arctic
	-0.49	-0.49	0.0012	-13.89	0.000	2347	6849	5	Greenland	Polar	Atlantic	Arctic
	-0.57	-0.57	0.0009	-18.66	0.000	1929	7041	5	Greenland	Polar	Walleye	Arctic
	-0.95	-0.95	0.0001	-84.02	0.000	460	19599	5	Greenland	Polar	Pacific	Arctic

LG22

Table S3. (continued)

	$D$	JK $D$	V.JK $D$	$Z$	$P_{BY}$	$nABBA$	$nBABA$	BI	$H_1$	$H_2$	$H_3$	$H_4$
	0.07	0.07	0.0001	8.00	0.000	8499	7344	5	Atlantic	Walleye	Pacific	Arctic
	0.06	0.06	0.0001	4.69	0.000	8285	7402	5	Atlantic	Walleye	Greenland	Arctic
	-0.18	-0.18	0.0002	-13.21	0.000	1355	1970	5	Atlantic	Walleye	Polar	Arctic
	-0.51	-0.51	0.0036	-8.52	0.000	8499	26415	5	Atlantic	Pacific	Walleye	Arctic
	0.92	0.92	0.0001	102.13	0.000	67671	2899	5	Atlantic	Pacific	Greenland	Arctic
	-0.16	-0.16	0.0009	-5.36	0.000	1939	2663	5	Atlantic	Pacific	Polar	Arctic
	-0.52	-0.52	0.0038	-8.41	0.000	8285	25977	5	Atlantic	Greenland	Walleye	Arctic
	0.92	0.92	0.0001	95.21	0.000	67671	2653	5	Atlantic	Greenland	Pacific	Arctic
	-0.17	-0.17	0.0009	-5.56	0.000	1888	2637	5	Atlantic	Greenland	Polar	Arctic
	-0.78	-0.78	0.0005	-35.34	0.000	1355	10881	5	Atlantic	Polar	Walleye	Arctic
	-0.59	-0.59	0.0003	-35.84	0.000	1939	7462	5	Atlantic	Polar	Pacific	Arctic
	-0.60	-0.60	0.0002	-45.23	0.000	1888	7514	5	Atlantic	Polar	Greenland	Arctic
	-0.56	-0.56	0.0025	-11.28	0.000	7344	26415	5	Walleye	Pacific	Atlantic	Arctic
	0.92	0.92	0.0001	81.56	0.000	65014	2685	5	Walleye	Pacific	Greenland	Arctic
LG23	-0.04	-0.04	0.0005	-1.61	0.819	2007	2156	5	Walleye	Pacific	Polar	Arctic
	-0.56	-0.56	0.0025	-11.08	0.000	7402	25977	5	Walleye	Greenland	Atlantic	Arctic
	0.92	0.92	0.0001	87.23	0.000	65014	2628	5	Walleye	Greenland	Pacific	Arctic
	-0.04	-0.04	0.0005	-1.81	0.534	1962	2129	5	Walleye	Greenland	Polar	Arctic
	-0.69	-0.69	0.0007	-26.58	0.000	1970	10881	5	Walleye	Polar	Atlantic	Arctic
	-0.59	-0.59	0.0002	-44.75	0.000	2007	7764	5	Walleye	Polar	Pacific	Arctic
	-0.60	-0.60	0.0001	-49.18	0.000	1962	7760	5	Walleye	Polar	Greenland	Arctic
	0.04	0.04	0.0001	3.62	0.002	2899	2653	5	Pacific	Greenland	Atlantic	Arctic
	0.01	0.01	0.0001	1.46	1.000	2685	2628	5	Pacific	Greenland	Walleye	Arctic
	0.01	0.01	0.0003	0.35	1.000	495	489	5	Pacific	Greenland	Polar	Arctic
	-0.47	-0.47	0.0003	-25.85	0.000	2663	7462	5	Pacific	Polar	Atlantic	Arctic
	-0.57	-0.57	0.0002	-41.01	0.000	2156	7764	5	Pacific	Polar	Walleye	Arctic
	-0.96	-0.96	0.0000	-181.21	0.000	495	21992	5	Pacific	Polar	Greenland	Arctic
	-0.48	-0.48	0.0004	-24.99	0.000	2637	7514	5	Greenland	Polar	Atlantic	Arctic
-0.57	-0.57	0.0002	-41.13	0.000	2129	7760	5	Greenland	Polar	Walleye	Arctic	
-0.96	-0.96	0.0000	-151.07	0.000	489	21992	5	Greenland	Polar	Pacific	Arctic	

**Table S4.  $D_{\text{FOIL}}$  statistics of admixture and introgression.** Based on method and software from (59). All tests of  $D$  statistics were statistically significant determined by a  $\chi^2$  goodness of fit test. However, the comparisons did not show the diagnostic patterns with at least one non-significant  $D$  that are necessary for detecting the direction of introgression (59). Also given in the lower panel are checks of concordance and discordance, that divergence is correctly ordered, and that terminal substitutions are higher among inner than outer taxa. Taxon labels are Greenland for Greenland cod, Pacific for Pacific cod, Walleye for walleye pollock, Arctic for Arctic cod, Atl\_Ice and Atl\_Tri for Atlantic cod from Iceland and Trinity Bay Newfoundland respectively. Based on the `gadmor1` assembly used by (29).

Tree	$D_{FO}$	$D_{IL}$	$D_{FI}$	$D_{OL}$
(((Greenland, Pacific), Atl_Ice), Walleye), Arctic)	-0.006	-0.006	-0.027	-0.028
(((Atl_Ice, Atl_Tri), Walleye), Pacific), Arctic)	+0.261	+0.261	-0.013	-0.012

Tree	Concordance > Discordance	Order $P_1/\backslash P_2 < P_3/\backslash P_4$	Terminal B/A:A/B
(((Greenland, Pacific), Atl_Ice), Walleye), Arctic)	Pass	Pass	Pass
(((Atl_Ice, Atl_Tri), Walleye), Pacific), Arctic)	Con < Dis	Pass	Pass



**Table S5. Summary statistics of sequencing coverage.** Mean  $\bar{Y}$ , first quartile  $Q_1$ , median  $M$ , third quartile  $Q_3$ , and standard deviation  $s$ . Coverage was estimated with `samtools depth`.

	Taxon	$\bar{Y}$	$Q_1$	$M$	$Q_3$	$s$
1	Arctic cod	12.0	5	8	12	55.9
2	Polar cod	2.8	1	2	3	18.0
3	Greenland cod	17.8	9	14	20	54.6
5	Pacific cod	27.5	15	23	30	74.3
4	Walleye pollock	20.6	11	17	22	70.6
6	Atlantic cod Sab	23.9	12	20	29	57.0
7	Atlantic cod Tri	45.2	30	40	49	87.6
8	Atlantic cod Ice7	28.3	18	24	31	63.5
9	Atlantic cod Ice3	25.9	16	22	29	61.9
10	Atlantic cod Nse2	26.4	17	23	29	61.6
11	Atlantic cod Nse8	30.1	20	26	32	69.6

**Table S6. Number of parsimony informative sites, number of blocks of 5000 parsimony-informative characters and number of mdl generated “recombinational genes” used in the SNaQ (32) analysis of different linkage groups.**

Linkage Group	Number of		
	Parsimony informative sites	Blocks	mdl genes
LG01	664687	169428	4259
LG02	565196	144078	3788
LG03	620023	158101	4627
LG04	811548	206686	6246
LG05	528925	134695	3884
LG06	532314	135450	3786
LG07	702590	178851	4752
LG08	579539	147706	4376
LG09	547265	139251	3910
LG10	556124	141603	3887
LG11	585207	149181	4139
LG12	592669	150828	4002
LG13	538737	137166	3764
LG14	616864	157015	4391
LG15	542853	138135	3952
LG16	632901	161115	4577
LG17	437674	111303	3332
LG18	506250	128866	3750
LG19	484376	123390	3611
LG20	484296	123346	3478
LG21	489167	124578	3540
LG22	477190	121378	3552
LG23	350990	89305	2985
Median	547265	139251	3887