

Supplementary materials.

Table S1. $\delta^{13}\text{C}$ signatures of the key prey items of the fish fauna in the western Wadden Sea. Data collected in 2012. Number of observations (N), together with mean $\delta^{13}\text{C}$ and standard deviation (s.d.). Data after van der Veer & Witte (unpublished.).

Common name	Scientific name	N	$\delta^{13}\text{C}$	s.d.
Gammarus	<i>Gammarus sp</i>	4	-15.9	0.49
Amphipod	<i>Hyperia galba</i>	11	-19.1	0.79
Isopod	<i>Idotea linearis</i>	17	-18.6	0.85
Chameleon shrimp	<i>Praunus flexuosus</i>	15	-17.9	0.93
Gastrosaccus spinifer	<i>Gastrosaccus spinifer</i>	15	-19.9	0.87
Brown shrimp	<i>Crangon crangon</i>	15	-16.4	1.22
Shore crab	<i>Carcinus meanas</i>	11	-16.8	0.54
Transparent goby	<i>Aphia minuta</i>	8	-18.8	1.00
Lozano's goby	<i>Pomatoschistus lozanoi</i>	14	-18.5	1.09
Common goby	<i>Pomatoschistus microps</i>	16	-17.1	1.19
Sand goby	<i>Pomatoschistus minutus</i>	17	-17.5	1.05
Sprat	<i>Sprattus sprattus</i>	20	-19.4	0.94
Herring	<i>Clupea harengus</i>	28	-19.4	1.75

Table S2. Total number of samples analysed per year together with mean $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values with corresponding standard error bars.

Common name	Scientific name	2012	2013	2014	2015	2016	Total	$\delta^{15}\text{N}$ Mean	$\delta^{15}\text{N}$ s.e.	$\delta^{13}\text{C}$ Mean	$\delta^{13}\text{C}$ s.e.
Bass	<i>Dicentrarchus labrax</i>	50	22	90	22	56	240	17.09	0.09	-16.36	0.11
Flounder	<i>Platichthys flesus</i>	24	54	46	14	39	177	16.23	0.09	-17.80	0.28
Herring	<i>Clupea harengus</i>	18	58	37	19	42	174	14.45	0.10	-18.86	0.12
Plaice	<i>Pleuronectes platessa</i>	8	20	38	14	22	102	14.67	0.11	-16.10	0.16
Dab	<i>Limanda limanda</i>	10	12	14	39	23	98	14.43	0.06	-17.61	0.06
Sea trout	<i>Salmo trutta</i>	5	21	9	26	19	80	16.00	0.19	-19.54	0.29
Golden grey mullet	<i>Chelon auratus</i>	12	0	18	13	25	68	16.54	0.12	-18.57	0.21
Twaite shad	<i>Alosa fallax</i>	7	19	26	4	12	68	13.10	0.15	-11.30	0.25
Whiting	<i>Merlangius merlangus</i>	6	16	25	3	11	61	16.12	0.13	-16.61	0.10
Five-bearded rockling	<i>Ciliata mustela</i>	9	8	16	9	15	57	16.14	0.17	-16.75	0.11
Thick-lipped grey mullet	<i>Chelon labrosus</i>	34	2	13	5	2	56	15.19	0.18	-18.45	0.19
Scad	<i>Trachurus trachurus</i>	4	12	9	0	18	43	13.39	0.26	-16.37	0.32
Smelt	<i>Osmerus eperlanus</i>	4	9	19	1	3	36	16.86	0.14	-16.64	0.26
Garfish	<i>Belone belone</i>	11	4	9	1	3	28	16.90	0.25	-16.45	0.14
Sprat	<i>Sprattus sprattus</i>	2	10	5	3	7	27	15.89	0.19	-19.01	0.14
Cod	<i>Gadus morhua</i>	10	12	4	0	0	26	15.00	0.20	-18.85	0.19
Stickleback	<i>Gasterosteus aculeatus</i>	2	8	10	1	5	26	15.46	0.40	-17.74	0.11
Sand-smelt	<i>Atherina presbyter</i>	1	1	16	0	6	24	15.76	0.18	-16.32	0.15
Greater pipefish	<i>Syngnathus acus</i>	6	1	9	3	3	22	17.41	0.12	-16.20	0.14
Pilchard	<i>Sardina pilchardus</i>	6	6	3	0	7	22	16.24	0.14	-15.93	0.32
Turbot	<i>Scophthalmus maximus</i>	1	1	15	2	0	19	13.66	0.24	-17.44	0.15
Bib	<i>Trisopterus luscus</i>	0	5	2	8	3	18	13.28	0.16	-19.23	0.34
Pollack	<i>Pollachius pollachius</i>	11	0	4	0	1	16	16.46	0.46	-16.50	0.17
Sand goby	<i>Pomatoschistus minutus</i>	0	4	6	0	6	16	15.96	0.13	-15.61	0.21
Bull-rout	<i>Myoxocephalus scorpius</i>	4	2	7	1	1	15	15.28	0.20	-16.63	0.18
Viviparous blenny	<i>Zoarces viviparus</i>	0	4	1	0	9	14	15.51	0.60	-17.20	0.41
Sole	<i>Solea solea</i>	0	5	4	0	1	10	16.23	0.19	-17.25	0.15
Saithe	<i>Pollachius virens</i>	3	3	1	1	1	10	15.24	0.13	-16.98	0.41
Brill	<i>Scophthalmus rhombus</i>	2	2	2	1	1	8	16.47	0.32	-15.78	0.42
Scaldfish	<i>Arnoglossus laterna</i>	1	5	0	0	2	8	15.52	0.40	-18.41	0.27
Eel	<i>Anguilla anguilla</i>	0	1	0	2	4	7	16.19	0.60	-26.93	2.61
Mackerel	<i>Scomber scombrus</i>	2	3	1	0	1	7	14.04	0.74	-19.22	0.50
Tub gurnard	<i>Trigla lucerna</i>	2	0	2	0	3	7	17.06	0.11	-16.57	0.21
Hooknose	<i>Agonus cataphractus</i>	1	1	1	1	2	6	16.11	0.46	-17.21	0.46
Lesser weever	<i>Echiichthys vipera</i>	3	0	0	1	2	6	16.35	0.17	-17.89	0.22
Lumpsucker	<i>Cyclopterus lumpus</i>	2	3	1	0	0	6	14.33	0.41	-19.32	0.40
Round goby	<i>Neogobius melanostomus</i>	0	0	0	0	6	6	17.26	0.16	-22.26	1.05
Butterfish	<i>Pholis gunnellus</i>	1	1	0	0	3	5	15.77	0.33	-17.45	0.17
Gilt-head sea bream	<i>Sparus aurata</i>	0	0	2	1	1	4	16.19	0.35	-14.71	0.32
Red sea-bream	<i>Pagellus bogaraveo</i>	0	0	4	0	0	4	15.57	0.23	-14.58	0.37
Anchovy	<i>Engraulis encrasicolus</i>	0	0	0	0	3	3	13.18	0.41	-18.60	0.22
Dragonet	<i>Callionymus lyra</i>	1	0	1	0	1	3	15.47	0.49	-18.51	0.21
Sea scorpion	<i>Taurulus bubalis</i>	0	0	2	0	1	3	15.21	0.25	-16.80	0.23
Sea-snail	<i>Liparis liparis</i>	1	1	0	0	1	3	16.54	0.66	-16.64	0.18
Greater sandeel	<i>Hyperoplus lanceolatus</i>	0	1	0	0	1	2	14.96	0.40	-18.06	0.34
Lemon sole	<i>Microstomus kitt</i>	2	0	0	0	0	2	15.27	0.29	-17.65	0.31
Poor cod	<i>Trisopterus minutus</i>	0	0	2	0	0	2				
Red mullet	<i>Mullus surmuletus</i>	1	0	0	0	1	2	16.20	0.22	-18.93	1.58
Sea lamprey	<i>Petromyzon marinus</i>	0	1	1	0	0	2	14.12	1.61	-18.81	0.70
Thin-lipped grey mullet	<i>Chelon ramada</i>	1	0	1	0	0	2	14.27	0.08	-14.21	2.64
Forkbeard	<i>Phycis blennoides</i>	0	1	0	0	0	1	15.96		-17.96	
Grey gurnard	<i>Eutrigla gurnardus</i>	0	0	0	0	1	1	15.84		-18.55	
Houting	<i>Coregonus oxyrinchus</i>	0	1	0	0	0	1	16.94		-19.54	
Reticulated dragonet	<i>Callionymus reticulatus</i>	0	1	0	0	0	1	15.65		-18.32	
Shanny	<i>Lipophrys pholis</i>	0	0	1	0	0	1	15.91		-17.95	
Tompot blenny	<i>Parablennius gattorugine</i>	0	0	0	0	1	1	18.50		-18.60	
Vendace	<i>Coregonus albula</i>	0	0	0	0	1	1	17.91		-23.22	

Table S3. Regression values for each species for $\delta^{15}\text{N} \sim \text{Length (cm)}$ and $\delta^{13}\text{C} \sim \text{Length (cm)}$. ***: $p < 0.001$; **: $p < 0.01$ - $p < 0.001$).

Common name	$\delta^{15}\text{N} \sim \text{Length (cm)}$	$\delta^{13}\text{C} \sim \text{Length (cm)}$
Anchovy	$y = 14.6 - 0.0833x$, $R^2 = 0.003$, $P = 0.97$	$y = -23.4 + 0.286x$, $R^2 = 0.12$, $P = 0.78$
Bass	$y = 16.4 + 0.0264x$, $R^2 = 0.038$, $P < 0.001$ ***	$y = -14.7 - 0.0596x$, $R^2 = 0.32$, $P < 0.001$ ***
Bib	$y = 13.2 + 0.221x$, $R^2 = 0.66$, $P < 0.001$ ***	$y = -17.6 + 0.103x$, $R^2 = 0.18$, $P = 0.078$
Brill	$y = 14.3 + 0.6x$, $R^2 = 0.42$, $P < 0.083$	$y = -15.4 - 0.025x$, $R^2 = 0.0059$, $P = 0.86$
Bull-rout	$y = 15.4 + 0.139x$, $R^2 = 0.44$, $P < 0.001$ ***	$y = -15.6 - 0.0465x$, $R^2 = 0.082$, $P = 0.17$
Butterfish	$y = 14.2 + 0.102x$, $R^2 = 0.23$, $P = 0.42$	$y = -17.1 - 0.0223x$, $R^2 = 0.041$, $P = 0.74$
Cod	$y = 15.2 + 0.102x$, $R^2 = 0.54$, $P < 0.001$ ***	$y = -16.4 - 0.0127x$, $R^2 = 0.012$, $P = 0.54$
Dab	$y = 14.3 + 0.00859x$, $R^2 = 0.0032$, $P = 0.56$	$y = -17.7 + 0.0026$, $R^2 = 0.0004$, $P = 0.84$
Dragonet	$y = 6.09 + 0.62x$, $R^2 = 0.98$, $P = 0.083$	$y = -14.6 - 0.257x$, $R^2 = 0.89$, $P = 0.22$
Eel	$y = 14.1 + 0.0338x$, $R^2 = 0.034$, $P = 0.69$	$y = -17.8 - 0.739x$, $R^2 = 0.87$, $P = 0.002$ **
Five-bearded rockling	$y = 14.9 + 0.0769x$, $R^2 = 0.12$, $P = 0.004$ **	$y = -17.2 + 0.038x$, $R^2 = 0.045$, $P = 0.082$
Flounder	$y = 16.4 - 0.0116x$, $R^2 = 0.0023$, $P = 0.48$	$y = -21.2 + 0.235x$, $R^2 = 0.079$, $P < 0.001$ ***
Forkbeard		
Garfish	$y = 10 + 0.0982x$, $R^2 = 0.13$, $P = 0.058$	$y = -17.6 - 0.00348x$, $R^2 = 0.0022$, $P = 0.81$
Gilt-head sea bream	$y = 21.1 - 0.357x$, $R^2 = 0.40$, $P = 0.37$	$y = -21.7 + 0.509x$, $R^2 = 0.96$, $P = 0.018$
Golden grey mullet	$y = 12.7 + 0.0214x$, $R^2 = 0.012$, $P = 0.36$	$y = -14 - 0.0192x$, $R^2 = 0.0035$, $P = 0.62$
Greater pipefish	$y = 5.89 + 0.21x$, $R^2 = 0.36$, $P = 0.003$ **	$y = -20.1 + 0.0724x$, $R^2 = 0.11$, $P = 0.13$
Greater sandeel		
Grey gurnard		
Herring	$y = 16.6 - 0.15x$, $R^2 = 0.46$, $P < 0.001$ ***	$y = -17.7 - 0.0849x$, $R^2 = 0.11$, $P < 0.001$ ***
Hooknose	$y = 19.9 - 0.236x$, $R^2 = 0.096$, $P = 0.55$	$y = -13.2 - 0.311x$, $R^2 = 0.17$, $P = 0.42$
Houting		
Lemon sole		
Lesser weever	$y = 12.8 + 0.262x$, $R^2 = 0.31$, $P = 0.25$	$y = -18.1 + 0.0159x$, $R^2 = 0.0066$, $P = 0.96$
Lumpsucker	$y = 15.2 + 0.077x$, $R^2 = 0.53$, $P = 0.1$	$y = -19.3 - 0.0027x$, $R^2 = 0.00068$, $P = 0.96$
Mackerel	$y = 14.5 - 0.0189x$, $R^2 = 0.0074$, $P = 0.85$	$y = -21.4 + 0.0824x$, $R^2 = 0.3$, $P = 0.2$
Pilchard	$y = 13.4 - 0.0054x$, $R^2 = 0.00047$, $P = 0.92$	$y = -21.9 + 0.107x$, $R^2 = 0.041$, $P = 0.37$
Plaice	$y = 13. + 0.213x$, $R^2 = 0.15$, $P < 0.001$ ***	$y = -18 + 0.232x$, $R^2 = 0.085$, $P < 0.001$ ***
Pollack	$y = 17.2 - 0.0375x$, $R^2 = 0.006$, $P = 0.74$	$y = -18.1 + 0.0945x$, $R^2 = 0.22$, $P = 0.031$ **
Poor cod		
Red mullet		
Red sea-bream	$y = 22.2 - 0.484x$, $R^2 = 0.98$, $P = 0.012$ **	$y = -24.4 + 0.713x$, $R^2 = 0.79$, $P = 0.11$
Reticulated dragonet		
Round goby	$y = 17.6 - 0.0259x$, $R^2 = 0.024$, $P = 0.77$	$y = -27.5 + 0.454x$, $R^2 = 0.18$, $P = 0.41$
Saithe	$y = 16.1 - 0.0079$, $R^2 = 0.0007$, $P = 0.92$	$y = -16.5 - 0.0387x$, $R^2 = 0.043$, $P = 0.46$
Sand goby	$y = 16.5 - 0.020x$, $R^2 = 0.00008$, $P = 0.89$	$y = -18.2 + 0.336x$, $R^2 = 0.05$, $P = 0.28$
Sand-smelt	$y = 12.9 + 0.27x$, $R^2 = 0.45$, $P < 0.001$ ***	$y = -17.8 + 0.134x$, $R^2 = 0.19$, $P = 0.023$
Scad	$y = 15.4 - 0.017x$, $R^2 = 0.0$, $P = 0.4$	$y = -19.8 + 0.0842x$, $R^2 = 0.21$, $P < 0.001$ ***
Scaldfish	$y = 12.5 + 0.279x$, $R^2 = 0.16$, $P = 0.33$	$y = -15.9 - 0.231x$, $R^2 = 0.24$, $P = 0.21$
Sea lamprey		

Sea scorpion	$y=13.6+0.182x$, $R^2=0.98$, $P=0.093$	$y=-15.3-0.164x$, $R^2=0.99$, $P=0.057$
Sea trout	$y=12.5+0.095x$, $R^2=0.49$, $P<0.001^{***}$	$y=-25.9+0.179x$, $R^2=0.52$, $P<0.001^{***}$
Sea-snail	$y=14.4+0.209x$, $R^2=0.68$, $P=0.38$	$y=-16-0.0644x$, $R^2=0.89$, $P=0.22$
Shanny		
Smelt	$y=14.7+0.121x$, $R^2=0.20$, $P=0.003^{**}$	$y=-20+0.185x$, $R^2=0.13$, $P=0.017$
Sole	$y=15.3-0.003x$, $R^2=0.002$, $P=0.89$	$y=-14.8-0.144x$, $R^2=0.72$, $P<0.001^{***}$
Sprat	$y=15.6-0.057x$, $R^2=0.005$, $P=0.71$	$y=-18.8-0.00715x$, $R^2=0.000083$, $P=0.96$
Stickleback	$y=22-0.92x$, $R^2=0.15$, $P=0.021^{**}$	$y=-19-0.0293x$, $R^2=0.00021$, $P=0.93$
Thick-lipped grey mullet	$y=14.1-0.017x$, $R^2=0.037$, $P=0.14$	$y=-18.4+0.043x$, $R^2=0.21$, $P<0.001^{***}$
Thin-lipped grey mullet		
Tompot blenny		
Tub gurnard	$y=16.6+0.0268x$, $R^2=0.18$, $P=0.35$	$y=-17.5+0.048x$, $R^2=0.15$, $P=0.39$
Turbot	$y=15.2+0.0931x$, $R^2=0.14$, $P=0.092$	$y=-15.1-0.0473x$, $R^2=0.017$, $P=0.57$
Twaite shad	$y=16.2+0.012x$, $R^2=0.021$, $P=0.2$	$y=-18.3-0.0106x$, $R^2=0.049$, $P=0.54$
Vendace		
Viviparous blenny	$y=16+0.013x$, $R^2=0.005$, $P=0.81$	$y=-15.7-0.111x$, $R^2=0.56$, $P=0.002^{**}$
Whiting	$y=15.8+0.09x$, $R^2=0.12$, $P=0.0036^{**}$	$y=-15.4-0.0908x$, $R^2=0.27$, $P<0.001^{***}$