

The following supplement accompanies the article

Community size spectra provide indicators of ecosystem recovery on the Newfoundland and Labrador shelf

Kyle J. Krumsick*, Jonathan A. D. Fisher

*Corresponding author: kyle.krumsick@mi.mun.ca

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Table S1: Identities and numbers of species sampled for stable isotope analysis in the 2015 survey by region and gear type.

Region	Gear	Species sampled (Number of individuals)
HC	Campelen 1800	American Plaice (21), Alligatorfish (9), Arctic Cod (5), Atlantic Cod (21), Atlantic Herring (2), Atlantic Hookear Sculpin (3), Atlantic Poacher (3), Blue Hake (1), Capelin (8), Checker Eelpout (9), Greenland Halibut (21), Marlin-spike (6), Moustache Sculpin (3), Myctophiid (<i>Benthosema</i> , 3), Myctophiid (<i>Notoscopelus</i> ; 9), Redfish (21), Roughhead Grenadier (9), Smooth Skate (8), Snakeblenny (1), Thorny Skate (18), Threebeard Rockling (1), White Barracudina (3), Witch Flounder (3)
NDC	Campelen 1800	American Plaice (16), Arctic Cod (15), Atlantic Cod (6), Atlantic Herring (1), Atlantic Hookear Sculpin (1), Capelin (1), Greenland Halibut (9), Moustache Sculpin (3), Redfish (12), Thorny Skate (2), White Barracudina (2), Witch Flounder (2)
	Mid-water Trawl	American Plaice (5), Arctic Cod (2), Atlantic Cod (14), Atlantic Herring (8), Capelin (8), Greenland Halibut (7), Myctophiid (<i>Benthosema</i> , 3), Myctophiid (<i>Notoscopelus</i> ; 9), Redfish (9), Thorny Skate (1), White Barracudina (1), Witch Flounder (1)
BC	Campelen 1800	American Plaice (21), Alligatorfish (9), Arctic Cod (17), Atlantic Cod (21), Atlantic Herring (9), Atlantic Hookear Sculpin (3), Atlantic Poacher (9), Capelin (9), Checker Eelpout (10), Fourline Snakeblenny (2), Greenland Halibut (21), Longfin Hake (1), Marlin-spike (9), Moustache Sculpin (3), Myctophiid (<i>Notoscopelus</i> ; 9), Redfish (22), Smooth Skate (1), Snakeblenny (1), Thorny Skate (21), Threebeard Rockling (5), White Barracudina (4), Witch Flounder (13)

Table S2: Catchabilities and length-weight relations for all analyzed species. In cases where weights of individual fish were obtained, those were used and no length-weight relation was required. The first reference is for the length-weight relation (unless all individuals were weighed, in which case relation from the literature was required) and the second reference is for the catchability.

Species	Scientific Name	Length-Weight Relation	Catchability	References
Alligatorfish	<i>Aspidophoroides monopterygius</i>	$W = 0.0029 * L^3$	0.25	Alpoim <i>et al.</i> , 2002; Jennings <i>et al.</i> , 2002
American Plaice	<i>Hippoglossoides platessoides</i>	$W = 0.0036 * L^{3.305}$	See Fraser <i>et al.</i> , 2007	Paz & Román, 1997
Anglerfish	<i>Oneirodes macrosteus</i>	All Individuals Weighed	0.021	Walker <i>et al.</i> , 2017
Arctic Cod	<i>Boreogadus saida</i>	All Individuals Weighed	$\frac{4.8585}{1 + e^{(-4.575+0.0783*L)}}$	Harley & Meyers, 2001
Argentine	<i>Argentina silus</i>	All Individuals Weighed	0.0658	Harley <i>et al.</i> , 2001
Atlantic Cod	<i>Gadus morhua</i>	$W = 0.0081 * L^{3.044}$	$\frac{7.2277}{1 + e^{(-5.04+0.138*L)}}$	Árnason <i>et al.</i> , 2009; Harley & Meyers, 2001
Atlantic Halibut	<i>Hippoglossus hippoglossus</i>	All Individuals Weighed	$\frac{4.3368}{1 + e^{(-4.41+0.109*L)}}$	Harley & Meyers, 2001
Atlantic Herring	<i>Clupea harengus</i>	$W = 0.0097 * L^{2.96}$	See Walker <i>et al.</i> , 2017	Wigley <i>et al.</i> , 2003
Atlantic Hookear Sculpin	<i>Artediellus atlanticus</i>	$W = 0.02 * L^{2.85}$	0.25	Greenstreet <i>et al.</i> , 2012; Jennings <i>et al.</i> , 2002
Atlantic Lumpfish	<i>Cyclopterus lumpus</i>	All Individuals Weighed	0.25	Jennings <i>et al.</i> , 2002

Atlantic Poacher	<i>Agonus decagonus</i>	$W = 0.0043 * L^{2.98}$	0.25	Alpoim <i>et al.</i> , 2002; Jennings <i>et al.</i> , 2002
Atlantic Wolffish	<i>Anarhichas lupus</i>	$W = 0.0053 * L^{3.077}$	0.4067	Templeman, 1986; Harley <i>et al.</i> , 2001
Capelin	<i>Mallotus villosus</i>	$W = 0.0042 * L^{3.11}$	0.08	Alpoim <i>et al.</i> , 2002; O'Driscoll <i>et al.</i> , 2002
Checker Eelpout	<i>Lycodes vahlii</i>	$W = 0.0017 * L^{3.27}$	0.471183	Alpoim <i>et al.</i> , 2002; Walker <i>et al.</i> , 2017
Daubed Shanny	<i>Lumpenus maculatus</i>	$W = 0.0091 * L^{2.335}$	0.25	Greenstreet <i>et al.</i> , 2012; Jennings <i>et al.</i> , 2002
Greenland Halibut	<i>Reinhardtius hippoglossoides</i>	$W = 0.005 * L^{3.1804}$	$\frac{4.3368}{1 + e^{(-4.41+0.109*L)}}$	Román & Paz, 1997; Harley & Meyers, 2001
Lightless Loosejaw	<i>Malacosteus niger</i>	All Individuals Weighed	0.25	Jennings <i>et al.</i> , 2002
Longfin Hake	<i>Urophycis chesteri</i>	$W = 0.0104 * L^{2.8226}$	0.303	Paz & Román, 1997; Harley <i>et al.</i> , 2001
Marlin-spike	<i>Nezumia bairdi</i>	$W = 0.0254 * L^{2.89}$	0.25	Alpoim <i>et al.</i> , 2002; Jennings <i>et al.</i> , 2002
Moustache Sculpin	<i>Triglops murrayi</i>	$W = 0.0032 * L^{3.46}$	0.25	Alpoim <i>et al.</i> , 2002; Jennings <i>et al.</i> , 2002
Myctophiid	<i>Notoscopelus sp. & Benthosema glaciale</i>	$W = 0.0054 * L^{3.08}$	0.25	Alpoim <i>et al.</i> , 2002; Jennings <i>et al.</i> , 2002
Northern Wolffish	<i>Anarhichas denticulatus</i>	$W = 0.017 * L^{2.92}$	0.4067	Alpoim <i>et al.</i> , 2002; Harley <i>et</i>

				<i>al.</i> , 2001
Redfish	<i>Sebastes</i> sp.	$W = 0.0247 * L^{2.9364}$	See Walker <i>et al.</i> , 2017	Paz & Román, 1997; Bethke et al., 2010
Roughhead Grenadier	<i>Macrourus berglax</i>	$W = 0.1851 * L^{2.7542}$	0.25	Paz & Román, 1997; Jennings <i>et al.</i> , 2002; González-Costas, 2010
Sea Tadpole	<i>Careproctus reinhardtii</i>	All Individuals Weighed	0.25	Jennings <i>et al.</i> , 2002
Shorthorn Sculpin	<i>Myoxocephalus scorpius</i>	$W = 0.0138 * L^{3.06}$	0.4933	Harley <i>et al.</i> , 2001; Froese <i>et al.</i> , 2014
Smooth Skate	<i>Raja senta</i>	$W = 0.02 * L^{2.85}$	0.0799	Paz & Román, 1997; Harley <i>et al.</i> , 2001
Spotted Wolffish	<i>Anarhichas minor</i>	$W = 0.0053 * L^{3.1719}$	0.4067	Paz & Román, 1997; Harley <i>et al.</i> , 2001
Snakeblenny	<i>Lumpenus lumpretaeformis</i>	$W = 0.0164 * L^{2.09}$	0.25	Alpoim <i>et al.</i> , 2002; Jennings <i>et al.</i> , 2002
Stout Sawpalate	<i>Serrivomer beani</i>	All Individuals Weighed	0.25	Jennings <i>et al.</i> , 2002
Thorny Skate	<i>Raja radiata</i>	$W = 0.0436 * L^{2.8611}$	0.0799	Paz & Román, 1997; Harley <i>et al.</i> , 2001
Three-beard Rockling	<i>Gaidropsarus ensis</i>	$W = 0.007 * L^{2.977}$	$8.7398 * \frac{e^{(-3.47+0.0916*L)}}{1 + e^{(-3.47+0.0916*L)}}$	Alpoim <i>et al.</i> , 2002; Harley & Meyers, 2001
White Barracudina	<i>Notolepis rissoii</i>	$W = 0.0003 * L^{3.58}$	0.25	Alpoim <i>et al.</i> , 2002; Jennings <i>et al.</i> , 2002

White Hake	<i>Urophycis tenuis</i>	$W = 0.0043 * L^{3.153}$	0.333	Beacham & Nepszy, 1980; Harley <i>et al.</i> , 2001
Witch Flounder	<i>Glyptocephalus cynoglossus</i>	$W = 0.0008 * L^{3.497}$	$\frac{4.3368}{1 + e^{(-4.41+0.109*L)}}$	Bowering & Stansbury, 1984; Harley & Meyers, 2001
Wolf Eelpout	<i>Lycenchelys verrilli</i>	All Individuals Weighed	0.25	Jennings <i>et al.</i> , 2002
Wrymouth	<i>Cryptacanthodes maculatus</i>	All Individuals Weighed	0.25	Jennings <i>et al.</i> , 2002
Viperfish	<i>Chauliodus sloani</i>	All Individuals Weighed	0.25	Jennings <i>et al.</i> , 2002

Table S3: Primary productivity estimates for the Newfoundland and Labrador shelf communities.

Region	Years	Annual Primary Productivity Estimate ($g \text{ C m}^{-2} \text{y}^{-1}$)	Study
Newfoundland-Labrador Shelf	1979-1986	540	Longhurst <i>et al.</i> , 1995
Grand Banks	1980-1981	186-194	Prasad & Haedrich, 1993
Newfoundland-Labrador Shelf	1980-1993	156 - 482	Bundy <i>et al.</i> , 2000
Newfoundland-Labrador Shelf	1993	150 - 300	Aquarone & Adams, 2008
Newfoundland-Labrador Shelf	1998-2002	132 - 190	Conti & Scardi, 2010
Newfoundland-Labrador Shelf	2001	440	Pepin & Maillet, 2002
Newfoundland-Labrador Shelf	2006-2010	241	Guijarro <i>et al.</i> , 2016

Table S4: Sample sizes by year within size categories. Fishes sampled in 2013 were measured for the biomass composition and fish sampled in 2015 were sampled for stable isotope analysis.

Year	Region	Size	Number of Fish
2013	Hawke Channel	< 4 kg	654
		4 – 8 kg	2
		> 8 kg	0
	Notre Dame Channel	< 4 kg	708
		4 – 8 kg	1
		> 8 kg	0
	Bonavista Corridor	< 4 kg	5741
		4 – 8 kg	404
		> 8 kg	27
2015	Hawke Channel	< 4 kg	179
		4 – 8 kg	10
		> 8 kg	1
	Notre Dame Channel	< 4 kg	113
		4 – 8 kg	5
		> 8 kg	0
	Bonavista Corridor	< 4 kg	213
		4 – 8 kg	7
		> 8 kg	1

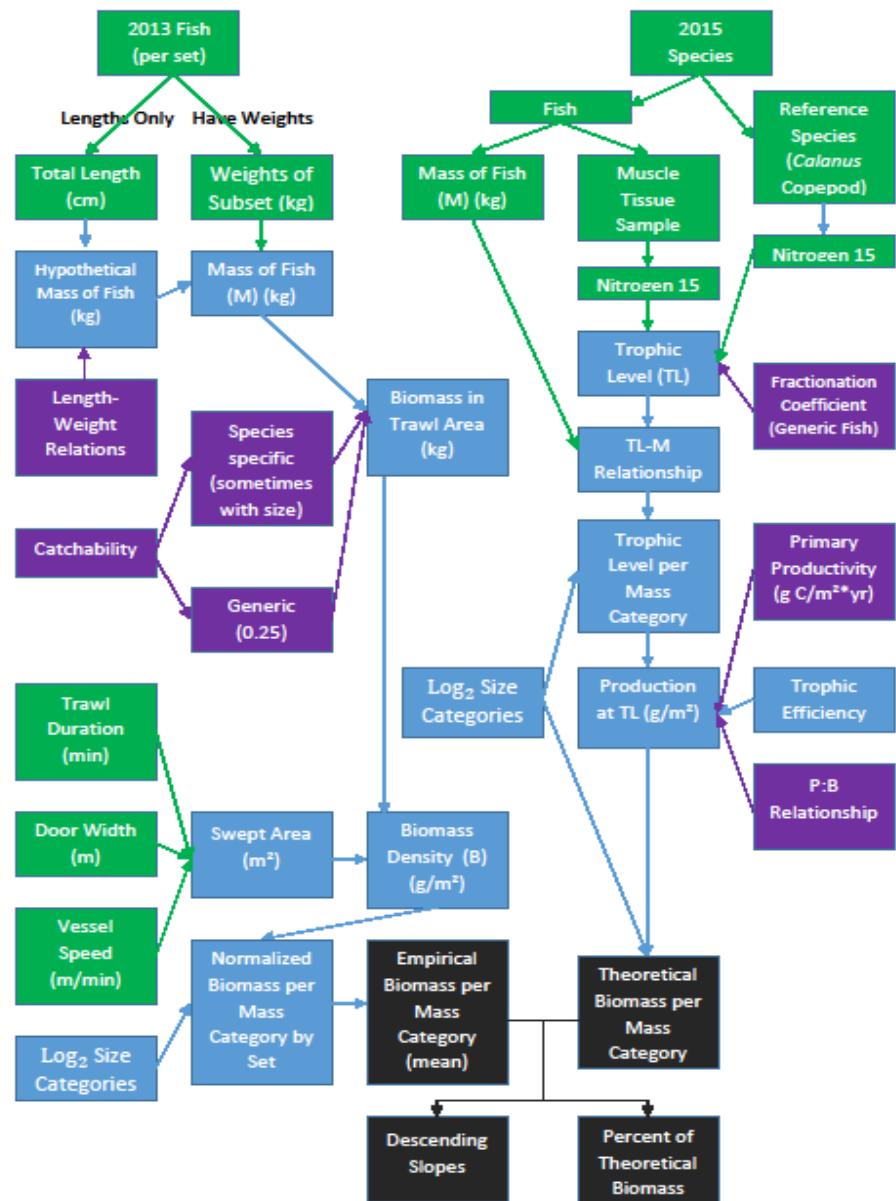


Figure S1: Flow chart of the methods used in this study. Green boxes represent values that were measured by the authors, purple boxes represent values obtained from the literature, blue boxes represent calculations conducted by the authors, and black boxes represent the outputs of the model.

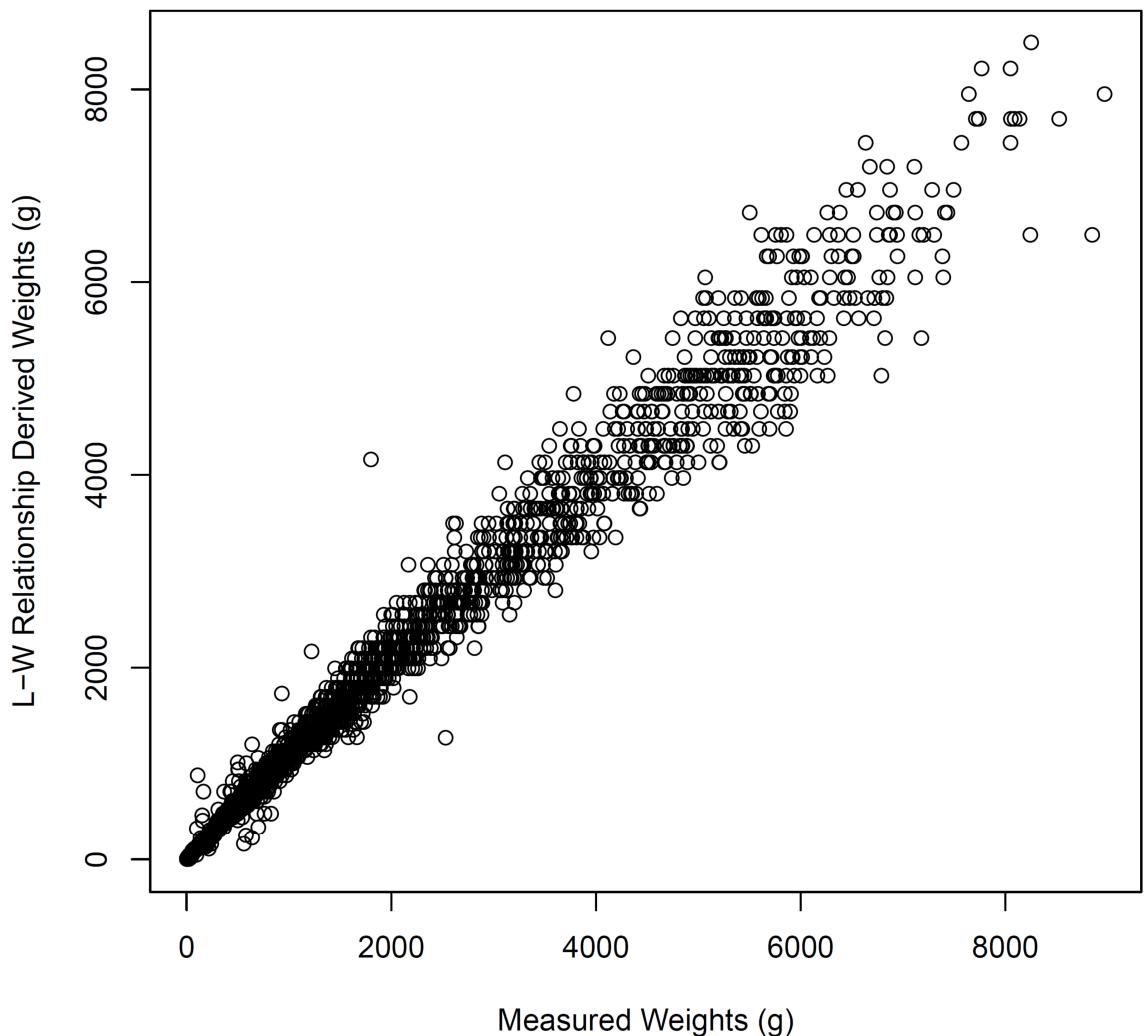


Figure S2: Comparison of measured weights to those derived from published species-specific length-weight relationships for individuals which were weighed in the field. Although deviations exist, a linear relationship with a slope of 1 is observed, indicating the relationships are overall adequate approximations.

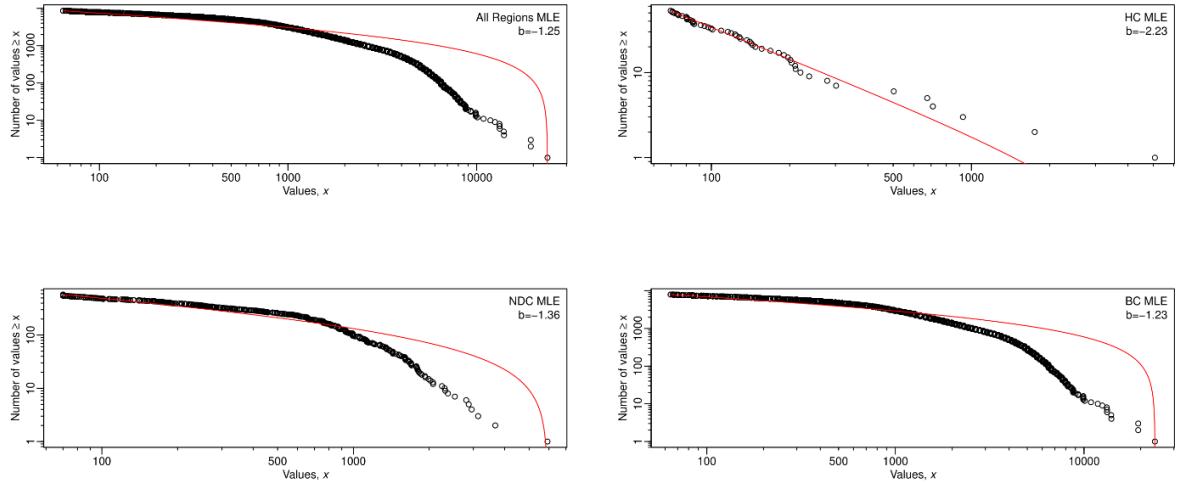


Figure S3: Maximum Likelihood Estimate method for estimating power-law distributions (lines overlying the empirical data from three regions and pooled regions) based on code provided in Edwards et al. (2017). The differences between MLE methods and empirical data demonstrate that, as indicated by Vidondo et al. (1997), power-law distributions are not appropriate for all data sets.

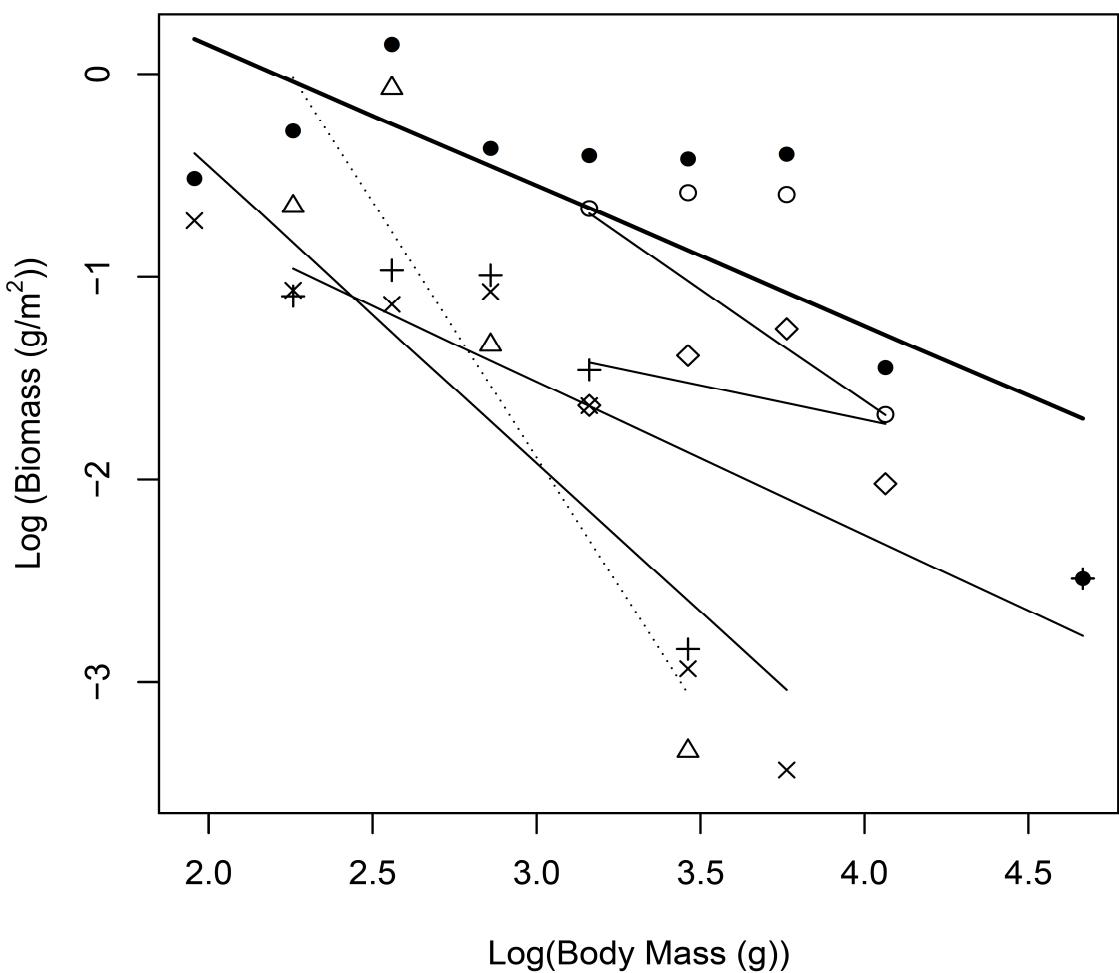


Figure S4: Individual size spectra for each fish guild (● for all fish, ○ for cod, + for flatfish, Δ for pelagics, ◊ for elasmobranchs, and x for demersal mesopredators). Dashed lines represent significant deviations from the community spectrum and solid lines represent non-significant differences in slope.

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