Table S1. Time series showing the number of individuals sampled per year for each species and cluster of species in the sample.

Species / clusters	Total individuals	Total years	2010	2013	2014	2015	2016	2017	2018	2019	2020	2021
Am. eel	16	2								10	6	
Am. plaice	195	9		12	34	29	24	27	30	10	19	10
Arc. cod	124	6			14	17	8	35	25		25	
Arc. krill	16	2						2			14	
Atl. cod	192	9	25	13	23	32		26	19	20	24	10
Atl. herring	194	10	2	11	2	23	36	29	32	16	34	9
Atl. mackerel	53	4			10	22		7			14	
Atl. seasnail	11	1								11		
Atl. tomcod	26	2								16	10	
beluga	62	9	10	6	4	7	5	9	5	10	6	
capelin	190	10	9	7	2	25	15	4	49	26	40	13
eelpout sp.	31	2								20	11	
Greenland halibut	187	9		19	4	24	30	21	36	18	25	10
grey seal	204	7	22	30	17		30		19		73	13
long sculpin	10	1	10									
n. krill	13	1									13	
n shortfin squid	30	2								15	15	
n. shrimp	251	8			61	41	41	1	39	25	23	20
rainbow smelt	24	2								15	9	
redfish sp.	162	8			24	13	28	18	21	32	16	10
sand lance	49	5	3			9	3				28	6
short sculpin	9	3		2						4	3	
silver hake	18	2								13	5	
striped bass	53	3		29						9	15	
thorny skate	13	1	13									
white hake	43	3	19							10	14	
winter flounder	37	3	13							9	15	
witch flounder	9	1		9								
C-classification												
A	413	10	25	13	47	45	28	44	40	91	60	20
B	294	9	19		61	41	41	1	39	35	37	20
C	245	10	13	12	34	29	24	27	30	19	47	10
D	420	10	5	11	26	71	47	71	57	16	101	15
E	175	9	10	46	4	7	5	11	5	39	48	
F	258	8	45	30	17		30		19	20	84	13
G	40	2								25	15	
H	377	10	9	26	6	49	45	25	85	44	65	23

N-classification

A	421	10	25	36	57	61	24	53	49	44	52	20
B	418	9	3		48	61	39	60	46	47	98	16
C	571	10	11	37	8	72	81	54	117	60	99	32
D	182	4	19					2		85	76	
E	62	9	10	6	4	7	5	9	5	10	6	
F	261	9	10		61	41	41	1	39	25	23	20
G	37	3	13							9	15	
H	270	8	35	59	17		30		19	9	88	13

Am.: American, Arc.: Arctic, Atl.: Atlantic, n.: northern

Table S2. Coefficient estimates of the five lipid-normalization models for $\delta^{13}C$ values, and the model retro-correcting $\delta^{15}N_{lipid\text{-}extracted}$ values, for each species considered individually (species-specific scenario). Model references are as follows for carbon lipid-normalization MM : McConnaughey and McRoy (1979), Fry : Fry (2002), Post: Post et al. (2007), Logan: Logan et al. (2008), Lesage : Lesage et al. (2010). Eq. 6 refers to nitrogen retro-correction (this study).

Species	$\delta^{13}C$									$\delta^{15}N$	
	MM [eq 1]		Fry [eq 2]	Post [eq 3]		Logan [eq 4]		Lesage [eq 5]		eq 6	
	D	I	D	β_0	β_1	β_0	β_1	β_0	β_1	β_0	β_1
American eel (*Anguilla rostrata*)	3.81	0.08	4.33	0.13	0.31	-1.41	1.92	0.66	0.95	0.84	0.90
American plaice (*Hippoglossoides platessoides*)	2.30	0.17	4.58	-1.91	0.73	-2.23	2.28	-2.35	0.86	3.68	0.70
Arctic cod (*Boreogadus saida*)	4.89	0.09	8.31	-3.46	1.25	-4.55	4.35	-6.15	0.67	0.83	0.89
Arctic krill (*Thysanoessa spp.*)	2.34	0.10	2.95	-1.46	0.55	-2.04	1.99	-5.01	0.70	2.80	0.66
Atlantic cod (*Gadus morhua*)	1.26	0.28	4.22	0.60	-0.06	0.62	-0.18	0.94	1.03	0.28	0.94
Atlantic herring (*Clupea harengus*)	4.63	0.08	5.25	-1.16	0.61	-2.97	3.07	-13.26	0.30	4.31	0.60
Atlantic mackerel (*Scomber scombrus*)	3.01	0.13	5.53	-2.17	0.81	-2.78	2.76	-5.03	0.73	1.22	0.83
Atlantic seasnail (*Liparis atlanticus*)	3.26	0.12	9.56	-2.49	0.91	-3.09	3.03	-6.59	0.64	2.24	0.79
Atlantic tomcod (*Microgadus tomcod*)	-1.87	-0.16	1.54	1.94	-0.52	2.29	-1.73	-0.09	0.98	1.08	0.89
beluga (*Delphinapterus leucas*)	2.83	0.06	3.84	-1.82	0.63	-2.59	2.39	16.15	0.08	1.02	0.93
capelin (*Mallotus villosus*)	3.65	0.15	6.47	-1.74	0.75	-2.79	2.94	-7.35	0.60	2.32	0.76
eelpout (*Lycodes sp*)	6.09	0.00	5.32	-5.14	1.63	-6.38	5.55	-10.28	0.43	3.54	0.71
Greenland halibut (*Reinhardtius hippoglossoides*)	4.61	0.16	6.26	-0.57	0.56	-2.38	2.92	-13.20	0.28	1.73	0.80
grey seal (*Halichoerus grypus*)	1.93	-0.04	1.03	-1.82	0.55	-2.16	1.81	-8.55	0.55	1.10	0.91
longhorn sculpin (*Myoxocephalus octodecemspinosus*)	0.82	0.75	-12.64	-0.50	0.36	-0.48	0.96	-5.95	0.65	-0.09	0.94
northern krill (*Meganyctiphanes norvegica*)	12.98	-0.07	2.97	11.44	3.36	14.19	11.59	12.07	0.36	3.19	0.66
northern shortfin squid (*Illex illecebrosus*)	4.08	0.14	7.66	-2.78	1.07	-3.63	3.66	0.72	0.99	7.41	0.39
northern shrimp (*Pandalus borealis*)	-1.19	-0.38	5.59	1.61	-0.37	1.79	-1.17	-2.78	0.83	4.65	0.58
rainbow smelt (*Osmerus mordax*)	-2.52	-0.14	2.08	2.68	-0.74	3.10	-2.40	0.12	0.99	0.85	0.90
redfish (*Sebastes sp*)	3.65	0.08	5.52	-2.76	0.96	-3.51	3.30	-6.04	0.67	-0.80	1.01
sand lance (*Ammodytes sp*)	-0.98	-0.68	6.39	1.58	-0.29	1.74	-0.93	-1.16	0.91	0.33	0.91

shorthorn sculpin (*Myoxocephalus scorpius*)	2.98	0.15	2.46	-3.05	1.10	-3.25	3.21	-2.97	0.81	5.38	0.60
silver hake (*Merluccius bilinearis*)	5.06	0.03	5.42	-3.34	1.13	-4.64	4.20	-12.77	0.33	-1.57	1.06
striped bass (*Morone saxatilis*)	4.89	0.05	5.50	-3.79	1.28	-4.82	4.41	0.06	0.98	0.13	0.97
thorny skate (*Amblyraja radiata*)	2.87	0.38	-1.88	-3.42	1.51	-3.03	3.68	-8.68	0.51	0.20	0.97
white hake (*Urophycis tenuis*)	-2.96	-0.08	12.67	3.25	-0.95	3.64	-2.95	-0.14	0.97	-0.32	0.97
winter flounder (*Pseudopleuronectes americanus*)	1.46	0.47	6.60	-1.11	0.56	-1.20	1.63	10.07	0.44	-4.06	1.21
witch flounder (*Glyptocephalus cynoglossus*)	1.26	0.28	4.42	-1.12	0.47	-1.20	1.36	-3.24	0.80	4.53	0.66

Table S3. Model performance parameters [95% slope confidence interval] estimates from the linear relationship between predicted $\delta^{13}C_{\text{lipid-free}}$ and observed $\delta^{13}C_{\text{lipid-extracted}}$ and between predicted and observed $\delta^{15}N_{\text{bulk}}$ for the global approach and cluster-based scenarios, mae: mean absolute error. Models (eq 1—5) for carbon normalization correspond to MM: McConnaughey and McRoy (1979), Fry: Fry (2002), Post: Post et al. (2007), Logan: Logan et al. (2008), and Lesage: Lesage et al. (2010), respectively. Cluster composition differs between C and N-classifications, therefore indicators cannot be compared within clusters.

Scenario/ Cluster	Indicator	**$\delta^{13}C$**						$C:N_{bulk}$	**$\delta^{15}N$**	
		MM [eq 1]	Fry [eq 2]	Post [eq 3]	Logan [eq 4]	Lesage [eq 5]	*n*	range	eq 6	*n*
Global approach scenario										
	slope	0.96 [0.94—0.98]	0.96 [0.94—0.98]	0.98 [0.96—1.00]	0.97 [0.95—0.99]	0.69 [0.67—0.71]	2222	2.30—8.90	0.89 [0.88—0.90]	2222
	mae	0.37	0.35	0.36	0.36	0.44			0.34	
	r^2	0.8	0.83	0.81	0.81	0.69			0.73	
	aic	3089.7	2743.4	3039.0	2960.0	2972.6				
Cluster-based scenario										
A	slope	0.80 [0.76—0.84]	0.78 [0.74—0.83]	0.80 [0.76—0.84]	0.80 [0.76—0.84]	0.73 [0.69—0.78]	413	2.59—4.24	0.74 [0.70—0.78]	421
	mae	0.26	0.31	0.25	0.26	0.28			0.34	
	r^2	0.77	0.74	0.78	0.78	0.73			0.88	
	aic	216.1	267.3	197.9	206.3	232.6				
B	slope	0.96 [0.91—1.02]	0.99 [0.94—1.05]	0.96 [0.91—1.02]	0.96 [0.91—1.02]	0.82 [0.77—0.86]	294	2.76—3.85	0.88 [0.85—0.91]	418
	mae	0.27	0.3	0.27	0.27	0.26			0.34	
	r^2	0.82	0.81	0.82	0.82	0.82			0.64	
	aic	196.4	236.0	196.1	196.2	103.7				
C	slope	0.88 [0.81—0.96]	0.88 [0.81—0.96]	0.89 [0.82—0.96]	0.89 [0.82—0.96]	0.70 [0.64—0.76]	245	2.68—4.64	0.64 [0.60—0.68]	571
	mae	0.28	0.37	0.28	0.28	0.29			0.19	
	r^2	0.71	0.68	0.72	0.72	0.7			0.98	
	aic	273.6	314.8	265.4	269.7	175.4				
D	slope	0.95 [0.89—1.01]	0.92 [0.86—0.99]	0.94 [0.87—1.00]	0.94 [0.88—1.00]	0.35 [0.30—0.39]	420	2.76—8.67	0.98 [0.96—1.00]	182
	mae	0.32	0.38	0.35	0.32	0.43			0.35	
	r^2	0.7	0.64	0.67	0.69	0.35			0.86	
	aic	490.3	579.7	544.1	498.0	268.7				

E	slope	0.89 [0.82—0.96]	0.90 [0.84—0.97]	0.90 [0.83—0.96]	0.89 [0.83—0.96]	0.76 [0.69—0.82]	175	2.73—5.70	0.86 [0.77—0.95]	62
	mae	0.33	0.33	0.32	0.33	0.35			0.26	
	r^2	0.79	0.8	0.8	0.8	0.75			0.53	
	aic	199.6	200.4	192.5	195.6	179.3				
F	slope	0.64 [0.56—0.73]	0.66 [0.58—0.75]	0.64 [0.55—0.73]	0.64 [0.55—0.73]	0.44 [0.38—0.50]	258	2.30—3.85	0.52 [0.46—0.58]	261
	mae	0.32	0.31	0.32	0.32	0.31			0.6	
	r^2	0.45	0.48	0.44	0.44	0.44			0.77	
	aic	256.9	240.4	254.8	255.9	65.6				
G	slope	1.01 [0.96—1.06]	1.02 [0.97—1.07]	1.02 [0.97—1.08]	1.02 [0.97—1.07]	0.94 [0.86—1.02]	40	3.16—7.33	0.77 [0.63—0.91]	37
	mae	0.29	0.32	0.31	0.3	0.55			0.21	
	r^2	0.98	0.98	0.98	0.98	0.94			0.92	
	aic	42.6	47.6	50.7	45.0	83.6				
H	slope	0.72 [0.66—0.78]	0.85 [0.78—0.91]	0.69 [0.63—0.76]	0.72 [0.65—0.78]	0.06 [0.04—0.09]	377	2.96—8.90	0.92 [0.89—0.95]	270
	mae	0.32	0.32	0.36	0.33	0.51			0.38	
	r^2	0.58	0.61	0.51	0.56	0.06			0.89	
	aic	358	427.1	434.9	379.8	-347.3				

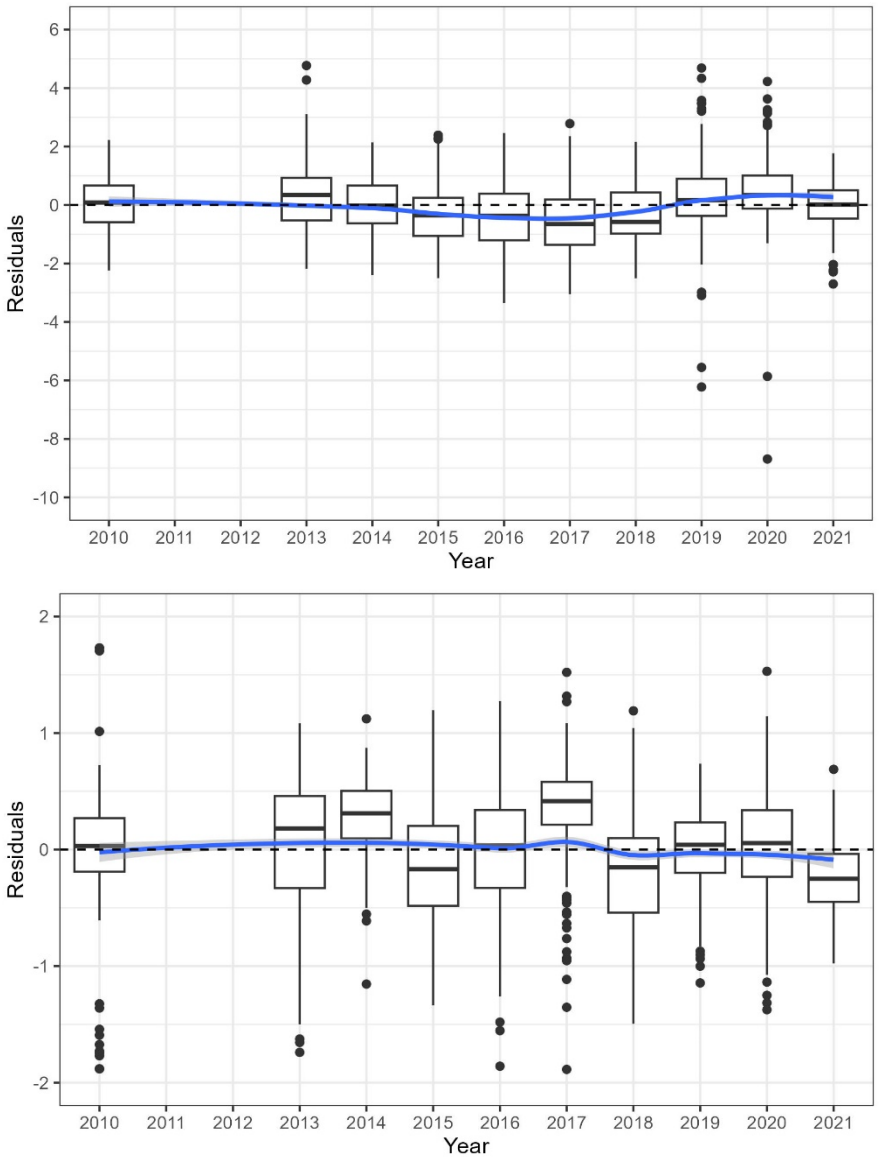

Fig. S1. Time series of the residuals from the regressions used as the basis for the clusterization procedures (top: $\delta^{13}C_{bulk}$ against $C{:}N_{bulk}$, bottom: $\delta^{15}N_{bulk}$ against $\delta^{15}N_{lipid\text{-}extracted}$).