Presentation 1 (oral; J. Hoffman presenting):
Bathypelagic food web structure of the northern Atlantic Mid-Atlantic Ridge based on stable isotope analysis

J.C. Hoffman1 and T.T. Sutton2

1 Mid-Continent Ecology Division, US EPA National Health and Environmental Effects Research Laboratory, 6201 Congdon Blvd, Duluth, Minnesota 55804 USA Tel. 01 218 529 5420. e-mail: hoffman.joel@epa.gov

2 Department of Fisheries Science, Virginia Institute of Marine Science, PO Box 1364, Gloucester Point, Virginia 23062 USA. Tel. 01 804 684 7372. e-mail: tsutton@vims.edu

Abstract: The objective of our study was to characterize the trophic connections of the dominant fishes of the deep-pelagic region of the northern Mid-Atlantic Ridge (MAR) with respect to vertical distribution using carbon (C) and nitrogen (N) stable isotope analysis. Our goals were to identify previously unknown or underestimated trophic linkages for those fishes with unknown diets and confirm diet classifications of those fishes for which data are available. We analyzed a recently collected data set of 48 mesopelagic, bathypelagic and bathydemersal fishes that were collected between Iceland and the Azores as part of MAR-ECO, an international field project of the Census of Marine Life (CoML). Both stable isotopes were increasingly enriched with increasing habitat class depth. The stable isotope data had a strongly linear relationship, implying reliance on a single organic matter source with an isotopic signature that is consistent with pelagic production. Based on N stable isotope signatures, the mean trophic levels ranged from 1.8 to 5.7, also increasing with increasing habitat class depth. Over half of the zooplankton and micronekton species analyzed were at about trophic level 3, indicating they were zooplanktivorous. Nearly half of the mesopelagic fishes had a trophic level of ca. 4, indicating consumption of a mix of zooplankton, micronekton and small myctophids. The largest group of fishes, 23 species, were feeding at about trophic level 4.5, indicating consumption of large mysids and other micronekton or mesopelagic fishes or both. The highest trophic levels estimated were among the bathydemersal fishes; nine species had a trophic level of 4.8 or higher, though levels could be overestimated if these fishes were utilizing benthic energy, as well. Overall, the data are consistent with widespread opportunistic feeding in the deep sea; many species shared similar trophic levels because omnivory was common. There was evidence of widespread consumption of diel-migrating organisms, which is a plausible mechanism for direct energy transport into the bathyal region. This abstract does not necessarily reflect EPA policy.