Marine Invertebrates

Vital Signs Monitoring- Southwest Alaska Network

Brown bears foraging on clams in Amalik Bay, biologists conducting quadrate counts of invertebrates, and mussels being collected for contaminants analysis.

Importance / Issues

Marine invertebrates were selected as a SWAN vital sign because they provide a critical prey resource for shorebirds, ducks, fish, bears, sea otters, and other marine invertebrate predators, as well as spawning and nursery habitats for forage fish and juvenile crustaceans. Benthic invertebrates are ecologically diverse in terms of habitat and trophic requirements; have a wide range of physiological tolerances and feeding modes; are relatively sedentary and have short generation times. Changes in species composition, abundance, contaminant levels, and biomass of intertidal invertebrates can indicate important changes in the coastal ecosystems of which they are a part, and can have effects that cascade to other trophic levels.

Objectives and Sampling Design

The purpose of this protocol is to monitor long-term trends in invertebrate species richness at randomly selected 100 m transects in sheltered rocky and mixed sand-gravel habitats. Objectives also include: 1) document how the size distribution of limpets (*Tectura persona*) and mussels (*Mytilus trossulus*) is changing annually; 2) estimate long-term trends in abundance of littleneck clam (*Protothaca staminea*) and document how the size distributions and growth rates are changing annually; and 3) monitor status and trends in the concentration of metals, organochlorides, PCBs, and mercury in mussel tissue.

Current and Future Monitoring

In 2006, 5 permanent transects were established and sampled along the KATM coast in Kukak, Kaflia, Kinak, Amalik Bays. Permanent stainless steel tags with the site numbers inscribed were bolted into place at 0.5 and 1.5 m MLLW tidal elevations at each site to mark the beginning of 100-m long transects. A Hobo temperature datalogger was placed next to the 0.5 m transect marker at each site. Large motile invertebrates (primarily sea stars) were counted along a 4-m wide band extending upslope from MLLW and stretching the 100-m length of the sampling site. The percent cover of algae and sessile invertebrates, and the abundance of smaller invertebrates (littorine snails and limpets) were determined in 12 quadrats placed along each of the two transects. Approximately 240 mussels and 120 limpets were collected at each site. All limpets and a subset of 120 mussels were measured to determine size distribution. Two samples of approximately 60 large (greater than 35 mm) mussels were collected from each site and frozen for analysis of organics and metals.

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