Physical Representation – Tidal Current

description

High tidal current is often associated with areas of high productivity, which are therefore ecologically important. As speed and direction of tidal currents are constantly changing, it is challenging to quantify and illustrate. Data illustrated here are modelled values representing average tidal speeds in metres per second over a large number of tidal cycles. Root mean square (RMS) is a measure of average tidal speed used to avoid calculating near zero average values over tidal cycles, which can be expected when averaging velocities in opposite directions. The values illustrated here were output from a 3-D diagnostic circulation model for the north eastern Pacific Ocean. The modelled tidal speeds are barotropic, meaning that water density has not been taken into account.

Data were received in 2008 as points with values and coordinates. The points were plotted and converted to a comprehensive grid. Average tidal speed values were classified for illustration into 6 classes based on Jenks natural breaks classification. The Jenks' natural breaks classification scheme (automated in ESRI ArcGIS software) determines the best arrangement of values into classes by iteratively comparing sums of the squared difference between observed values within each class and class means. The "best" classification identifies breaks in the ordered distribution of values that minimizes within-class sum of squared differences, and thus identifies classes that are most homogenous within.

PHOTO: MIKE AMBACH

PHOTO: 2009 FOTO FRIENDS

data sources

- Fisheries and Oceans Canada – Institute of Ocean Sciences - Dr. Mike Foreman

data resolution

- The tidal model used a variable resolution triangular grid with side lengths ranging from as small as 80 metres in narrow passes like Dodd Narrows to as large as 80 kilometres in the deep ocean.

date of analysis

- A peer-reviewed publication describing the model development and its evaluation against observations was published in 2000.

reviewers

- Kim Conway, Natural Resources Canada
- Zach Ferdana, The Nature Conservancy
- Mike Foreman, Fisheries and Oceans Canada

reviewer comments

- One reviewer suggested that a physical oceanographer at the Institute of Ocean Sciences be asked to review the map. A review was requested and no response was received.

caveats of use

- Recommended date of expiry for use of these data in a marine planning context: January 1, 2012.

map, feature data and metadata access

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

references

- Fisher, W. D. On grouping for maximum homogeneity. *Journal of the American Statistical Association.* 1958. Pages 53, 789-798.
- Foreman, M.G.G., W.R. Crawford, J.Y. Cherniawsky, R.F. Henry and M.R. Tarbotton. A high-resolution assimilating tidal model for the northeast Pacific Ocean. *Journal of Geophysical Research.* 2000. Pages 105:28, 629-28, 652. *www.pac.dfo-mpo.gc.ca/sci/osap/publ/online/foreman_jgr2000_neptides.pdf*
- Jenks, G. F. Optimal data classification for choropleth maps. *Occasional paper No. 2. Lawrence, Kansas: University of Kansas, Department of Geography.* 1977.

BCMCA Atlas

Physical Representation

Tidal Current

Legend

Root Mean Square (RMS) Tidal Speed (m/s)

- 0.001 - 0.045
- 0.046 - 0.111
- 0.112 - 0.199
- 0.2 - 0.331
- 0.332 - 0.572
- 0.573 - 2.801

Data Sources:
Fisheries and Oceans Canada

Base Data:
ESRI Base Data, GEOBase, GeoBC, Natural Resources Canada, 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

0 25 50 75 100 125 150
Kilometres

0 25 50 75
Nautical Miles

1:4,250,000 *

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

Prepared for:

BC Marine Conservation Analysis

Map template by Caslys Consulting Ltd.
June 2, 2010

142°W 140°W 138°W 136°W 134°W 132°W 130°W 128°W 126°W 124°W 122°W
54°N 52°N 50°N 48°N 46°N

Alaska
Haida Gwaii
British Columbia
Vancouver Island
Washington
PACIFIC OCEAN
Nass River
Skeena River
Fraser River

Inset Map 1:500,000*

Note: 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.