



Brief Species Description:

Green abalone ranges from Pt. Conception, California, to Bahia Magdalena, Baja California Sur, Mexico (Figure 1). This species resides in shallow water on open/exposed coast from low intertidal to at least 30 feet (9 m) and perhaps as deep as 60 feet (18 m). They are found in rock crevices, under rocks and other cryptic cavities. The shell is usually brown and marked with many low, flat-topped ribs which run parallel to the 5 to 7 open respiratory pores that are elevated above the shell's surface. The inside of the shell is an iridescent blue and green. The epipodium is a "ruffle" of tissue along the side of the foot (Figure 2). The cephalic (head) and epipodial tentacles are olive green, but the epipodial fringes are a mottled cream and brown, with tubercles scattered on the surface and a frilly edge (California Department of Fish and Game 1986).

Green abalone have separate sexes and broadcast spawn from early summer through early fall. Maturity is reached at 2.4 to 5 inches (61-128 mm) length or 5 to 7 years. Figure 3 shows the typical life cycle stages. Green abalone are herbivores, feeding mostly on drift algae and preferring fleshy red algae. Lifespan is up to 30 years or more.

KEY INFORMATION

Areas of Concern

Pt. Conception, California, to Bahia Magdalena, Baja California.

Year Identified as "Species of Concern"
2004

Factors for Decline

- Fishing
- Disease
- Illegal harvest
- Predation
- Competition
- Climate
- El Niño

Conservation Designations

IUCN: Not Evaluated

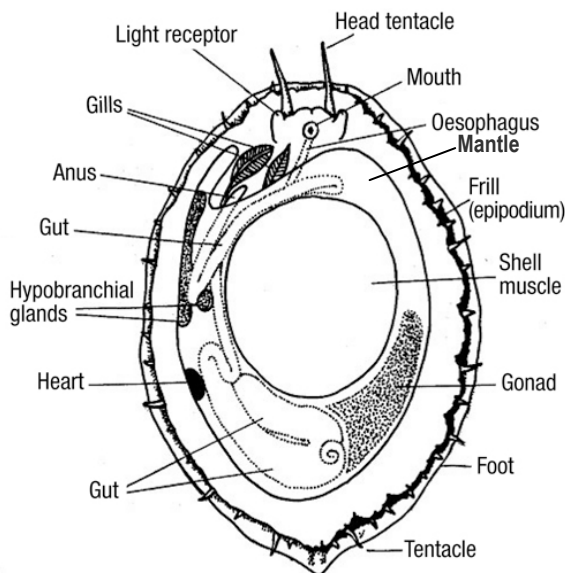


Figure 2. Abalone anatomy.

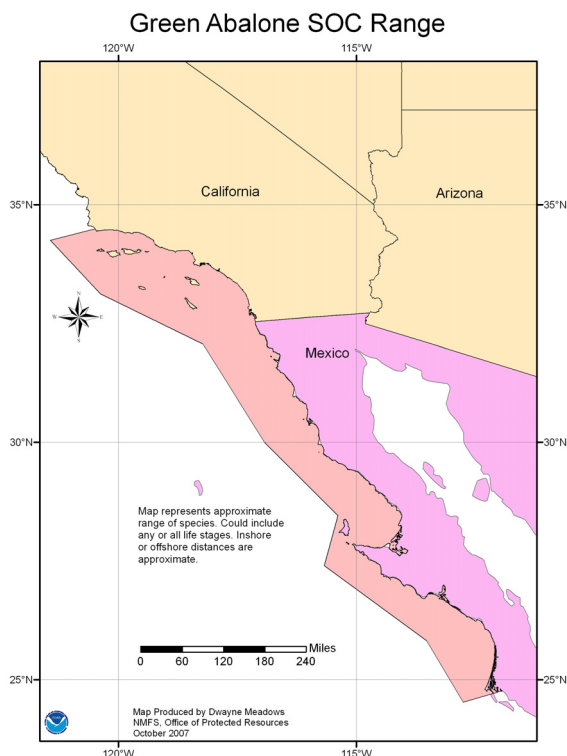


Figure 1. Map of green abalone range.

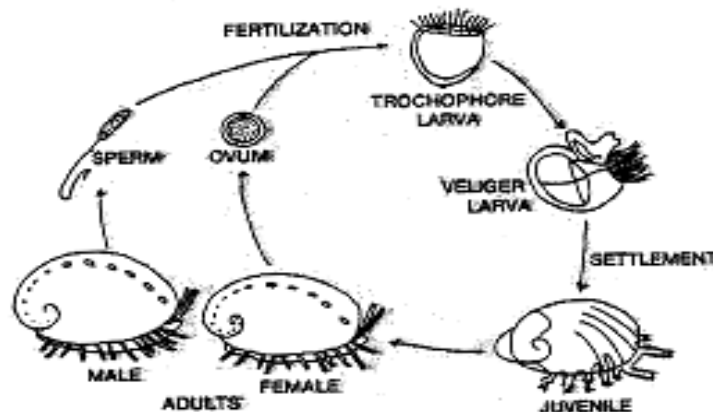


Figure 3. Abalone life cycle.

Rationale for “Species of Concern” Listing:

Demographic and Genetic Diversity Concerns:

Population size has declined in many areas. Commercial landings peaked in the early 1970's and declined precipitously after that (Figure 4). Reduced numbers due primarily to overfishing make the species vulnerable to extirpation due to a phenomenon known as 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 green abalone, this effect is likely due to increasing distance among potentially spawning males and females, leading to reproductive failure, as the population density decreases.

Factors for Decline:

The primary factors contributing to the decline of this species are overharvest, and suspected illegal harvest and trade. Other factors include predation by sea stars, the southern sea otter (*Enhydra lutris*), fishes and octopi, competition from sea urchins (*Strongylocentrotus* spp.), disease (withering syndrome), climate change, and El Niño events. The green abalone fishery in California was targeted after the collapse of the pink abalone fishery in 1970. Peak catch in California occurred in 1971 (> 494 metric tons) and by 1990 the catch had declined to 6% of the 1968-1972 average catch (Figure 3). In 1996 the California Department of Fish and Game closed the commercial and recreational abalone fisheries in California, but populations continued to decline. Information regarding the status of green abalone in Mexico is scant. Aquaculture programs are being pursued in



Species of Concern

NOAA National Marine Fisheries Service

an attempt to artificially enhance populations. A commercial fishery for green abalone is still in place in Mexico and is managed by local cooperatives.

Status Reviews/Research Underway:

The program recently funded a project to investigate culturing techniques and outplanting strategies to improve the status of this species.

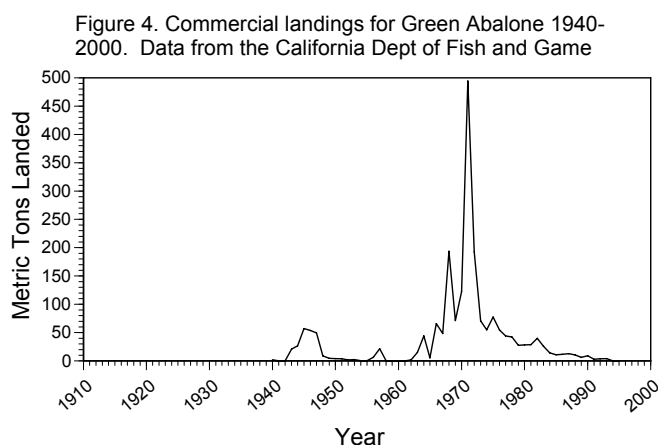
Data Deficiencies:

Population monitoring and genetic population structure information are needed.

Existing Protections and Conservation

Actions:

Existing protections include a proposed system of California Marine Protected Areas, commercial and recreational fishery closures, and an [Abalone Recovery Management Plan](#) was adopted in 2005. Culturing is being conducted under a joint U.S. Navy/City of San Diego project.



References:

Allee, W.C., A.E. Emerson, O. Park, T. Park, and K.P. Schmidt. 1949. Principles of Animal Ecology. Saunders, Philadelphia, Pennsylvania, USA.

California Department of Fish and Game. 1986. California Abalone. Marine Resources Leaflet No. 11, Marine Resources Division, Long Beach, California, USA.

California Department of Fish and Game. 2005. Abalone recovery and management plan. www.dfg.ca.gov/mrd/armp/index.html

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.