Species of Concern
NOAA National Marine Fisheries Service

Black abalone
Haliotis cracherodii

Brief Species Description:
Black Abalone range from Cabo San Lucas, Baja California Sur, Mexico north to Mendocino County, California, USA (Figure 1), although rare sightings have been reported as far north as Coos Bay, Oregon, USA (California Department of Fish and Game 1986). The smooth shell of the black abalone is black or slate blue on the outside with a pearly white interior. Both the mantle and foot are black. Five to nine open flush pores (respiratory pores) can be found on the left side of the shell and spiral growth lines are evident on the posterior. Tentacles surrounding the foot and extending out of the shell sense food and predators. Figure 2 shows their main anatomy.

KEY INFORMATION

Areas of Concern
California and Baja California.

Year Identified as "Species of Concern"
1999

Factors for Decline
- Fishing
- Disease
- Temperature stress
- Illegal harvest
- Habitat destruction
- Predation
- Competition

Conservation Designations
IUCN: Critically Endangered

These marine gastropods can typically be found wedged into crevices, cracks and holes of intertidal and shallow subtidal rocks during low tide, rendering them quite cryptic. They generally occur in areas of moderate to high surf. When immersed and during night hours, however, this species has been observed using its muscular foot to move freely over rock surfaces. Black abalone have separate sexes and broadcast spawn primarily during the summer months (Hamm and Burton 2000). Maturity is reached at about 1.6 inches (40 mm) length or 3 years. Figure 3 shows the typical life cycle stages. Black abalones are herbivores, feeding mostly on kelp and drift algae (Leighton 1959). Lifespan appears to be up to 30 years (Blecha et al. 1992).

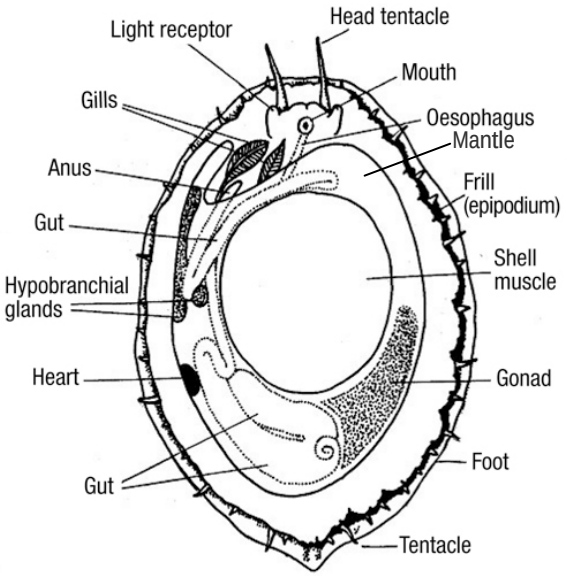

Figure 2. Black abalone anatomy.

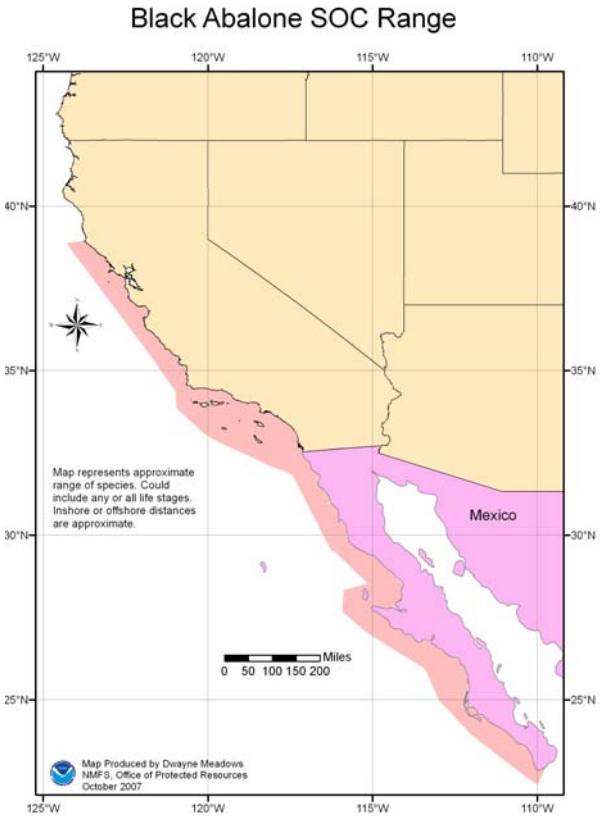

Figure 1. Map of black abalone range.

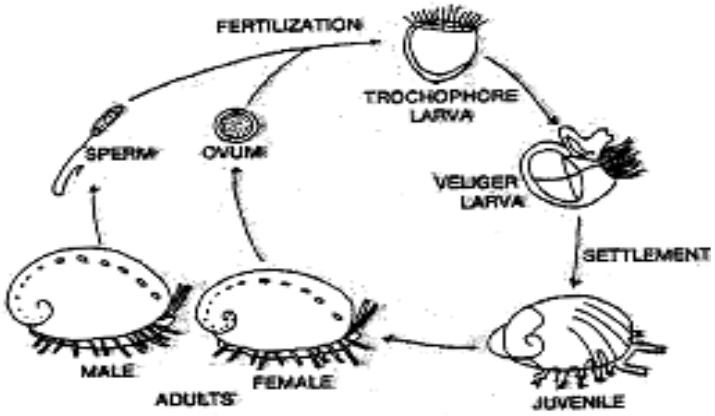

Figure 3. Black abalone life cycle.

Rationale for "Species of Concern" Listing:

Demographic and Genetic Diversity Concerns:

Black abalone has experienced population decline due to overfishing and disease (i.e., withering syndrome) throughout its range and has gone locally extinct in most locations south of Point Conception, California, USA. **Withering syndrome** was first evidenced at the northern Channel Islands in 1985 (Richards and Davis 1993, Friedman et al. 1997). The disease became more prevalent in the southern portion of its range (South of Point Conception) where water temperatures are relatively higher. Die-offs also occur in habitats north of Point Conception where water temperatures have become elevated due to human activities (Alstatt et al. 1996).

It is believed that declines in population abundance have resulted in repeated recruitment failure due to risks associated with the **Allee effect** (Allee et al. 1949). The Allee effect describes a situation whereby a decrease in population size leads to decreases in reproduction and survival of individuals. In the case of black abalone, this effect is likely due to increasing distance among potentially spawning males and females, leading to reproductive failure, as the population density decreases. Evidence of genetic differentiation among remaining populations and localized recruitment exists (Chambers et al. 2005, 2006) and decreasing populations size have also raised concerns about genetic inbreeding and loss of genetic diversity.

Factors for Decline:

The primary factors leading to the decline of black abalone are overfishing and disease. Black abalone have been important to commercial and recreational fishing in California since the mid-1800's, but it was not until the late 1970's that significant declines in black abalone populations were detected. Landings for black abalone peaked in 1973 at 868 metric tons and dropped to essentially zero in the mid 1990's (Figure 4. Rogers-Bennett et al. 2002). In addition, a disease called withering syndrome struck black abalone populations at the northern Channel Islands in 1985. The disease is caused by a Rickettsia-like prokaryote, and full manifestation of the disease appears to be more prevalent in the southern portion of its range (South of Point Conception, California) where water temperatures are relatively higher. Die-offs also seem to occur in habitats where water temperatures are elevated by thermal discharge of power plants. Other factors responsible for their decline are illegal harvest, habitat destruction, natural predation by a variety of predators including sea stars, the southern sea otter (*Enhyrda lutris*), and striped shore crab (*Pachygrapsus crassipes*), and competition for space with purple (*Strongylocentrotus purpuratus*) and red (*S. franciscanus*) sea urchins.

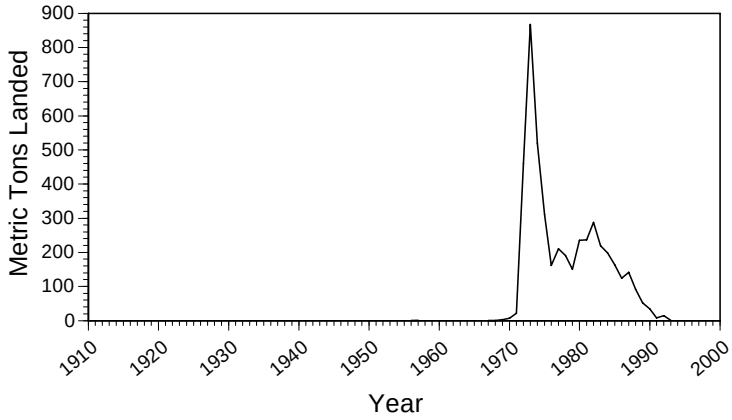

Figure 4. Abalone catch. California Dept of Fish and Game.

Status Reviews/Research Underway:
The National Marine Fisheries Service (NMFS) status review is underway and is expected to be completed during autumn 2007. As of October 18, 2006, NMFS added this species officially to its **candidate species** list **(**71 FR 61021). Transect surveys are conducted by the Multi-Agency Rocky Intertidal Network, Glenn van Blaricom, Alan and Susanne Miller, National Park Service, Brian Tissot, Tenera Environmental, and Pete Raimondi.

Data Deficiencies:
Population surveys are needed in the Monterey, CA area and genetic population structure information are needed for the species.

Existing Protections and Conservation Actions:
Existing protections include a proposed system of California Marine Protected Areas, commercial and recreational fishery closures; an **Abalone Recovery Management Plan** was adopted in 2005.

References:

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Point(s) of contact for questions or further information:

For further information on this Species of Concern, or on the Species of Concern Program in general, please contact NMFS, Office of Protected Resources, 1315 East West Highway, Silver Spring, MD 20910, (301) 713-1401, soc.list@noaa.gov; http://www.nmfs.noaa.gov/pr/species/concern/, or Dr. Melissa Neuman, NOAA Fisheries, Southwest Region, Protected Resources Division,501 W. Ocean Blvd. Suite 4200, Long Beach, California, 90802-4213, (562) 980-4115, Melissa.Neuman@noaa.gov.