Commercial Sea Cucumber Dive Fisheries

Overview

The giant red sea cucumber (Parastichopus californicus) is the only commercially harvested sea cucumber in Alaska. The species is common in many nearshore areas from Baja California (Mexico) north and west to the Gulf of Alaska to at least Chignik where it inhabits a variety of intertidal and subtidal habitats to at least 816 ft (249 m) (Lambert 1997). Alaska's largest fishery occurs in Southeast Alaska and a smaller scale fishery occurs in the Kodiak and Chignik areas (sea cucumber management activities map).

The red sea cucumber is a slow moving benthic detritus feeder. Ecologically, it functions as a bioturbator, ingesting significant amounts of fine substrate and recycling detritus into nutrients for primary producers in the marine food web. This species is most common in protected embayments on hard and sandy substrates, avoiding mud bottoms and areas with freshwater or glacial runoff. The species is an important subsistence food resource; traditional harvest methods include use of spears on long poles. Commercial harvesting is by divers, who deliver eviscerated but live animals to shore based processors. The animals are processed by hand by separating the five longitudinal muscles bundles from the skin with a scraper or knife. The skin is cooked or boiled and then dried into a product known as trepang or beche de mer. The frozen muscles and dried skin products are marketed domestically and in Asia.

History

The first commercial harvest of sea cucumbers was in 1983 in the Ketchikan area under an experimental harvest permit. The fishery accelerated beginning in 1986 (harvest, 1983-2002) with an influx of participants in southern Southeast Alaska, driven in part by increasing restrictions on harvests imposed by rapidly developing sea cucumber fisheries in Washington State and British Columbia. Harvesting peaked in 1989 with 2.3 million pounds of eviscerated product landed by 205 permit holders. The rapid expansion of the fishery in Southeast Alaska and the state's lack of authority to control effort under the existing permit system led to closure of the fishery in May 1990. The fishery reopened in October 1990 following development of the

Southeast Alaska Sea Cucumber Commercial Fisheries Management Plan, later adopted by the Board of Fisheries (5 AAC 38.140). This plan seeks to protect subsistence opportunities and provides for sustained commercial fishing harvests. The essence of that plan, requiring abundance surveys and maximum harvest rates, is in effect today.

Entry into the fishery was restricted by moratorium in 1996, with entry limited to 436 permit holders in 2000. This relatively large allowance for permits is over twice the 2004 participation. The limit was imposed based largely on overwhelming public opposition to open access, fearing further influx of participants.

An exploratory sea cucumber fishery began in the Kodiak area in 1991. The fishery peaked in 1993 with 564,000 lb (256 mt) harvested by 50 permit holders. Harvests then dropped steeply in subsequent years to a recent 5-year average of about 150,000 lb.

Management

The Southeast Alaska sea cucumber fishery management plan (5 AAC 38.140) requires that harvest rates be set as a conservative percentage (maximum of 6.4%) of the estimated biomass. Biomass surveys are conducted by department divers prior to fishery openings in each management area, with areas opening on a 3-year rotational basis such that about one-third of approximately 46 areas are open each year, beginning in October. The 3 year rotation was put into place as a means of reducing management costs for surveys and management, and not as a method to allow stock rebuilding between harvests. The plan also identifies 20 areas closed to commercial sea cucumber fishing to provide for subsistence harvests and research sites.

Kodiak area harvests are managed using separate GHLs for 8 areas corresponding to Tanner crab management areas. GHLs are set each season depending on fishery performance as measured by catch rate information obtained from logbooks. Recent experimentation with drop video cameras has shown promise for remotely assessing sea cucumber densities but the methods are still under development. Recent (2004/05) season GHLs have totaled 150,000 lb. The Chignik harvest is limited to a GHL of 25,000 lb, and the Alaska Peninsula, Aleutian Islands, and Bering Sea each have GHLs of 5,000 lb to allow for exploratory fishing.

Gear

Sea cucumber harvesting is restricted to hand picking. Divers use scuba or surface supplied air and gather the animals in mesh bags for transport to the surface.

Recent Harvest and Status

Statewide harvests have averaged slightly over 1.6 million lb per year taken by 229 divers. Harvests in Southeast Alaska have stabilized at around 1.47 million lb per year with about 210 divers participating. Kodiak area harvests have averaged around 153,000 lb in the past 5 years with an average of 19 participants. (harvest, 2000-2004).

Conservation and Other Issues

Commercial harvests of sea cucumbers in tropical areas of the Pacific and elsewhere have generated concerns for over harvest. It was recognition of these and similar concerns that led the department to impose a conservative management program in Southeast Alaska, requiring stock assessments prior to harvests. Commercial divers in Southeast Alaska have expressed concerns that favorite harvest areas are not recovering between each 3 year rotational harvest. These highly localized depletions, occurring principally in areas offering some protection from inclement fall weather and sea conditions, would not be expected to recover during the three year management cycle given the slow growth rates and sporadic recruitment of sea cucumbers. The goal of the current management approach is to provide sustained harvests over larger areas of approximately 100 km of shoreline. An alternative management strategy will be needed if concerns of highly localized depletions are to be addressed.

[Based on excerpts from the publication, Commercial Fisheries in Alaska, Woodby et al. Alaska Department of Fish and Game, Special Publication 05-09, June 2005 (PDF - 1,059K). Information or data on this web page may have been updated and may no longer match the original publication.]

Commercial Sea Urchin Dive Fisheries

Overview

Two sea urchins species are commercially harvested in Alaska. The red sea urchin (Strongylocentrotus franciscanus) is the larger, longer-spined species and is the target in the state's largest urchin fishery in Southeast Alaska (sea urchin management activities). The green sea urchin (S. droebachiensis) is a smaller species with shorter spines taken in a small commercial fishery principally in the Kodiak area. Red sea urchins occur from Baja California north to the Gulf of Alaska and sparingly to Kodiak, whereas the green sea urchin is circumpolar in the northern hemisphere, occurring in the eastern Pacific from Washington State to the Arctic Ocean. Red sea urchins occur primarily on rocky shorelines of the outside coast with highest densities in the subtidal range down to 40 feet. Green sea urchins are found in a wider variety of habitats, and especially in more protected waters and embayments. Highest concentrations occur from the intertidal to depths of 30 feet. Both species feed on kelps and other algae.

History

The urchin fishery on the west coast of North America began in Southern California where urchins were originally considered pests. Prior to the realization that urchin roe was a valuable commodity, kelp harvesters would spread lime to kill urchins, and divers would manually crush urchins to promote kelp bed growth. As the Japanese market developed for California urchins in the 1970s, fisheries expanded north to include Oregon, Washington, and British Columbia.

Harvests of urchins in Alaska began in 1980 in the Kodiak area where a small green sea urchin fishery began and continues at a minimal level to this day (harvests, 1980-2002). Harvests in Southeast Alaska began in 1981 near Ketchikan, for both red and green sea urchins, with the vast majority of the harvest comprised of red urchins. This fishery closed in 1989 in the Ketchikan area due to marketing difficulties. A subsequent small scale harvest of red sea urchins in the Sitka area from 1991 to 1993 succumbed to marketing difficulties and extreme predation by sea otters.

The Southeast Alaska fishery was jump-started in 1995–1996 when a large, 3 million lb test fishery for red sea urchins was conducted in the Ketchikan area to evaluate the economic feasibility of the fishery and to provide funds for stock assessments. A management plan was adopted by the Board of Fisheries in 1997 establishing a conservative harvest rate approach, and requiring stock assessment surveys prior to harvests. The Commercial Fisheries Entry Commission limited entry of harvesters into the fishery in 2000.

In response to interests in developing a green sea urchin fishery in Southeast Alaska, the department, in consultation with the Southeast Alaska Regional Dive Fishery Association (SARDFA) developed an exploratory stock assessment program funded largely with Federal monies beginning in 1999. The program included reconnaissance surveys by commercial dive harvesters and subsequent biomass surveys conducted by the department. The conclusion from these assessments was that the green urchin resource was inadequate to support a commercial

dive fishery, primarily because population densities were too low and urchin sizes were too small.

Management

Red sea urchin management in the panhandle is guided by the Southeastern Alaska Red Sea Urchin Fishery Management Plan (5 AAC 38.145), which specifies a conservative harvest rate of no more than 6% of the biomass of large (> 60mm shell diameter) red sea urchins. Biomass estimates are made once every three years in 20 or more harvest areas coinciding with salmon statistical areas that average roughly 75 km in length. Several control areas where no harvests occur are also monitored for environmental effects on urchin populations that are independent of urchin harvesting. The department works in close cooperation with SARDFA in developing proposals for new or revised regulations to present to the Board of Fisheries for consideration.

The green sea urchin fishery in Kodiak and areas westward is managed under the authority of a Commissioner's permit for miscellaneous species (5 AAC 38.062) that specifies harvest locations, season length, and guideline harvest levels. Boundary lines established for Tanner crab and sea cucumbers are used for green urchin management in the Kodiak area, with maximum GHLs of 10,000 and 5,000 lb depending on historical production.

Gear

Urchin harvests are limited to hand picking and use of an urchin rake. Divers typically use surface supplied air or scuba gear and collect urchins in mesh bags that are lifted to the surface.

Recent Harvest and Status

Statewide urchin harvests have been tailing off due to lower market demand for uni. Average harvests in the 5-year period ending in 2004 were 2.8 million lb at an average price of about 33 cents per lb. (5-yr avg harvest, 2000-2004).

Conservation and Other Issues

The major emphasis of the management program for red sea urchins in Southeast Alaska has been to avoid over harvest as has occurred in urchin fisheries elsewhere; however, the impact of expanding sea otter populations may be of much greater magnitude. Fishery development efforts in the Sitka area in the early 1990s were thwarted when the local sea otter population underwent a significant expansion south of town, decimating urchin stocks. Sea otter populations are just a few miles outside the boundaries of existing stocks of red sea urchins in southern Southeast Alaska that now support much of the fishery.

[Based on excerpts from the publication, Commercial Fisheries in Alaska, Woodby et al. Alaska Department of Fish and Game, Special Publication 05-09, June 2005 (PDF - 1,059K). Information or data on this web page may have been updated and may no longer match the original publication.]

Commercial Geoduck Dive Fisheries

Overview

Geoduck clam Panopea generosa fisheries in Alaska occur only in Southeast. Geoduck beds have a patchy habitat specific distribution in the central and southern portions of Southeast Alaska, primarily in protected waters near the outside coast. The highest densities are found in fine to course sand substrates with minimal surge energy. In Southeast Alaska, the highest densities have been observed in the large island groups just west of Craig, including shoreline adjacent to Suemez Island, Baker Island, Lulu Island and Noyes Island. Studies conducted in Washington State, British Columbia and in Southeast Alaska indicate this clam can live to be over 100-years old (Bureau et al. 2003). Southeast Alaska is the extreme northern limit of the geographic range of this species and recruitment is sporadic or very low seasonally. Sporadic recruitment, low growth rates, and high maximum age makes this species susceptible to overharvest.

History

Starting in 1978 with the Noyes Island survey, state grants were used to find and qualitatively assess commercial beds in the Ketchikan, Craig, Petersburg, Wrangell, and Sitka areas. A number of potential commercial beds were located near Ketchikan, Craig, and Sitka. Procedures for testing and certifying the product for human consumption were established by the ADEC.

Population assessment surveys were conducted on three beds around Noyes Island near Craig, a harvestable biomass estimated, and the ADEC completed sanitation surveys on these areas. Two processors conducted the required modifications to their facilities and procedures to handle batch processing, lot testing, and product quarantine and were certified to process geoducks. In late 1985 the first permit was issued for the commercial harvest of geoduck clams. During the 1985/86 season 143,868 lb of the 300,000 lb, five-year quota (Table 3) were harvested by eight divers in the Noyes Island area.

Increased interest in this fishery began after the department completed a population estimates for Gravina Island, Biorka Island, Kah Shakes and Goddard area between 1989 and 1999. The largest growth in the geoduck fishery occurred between the 2004/05 through 2008/09 seasons due in part to survey funding from Nearshore federal grant money, cooperation from SARDFA reconnaissance, and a logbook program allowing the identification and mapping of new unmapped geoduck beds both within existing fishing areas and new areas being surveyed.

Exvessel value and the number of divers began to increase with the 1992/93 season with increased participation from non-resident divers. Participation fluctuated in the late 1990’s due to decreasing exvessel value with sales of processed product. However, the changes in PSP testing protocol by ADEC prior to the 2003/04 season, which allowed for over 90% percent of the harvested product to be sold live, generated increased effort in the fishery. During the last three seasons 100% of the harvest has been sold as live product.

Management

The objective of geoduck fishery management is to allow only a very low exploitation rate because the species is long-lived and recruitment is sporadic and low both spatially and temporally. Harvests are by permit only and have generally been allowed only from October through May 31, to avoid the summer spawning and recruitment period and to minimize PSP toxin levels. Prior to the January 2000 Board of Fisheries meeting, regulations (5 AAC 38.110.) referred to the general harvest of clams; requiring a permit that specifies the species, method of fishing, area of operation, and harvest levels. There were no regulations that specifically addressed the Southeast Alaska geoduck clam fishery. The department, in cooperation with the SARDFA Geoduck Committee, developed regulations and a management plan for the Southeast Alaska commercial fishery. The Alaska Board of Fisheries formally adopted the geoduck management plan (5 AAC 38.142) in 2000. The core elements are:

1. There are no size limits for geoducks and all geoducks harvested must be retained.
2. Annual guideline harvest levels must be established for an area before it is open to commercial harvest. The GHL must be based on biomass estimates where biomass surveys have been conducted within the previous 12 years.
3. Commercial harvest gear is limited to dive gear while using a hand-held, manually operated, water jet device. During the February 2006 Board of Fisheries meeting the geoduck management plan was amended to allow the department to require a harvest logbook from commercial divers.

Paralytic Shellfish Poisoning (PSP)

A troubling problem is the tendency for geoduck clams to bioaccumulate undesirable microorganisms or compounds. In particular, high levels of paralytic shellfish poisoning (PSP) have been found in geoducks in Southeast Alaska, most strongly associated with the viscera. The mantle and necks are the usual body parts consumed and PSP concentrations are lower in these parts. Though this situation permits the sale of processed clams with viscera removed, exvessel value for processed clams is significantly less than that for whole, live product. In order to protect consumers, the state requires that each individual fishery be sampled and clams tested by the Alaska Department of Environmental Conservation (ADEC).

Previous to the 2003/04 season, the department opened commercial geoduck fisheries in Southeast Alaska with little or no preliminary knowledge of current PSP levels. With pressure from industry, ADEC implemented a live shipment program and preliminary PSP testing was begun during the 2003/04 season which increased the value of the fishery significantly. During the 2003/04 through 2006/07 seasons a significant amount of PSP data was collected by ADEC and changes to the testing protocol were adopted. Further, upwards of 90% of the GHL was shipped live, significantly increasing the value of the fishery.

Fishery Area openings are based on geoducks passing ADEC PSP testing and gives relatively short notice for announcements. As openings for specific areas may be delayed, then opened on short notice, permit holders are required to closely monitor PSP test results which are posted on ADEC's and SARDFA's web sites.

Southeast Alaska Dive Fisheries Association (SARDFA)

Reconnaissance surveys within Sea Otter Sound (Port Alice/Cone Bay, Turn Point), Nakat Inlet (Cape Fox, Lord/Sitklan Island), and the Goddard area were conducted by SARDFA and SHDA prior to population assessment surveys by the department. The purpose of the reconnaissance surveys was for industry to identify the most likely sites capable of supporting commercial geoduck fisheries. This data was then given to the department for biomass assessment surveys. The department has also received Federal Nearshore Funds that have been used through industry contracts to complete reconnaissance surveys for potential commercial beds in a substantial portion of Southeast Alaska between 2001 and 2008. The results from these surveys included increased precision of the survey and an increase in biomass with subsequent increase of GHL. Since 1998, new fisheries have been defined by industry reconnaissance and subsequently surveyed by the department most yearly with a current total of 38 defined commercial harvest areas.