OUR OCEAN BACKYARD

GARY GRIGGS

ARTICLE NO. 411

Crabs and Whales

Californians love their Dungeness crab, especially at the Thanksgiving dinner table. And historically there has been enough to go around, but this has changed in the last few years as a conflict has developed with migrating whales getting entangled in the mooring lines connecting sea floor crab traps to surface floats. This impact on the whales has led to closure of the normal crab season for a significant period of time while the whales are present in substantial numbers. This, in turn, has had a major impact on the crab fishery.

In 1996, when the National Oceanographic and Atmospheric Association (NOAA) began monitoring the Dungeness crab fishery under the Marine Mammal Protection Act, an estimated 1,475 vessels were involved in the commercial fishery across the West Coast. By the 2020 season, there were only 501 commercial crabbing vessels remaining.

Despite this reduction, in recent years the Dungeness crab fishery has been one of the two most valuable commercial fisheries in California, competing with market squid for the top spot. Since 1996, the value of commercial Dungeness crab landing has varied from a little less than $9 million to nearly $90 million yearly. Between 2011 and 2018, years when data are easily accessible, the fishery returned on average 30% of the income for the state’s entire commercial fishery, averaging about $57 million annually. Crab was number one for four of these years, and number two for the others. For some perspective on this offshore industry, dividing the average annual dollar return by the number of vessels working in 2020, generates an average annual income of about $114,000 per vessel.

Looking at the annual tonnage harvested by the Dungeness crab fishery, between 2010 and 2022, the catch varied from a low of 1,506 tons in 2015 to a high of 15,884 tons in 2012. The average return over this period is just under 8,000 tons per year, which ranked it second or third in California’s commercial fishery, which is typically dominated by market squid.

The variation in the size of the annual catch is partially explained by the [cyclical nature of the Dungeness crab population](https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=65494), which may be attributed to the Pacific Decadal Oscillation (PDO), a climate cycle lasting a decade or two of alternating warmer and cooler periods in the offshore ocean. The why of this fluctuation is not completely understood, but El Niño events tend to be stronger and more frequent during the warmer PDO cycles. Larval Dungeness crabs are most abundant when the water temperature is lower during the cooler years of the climate cycle. Those baby crabs then take about three years to grow big enough to be included in the commercial catch.

But despite the fishery’s cultural and economic importance, several obstacles have made it increasingly difficult for commercial crabbers to make enough income each year to keep their boats in the water. In the central California management area, which includes Monterey Bay, the Dungeness crab fishery historically would open as early as November 15 and close as late as June 30, so a season as long as seven and half months. However, the season start has been delayed multiple times in recent years, in part due to the poor quality of the crabs, as these crustaceans hadn’t bulked up enough following their molting period to support the fishery.

Another cause for delay can be unsafe levels of domoic acid, a neurotoxin concentrated by a type of plankton that can be devastating and even deadly to marine mammals and birds. For humans, severe cases of domoic acid poisoning can create breathing problems, confusion and disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and even death. This most often has occurred from consuming contaminated shellfish like mussels and is why crabs are tested routinely to make sure they are safe.­

After four delays in the opening of this year’s Dungeness crab season because of significant numbers of humpback whales offshore and concerns with entanglements in the crab lines, the fishery opened statewide ten days ago on January 18, although with some restrictions.

Confirmed whale entanglements in fishery lines off the coasts of California, Oregon and Washington have increased from about 10 a year between 2003 and 2011, to 22 in 2014, and over 50 incidents in 2015 and 2016. Between 2017 and 2022 confirmed entanglements ranged from 17 to 46. Of the 421 whales caught in gear between 2003 and 2022, 246 or 58.4% were humpbacks and 129 or 30.6% were gray whales.

There are several potential reasons for these increasing entanglement numbers including more whales, changing distribution and movement of whales, changes in the areas of more intense fishing and also an increased public awareness of whale entanglements and reporting procedures. The late opening of the Dungeness crab season in California in 2016, for example, probably influenced the distribution and concentration of crabbing in particular areas where whales also congregated.

A number of different fisheries use gear that has the potential to entangle marine mammals, but the high incidents in 2015 and 2016 have been directly attributed to the Dungeness crab fishery. Some whales that get entangled may be able to shed the gear on their own but others can carry it for days, months or years. They can then suffer from injuries, infection, and impairment of the mammal’s ability to feed or swim. The drag of carrying what can be a large and heavy mass of gear can cause the whales to expend more energy swimming, making feeding more difficult and can result in malnutrition or starvation.

These whale entanglements are bad news for both the whales and the fishers. Injury or death to the whales, damage or loss of the fishing gear, and a shortened fishing season with restrictions harms those who depend on the Dungeness crab for their livelihood. There are efforts underway to help address this challenge, but they will have to wait for the next column.