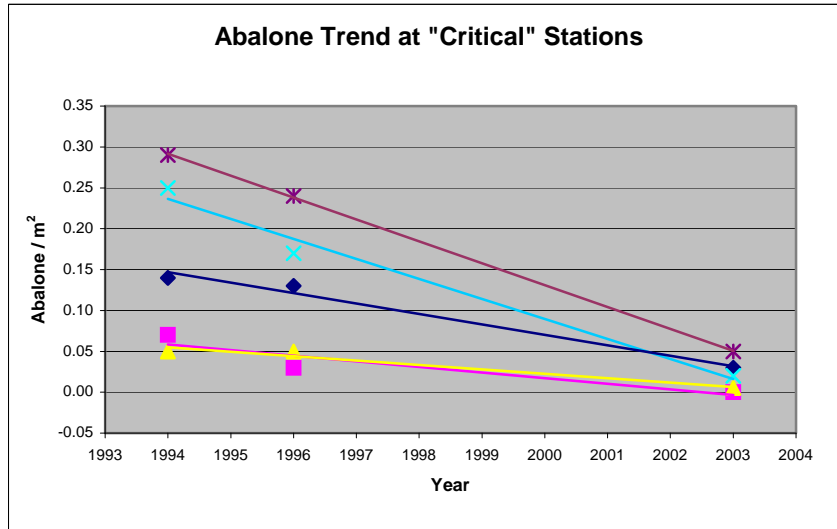


Pinto Abalone in Washington

DECLINE IN ABUNDANCE

Data from diving survey work conducted by the Washington Department of Fish and Wildlife from 1979 through 2003 has shown a large-scale decline in pinto abalone (*Haliotis kamtschatkana*) abundance in Washington State. The sport fishery for abalone was closed in 1994 and yet surveys through 2003 show continued declines. The pinto abalone, also known as the northern abalone, has been listed by WDFW (1996) as a “State Candidate Species” and NOAA Fisheries (2004) as a “Species of Concern”.



The reasons for this decline are not fully understood but may include:

1. Abalone sport fishing annual catch rates too high (1982 to 1994)
2. Abalone poaching / Illegal harvest
3. Changing environmental conditions
 - a. Increased siltation of abalone habitat from local rivers
 - b. Increased pollutants in surface water run-off from local urbanized areas
 - c. Physical ocean changes such as temperature increases or salinity decreases
 - d. Habitat loss from increase in bottom kelp (macroalgae)
 - e. Loss of nearshore red urchin spine canopy protection for juvenile abalone

One or all of these factors could be playing a role and are in need of further investigation.

THE CURRENT PROBLEM

Abalone populations may be at density levels that will make natural recovery of this species impossible. Abalone are “broadcast spawners”. The males and females eject their gametes (sperm and eggs) into the water column and rely on release timing, large quantities of gametes, and favorable ocean conditions to insure fertilization. The chances of fertilization may be enhanced by aggregation of animals at certain times during the year and timing gamete release to daylight cycles, lunar phases and tidal events. These behaviors are not fully documented or well understood. What is known from research is that broadcast spawning, sedentary invertebrates, such as abalone, need a minimum adult density between 0.33 - 0.15 individuals/m² for successful fertilization to occur. Nine out of ten sites surveyed in 2003 had densities below the 0.15 abalone/m² suggested by researchers as the minimum density. Recruitment of juvenile abalone

into the population, an event required for recovery, cannot occur without successful fertilization, larval survival and settlement. In 2003, five out of ten stations surveyed had no abalone less than 95mm (3 ¾ inches). This data suggests recruitment failure caused by low adult densities, an ecological event known as the “Allee Effect”. “Allee Effect” problems represent a “Catch 22” for species recovery. You can’t have a population increase without successful recruitment, and you can’t have recruitment without an adequate population size.

HOW CAN REEF HELP?

REEF volunteers logged over 1769 dives in Washington State between January 1, 1996 and October 31, 2004. Only 11 dives documented the presence of pinto abalone. This data could be just another example of the decline in abalone abundance in Washington State. But the fact remains, pinto abalone are a difficult animal to find within their typical habitat. The information provided below may help to educate REEF volunteers and increase the likelihood of consistent, accurate observations.



Pinto abalone are found most commonly in nearshore, rocky habitat at depths between –1 and –35 feet (they have been found as deep as –90 feet). They are generally associated with kelp beds (*Nereocystis* and/or *Macrocystis*). The rocky areas they prefer are largely covered by crustose coralline algae. Crustose coralline algae forms a hard thin layer of pink material on the rocks. Pinto abalone are cryptic, often occupying spaces that may hide individuals from casual observers. Cracks in rocks, spaces under and between boulders and small ledges in rocky walls are common microhabitats used by pinto abalone. They also occur out on open rocky surfaces, but their shells may be encrusted with crustose coralline algae, bryozoans or filamentous algae enabling them to blend into the surrounding environment. They tend to be found in dynamic areas exposed to heavy weather and current. Abalone may also be associated with red and green sea urchins. These three animals are important herbivores in the nearshore rocky environment and may play a critical role in keeping rocky substrate clear for settlement of other invertebrate species.



CHALLENGE YOUR ABILITIES

During your recreational diving, make it a personal challenge to find pinto abalone. Novice observers may often confuse pinto abalone with gumboot chitons, keyhole limpets, or other gastropods. Look at the photos provided with this information. The abalone you are likely to encounter will range in size from 50mm to 150 mm (2 to 6 inches). Abalone have a distinct pattern to their shell. The peak of the shell generally has a silver color. Most of the shell will be pinkish to red with patches of green. The shell will have five to six distinct gill pores, shaped like mini volcanoes, along its outer margin. The flesh within the gill pores will often have a yellow color. The foot around the margin of the shell will have an alternating pattern of black and beige stripes. Small tentacles, called epipodial tentacles, will be noticeable along the edge of the foot. **Never attempt to remove an abalone from the rock.** They are hemophiliacs and are likely to bleed to death if subject to any tissue injury. When you find yourself in likely abalone habitat, use the colors, patterns and shell morphology described above to help you locate abalone. Remember, these animals are cryptic and may be in spaces hidden from casual view. Finally, during REEF dives it is important to be 100% sure of your identification. If you're not sure, verify your sighting with another more experienced REEF volunteer.

RECORD AND REPORT SPECIAL OBSERVATIONS

As discussed earlier, there is little known about the behavior of abalone during spawning events. If you see uncommon abalone behavior (spawning, aggregating, individuals climbing on top of algae, multiple individuals clustered at high points in the habitat) please call or e-mail Don Rothaus at the Washington Department of Fish and Wildlife [(425) 379-2315 or rothadpr@dfw.wa.gov]. Please include the date, time, depth, and specific location (latitude and longitude coordinates when available) for your observations.

