DFO Gridded Commercial Fishing Data – various years

Summary

These datasets show the general spatial distribution of commercial fishing harvest and landed values by fishery on a 1km x 1km planning grid. They aggregate key statistics around fleet specific fishing activity and catch in British Columbia (BC) within the exclusive economic zone (EEZ). These gridded data describe the annual average landed weight (Rounded KGs), and landed catch values (CAD $2016) of the subject fishery over the period. The data represented were created from logbook records and matched to prices from fish slips submitted to DFO by participants of BC's commercial fishing fleets. The dataset is comprised of an aggregate of all species over 10, 9, or 5 years of fishing seasons, depending on the fishery.

To preserve potentially proprietary information, a privacy filtering Rule of Five has been applied to each planning unit (each 1km x 1km planning unit). If any planning units do not meet this minimum of 5 unique vessels/unique identifiers during the time span then they are flagged as being filtered and an average of all filtered planning units is applied.

This dataset was created to support work on the Northern Shelf Bioregion Marine Protected Area Network. It has previously been viewable by public, and has been released to planning partners and other external parties for research purposes. The data comes with no guarantee that it will be updated in the future. The data are processed and released pursuant to the Access to Information Act, section 20 (1) (a, b, c, d). Data are provided by third party service providers and fishers to Fisheries and Oceans Canada in confidence that trade secrets of individuals and businesses are protected. Fisheries and Oceans Canada cannot disclose third party confidential information that may prejudice the competitive position of the fisher. Fishing location has been identified as one of the entities to be protected.

Please read the full metadata before using the data to prevent misinterpretation.

Description

These geospatial datasets represent components of commercial catch, effort, and landings. Although these datasets fulfill multiple cross-cutting needs between initiatives, the focus at time of creation (Fall 2017) was to provide planning support to DFO and the Partners of the Marine Protected Area Technical Team (MPATT), with focus on the context of Marine Protected Area Network planning in the 'Northern Shelf Bioregion'.

Catch metrics include weight and landed value estimates for all species landed on trips in that fishery, not only the weight and landed value of the target species. When shared outside DFO, data is filtered to protect personal and competitive information of fishers by making sure that reported activity has a minimum of 5 unique vessels represented in each 1km x 1km planning unit. Planning units that did not meet this rule were flagged with a placeholder value of -99999.

Average values representative of the whole category were calculated and provided in a separate field. Groundfish data groups filtered categories to averages at the regional or sub regional level, other fisheries group averages at the coast wide level. This approach to populating filtered planning units results in the entire reported coast-wide catch being represented/included in the data layer. Note that when looking at smaller areas with high proportion of filtered cells there could be differences between the catch shown in the data layer and the actual catch at that locale.

Data represented – Summary

Fishery	**Years (inclusive)**	**Logbook spatial component**
Groundfish Trawls -bottom trawl -midwater trawl	2012-2016 (5)	Track lines/ supplemented with points when lines cannot be completed due to missing data or data with errors
Groundfish Hook & Line, Trap -rockfish -sablefish -halibut -combo trips hab/sab -lingcod	2012-2016 (5) -Rockfish 2007-2016 (10) -sablefish -lingcod -combo -halibut	Track lines/ supplemented with points when lines cannot be completed due to missing data or data with errors
Shellfish Dive -green sea urchin (GSU) -red sea urchin (RSU) -sea cucumber -geoduck	Variable years GSU 2006-2015 (10) RSU 2007-2015 (9) Sea Cucumber 2008-2016 (9) Geoduck 2007-2015 (9)	GSU, RSU use bed polygons Sea Cucumber uses shore polylines Geoduck uses points If main method fails, recorded point used
Shellfish Trap, Trawl -prawn trap -shrimp trawl	2007-2016 (10)	Points

Credits

Product of Fisheries and Oceans Canada; Oceans Program and Economic Analysis Unit, with input from Science, and Fisheries Management. Data and methods validation by numerous fishery specific advisory boards, the Access to Information Program, sectoral representatives, and planning partners to accomplish this work.

Use limitations

Pursuant to the Access to Information Act, section 20 (1) (a, b, c, d), DFO is required by law to protect proprietary industry trade secrets. Privacy filtering with the Rule of Five has been applied to each planning unit (each 1km x 1km planning unit). If planning units do not meet this minimum 5 unique vessels/unique identifiers during the time span then they are flagged with a placeholder value of -99999. Average values representative of the whole category were calculated and provided in a separate field. These datasets are intended to display commercial fisheries' use of the marine space to aid marine spatial planning initiatives throughout British Columbia. The data comes with no guarantee that it will be updated in the future.

Due to the variability of fisheries logbook and fish slip data quality, this derived product may not precisely match reported commercial true catch, effort, or value of commercial fishing activity. Furthermore, these data only reflect reported catch as it appears in the logbook. Unreported or misreported catch will either not be reflected or will be the source of some error in the final dataset. For various reasons some data must be discarded during the processing. The result is that this dataset is not intended to be used for analysis where highly accurate or precise results are required. These data should only be used to produce coarse estimates for a region's catch or value, and for observing trends in in spatial distribution. In general, this dataset is intended to represent commercial fishing activity only, and do not directly represent habitat or abundance for a given species. There are various regulatory, practical, environmental, and clerical factors which may affect the accuracy of where catch is reported.

End of basic metadata.

The pages following are part of the full metadata.

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Geodatabase

The accompanying geodatabase contains two data layers: “all_fisheries_filtered_gridded“, which includes all of the commercial fisheries data in 1km x 1km grids, and “DFO_marine_bioregions_NSB_subregions”, which includes polygon feature boundaries for the federal marine bioregions and Northern Shelf bioregion sub-regions.

Data Dictionary for Geodatabase and SeaSketch Layers

The following section overviews the structure and general usage notes of the data.

Field Name	Example entry	Data Type	Description
OBJECTID	10260	ObjectID	An ObjectID is a unique, non-null integer field used to uniquely identify rows in tables in a geodatabase.
PU_ID	116530	dbl	Planning Unit (PU) Reference to the 1km x 1km DFO planning grid. Attribute table for this dataset will contain multiple rows with same PUID, one row for each fishery with catch associated with that PUID
name_label		text	Full name of fishery. Main attribute for filtering data into distinct fisheries.
years	2012 to 2016	text	A text description of the time span used, each fishery has its own entry
Filtered_YN	yes	text	Indicates if the planning unit has been filtered based on the Rule of Five. Can be either a yes or no. A yes indicates that the PU failed the privacy check and has been filtered. All filtered values were set to the average values in the ‘filtered’ columns and -99999 in ‘unfiltered’ columns.
total_kg_unfiltered	2637.87294	dbl	Total kilogram weight of all landed species in the events overlapping each planning unit indicated in PU_ID. Values available for unfiltered units. Filtered units have been replaced with a placeholder value (-999999).
total_CAD2016_unfiltered	857.38361	dbl	Total Canadian dollar value of all species landed in the events overlapping the planning unit indicated in PU_ID. Adjusted to 2016 constant dollars using the Stats Canada GDP deflator. Values available for unfiltered units. Filtered units have been replaced with a placeholder value (-999999).

Mean_Annual_kg_unfiltered	527.574588	dbl	Annual landed catch (kg) of the planning unit referenced in PU_ID. Total_kg divided by the number of years for each fishery. Values available for unfiltered units. Filtered units have been replaced with a placeholder value (-999999).
Mean_Annual_CAD2016_unfiltered	171.476721999999994	dbl	Annual 2016 constant Canadian dollars value of landed catch of the planning unit referenced in PU_ID. Total_CAD2016 divided by the number of years for each fishery. Values available for unfiltered units. Filtered units have been replaced with a placeholder value (-999999).
total_kg_filtered	2637.87294	dbl	Total kilogram weight of all landed species in the events overlapping each planning unit indicated in PU_ID. Values available for unfiltered units. An aggregate value averaging the catch over all of the years for each fishery in the planning unit is available for filtered units. Unfiltered units have been replaced with a <Null> value.
total_CAD2016_filtered	857.38361	dbl	Total Canadian dollar value of all species landed in the events overlapping the planning unit indicated in PU_ID. Adjusted to 2016 constant dollars using the Stats Canada GDP deflator. An aggregate value averaging the catch over all of the years for each fishery in the planning unit is available for filtered units. Unfiltered units have been replaced with a <Null> value.
Mean_Annual_kg_filtered	527.574588	dbl	Annual landed catch (kg) of the planning unit referenced in PU_ID. Total_kg divided by the number of years for each fishery. Values available for unfiltered units. An aggregate value averaging the catch over all of the years for each fishery in the planning unit is available for filtered units. Unfiltered units have been replaced with a <Null> value.
Mean_Annual_CAD2016_filtered	171.47672199999994	dbl	Annual 2016 constant Canadian dollars value of landed catch of the planning unit referenced in PU_ID. Total_CAD2016 divided by the number of years for each fishery. Values available for unfiltered units. An aggregate value averaging the catch over all of the years for each fishery in the planning unit is available for filtered units. Unfiltered units have been replaced with a <Null> value.
SHAPE_Length	400	dbl	Length of the perimeter of the polygon in map units.

SHAPE_Area	1000000	dbl	Area of the feature in map units.

Attribute Table Notes

- Filtered and unfiltered landed weight and catch values have been split into two separate columns for each of the attribute categories (e.g. total kg, total CAD2016, mean kg, and mean CAD2016).
- All dollar value fields (CAD2016) uses 2016 as the base year. Values adjusted using Stats Canada's Canadian GDP deflator. Source: Statistics Canada. Table: 36-10-0130-01 - Gross domestic product indexes.

Displaying the Dataset

Since this dataset contains data for multiple fisheries, each planning unit or grid may have multiple records. In order to properly display this dataset users should select and separate the data by fishery and display the data using any of the filtered and/or unfiltered fields.

In ESRI software (e.g. ArcGIS Pro, ArcGIS Desktop) symbology is displayed based on the statistics of a sample of the dataset. This may cause parts of the full dataset to not display. To address this issue go to 'Advanced symbology options' and increase the maximum sample size.

For a more comprehensive view of the fishery datasets users may want to replace the NULL values in filtered fields with the true unfiltered value by combining the two fields. To combine filtered and unfiltered fields, open 'Field Calculator' in a GIS software for a filtered field and enter:

Selected_field_filtered =

!selected_field_unfiltered! if !selected_field_filtered! is None else !total_kg_filtered!

Please note that specific syntax might differ depending on the GIS software and Python version used.

Time period and sources

Sources: Commercial landings data are extracted from logbooks (at-sea observer /fisher) and dockside monitoring programs, using fish slip data to assign a price per kg for each logbook entry. The information was put together by the Oceans and Policy branches with support from other programs.

Different time periods were selected for each fishery by engaging DFO internally and some Fisheries Advisory Boards. A ten-year period is selected as the default as most fisheries have not radically changed in the past 10 years, and 10 years covers 2.5 average salmon runs (of 4 years), allowing for a reliable average for fisheries with highly variable seasonal landings. Rotational

Dive fisheries' harvest locations are rotational, this dataset uses 9 years, using the latest available, to allow three full harvest cycles to ensure areas off cycle are not underrepresented.

Based on conversations with industry experts, two sub-periods were created for the groundfish data sets, as the last 5 years of the 10 year span better represents the current fishery as there have been significant new management measures and changes in fisher behavior, leading the 5-year span to more accurately reflect the current day situation of the groundfish fleet. The 5year spans were reviewed and approved by the Groundfish Integrated Advisory Board. Most of these Groundfish data sets are the original 10 year spans.

Technical Summary of Attached Data

The table below shows the contents of the attached geodatabase.

Fishery Group	**years**	**Gear**	**Spatialization Method**	**Filtering Average Rule**
Groundfish, Trawl	2012 to 2016	Mid water Net, Bottom Net	Start, Mid, End points spatialized to track lines, line segments split onto the grid. If Points malformed, start point used.	DFO Bio-regional sub-regions
Groundfish, Halibut, Rockfish, Lingcod	2007 to 2016 2012 to 2016	Long Line Long Line / Trap Hook & Line Multiple Trolls/ Hook & line	Start, Mid, End points spatialized to track lines, line segments split onto the grid. If Points malformed, start point used.	DFO Bio-regional sub-regions
Groundfish, Halibut/Sablefish Combo Trip	2012 to 2016	Long Line / Trap	Start, Mid, End points spatialized to track lines, line segments split onto the grid. If points malformed, start point used.	DFO Bio-regional sub-regions
Salmon, Gillnet Troll Seine	2007 to 2016	Gillnet Troll Seine	Sub-PFMA catch evenly distributed in overlapping PUs	BC EEZ

Shellfish, Dive	2007 to 2016 2008 to 2016 2007 to 2015 2007 to 2015	Dive Dive Dive Dive, Stinger	GSU Bed Polygons, points if no polygons Sea cucumber Shore Polylines, points if no polylines RSU Bed polygons, points if no polygons Points only	BC EEZ
Shellfish, Prawn Shrimp	2008 to 2016	Trap Lines Trawl	Single points only	BC EEZ

Sources: DFO Fish Slips for price information, DFO salmon, shellfish, and groundfish logbooks for quantity.