Table 1 Ecopath model summary. TP is trophic position, PB production to biomass ratio, QB consumption to biomass ratio, EE ecotrophic efficiency, GE gross efficiency (PB/QB). See Table S1 for scientific names of species within functional groups.

| Group | TP | Biomass (g/m) | PB (1/yr) | QB (1/yr) | EE | GE | Removals (g/m/yr) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Juv Shark | 3.49 | 0.0844 | 2 | 18 | 0.00237 | 0.11100 | 4e-04 |
| Adu Shark | 3.86 | 6.8e-07 | 0.51 | 3.91 | 0.288 | 0.13000 | 1e-07 |
| Juv R Drum | 2.35 | 0.2 | 2.2 | 4.5 | 0.706 | 0.48900 | 5e-04 |
| Adu R Drum | 3.18 | 0.00149 | 0.62 | 1.87 | 1.46e-05 | 0.33200 | 0 |
| Juv Seatrout | 2.92 | 0.00275 | 3.7 | 29.1 | 0.843 | 0.12700 | 0 |
| Adu Seatrout | 2.97 | 0.1 | 0.7 | 5.4 | 0.312 | 0.13000 | 0.004 |
| Juv B Drum | 2.33 | 0.109 | 2 | 22.6 | 0.923 | 0.08830 | 0.033 |
| Adu B Drum | 2.69 | 0.00117 | 0.5 | 6.36 | 0.741 | 0.07860 | 0.00016 |
| Juv Catfish | 2.30 | 0.0175 | 2 | 10.8 | 0.74 | 0.18500 | 0 |
| Adu Catfish | 2.76 | 0.156 | 0.8 | 3.3 | 0.834 | 0.24200 | 0.02 |
| Juv Sm Sciaenids | 2.74 | 0.33 | 2 | 20 | 0.902 | 0.09990 | 0 |
| Adu Sm Sciaenids | 2.64 | 1.56 | 1.5 | 8.84 | 0.577 | 0.17000 | 0.022 |
| Juv Sheepshead | 2.73 | 0.0975 | 2 | 14.6 | 0.788 | 0.13700 | 0.001 |
| Adu Sheepshead | 3.11 | 0.05 | 0.42 | 5.9 | 0.838 | 0.07120 | 0.015 |
| Juv Flounder | 2.67 | 0.00647 | 2 | 13.3 | 0.869 | 0.15000 | 2e-04 |
| Adu Flounder | 3.32 | 0.00581 | 0.42 | 4.51 | 0.792 | 0.09320 | 0.0018 |
| Juv Pinfish | 2.26 | 0.0727 | 2 | 19.8 | 0.946 | 0.10100 | 0 |
| Adu Pinfish | 2.11 | 0.08 | 0.7 | 8 | 0.947 | 0.08750 | 0.002 |
| Juv Menhaden | 3.00 | 0.17 | 2.3 | 19.4 | 0.254 | 0.11900 | 1e-04 |
| Adu Menhaden | 2.02 | 0.569 | 1.9 | 8.48 | 0.909 | 0.22400 | 0.68 |
| Juv Mullet | 2.71 | 0.38 | 2.4 | 33 | 0.408 | 0.07280 | 0.002 |
| Adu Mullet | 2.00 | 1.44 | 0.8 | 12.3 | 0.16 | 0.06510 | 0 |
| Anchovy Silverside | 2.65 | 0.952 | 2.3 | 19.4 | 0.854 | 0.11900 | 0.002 |
| Gar | 3.34 | 0.04 | 0.48 | 2.25 | 0.104 | 0.21300 | 0.002 |
| Stingray | 3.17 | 0.16 | 0.48 | 1 | 0.197 | 0.48000 | 0 |
| Gulls & Terns | 3.48 | 0.00147 | 0.1 | 50 | 0 | 0.00200 | 0 |
| Pelicans | 3.45 | 0.00747 | 0.1 | 17.7 | 5.41e-05 | 0.00565 | 0 |
| Wading Birds | 3.36 | 0.00013 | 5.48 | 87.6 | 0 | 0.06250 | 0 |
| Dolphins | 3.55 | 0.08 | 0.051 | 25.3 | 8.24e-05 | 0.00202 | 0 |
| Killifishes | 2.72 | 0.215 | 2.53 | 19.4 | 0.966 | 0.13000 | 0 |
| Juv Penaeids | 2.05 | 0.205 | 3 | 66.6 | 0.262 | 0.04500 | 0 |
| Adu Penaeids | 2.16 | 15.5 | 2.4 | 19.2 | 0.0388 | 0.12500 | 1.32 |
| Juv Blue Crab | 2.37 | 0.443 | 3 | 17 | 0.203 | 0.17600 | 0.002 |
| Adu Blue Crab | 2.44 | 0.563 | 2.4 | 8.5 | 0.589 | 0.28200 | 0.601 |
| Carn Insects | 2.68 | 0.0171 | 6 | 30 | 0.3 | 0.20000 | 0 |
| Grass Shrimp | 2.05 | 0.446 | 4.5 | 18 | 0.901 | 0.25000 | 0 |
| Other Crabs | 2.00 | 1 | 4.5 | 18 | 0.991 | 0.25000 | 0 |
| Herb Insects | 2.00 | 0.174 | 6 | 30 | 0.3 | 0.20000 | 0 |
| Zooplankton | 2.00 | 4.12 | 28.8 | 84.9 | 0.489 | 0.33900 | 0 |
| Oyster Spat | 2.00 | 0.0356 | 2 | 40 | 0.032 | 0.05000 | 0 |
| Seed Oyster | 2.05 | 1.2 | 1.8 | 14.6 | 0.625 | 0.12300 | 0 |
| Sack Oyster | 2.05 | 0.685 | 2.4 | 10 | 0.839 | 0.24000 | 0.3 |
| Oyster Drill | 2.24 | 1.5 | 4.5 | 18 | 0.272 | 0.25000 | 0.01 |
| Mollusks | 2.00 | 4.03 | 3 | 15 | 0.743 | 0.20000 | 0 |
| Benthic Inverts | 2.03 | 6 | 4.5 | 22 | 0.982 | 0.20500 | 0 |
| Marsh Plants | 1.00 | 192 | 2.99 | 0 | 0.00919 | 0.00000 | 0 |
| SAV | 1.00 | 9.78 | 9.01 | 0 | 0.744 | 0.00000 | 0 |
| Benthic Microalgae | 1.00 | 29.8 | 3.91 | 0 | 0.755 | 0.00000 | 0 |
| Phytoplankton | 1.00 | 12.8 | 102 | 0 | 0.31 | 0.00000 | 0 |
| Detritus | 1.00 | 100 | 0 | 0 | 0 | 0.00000 | 0 |

|  |
| --- |
| De Mutsert et al. 2017 |
| C.W. Martin 2022, expert opinion |
| Murie et al. 2009 |
| Pauly, 1998 |
| Sage et al. 1972 |
| De Mutsert et al. 2016 |
| Geers, 2012 |
| Deehr et al. 2014 |
| McDonald et al. 2017 |
| Bejarano et al. 2017 |
| Wolff et al. 2000 |
| Lin and Mendelssohn, 2012 |
| Hill and Roberts, 2017 |
| Leading stanza |
| Solved by Rpath |
| Sensitivity of results to this parameter was minimal |

Table 2 Distributions used for bootstrapping functional responses. Distributions are similar to those used by Koehn et *al.* (2017)

|  |  |  |
| --- | --- | --- |
| Parameter symbol | Description | Distribution |
| *γi* | Other mortality density-dependence for group *i* | Beta(3, 12) |
| *θij* | Prey dependence of predator *j* prey *i* functional response | Beta(12,3) |
| *εij* | Predator dependence of predator *j* prey *i* functional response | Beta(2,2) |

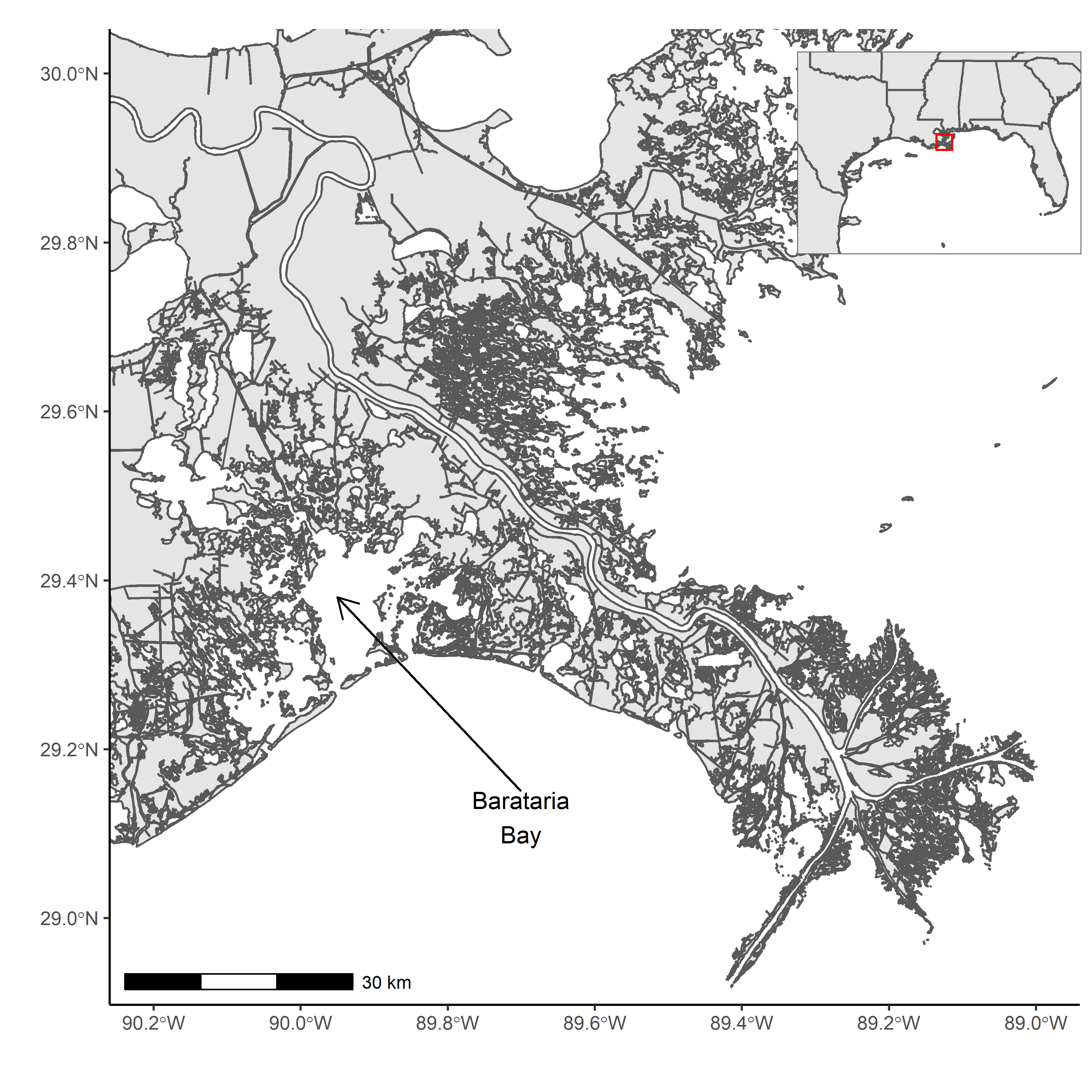


Fig. 1 Map of the region

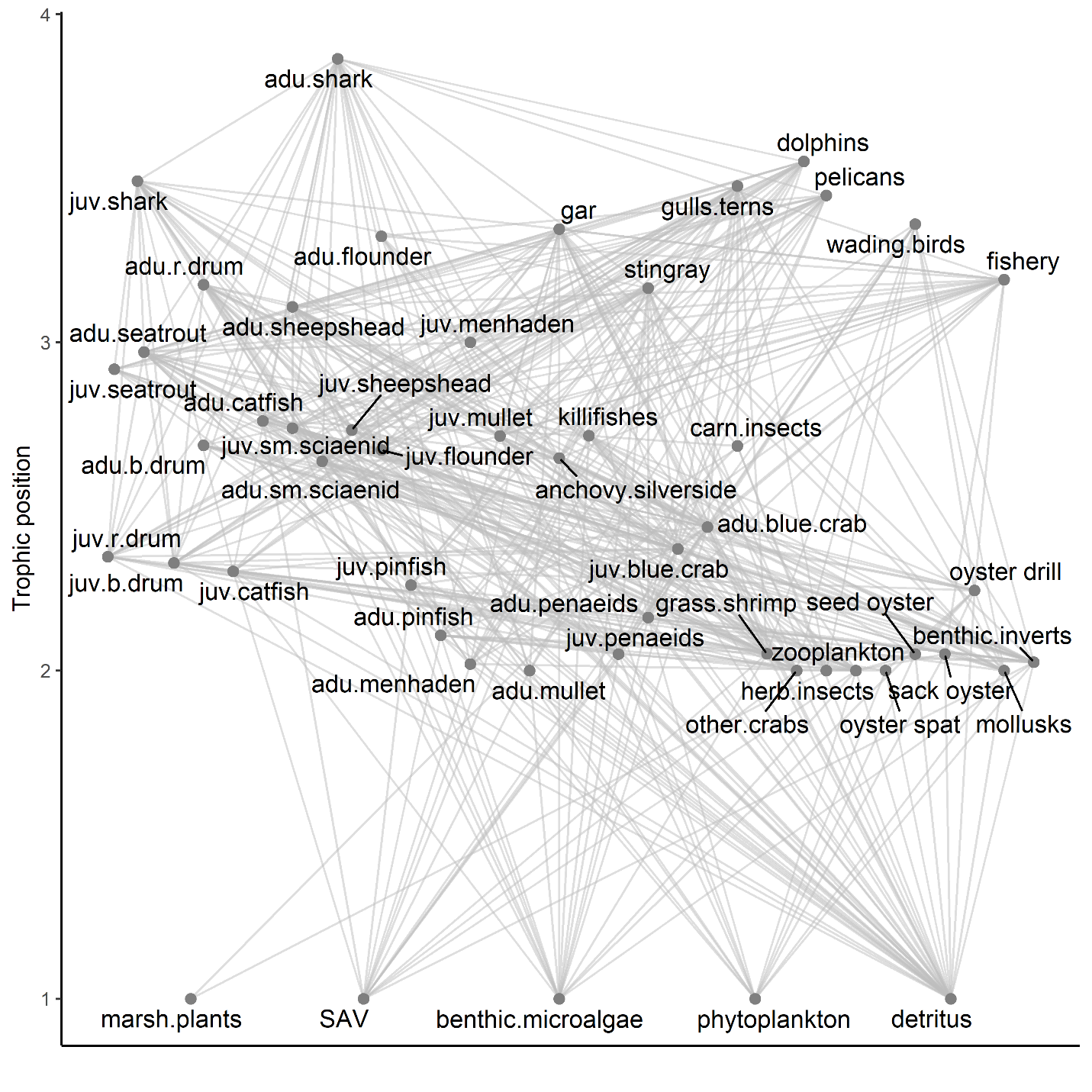


Fig. 2 Diagram of Rpath food web model

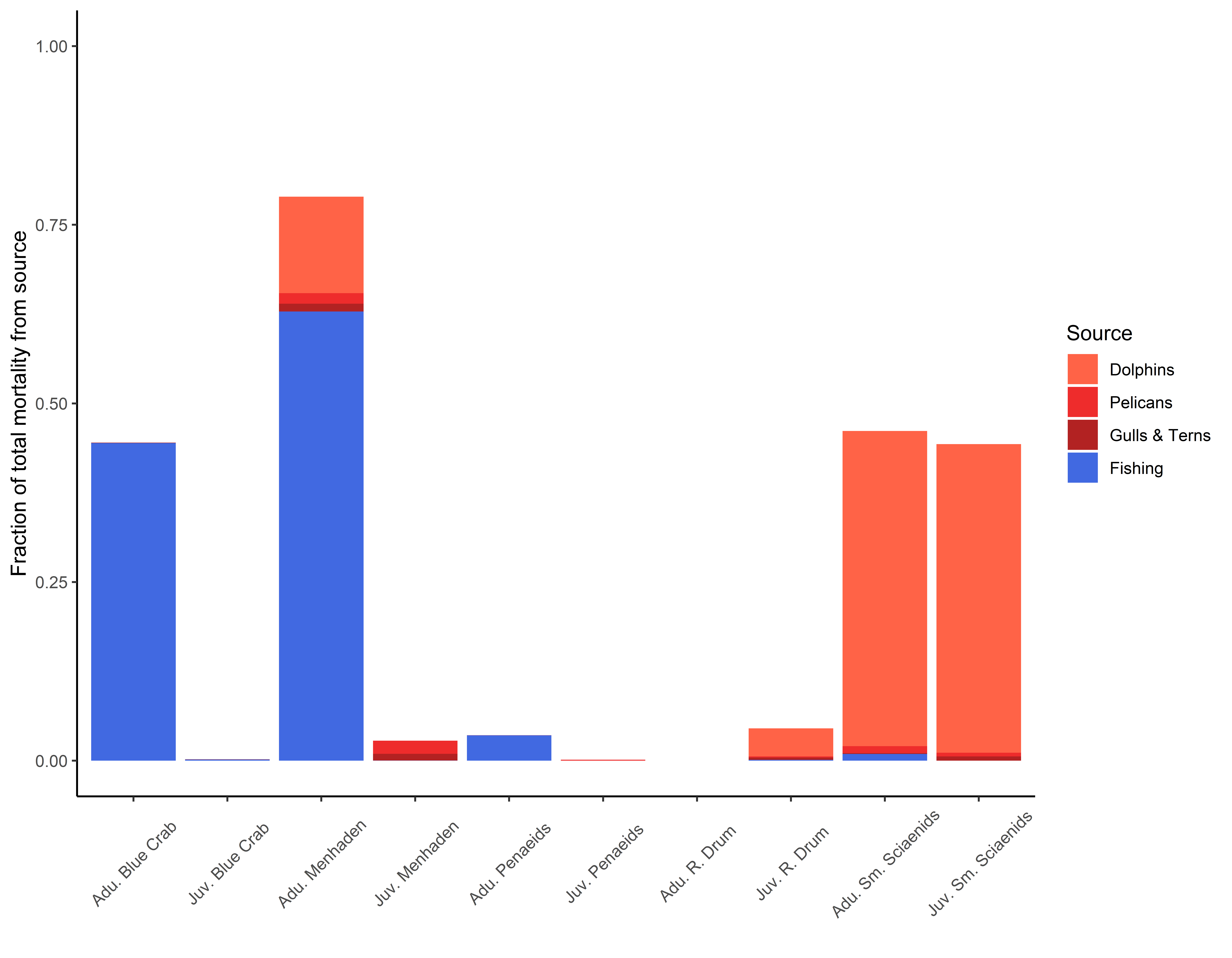


Fig. 3 Proportion of total mortality directly induced by predators and fishing on juvenile and adult stanzas of five key fish and invertebrate functional groups.

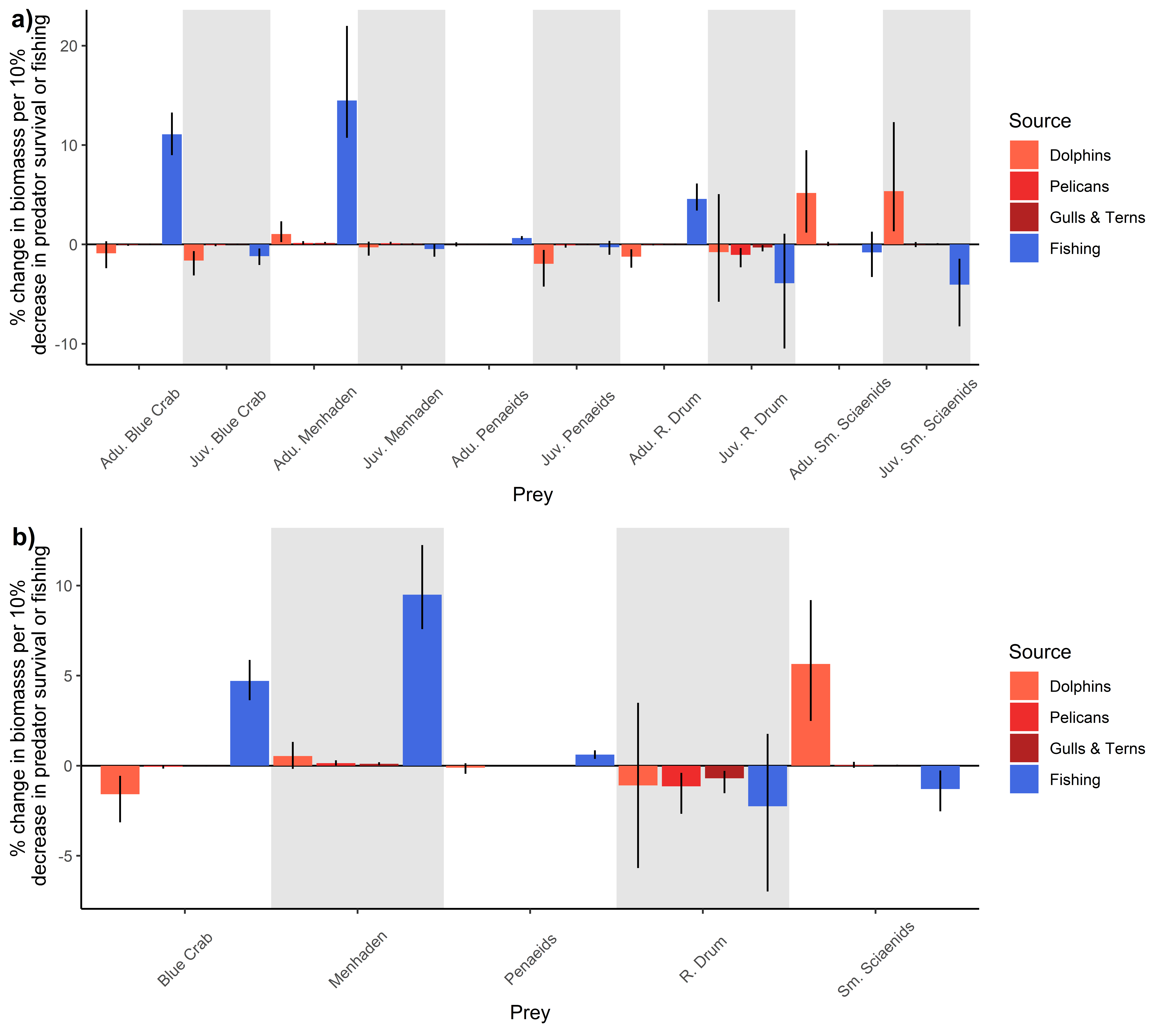


Fig. 4 Direct and indirect responses from generalized equilibrium model of fish and invertebrate biomass to changes in predator productivity and fishing effort with stanzas a) dynamically unlinked and b) combined into one homogenous functional group. Bars are at median of the Monte Carlo simulations and error lines represent the interval covering the middle 50% of simulations.

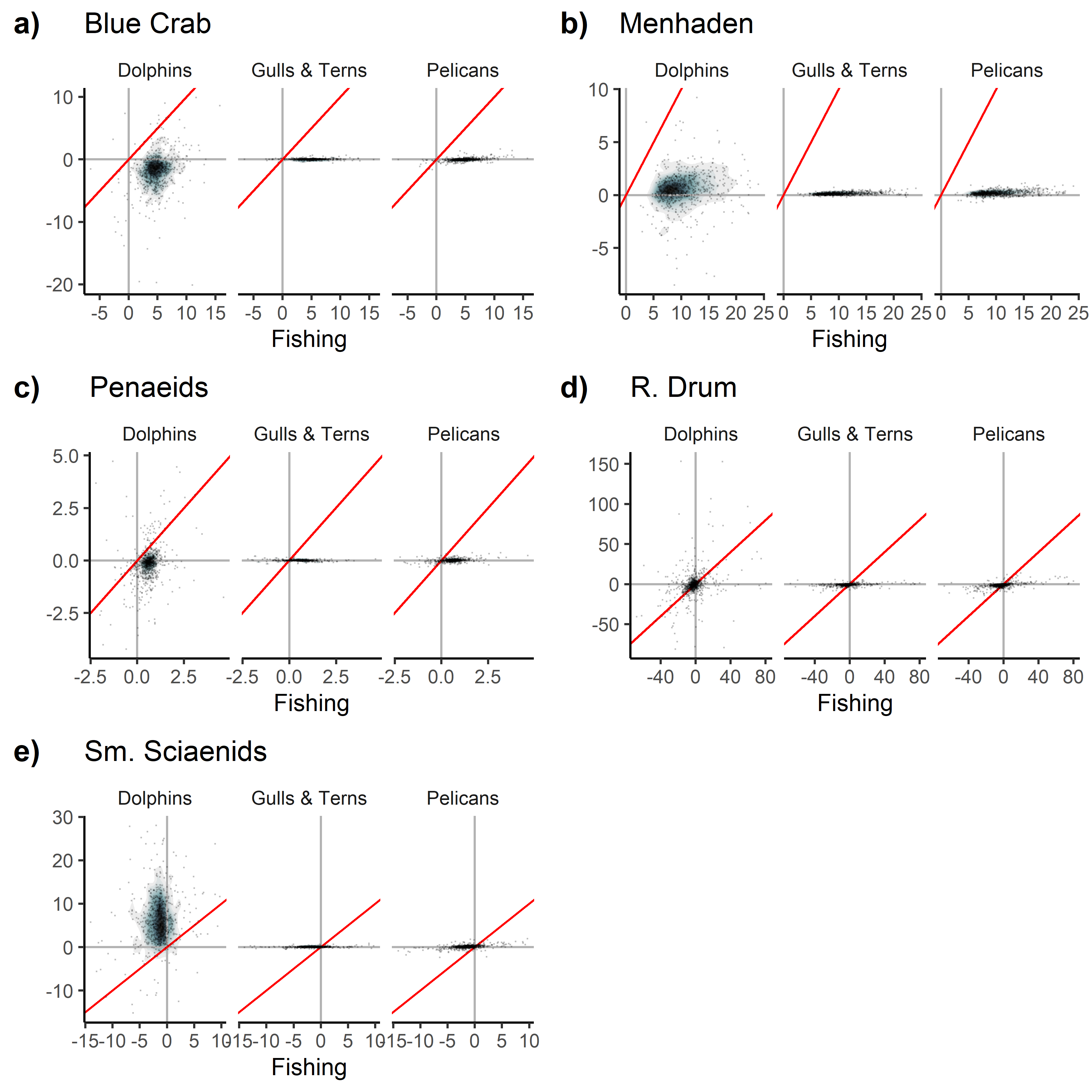


Fig. 5 Percent change in biomass in response to a 10% change in fishing effort vs 10% change in respective predator productivity for five focal functional groups, with juvenile and adult stanzas combined. Red line is 1:1. Points are overlaid on top of density plot, with bluer colors indicating higher point density and grayer/white colors indicating lower point density. Only models falling in the middle 95% of responses for all four sources for all five focal functional group are plotted (789/1000 models).