SUPPLEMENTARY FILE

The Canadian Beaufort Shelf trophic structure: evaluating an ecosystem modelling approach by comparison with observed stable isotopic structure

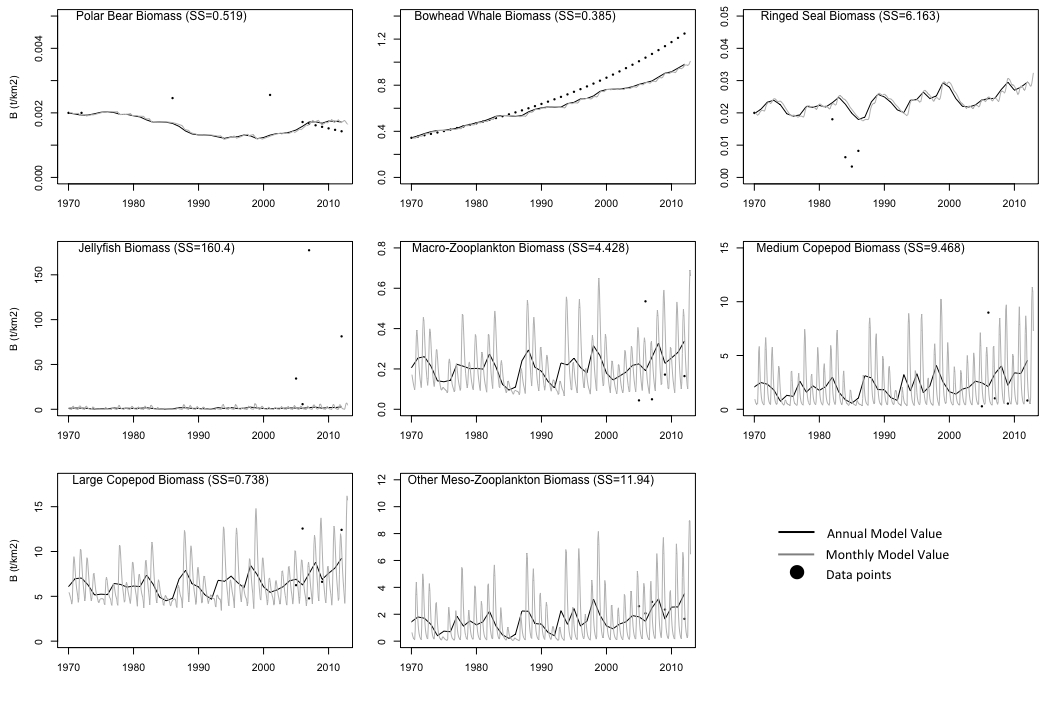
Hoover, C., Giraldo, C., Ehrman, A., Suchy, K.D., MacPhee, S.A., Brewster, J., Reist, J.D., Power, M., Swanson, H.4, and Loseto, L.

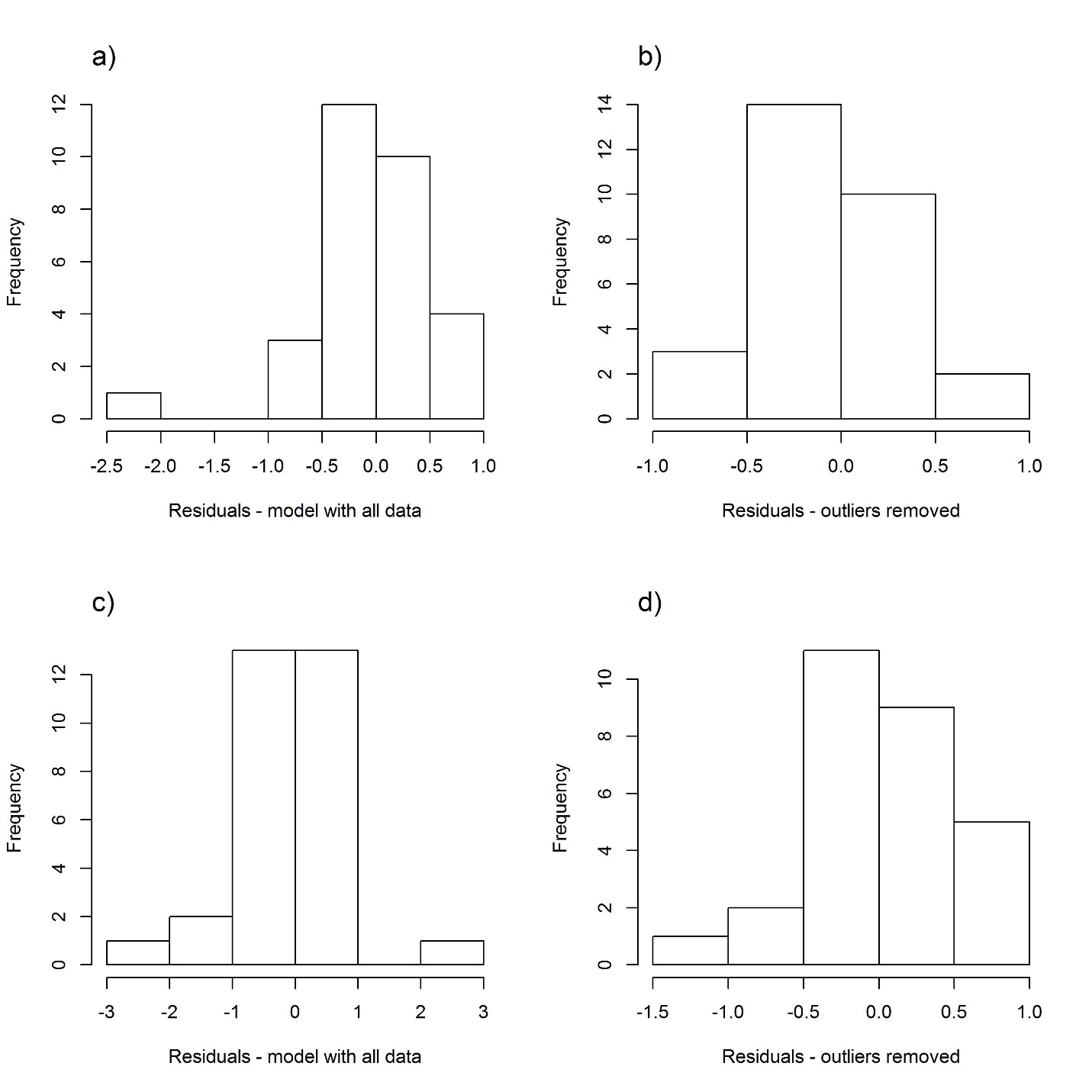
**Table S1.** List of species included in SI models, by species group.

| **Species Group (Code)** | **Common Name** | **Taxa** | **Authority** |
| --- | --- | --- | --- |
| Polar Bears  (POL) | Polar Bear | *Ursus maritimus* | Phipps, 1774 |
| Beluga Whales  (BEL) | Beluga whale | *Delphinapterus leucas* | (Pallas, 1776) |
| Bowhead Whales  (BOW) | Bowhead whale | *Balaena mysticetus* | Linnaeus, 1758 |
| Ringed Seals  (RSE) | Ringed Seal | *Pusa hispida* | (Schreber, 1775) |
| Bearded Seals  (BSE) | Bearded Seal | *Erignathus barbatus* | (Erxleben, 1777) |
| Birds  (BIR) | Dovekie | *Alle alle* | (Linnaeus, 1758) |
| Black Guillemot | *Cepphus grylle* | (Linnaeus, 1758) |
| Northern Fulmar | *Fulmarus glacialis* | (Linnaeus, 1761) |
| Glaucous Gull | *Larus hyperboreus* | Gunnerus, 1767 |
| Thayer's Gull | *Larus thayeri* | Brooks, 1915 |
| Ivory Gull | *Pagophila eburnea* | (Phipps, 1774) |
| Black-legged Kittiwake | *Rissa tridactyla* | (Linnaeus, 1758) |
| Common Eider | *Somateria mollissima* | (Linnaeus, 1758) |
| Thick-billed Murre | *Uria lomvia* | (Linnaeus, 1758) |
| Arctic Char & Dolly Varden  (CHA) | Dolly Varden | *Salvelinus malma* | (Walbaum, 1792) |
| Arctic Char | *Salvelinus alpinus alpinus* | (Linnaeus, 1758) |
| Ciscoes & Whitefish  (CIS) | Broad Whitefish | *Coregonus nasus* | (Pallas, 1776) |
| Arctic Cisco | *Coregonus autumnalis* | (Pallas, 1776) |
| Lake Whitefish | *Coregonus clupeaformis* | (Mitchill, 1818) |
| Least Cisco | *Coregonus sardinella* | Valenciennes, 1848 |
| Round Whitefish | *Prosopium cylindraceum* | (Pennant, 1784) |
| Other Salmonids  (SAL) | Pink Salmon | *Oncorhynchus gorbuscha* | (Walbaum, 1792) |
| Chum Salmon | *Oncorhynchus keta* | (Walbaum, 1792) |
| Inconnu | *Stenodus leucichthys* | (Güldenstädt, 1772) |
| Small Nearshore Forage Fishes  (SFF) | Pacific Herring | *Clupea pallasii* | Valenciennes, 1847 |
| Rainbow Smelt | *Osmerus mordax mordax* | (Mitchill, 1814) |
| Arctic & Polar Cod  (COD) | Arctic Cod | *Boreogadus saida* | (Lepechin, 1774) |
| Capelin  (CAP) | Capelin | *Mallotus villosus* | (Müller, 1776) |
| Flounders & Benthic Cods  (FLO) | Arctic Flounder | *Liopsetta glacialis* | (Pallas, 1776) |
| Starry Flounder | *Platichthys stellatus* | (Pallas, 1787) |
| Saffron Cod | *Eleginus gracilis* | (Tilesius, 1810) |
| Burbot | *Lota lota* | (Linnaeus, 1758) |
| Small Benthic Marine Fishes  (SBF) | Slender Eelblenny | *Lumpenus fabricii* | Reinhardt, 1836 |
| Fourhorn Sculpin | *Myoxocephalus quadricornis* | (Linnaeus, 1758) |
| Eelpout | *Lycodes* sp. | Reinhardt, 1831 |
| Arctic Alligatorfish | *Aspidophoroides olrikii* | Lütken, 1877 |
| Arctic Staghorn Sculpin | *Gymnocanthus tricuspis* | (Reinhardt, 1830) |
| Canadian Eelpout | *Lycodes polaris* | (Sabine, 1824) |
| Pale Eelpout | *Lycodes pallidus* | Collett, 1879 |
| Snailfish | *Liparis* sp. | Scopoli, 1777 |
| Gelatinous Snailfish | *Liparis fabricii* | Krøyer, 1847 |
| Halfbarred Pout | *Gymnelus hemifasciatus* | Andriashev, 1937 |
| Kelp Snailfish | *Liparis tunicatus* | Reinhardt, 1836 |
| Ribbed Sculpin | *Triglops pingelii* | Reinhardt, 1837 |
| Spatulate Sculpin | *Icelus spatula* | Gilbert & Burke, 1912 |
| Sculpin, unidentified | *Icelus* sp. | Krøyer, 1845 |
| Stout Eelblenny | *Anisarchus medius* | (Reinhardt, 1837) |
| Threespot Eelpout | *Lycodes rossi* | Malmgren, 1865 |
| Twohorn Sculpin | *Icelus bicornis* | (Reinhardt, 1840) |
| Other Fishes  (FIS) | Ninespine Stickleback | *Pungitius pungitius* | (Linnaeus, 1758) |
|  |  |  |
| Arthropods  (ART) | Amphipod | *Acanthostepheia malmgreni* | (Goës, 1866) |
| Amphipod | *Ampelisca macrocephala* | Liljeborg, 1852 |
| Amphipod | *Ampelisca* sp. | Krøyer, 1842 |
| Amphipod | Amphipoda | Latreille, 1816 |
| Amphipod | *Anonyx nugax* | (Phipps, 1774) |
| Amphipod | *Anonyx* sp. | Krøyer, 1838 |
| Amphipod | *Arctolembos arcticus* | (Hansen, 1887) |
| Sea piglet | *Arrhis phyllonyx* | (Sars, 1858) |
| Amphipod | *Atylus carinatus* | (Fabricius, 1793) |
| Amphipod | *Byblis gaimardii* | (Krøyer, 1846) |
| Amphipod | *Caprella* sp. | Lamarck, 1801 |
| Amphipod | *Epimeria (Epimeria) loricata* | G.O. Sars, 1879 |
| Amphipod | *Eusirus cuspidatus* | Krøyer, 1845 |
| Amphipod | *Gammaracanthus loricatus* | (Sabine, 1824) |
| Amphipod | *Gammarus setosus* | Dementieva, 1931 |
| Amphipod | *Gammarus wilkitzkii* | Birula, 1897 |
| Amphipod | *Halirages* sp. | Boeck, 1871 |
| Amphipod | *Haploops laevis* | Hoek, 1882 |
| Amphipod | *Haploops* sp. | Liljeborg, 1856 |
| Amphipod | *Hippomedon* sp. | Boeck, 1871 |
| Amphipod | *Quasimelita formosa* | (Murdoch, 1885) |
| Amphipod | *Monoculodes* sp. | Stimpson, 1853 |
| Amphipod | *Pardalisca* sp. | Krøyer, 1842 |
| Amphipod | *Paroediceros lynceus* | (M. Sars, 1858) |
| Amphipod | *Pontoporeia femorata* | Krøyer, 1842 |
| Amphipod | *Protomedeia fasciata* | Krøyer, 1842 |
| Amphipod | *Rhachotropis aculeata* | (Lepechin, 1780) |
| Amphipod | *Rhachotropis* sp. | S.I. Smith, 1883 |
| Amphipod | *Stegocephalus* sp. | Krøyer, 1842 |
| Amphipod | *Syrrhoe* sp. | Goës, 1866 |
| Cumaceans; Hooded shrimps | Cumacea | Krøyer, 1846 |
| Cumaceans; Hooded shrimps | *Diastylis* sp. | Say, 1818 |
| Shrimp | *Argis* sp. | Krøyer, 1843 |
| Arctic shrimp; Arctic argid | *Argis dentata* | (Rathbun, 1902) |
| Snow crab | *Chionoecetes opilio* | (O. Fabricius, 1788) |
| Hermit crab | Decapoda | Latreille, 1802 |
| Lesser toad crab; Arctic lyre crab | *Hyas coarctatus* | Leach, 1815 |
| Hermit crab | *Pagurus* sp. | Fabricius, 1775 |
| Fuzzy hermit crab | *Pagurus trigonocheirus* | (Stimpson, 1858) |
| Blue king crab | *Paralithodes platypus* | (J.F. Brandt in von Middendorf, 1851) |
| Sevenline shrimp | *Sabinea septemcarinata* | (Sabine, 1824) |
| Warrior shrimp | *Sclerocrangon ferox* | (Sars G.O., 1877) |
| Shrimp | *Spirontocaris* sp. | Spence Bate, 1888 |
| Isopod | *Saduria entomon* | (Linnaeus, 1758) |
| Isopod | *Saduria sabini* | (Krøyer, 1849) |
| Isopod | *Saduria sibirica* | (Birula, 1896) |
| Isopod | *Saduria* sp. | Adams, 1852 |
| Isopod | *Synidotea bicuspida* | (Owen, 1839) |
| Isopod | *Synidotea* sp. | Harger, 1878 |
| Sea spider | Pycnogonida | Latreille, 1810 |
| Bivalves  (BIV) | Boreal astarte | *Astarte borealis* | (Schumacher, 1817) |
| Narrow-hinge astarte | *Astarte montagui* | (Dillwyn, 1817) |
| Astarte clam | *Astarte* sp. | J. Sowerby, 1816 |
| Orbicular Axinopsid | *Axinopsida orbiculata* | (G. O. Sars, 1878) |
| Glacial bathyark | *Bathyarca glacialis* | (Gray, 1824) |
| Scallop | *Chlamys* sp. | Röding, 1798 |
| Iceland cockle | *Ciliatocardium ciliatum* | (Fabricius, 1780) |
| Clam | *Cyclocardia* sp. | Conrad, 1867 |
| Kurr propellerclam | *Cyrtodaria kurriana* | Dunker, 1861 |
| Smooth nutclam | *Ennucula tenuis* | (Montagu, 1808) |
| Red-nose clam | *Hiatella arctica* | (Linnaeus, 1767) |
| Wavy liocyma | *Liocyma fluctuosa* | (Gould, 1841) |
| Sandy lyonsia | *Lyonsia arenosa* | (Møller, 1842) |
| Chalky macoma | *Macoma calcarea* | (Gmelin, 1791) |
| Flat Macoma | *Macoma moesta* | (Deshayes, 1855) |
| Clam | *Macoma* sp. | Leach, 1819 |
| Green crenella | *Musculus discors* | (Linnaeus, 1767) |
| Mussel | *Musculus* sp. | Röding, 1798 |
| Truncate softshell clam | *Mya truncata* | Linnaeus, 1758 |
| Northern nutclam | *Nuculana pernula* | (O. F. Müller, 1779) |
| Rayed nutclam | *Nuculana radiata* | NA |
| Clam | *Nuculana* sp. | Link, 1807 |
| Glacial pandora | *Pandora glacialis* | Leach in Ross, 1819 |
| Arctic nutclam | *Portlandia arctica* | (Gray, 1824) |
| Greenland cockle | *Serripes groenlandicus* | (Mohr, 1786) |
| Scallop | *Similipecten greenlandicus* | (G. B. Sowerby II, 1842) |
| Clam | *Thyasira* sp. | Lamarck, 1818 |
| Clam | Thyasiridae | Dall, 1900 (1895) |
| Northern yoldia | *Yoldia hyperborea* | (Gould, 1841) |
| Oval yoldia | *Yoldia myalis* | (Couthouy, 1838) |
| Echinoderms  (ECH) | Basket star | *Amphiura sundevalli* | (Müller & Troschel, 1842) |
| Sea lily; Feather star | Crinoidea | NA |
| Common sun star | *Crossaster papposus* | (Linnaeus, 1767) |
| Sea star | *Ctenodiscus crispatus* | (Bruzelius, 1805) |
| Sea cucumber | *Cucumaria* sp. | de Blainville, 1830 |
| Rough fusiform sea cucumber | *Eupyrgus scaber* | Lütken, 1857 |
| Northern basket star | *Gorgonocephalus arcticus* | Leach, 1819 |
| Basket star | *Gorgonocephalus eucnemis* | (Müller & Troschel, 1842) |
| Sea lily; Feather star | *Heliometra glacialis* | (Owen, 1833 ex Leach MS) |
| Sea cucumber | Holothuroidea | NA |
| Sea star | *Leptasterias groenlandica* | (Steenstrup, 1857) |
| Rink's footless sea cucumber | *Myriotrochus rinkii* | Steenstrup, 1851 |
| Sea cucumber | *Myriotrochus* sp. | Steenstrup, 1851 |
| Sea cucumber | *Ocnus glacialis* | (Ljungman, 1879) |
| Brittle star | *Ophiacantha bidentata* | (Bruzelius, 1805) |
| Brittle star | *Ophiocten sericeum* | (Forbes, 1852) |
| Brittle star | *Ophiura robusta* | (Ayres, 1852) |
| Brittle star | *Ophiura sarsii* | Lütken, 1855 |
| Brittle star | Ophiuridae | Müller & Troschel, 1840 |
| Sea star | *Pontaster tenuispinus* | (Düben & Koren, 1846) |
| Slipper sea cucumber | *Psolus chitonoides* | Clark, 1901 |
| Sea cucumber | *Psolus* sp. | Oken, 1815 |
| Sea star | *Pteraster obscurus* | (Perrier, 1891) |
| Brittle star | *Stegophiura nodosa* | (Lütken, 1855) |
| Green sea urchin | *Strongylocentrotus droebachiensis* | (O.F. Müller, 1776) |
| Pale sea urchin | *Strongylocentrotus pallidus* | (Sars G.O., 1872) |
| Sea star | *Urasterias lincki* | (Müller & Troschel, 1842) |
| Molluscs (not Bivalves)  (MOL) | Spoonarm octopus | *Bathypolypus arcticus* | (Prosch, 1849) |
| Whelk | *Beringius* sp. | Dall, 1887 |
| Snail | *Boreocingula martyni* | (Dall, 1886) |
| Snail | *Boreotrophon* sp. | P. Fischer, 1884 |
| Whelk | *Buccinum* sp. | Linnaeus, 1758 |
| Naked sea butterfly | *Clione limacina* | (Phipps, 1774) |
| Arctic moonsnail | *Cryptonatica affinis* | (Gmelin, 1791) |
| Necklace snail; Moon snail | *Cryptonatica* sp. | Dall, 1892 |
| White chalice-bubble snail | *Cylichna alba* | (T. Brown, 1827) |
| Concealed chalice-bubble snail | *Cylichnoides occultus* | (Mighels & C. B. Adams, 1842) |
| Polished moonsnail | *Euspira pallida* | (Broderip & G. B. Sowerby I, 1829) |
| Helicid pteropod | *Limacina helicina* | (Phipps, 1774) |
| Pearly topsnails | *Margarites* sp. | Gray, 1847 |
| Whelks | *Neptunea* sp. | Röding, 1798 |
| Whelk | *Plicifusus kroeyeri* | (Möller, 1842) |
| Whelk | *Propebela arctica* | (A. Adams, 1855) |
| Cuttlefish | *Rossia* sp. | Owen, 1835 |
| Eroded turretsnail | *Tachyrhynchus erosus* | (Couthouy, 1838) |
| Turret snail; Tower shell | *Tachyrhynchus* sp. | Mörch, 1868 |
| Worms  (WOR) | Catworm | *Aglaophamus malmgreni* | (Théel, 1879) |
| Polychaete; Bristle worm | Ampharetidae | Malmgren, 1866 |
| Bamboo worms | *Axiothella* sp. | Verrill, 1900 |
| Polychaete; Bristle worm | *Brada* sp. | Stimpson, 1854 |
| Scale worm | *Bylgides promamme* | (Malmgren, 1867) |
| Scale worm | *Bylgides* sp. | Chamberlin, 1919 |
| Gallery worm | *Capitella capitata* | (Fabricius, 1780) |
| Ribbon worm | *Cerebratulus* sp. | Renier, 1804 |
| Bristleworm | *Cirratulus cirratus* | (O. F. Müller, 1776) |
| Polychaete; Bristle worm | *Cistenides hyperborea* | Malmgren, 1866 |
| Scaleworm | *Eucranta* sp. | Malmgren, 1865 |
| Scaleworm | *Eucranta villosa* | Malmgren, 1865 |
| Scaleworm | *Eunoe* sp. | Malmgren, 1865 |
| Peanut worm | *Golfingia* sp. | Lankester, 1885 |
| Scaleworm | *Harmothoe extenuata* | (Grube, 1840) |
| Polychaete; Bristle worm | *Lumbrineris* sp. | Blainville, 1828 |
| Bamboo worm | *Maldane sarsi* | Malmgren, 1865 |
| Bamboo worm | *Maldane* sp. | Grube, 1860 |
| Ribbon worms | Nemertea | NA |
| Catworm | *Nephtys ciliata* | (Müller, 1788) |
| Shimmy worms | *Nephtys* sp. | Cuvier, 1817 |
| Polychaete; Bristle worm | *Nereimyra aphroditoides* | (O. Fabricius, 1780) |
| Ragworm | *Nereis zonata* | Malmgren, 1867 |
| Polychaete; Bristle worm | *Nicolea zostericola* | Örsted, 1844 |
| Beachworm | *Nothria conchylega* | (Sars, 1835) |
| Beachworm | *Paradiopatra parva* | (Moore, 1911) |
| Trumpet worm | *Cistenides granulata* | (Linnaeus, 1767) |
| Paddleworm | *Phyllodoce groenlandica* | Örsted, 1842 |
| Scaleworms | Polynoidae | Kinberg, 1856 |
| Sabellid feather-duster worm; Fanworm | *Potamilla neglecta* | (Sars, 1851) |
| Bamboo worm | *Praxillella* sp. | Verrill, 1881 |
| Cactus worm | *Priapulus caudatus* | Lamarck, 1816 |
| Spionid worm | *Prionospio cirrifera* | Wirén, 1883 |
| Sabellid feather-duster worm; Fanworm | Sabellidae | Latreille, 1825 |
| Peanut worm | Sipunculidae | Rafinesque, 1814 |
| Bristleworm | *Spio filicornis* | (Müller, 1776) |
| Mud owl; Gooseberry worm | *Sternaspis scutata* | (Ranzani, 1817) |
| Polychaete; Bristle worm | *Terebellides stroemii* | Sars, 1835 |
| Polychaete; Bristle worm | *Travisia forbesii* | Johnston, 1840 |
| Polychaetes; Bristle worms | Polychaeta | Grube, 1850 |
| Other Benthos  (BEN) | Naked-throat bryozoan; Tubular bryozoan | *Alcyonidium disciforme* | Smitt, 1872 |
| Naked-throat bryozoan; Tubular bryozoan | *Alcyonidium mamillatum* | Alder, 1857 |
| Naked-throat bryozoan; Tubular bryozoan | *Alcyonidium* sp. | J.V.F. Lamouroux, 1813 |
| Sea anenome | Anemonia | Risso, 1826 |
| Lace corals | Bryozoa | NA |
| Paired bryozoan | *Eucratea loricata* | (Linnaeus, 1758) |
| Naked-throat bryozoan; Tubular bryozoan | *Flustra* sp. | Linnaeus, 1761 |
| Strawberry carnation coral | *Gersemia rubiformis* | (Ehrenberg, 1834) |
| Horny sponge | *Halichondria* sp. | Fleming, 1828 |
| Ascidian; Sea squirt | *Halocynthia aurantium* | (Pallas, 1787) |
| Sea grapes | *Molgula griffithsii* | (MacLeay, 1825) |
| Naked-throat bryozoan; Tubular bryozoan | *Semisuberites* sp. | Carter, 1877 |
| Hydroid | *Sertularia robusta* | (Clark, 1877) |
| Hydroid | Sertulariidae | Lamouroux, 1812 |
| Sponge | Porifera | Grant, 1836 |
| Sea anenome | *Tealia* sp. | Gosse, 1858 |
| Jellyfish | Cnidaria | Hatschek, 1888 |
| Sea anenome | *Urticina* sp*.* | Ehrenberg, 1834 |
| Jellies  (JEL) | Pink helmet | *Aglantha digitale* | (O. F. Müller, 1776) |
| Melon comb jelly | *Beroe cucumis* | Fabricius, 1780 |
| Constricted jellyfish | *Catablema vesicarium* | (A. Agassiz, 1862) |
| Comb jellies | Ctenophora | Eschscholtz, 1829 |
| Arctic sea gooseberry | *Mertensia ovum* | (Fabricius, 1780) |
| Hydroid | *Obelia longissima* | (Pallas, 1766) |
| Macrozooplankton  (MAC) | Mysid; Opposum shrimp | *Boreomysis arctica* | (Krøyer, 1861) |
| Mysid; Opposum shrimp | *Boreomysis* sp. | G.O. Sars, 1869 |
| Shrimps | *Bythocaris* sp. | G.O. Sars, 1870 |
| Arrow worm | Chaetognatha | NA |
| Mysid; Opposum shrimp | *Erythrops* | G.O. Sars, 1869 |
| Circumpolar shrimp | *Eualus gaimardii* | (H. Milne Edwards, 1837 [in H. Milne Edwards, 1834-1840]) |
| Circumpolar eualid | *Eualus* sp. | Thallwitz, 1891 |
| Arrow worm | *Eukrohnia hamata* | (Möbius, 1875) |
| Krill | Euphausiidae | Dana, 1852 |
| Big-eye amphipod | *Hyperia galba* | (Montagu, 1813) |
| Shrimp | *Lebbeus* sp. | White, 1847 |
| Mysid; Opposum shrimp | *Michthyops theeli* | (Ohlin, 1901) |
| Mysid; Opposum shrimp | Mysidae | Haworth, 1825 |
| Mysid; Opposum shrimp | *Mysis litoralis* | (Banner, 1948) |
| Mysid; Opposum shrimp | *Mysis oculata* | (Fabricius, 1780) |
| Mysid; Opposum shrimp | *Mysis* sp. | Latreille, 1802 |
| Shrimp | *Pandalus* sp. | Leach, 1814 [in Leach, 1813-1814] |
| Elegant arrow worm | *Parasagitta elegans* | (Verrill, 1873) |
| Mysid; Opposum shrimp | *Pseudomma frigidum* | Hansen, 1908 |
| Arrow worm | *Sagitta* sp. | Quoy & Gaimard, 1827 |
| Amphipod | *Themisto abyssorum* | (Boeck, 1871) |
| Amphipod | *Themisto libellula* | (Lichtenstein in Mandt, 1822) |
| Amphipod | *Themisto* sp. | Guérin, 1825 |
| Krill | *Thysanoessa raschii* | (M. Sars, 1864) |
| Krill | *Thysanoessa inermis* | (Krøyer, 1846) |
| Medium Copepods  (MED) | Calanoid copepods | *Calanus* sp. | Leach, 1816 |
| Copepods | Copepoda | Milne Edwards, 1840 |
| Calanoid copepods | Paraeuchaeta | Scott A., 1909 |
| Large Copepods  (COP) | Calanoid copepods | *Calanus glacialis* | Jaschnov, 1955 |
| Calanoid copepods | *Calanus hyperboreus* | Krøyer, 1838 |
| Calanoid copepods | *Metridia longa* | (Lubbock, 1854) |
| Calanoid copepods | Calanoida | Sars G. O., 1903 |
| Other Mesozooplankton  (MES) | Plankton (from 335 µ net) | NA | NA |
| Pelagic Primary Producers (all sizes) (PPP) | Pelagic detritus | POM at subsurface chl max | NA |
| Benthic Detritus  (BDE) | Sediment | POM, sediment | NA |
| Sediment | Surface sediment | NA |
| Pelagic Detritus  (PDE) | Particulate organic matter | near-bottom water | NA |
| Particulate organic matter | POM, suspended | NA |

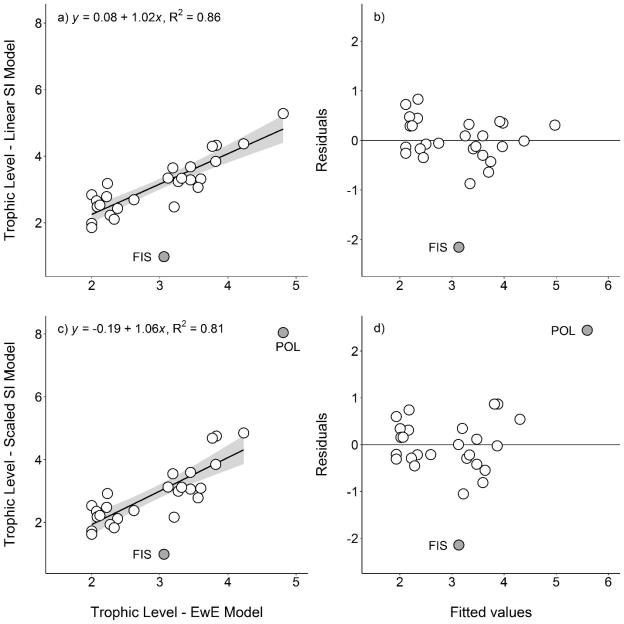
**Table S.2** List of species included in the EwE model by species group, with model diet inputs and references. Percent diets are inputted as wet weight, and are calculated or estimated based on various references and methods. Input source for diet methods refer to observational (OB), stomach contents (SC), fatty acids (FA), stable isotopes (SI), feeding rates (FR), literature review (LR), estimated diet (ES) and expert knowledge (EX). Feeding rates pertain to filter feeders. Information on both estimated diets (based on general knowledge), and expert knowledge (from EwE model creators) can be found in more detail in Hoover *et al.* (2021). Location of each dietary study are provided for reference and include the Beaufort Sea (BS), other Arctic ecosystems (OAE), or other ecosystems (OE) which relies on data from non-Arctic regions.

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| --- | --- | --- | --- | --- |
| **Species Group Name** | **Group Code** | **Species Included** | **EwE Diets** | **Diet Location and Type by References** |
| Polar Bears | POL | Polar Bears *(Ursus maritimus)* | 3% Beluga Whales, 2% Bowhead Whales, 85% Ringed Seals, 9.9% Bearded Seals, and 0.1% Polar Bears (to account for cannibalism). | Peacock *et al.* (2010, OB-OAE); Stirling (2002, OB-BS); Stirling and Archibald (1977, OB-OAE) |
| Beluga | BEL | Beluga *(Delphinapterus leucas)* | 1% Anadromous Chars, 16% Ciscos & Whitefish, 7% Herring & Smelt, 45% Arctic & Polar Cods, 5% Capelin, 2% Flounders & Benthic Cods, 10% Small Benthic Marine Fish, 2% Other Fish, 5% Macro-zooplankton, 2% Med Copepods, 3% Lg Copepods, 2% Other Meso-Zooplankton. | Harwood and Smith (2002, OB-BS); Loseto *et al.* (2009, FA-BS); Quakenbush *et al.* (2015, SC-BS) |
| Bowhead | BOW | Bowhead *(Balaena mysticetus)* | 12% Macro-Zooplankton, 20% Med Copepods, 50% Lg Copepods, 13% Other-Meso-Zooplankton, 5% Micro-Zooplankton. | COSEWIC (2009, LR-BS); Harwood and Smith (2002, LR-BS); Lowry et al. (2004, SC-BS); Schell *et al*. 1989, SI-BS) |
| Ringed Seals | RSE | Ringed Seals *(Phoca hispida)* | 10% Anadromous Chars, 8% Ciscos & Whitefish, 3% Herring & Smelt, 12% Arctic & Polar Cods, 3% Capelin, 5% Flounder & Benthic Cods, 9% Small Benthic Marine Fish, 1% Other Fish, 9% Arthropods, 5% Echinoderms, 5% Molluscs, 5% Worms, 5% Other Benthos, 10% Macro-Zooplankton, 3% Med Copepods, 5% Large Copepods, and 2% Other Meso-Zooplankton. | Holst *et al.* (2001, SI/SC- OAE); Lowry *et al.* (1987, SC-BS); Outridge, *et al.* (2009, SI- BS) |
| Bearded Seals | BSE | Bearded Seals *(Erignathus barbatus)* | 5% Anadromous Chars, 4% Ciscos & Whitefish, 4% Salmonids, 1% Herring & Smelt, 11% Arctic & Polar Cods, 2% Capelin, 10% Flounder & Benthic Cods, 10% Small Benthic Marine Fish, 3% Other Fish, 25% Arthropods, 9% Echinoderms, 6% Molluscs, 5% Worms, and 5% Other Benthos. | Finley and Evans (1983, SC-OAE); Smith (1981, SC-BS); Stewart (2006, LR- OAE) |
| Birds | BIR | See Hoover *et al.* (2021) Appendix B for a full list of species identified in the model area. | 5% Anadromous Chars, 6% Ciscos & Whitefish, 5% Salmonids, 10% Herring & Smelt, 11% Arctic & Polar Cods, 2% Capelin, 3% Flounder & Benthic Cods, 9% Small Benthic Marine Fish, 1% Other Fish, 7% Arthropods, 2% Bivalves, 2% Echinoderms, 2% Molluscs, 3% Worms, 2% Other Benthos, 2% Jellyfishes, 5% Macro-Zooplankton, 8% Med Copepods, 10% Large Copepods, 5% Other Meso-Zooplankton. | Divoky *et al.* (2015, OB-OAE); Eckert et al. (2005, OB-BS); EX |
| Char & Dolly Varden | CHA | Arctic Char (*Salvelinus alpinus),*  *Dolly Varden (Salvelinus malma)* | 1% Ciscos & Whitefishes, 10% Herring & Smelt, 1% Arctic & Polar Cods, 12% Capelin, 8% Flounders & Benthic Cods, 5% Small Benthic Marine Fish, 1% Other Fish, 15% Arthropods, 5% Bivalves, 2% Echinoderms, 2% Molluscs, 5% Worms, 2% Other Benthos, 3% Macro-Zooplankton, 5% Med Copepods, 20% Large Copepods, 3% Other Meso-Zooplankton. | Alaska Department of Natural Resources (2009, LR-BS); DFO (1999, SC-BS); Dempson *et al*. (2002, SC-OAE); Moore and Moore (1974, SC-OAE) |
| Ciscos & Whitefish | CIS | Arctic Cisco (*Coregonus autumnalis*),  Lake Whitefish (*Coregonus clupeaformis*), Broad Whitefish (*Coregonus nasus*), Least Cisco (*Coregonus sardinella*), Cisco (*Coregonus artedi*), Round Whitefish (*Prosopium cylindraceum*) | 6% Herring & Smelt, 2% Small Benthic Marine Fish, 2% Other Fish, 10% Arthropods, 3% Echinoderms, 2% Molluscs, 5% Worms, 5% Macro-Zooplankton, 10% Med Copepods, 30% Large Copepods, 10% Other Meso-Zooplankton, 5% Micro-Zooplankton, 7% Large Pelagic Producers (>5um), and 3% Ice Algae. | Alaska Department of Natural Resources (2009, LR-BS); Lacho (1981, SC-BS) |
| Salmonoids | SAL | Arctic Greyling (*Thymallus arcticus*), Inconnu (*Stenodus leucichthys*), Pink Salmon (*Oncorhynchus gorbuscha*), Chum Salmon (*Oncorhynchus keta*), Coho Salmon (*Oncorhynchus kisutch*), Sockeye Salmon (*Oncorhynchus nerka*),  Chinook Salmon (*Oncorhynchus tshawytscha*) | 10% Ciscos & Whitefish, 12% Arctic & Polar Cods, 3% Capelin, 5% Small Benthic Marine Fish, 5% Other Fish, 31% Arthropods, 5% Worms, 2% Other Benthos, 3% Macro-Zooplankton, 2% Med Copepods, 15% Lg Copepods, 2% Other Meso-zooplankton, and 5% Large Pelagic Producers >5um. | Fuller (1955, LR-OE); Heidi Swanson (pers. comm.); Craig and Haldorson (1986, SI-BS); Hoekstra *et al.* (2003, SC-BS) |
| Small Nearshore Forage Fish | SFF | Pacific Herring (*Clupea pallasii*) Northern Sand Lance (*Ammodytes dubius*) Pacific Sand Lance (*Ammodytes hexapterus*) Rainbow Smelt (*Osmerus mordax*) | 3% Ciscos & Whitefish, 2% Flounders 2% Benthic Cods, 2% Small Benthic Marine Fish, 5% Arthropods, 2% Echinoderms, 2% Molluscs, 5% Worms, 1% Other Benthos, 20% Macro-Zooplankton, 5% Med Copepods, 20% Large Copepods, 5% Other Meso-Zooplankton, 5% Micro-Zooplankton, 10% Large Pelagic Producers, 10%Small Pelagic Producers, and 3% Ice Algae. | Hunter (1981, SC-OE); Evans and Loftus (1987, SC-OE); Hrabik *et al.* (1998, SC-OE); Haldorson and Craig (1984, SC-OE); Wailes, (1936, SC-OE) |
| Arctic & Polar Cods | COD | Arctic Cod (*Boreogadus saida*) Polar Cod (*Arctogadus glacialis*) | 2% Salmonids, 20% Herring & Smelt, 5% Arthropods, 2% Echinoderms, 2% Molluscs, 4% Worms, 1% Other Benthos, 7% Macro-Zooplankton, 10% Med Copepods, 40% Large Copepods, 5% Other Meso-Zooplankton, and 2%Large Pelagic Producers. | Dodson *et al.* (2007, LR-OAE); Craig *et al.* (1982, SC-BS); Lacho (1986, SC-BS); Hoekstra et al. (2003, SI-BS); Hop and Gjøsæter, (2013, SC-OAE), Walkusz et al. (2013a, SC-BS); Majewski et al. (2016, SC-BS) |
| Capelin | CAP | Capelin (*Mallotus villosus*) | 5% Arthropods, 2% Echinoderms, 2% Molluscs, 4% Worms, 1% Other Benthos, 30% Macro-Zooplankton, 15% Med Copepods, 35% Large Copepods, 5% Other Meso-Zooplankton, and 2% Large Pelagic Producers. | Gjøsæter (1998, SC-OAE); Hedeholm *et al.* (2012, SI/SC- OAE); Orlova et al. (2010, SC-OAE) |
| Flounders & Benthic Cods | FLO | Starry flounder (*Platichthys stellatus*), Arctic flounder (*Pleuronectes glacialis*), Bering flounder (*Hippoglossoides robustus*), Saffron cod (*Eleginus gracilis*), Burbot (*Lota lota*), Greenland cod (*Gadus ogac*) | 2% Small Nearshore Forage Fish, 2% Arctic and Polar Cods, 1% Capelin, 1% Flounder & Benthic Cod, 9% Small Benthic Marine Fish, 2% Other Fish, 20% Arthropods, 15% Bivalves, 5% Echinoderms, 10% Molluscs, 17% Worms, 5% Other Benthos, 2% Macro-Zooplankton, 2% Med Copepods, 5% Lg Copepods, 2% Other Meso-Zooplankton. | Percy (1975, SC-BS); Hunter (1981, SC-OE); Mikhail and Welch (1989, LR-OAE); Johnson *et al.* (2009, SC, OAE), Ghan and Sprules, (1993, SC-OE); Lacho (1981, SC-BS); Atkinson and Percy (1992, SC-BS); Coyle *et al.* (1994, SI-BS); Alaska Department of Natural Resources (2009, LR-BS). |
| Small Benthic Marine Fish | SBF | Fourhorn Sculpin (*Myoxocephalus quadricornis*), Hamecon (*Artediellus scaber*), Arctic Hookear Sculpin (*Artediellus uncinatus*), Arctic Staghorn Sculpin (*Gymnocanthus tricuspis*), Twohorn Sculpin (*Icelus bicornis*), Spatulate Sculpin (*Icelus spatula*), Arctic sculpin (*Myoxocephalus scorpioides*), Shorthorn Sculpin (*Myoxocephalus scorpius*), Bigeye Sculpin (*Triglops nybelini*), Sibbed Sculpin (*Triglops pingelii*), Twolip Pout (*Gymnelus bilabrus*), Knipowitsch's Pout (*Gymnelus knipowitschi*), Fish Doctor (*Gymnelus viridis*), Shulupaoluk (*Lycodes jugoricus*), White Sea Eelpout (*Lycodes marisalbi*), Saddled Eelpout (*Lycodes mucosus*), Canadian Eelpout (*Lycodes polaris*), Threespot Eelpout (*Lycodes rossi*), Archer Eelpout (*Lycodes sagittarius*), Longear Eelpout (*Lycodes seminudus*) | 1% Flounder & Benthic Cods, 3% Small Benthic Marine Fish, 3% Other Fish, 21% Arthropods, 10% Bivalves, 10% Echinoderms, 10% Molluscs, 15% Worms, 8% Other Benthos, 0.5% Jellyfishes, 3% Macro-Zooplankton, 2% Med Copepods, 3% Large Copepods, 5% Other Meso-Zooplankton, 3% Micro-Zooplankton, 2.5% Large Pelagic Producers. | Hoekstra *et al*. (2003, SI-BS); Leonardsson *et al.,* (1988, SC-OAE); Atkinson and Percy (1992, SC-BS); Alaska Department of Natural Resources (2009, LR-BS); Lacho (1981, SC-BS); Coyle *et al.* (1997, SI-BS) |
| Other Fish | FIS | Arctic Lamprey (*Lampetra camtschatica*), Threespine Stickleback (*Gasterosteus aculeatus*), Ninespine Stickleback (*Pungitius pungitius*), Arctic Alligatorfish (*Ulcina olrikii*), Leatherfin Lumpsucker (*Eumicrotremus derjugini*),  Atlantic Spiny Lumpsucker (*Eumicrotremus spinosus),* Sea Tadpole (*Careproctus reinhardti*), Gelatinous Snailfish (*Liparis fabricii*), Variegated (aka Dusky) Snailfish (*Liparis gibbus*), Kelp Snailfish (*Liparis tunicatus*), Pighead (aka Blackline) Prickleback (*Acantholumpenus mackayi*), Fourline Snakeblenny (*Eumesogrammus praecisus*), Slender Eelblenny (*Lumpenus fabricii*), Daubed Shanny (*Lumpenus maculatus*), Stout Eelblenny ( *Lumpenus medius*), Arctic Shanny (*Stichaeus punctatus*), Longnose Sucker (*Catostomus catostomus catostomus),* Northern Pike (*Esox lucius*),  Greenland Seaanail (aka kelp snailfish) (*Liparis tunicatus*), Whitespotted Greenling (*Hexagrammos stelleri*) | 13% Arthropods, 7% Bivalves, 4% Echinoderms, 4% Molluscs, 5% Worms, 4% Other Benthos, 1% Jellyfishes, 5% Macro-Zooplankton, 4% Med Copepods, 30% Large Copepods, 5% Other Meso-Zooplankton, 5% Micro-Zooplankton, 10% Large Pelagic Producers, 1% Small Pelagic Producers, 2% Ice Algae. | Gallagher and Dick (2011, SI-OAE) |
| Arthropods | ART | Amphipods, (Isopods or others), Tanaidacea, Cumacea (hooded shrimp), Decapoda, Pycnogonodia (sea spiders), Maxillopoda | 2% Bivalves, 5% Echinoderms, 5% Molluscs, 5% Worms, 3% Other Benthos, 3% Benthic Plants, 10% Pelagic Detritus, 67% Benthic Detritus [was assumed to capture diverse feeding dynamics] | Arndt and Swadling, (2006, LR-OAE); Scott *et al.* (2001, FA-OAE), Carey and Ruff, (1977, LR-OAE); ES |
| Bivalves | BIV | Pelecypoda (or others) | 2% Small Pelagic Producers, 3% Large Pelagic Producers, 5% Benthic Plants, 10% Ice Algae, 10% Pelagic Detritus, 70% Benthic Detritus. | Hawkins *et al*. (1996, FR-OE); Loo and Rosenberg (1989, FR-OE); Dunton and Schell, (1987, SI-BS); Sauriau and Kang (2000, SI-OE) |
| Echinoderms | ECH | Ophiuroidea (brittle stars), Asteroidea (sea stars), Holothuroidea (sea cucumbers), Echinoidea (urchins), Crinoidea (sea lilies and feather stars) | 4% Arthropods, 2% Bivalves, 5% Echinoderms, 5% Molluscs, 5% Worms, 2% Benthic Plants, 10% Pelagic Detritus, 67% Benthic Detritus | Howell *et al.* (2003, FA-OAE); Fratt and Dearborn (1984, SC-OAE); McClintock (1994; LR-OAE); Dearborn *et al*. (1996, SC-OAE) |
| Molluscs | MOL | Gastropods (snails and slugs), Polyplacophora (Chiton), Scaphopoda (tusk shells), Cephalopoda (cephalopods), Aplacophora, Caudofovaeta (Chaetodermomorpha) | 10% Benthic Plants, 15% Pelagic Detritus, 75% Benthic Detritus. | Aitken and Gilbert, (1996, LR-OAE); Vanderklift and Ponsard, (2003, SI-OE) |
| Worms | WOR | Annelids (segmented worms: Polychaetes and Ciltellata), Entoprocta, Nematoda (round worms), Nemertea (ribbon worms), Priapulida (penis worms) | 1% Arthropods, 2% Echinoderms, 2% Molluscs, 1% Other Benthos, 1% Benthic Plants, 13% Pelagic Detritus, 80% Benthic Detritus. | Carey Jr, (1978, SC/LR-BS) |
| Other Benthos | BEN | Cnidarians (Anthozoa: sea anemones and Hydrozoa: sea serpent), Ascidiacea (sea squirts), Brachiopods, Bryozoa (moss animals), Kinorhyncha (mud dragons), Various unidentified eggs | 2% Arthropods, 1% Echinoderms, 1% Molluscs, 3% Worms, 2% Benthic Plants, 16% Pelagic Detritus, 75% Benthic Detritus. | Barnes and Clarke (1995, FR-OAE); Orejas *et al.* (2001, FR-OAE); Peck *et al.* (2005, FR-OAE) |
| Jellies | JEL | Ctenophores, Cnidarians (Scyphozoa, Hydrozoa), Larvaceans | 5% Med Copepods, 5% Large Copepods, 5% Other Meso-Zooplankton, 5% Micro-Zooplankton, 15% Large Pelagic Producers, 55% Small Pelagic Producers, and 10% pelagic detritus | Sullivan and Reeve (1982, FR/SC-OE) |
| Macro-Zooplankton | MAC | Zooplankton species > 20mm, while having never been sampled explicitly, likely contains krill, shrimp, mysiids, amphipods, and chaetognaths (arrow worms) | 3% Macro-zooplankton, 10% Med Copepods, 20% Large Copepods, 15% Other Meso-Zooplankton, 2% Micro-Zooplankton, 15% Large Pelagic Producers, 5% Small Pelagic Producers, 15% ice algae, and 15% pelagic detritus. | Auel and Werner (2003, LR/FR-OAE) |
| Medium Copepods | MED | *Pseudocalanus* spp., *Oithona simils*  *Limnocalanus grimaldi* (formerly *L. macrurus*) | 5% Other Meso-Zooplankton, 5% Micro-Zooplankton, 30% Large Pelagic Producers, 40% Small Pelagic Producers, 10% Ice Algae, and 10% Pelagic Detritus. | Darnis *et al.* (2008, LR-BS); Breteler *et al.* (1995, FR-OAE); Campbell *et al.* (2009, FR-BS) |
| Large Copepods | COP | *Calanus hyperboreus, Calanus glacialis,  Metridia longa, Calanus metrida* | 5% Med Copepods, 25% Micro-Zooplankton, 15% Large Pelagic Producers, 5% Small Pelagic Producers, 40% Ice Algae, 3% Pelagic Detritus, and 7% Ice Detritus. | (Forest *et al.* (2011, SI-BS); Campbell *et al.* (2009, FR-BS) |
| Other Meso-Zooplankton | MES | This includes all sampled species within surveys that did not fall into the other functional groups in the 0.2-20mm size class | 5% Med Copepods, 3% Other Meso-Zooplankton, 24% Micro-Zooplankton, 25% Large Pelagic Producers, 18% Small Pelagic Producers, 15% Ice Algae, and 10% Pelagic Detritus | ES; EX |
| Micro-Zooplankton | MIC | Zooplankton (<0.2mm) | 85% Small Pelagic Producers, 5% Ice Algae, 5% Ice Detritus, and 5% Pelagic Detritus. | (Sherr *et al.* (2009, FR- OAE) |

**Figure S1:** EwE model fitting for species groups with abundance trends showing species group biomass (t/km2). Contribution of individual time-series to total SS (Sum of Squares) values is presented for each time-series along with seasonal monthly model values and annual trends. Fitted model in Hoover *et al*. (2021) total SS= 194.052, with 0.011 of the errors coming from forced catches in the fitted model, not shown in Figure S1.

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**Figure S2.** Distribution of residuals for regressions between trophic levels derived from the EwE Model and those derived from the Linear (a, b) and Scaled (c, d) SI models, respectively. Normality of residuals improved when the outlier Other Fishes was removed from the regression with TLs from the Linear SI Model (b), and when the outliers Other Fishes and Polar Bears were removed from the regression with TLs from the Scaled SI Model (d). Results of Shapiro-Wilkes tests for deviation from normal distributions were as follows: a) *W* = 0.86, *p* < 0.001, b) *W* = 0.98, *p* = 0.88, c) *W* = 0.91, *p* < 0.001, d) *W* = 0.98, *p* = 0.78.



a)

b)

**Figure S3.** Residual versus fitted values for linear regressions between TL estimates calculated by the EwE model versus a) the Linear SI Model and b) the Scaled SI Model. Outlier groups Other Fishes (FIS) and Polar Bears (POL) are shown in grey. Residual and fitted values were not correlated for either SI model.

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