1. The R/V Yuzhmorgeologiya is currently enroute to Admiralty Bay, King George Island in order to seek a sheltered location to calibrate acoustic equipment. The past week was spent concluding all trawl and video operations, transiting from the South Orkney Islands to the South Shetland Islands, and closing and depopulating Cape Shirreff and Copacabana field camps (10 scientists were picked up). We have successfully completed a total of 78 trawl stations using a random depth stratified sampling design. Severe sustained weather conditions near Cape Shirreff prevented us from removing all but personnel from the Cape Shirreff field camp.

2. Total gear deployments included 78 bottom trawl hauls, 21 deployments of the Ski Monkey camera/video configuration (consisting of 19 high definition videos and 2865 high resolution images), 39 CTDs, 20 XBTs, and 19 IKMT net deployments.

3. As of 7 March, a total of 7853 Kg of finfish (31194 individuals) of 58 species have been captured and processed. Our survey of finfish on the shelf of the South Orkney Islands was successfully completed in full. Further analysis of this data will be conducted in order to generate biomass estimates, as well as spatial distribution, biological and demographic patterns for finfish species on the shelf region (500 m) of the South Orkney Islands. This analysis will be used toward generating advice to CCAMLR on the potential of re-opening the commercial fishery for C. gunnari or other finfish species around the South Orkney Islands (CCAMLR Subarea 48.2). Additional deeper stations has allowed us to collect valuable information on slope areas (down to 750 m) of the South Orkney Islands and northern Antarctic Peninsula region. In addition, we have captured at least two undescribed species of finfish and potentially several undescribed invertebrate species.

4. Of particular note with respect to finfish were multiple encounters of the nototheniod species Trematomus eulepidotus. This species had been targeted in the commercial fishery by the ex-Soviet Union in the high-Antarctic in the 1980s, and occurs on the shelf of the South Orkney Islands. Catches during the course of the survey typically contained several individuals/tow. Both immature and fish in pre-spawning condition contributed to these catches. Pre-spawning T. eulepidotus were caught in larger numbers (38 – 126) in two hauls in the outflow of the western Weddell Sea from 620 to 745 m depth. The first shallower haul contained 126 individuals of which more than 90% were males. The second haul about 120 m deeper contained only females. The invertebrate benthic by-catch was composed of only two sponges and a small amount of
other benthos. The two hauls seem to suggest that males occupy a habitat different to females prior to spawning. Whether they occupy territories as a number of other notothenioids do is still speculative.

5. With respect to patterns of benthic invertebrate megafaunal bycatch, of the hauls conducted this week, the greatest biomass and taxonomic diversity was the community fished at Station 69, west of Inaccessible Islands, which included a well-developed demosponge community and an extremely high abundance of irregular echinoids. Notable also, was our last South Orkney station (Station 87) at which the bottom trawl’s codend arrived on deck empty. This suggests that the area on the far western shelf supports an extreme paucity of benthic invertebrates.

6. One of two Antarctic Peninsula stations conducted this week after leaving the South Orkneys (Station 101), east of Joinville Island, shows great potential for designation as a Vulnerable Marine Ecosystem (VME) risk area. Approximately 1.4 metric tons of benthos was encountered here revealing long-established and diverse communities of both demosponges and hexactinellid glass sponges. Also of note was a substantial biomass of stylasterid hard corals (also known as hydrocorals) and a lovely and delicate bamboo coral species not observed by us previously. This location was also particularly memorable by its inclusion of 2 giant octopus, the largest of which weighed 37.62 kg.

7. In addition to the two deep stations conducted off Joinville Island at the tip of the Antarctic Peninsula, total benthos sorted and analyzed this week was approximately 1.6 metric tons. A grand total of 11.2 metric tons of benthic invertebrate megafauna have been analyzed thus far this cruise.

8. In order to aid assessment and characterization of benthic communities in terms of potential VME status, the Ski Monkey high-definition video and still camera system was deployed at numerous stations considered to have high-potential for VME-designation. Such visual data provides direct evidence of high abundance and diversity of VME forming taxa, and will be analyzed and presented as evidence supporting potential VME risk areas. The system has revealed stunning images of hard bryozoans (a VME forming taxa) forming reef-structures as complex as coral reefs in tropical waters. The Ski Monkey was also deployed at a station in the Bransfield Strait near the Antarctic Peninsula where, during the 2006 AMLR survey, 1.5 metric tons of extremely large hexactinellid glass sponges considered to be of ancient age (at least many hundreds of years) was recorded.

9. At the close of the 2009 finfish survey, we have collected formalin fixed finfish specimens and tissue biopsies from 62 species of finfish. Certain notothenioid species were sampled for buoyancy data, and measurements were taken for functional morphological characters for all sampled notothenioid species. Our collections have resulted in specimens for at least two undescribed species, a muaenolepid and a Bathyraja species that has been known to scientists for at least 20 years. Investigations and possible species descriptions will take place at Yale University. Tissue samples collected during this survey will be used for ongoing phylogenetic and population genetic studies of notothenioid fishes.
10. A total of 209 finfish otoliths were collected from finfish this week, bringing total otolith collections to 2583, across 21 species. These otoliths are to be used in age estimation and stock assessment studies based at the Center for Quantitative Fisheries Ecology (CQFE), Old Dominion University (ODU), Norfolk, Virginia. In addition, otoliths and gonads for *C. aceratus* were targeted for examining age and growth, reproductive biology, and population structure of this species. Otoliths of *P. antarcticum, D. eleginoides, D. mawsoni,* and *N. coriiceps* are being targeted towards the fulfillment of connectivity and population structure projects based at the CQFE. A total of 146 gonads (male and female, stages 1-3) have been collected from *C. aceratus* as of March 8. Gonads have also been collected from *C. gunnari, N. coriiceps, T. hansonii, P. antarcticum, L. larseni, T. nunesi, C. rastrospinosus, N. rossii, L. squamifrons, T. nudifrons, T. eulepadotus,* and *W. witsoni.* Total gonad collections for Leg II across all species thus far is 265. These gonads will be used in histological studies based at the CQFE and the CNR in Ancona, Italy.

11. Benthic invertebrate DNA samples will go to Scripps Institution of Oceanography, La Jolla. To date Wilson has collected 1083 DNA samples, and photographed 594 individual morphospecies. One hundred and fifteen individuals of one target species, the nudibranch mollusc *Austrodoris kerquelelenensis,* have been collected. Groups with the highest diversity are Bryozoa, Cnidaria, Mollusca, Pycnogonida, Echinodermata and Porifera. DNA samples will be used for phylogeographic and phylogenetic studies, as well as DNA barcoding and identification.

12. More than 600 hundred lots of benthic invertebrates from more than a dozen phyla will be deposited in the collections of the Peabody Museum of Natural History, Yale University. In most cases specimens of distinct morphology or color pattern were photographically recorded, and these images will be made available to the scientific community via the museum’s searchable website. The museum will also be a voucher repository for many of the individual specimens sampled for DNA by N. Wilson of Scripps Institution of Oceanography.

13. Specimens of 9 more benthic invertebrates were preserved as additions to the teaching collection for Florida Atlantic University. One more species of nototheniid fish was also collected for FAU as a teaching specimen. This teaching collection will be utilized in a new unit on polar biology for marine biology course.

14. Two IKMT net deployments were completed this week (19 to date) with zero krill caught. We have measured 865 krill to date. The final mean length for the cruise remains at 46 mm with greater than 50% of the krill between 45-49 mm.

15. Antarctic fur seal scat was processed onboard for dietary components. A random sample of 25 krill carapaces was isolated from each sample and measured for length and width. Additionally, all otoliths are removed from each scat. To date, 70 scats have been processed. Of the 70 scats, all but one contained krill, 14 contained one or more otoliths, and four contained squid beaks. Preliminary identification of otoliths indicates that of the 484 otoliths recovered from scat, 280 are from the myctophid *Gymnescopelus*
151 are eroded, but are probably also *G. nicholsi*, 13 are from the myctophid *Electrona antarctica*, 2 are eroded, but are probably also *E. antarctica*, and 38 are too damaged or eroded to be identified. Also, lipids are being extracted from milk samples collected from lactating fur seals. Currently, 99 milk samples have had lipids extracted. Remaining work includes extracting lipids from 12 more milk samples.

16. Two specimens of the vascular plant, *Colobanthus quitensis*, were collected at Copacabana field camp on King George Island (under NSF OPP permit #2009-024). Portions of these specimens will be used by Anne Greenberg, a doctoral student at the Department of Ecology and Evolutionary Biology at Yale University, for a molecular systematic study of plants within the Caryophyllaceae. The rest of the plants will be deposited as vouchers at the Herbarium at the Peabody Museum of Natural History at Yale University.

17. An additional 7 Ski Monkey camera deployments were done, bringing the total number of deployments to 20. More than three and a half hours of bottom time have produced 2635 high resolution still images and 18 high definition videos. The system was used to a maximum depth of 637m producing excellent clear footage at a consistent rate.

18. An additional 4 CTD stations concluded the oceanographic operations for the second leg, bringing the total number of stations to 39. CTD data is being processed to provide bin averaged data for the leg.

19. Moderate North-Easterly winds averaging 15 knots, accompanied by a steady barometer hovering around 995 millibar, made for a calm but cold start to the week with temperatures averaging 0° C. Moderate conditions continued into the week, with Wednesday producing temperatures as low as -2° C. Thursday saw the barometer drop sharply from 1012 to 980 millibar resulting in South Easterly gusts approaching 50 knots on Friday, producing 3 meter swells and forcing the closure of the field camp at Cape Sherriff to be delayed by one day. Saturday and Sunday saw the barometer return gradually to 1000 millibar with persistent Northerly winds averaging 25 knots.