

Commercial Fisheries – Sea Cucumber

description

The Pacific commercial sea cucumber fishery began in British Columbia in 1971, primarily in southern coastal waters. In 1980 a scientific fishery commenced, during which time markets were established, and in 1987 the fishery expanded into northern waters. Today, Fisheries and Oceans Canada (DFO) manages the commercial fishery through limited entry licensing, area licensing, a precautionary fixed exploitation rate, area quotas and an individual quota (IQ) program. The coast is divided into three categories, with approximately 25% of the total coastline in non-contiguous areas devoted to the commercial fishery, 25% in experimental fisheries and the remaining 50% closed to harvesting until the fishery is known to be sustainable.

The commercial sea cucumber fishery is currently licensed over four geographic areas: West Coast of Vancouver Island (Area 24), East Coast Vancouver Island (Areas 12 and 13), Central Coast (Areas 7, 8, 9 and 10), and North Coast (Areas 3, 4, 5 and 6) (see www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/areas-secteurs/index-eng.htm). The number of licences assigned to each licence area equals the area quota for the licence area divided by the IQ. Sea cucumbers are harvested commercially under the authority of a limited “ZD” licence. Licence limitation was implemented in 1991 with, after licence appeals, 85 licence eligibilities established.

There are approximately 30 species of sea cucumbers found in BC waters, but only the largest, the giant Pacific sea cucumber (*Parastichopus californicus*), is harvested commercially. Also known as the giant red or California sea cucumber, they are found from the intertidal zone to depths of 250 metres. They prefer hard substrates, but can be found on most substrate types. Sea cucumbers are commonly associated with bedrock in areas with low to moderate current, and areas rich in micro-organisms and/or organic matter. Sea cucumbers have limited mobility, travel up to 4 metres per day while feeding, and are believed to undertake seasonal depth-migration. It is believed that *P. californicus* is a slow-growing species (5 to 20 millimetres during the first year) that reaches sexual maturity in about five to six years, with an average life span of over eight years and maximum length of approximately 50 centimetres.

Sea cucumber harvesting is performed by scuba divers who remove the animals from the substrate by hand. Once obtained, sea cucumbers are taken on board a vessel, where they are cut open longitudinally to remove any viscera and internal fluids in a process called “splitting”. China is the primary market for the muscle strips and dried skin, although a small domestic market has formed.

The total estimated catch (pounds) for the sea cucumber fishery was assembled by DFO into 4 kilometre x 4 kilometre grid cells directly from the Shellfish Stock Assessment harvest log database located at the Pacific Biological Station (PBS) and includes the 2000-2005 fishing seasons. The database is based on fishing events provided by fishermen. Information provided by DFO was modified to meet confidentiality requirements.

The data are displayed using equal interval categories, meaning that the data are divided into 5 equally spaced classes where each class may contain a different number of grid cells. The percent of grid cells that fall in a given category is shown in the legend.

Permanent, year-round closures for the sea cucumber fishery were compiled based on the Integrated Fisheries Management Plan (IFMP) for Sea Cucumber by Dive dated October 1, 2007 – September 30, 2008 and 2008 Fisheries Notices (up to Oct. 2, 2008). Areas identified as closures may also include areas not licensed for this fishery. (Please read caveats of use for more information on closures.)

data sources

- Fishery data: Fisheries and Oceans Canada, Shellfish Stock Assessment Harvest Log Database, Pacific Biological Station
- Year-round commercial fishing closures: Living Oceans Society (see Robb *et al.*, 2010)

data resolution

- 4 kilometre by 4 kilometre grid cells

date compiled

- Fishery data: 2000-2005
- Year-round commercial fishing closures: 2008

reviewers

- Commercial fishing industry representatives (who may or may not be experts for this specific fishery), assembled with the support of the commercial fisheries representatives on the BC Marine Conservation Analysis (BCMCA) Human Use Data Working Group.
- Fisheries and Oceans Canada data providers.

reviewer comments

- Generally reviewers wanted to see catch for longer time periods and closures that matched the time periods shown for the fishery.
- Reviewer recommends getting data as far back as 1990 to reflect the impact of long-term management closures. DFO noted that reporting and technology have improved over time and it was not until 2000 that spatial accuracy to the level shown in the map was available.
- Dive fisheries that target sedentary species (e.g. geoduck, urchins and sea cucumber) cannot be spatially compared to fisheries for species which are more mobile.
- Important to note that there are large, self-imposed closures for this fishery.

caveats of use

- In the case of discrepancies, catch information from DFO takes precedence over commercial fisheries information portrayed by BCMCA.
- This map should be interpreted as showing only where fishing has taken place; it does not represent economic valuations or biological trends. Neither should it be inferred that species are more abundant where fished and less abundant in areas closed to commercial harvest.
- Data displayed should not be assumed to match current or future conditions due to ongoing changes in the environment and management.
- Data on this fishery have been screened to meet confidentiality requirements. The count of commercial fishing vessels for each spatial unit the data are provided in must be greater than 2 for information to be made public. This screen was set for each year before data were binned across years. This map represents 78.4% of the data from this fishery that met confidentiality requirements.
- The effort expended to capture targeted species differs among fisheries. Therefore it is difficult to compare weight caught for a low volume fishery versus a high volume fishery.
- Closures illustrated are permanent, year-round closures. Seasonal, temporary and voluntary closures were not included, all of which may impact catch. Areas identified as closures may also include areas not licensed for this fishery.
- Due to a lack of available spatial data regarding fisheries closures, the time period for closures does not match the time period for catch illustrated on the map. Many of the closures were implemented after the period for which catch is shown. As a result, the map may show harvesting in the closed areas, while in reality they did not overlap in time. Because the closure data are compiled in irregular polygons, closures may overlap the square grid cells delineating areas of commercial harvesting. Harvesting does not occur consistently throughout each grid cell and may not have occurred within the closure.
- Recommended date of expiry for use of these data in a marine planning context: None provided.

map, feature data and metadata access

- Visit www.bcmca.ca/data for more information.

references

- BC Marine Conservation Analysis. *Workshop Report on Commercial Fisheries Data Review*. March 2010. www.bcmca.ca/document-library
- Fisheries and Oceans Canada. *Annual Integrated Fisheries Management Plans*. www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/MPlans.htm?&lang=en
- Robb C.K., K.M. Bodtger, K. Wright and J. Lash. “Commercial fisheries closures in marine protected areas on Canada’s Pacific coast: The exception, not the rule.” *Marine Policy* (2010), doi:10.1016/j.marpol.2010.10.010

BCMCA Atlas
Commercial Fisheries
Sea Cucumber 2000 - 2005

Legend

Pounds of Sea Cucumber Caught

- 2,406 - 35,000 (87.32%)
- 35,001 - 70,000 (11.27%)
- 70,001 - 105,000 (0.94%)
- 105,001 - 140,000 (0%)
- 140,001 - 175,000 (0.47%)
- Year-round Sea Cucumber Closures

Notes:

- The number in brackets in the legend above is the percent of polygons that fell into the given category.
- This map represents 78.4% of the data from this fishery that meet confidentiality requirements (minimum 3 vessels reporting).
- Closures obtained from the Oct. 1, 2007-Sep. 30, 2008 Integrated Fisheries Management Plan and from the 2008 Fisheries Notices to Oct. 2, 2008.

Data Sources:

Fisheries and Oceans Canada,
 Living Oceans Society

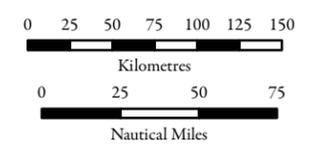
Base Data:

ESRI Base Data, GeoBase, GeoBC,
 NOAA, Natural Resources Canada,
 USGS, Washington State Government

Thematic Data:

For more information on data sources and methods please refer to the facing page to this map

Projection: BC Albers NAD83



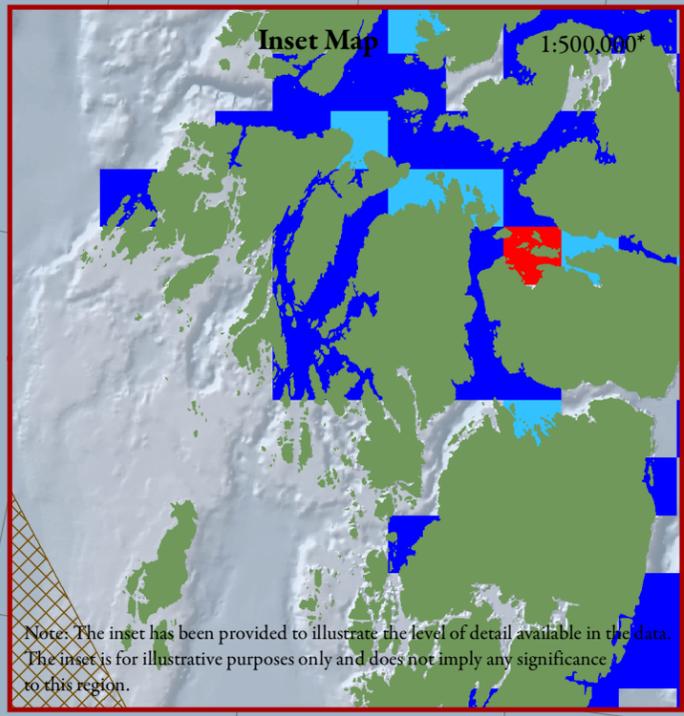
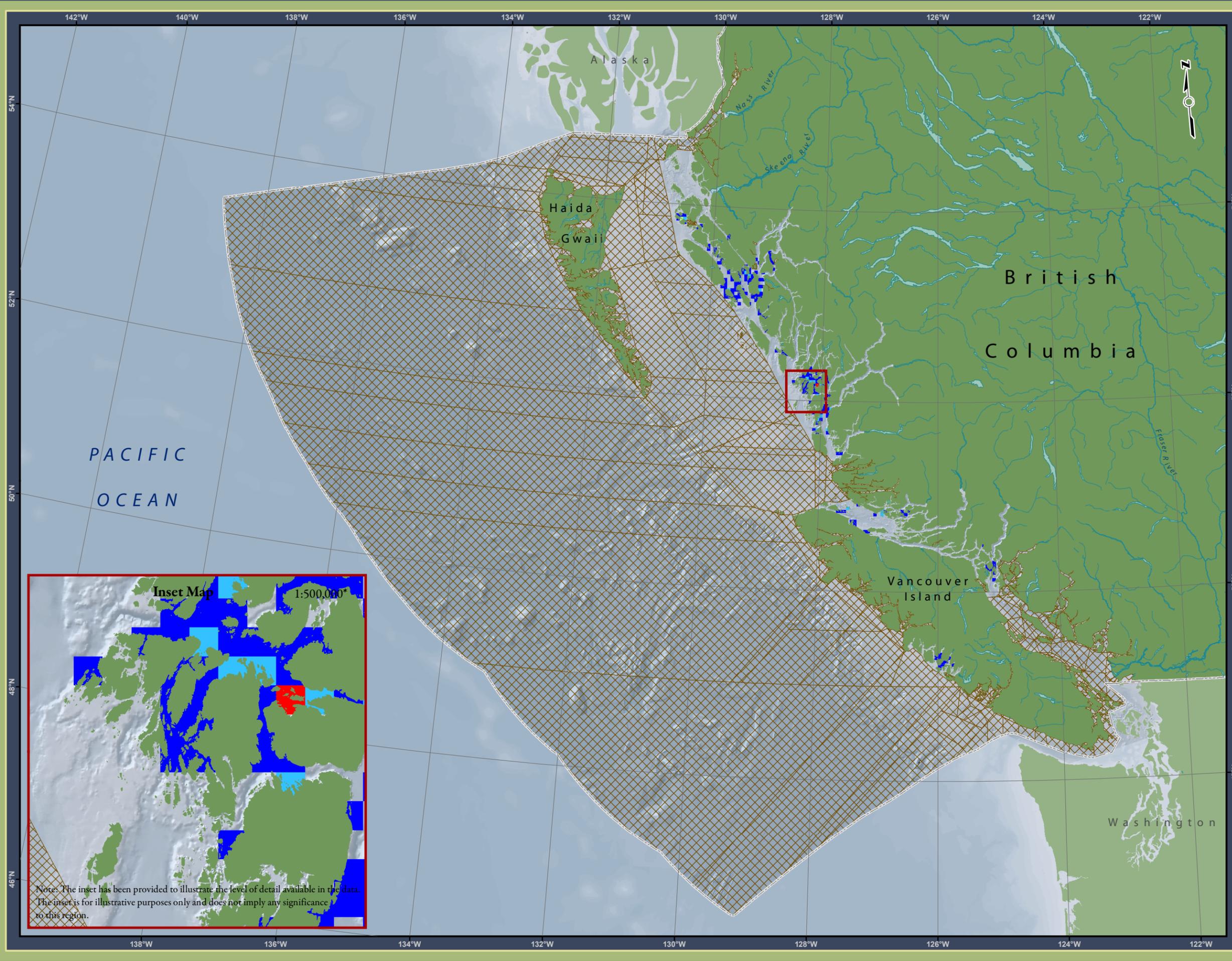
1:4,250,000 *

* Written scales are approximate and are based on a 11 x 17 inch paper size.

Prepared for:



Map template by Caslys Consulting Ltd.
 November 24, 2010



Notes: The inset has been provided to illustrate the level of detail available in the data. The inset is for illustrative purposes only and does not imply any significance to this region.