Marine Fish - Habitat Based Estimates of Salmon Productivity

description

Many different species of salmon use some part of the marine habitat in the Canadian Pacific. Salmon, from the family Salmonidae, are highly migratory and are anadromous, meaning they spend part of their life cycle in fresh water and part in salt water. In British Columbia, salmon are not only an iconic species with rich historical and cultural significance; they are an important resource, both economically and ecologically.

This atlas page illustrates the mouths of salmon bearing streams that occur at the interface between the marine environment and freshwater salmon habitat. Potential productivity estimates, in terms of juvenile fish abundance for seven species of salmon, are also illustrated for a subset of watersheds where estimates were available. Species included are Steelhead *(Oncorhynchus mykiss)*, Cutthroat trout *(Oncorhynchus clarki)*, Coho *(Oncorhynchus kisutch)*, Chum *(Oncorhynchus keta)*, Sockeye *(Oncorhynchus nerka)*, Chinook *(Oncorhynchus tshawytscha)* and Dolly Varden *(Salvelinus malma)*. Estimates of potential production were generated from a habitat-based model developed by the University of Montana. First, field data were collected, using electrofishing techniques, for the number of juvenile fish found in various types of freshwater habitats. Next a model was built relating the numbers of fish observed and their habitats, based on landscape variables. Estimates were generated for watersheds based on the total amount of those specific habitats types in each watershed and the related numbers of fish for each habitat. British Columbia watersheds were classified for illustration into 4 classes based on Jenks natural breaks classification.

The Jenks' natural breaks classification scheme (automated in ESRI ArcGIS software) (Jenks, 1977 and Fisher, 1958) 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: ROBERT KOOPMANS

data sources

- University of Montana, Flathead Lake Biological Station - Watershed based estimates of salmon productivity and mouths of salmon bearing streams (Contact Diane Whited, University of Montana)

data resolution

- Estimates were provided by watershed polygon and linked to a point at the mouth of the watershed.

date of analysis

- 2008

reviewers

- Not reviewed.

reviewer comments

- None provided.

caveats of use

- Recommended date of expiry for use of these data in a marine planning context: 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. 53, 789-798.
- Jenks, G. F. Optimal data classification for choropleth maps. *Occasional paper No. 2. Lawrence, Kansas: University of Kansas, Department of Geography.* 1977.

BCMCA Atlas

Marine Fish

Habitat Based Estimates of Salmon Productivity

Legend

Juvenile Salmon Estimates

- 3,825 - 366,016
- 366,017 - 1,132,276
- 1,132,277 - 4,243,358
- 4,243,359 - 6,479,445
- Watersheds lacking salmon estimates
- Mouths of Salmon-bearing Streams

Note:
- Classification based on 4 natural breaks.

Data Sources:
University of Montana -
Flathead Lake Biological Station

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

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.
September 7, 2010

Alaska

Haida Gwaii

British Columbia

Vancouver Island

Washington

PACIFIC OCEAN

Skeena River

Fraser River

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

Inset Map 1:500,005*

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.