

Geoduck Aging

Geoduck (*Panopea abrupta*) clams are the target of several valuable commercial fisheries conducted in the Pacific coastal waters of Alaska, British Columbia, and Washington. Age estimation in geoducks is conducted using methods analogous to those used for otoliths in bony fishes: growth lines, assumed to be annuli, are visualized and counted via light microscopy. Among bivalve mollusks, the putative longevity of the geoduck clam places them among the longest living bivalve mollusks, with the oldest reportedly living to 168 years. To date, verification that the growth bands quantified are actually annuli has been limited to a) studies of young, known-age clams, b) correlation of age frequencies inside and outside a disturbance zone, and c) correlation of band width with sea surface temperature patterns. This project uses radiocarbon as an accurate means of achieving age verification. The testing of atomic bombs during the 1950s and 1960s produced a sharp increase in atmospheric radiocarbon (^{14}C) that was reflected globally in dissolved inorganic carbon (DIC) in marine waters, and incorporated as calcium carbonate in the shells of bivalves. This increase provides a fairly precise marker for age verification in species with longevities that span the bomb period, since atmospheric bomb testing was halted in 1963. Thus, if previous geoduck age estimates are good approximations and geoducks in Puget Sound, Washington are as long-lived as reported, the bomb- ^{14}C signal can be used to confirm age estimates of this species.