BRITISH COLUMBIA
MARINE CONSERVATION ANALYSIS

Shipping & Transport – Passenger and Cruise Vessel Traffic 2010

description

This atlas page illustrates hours that passenger and cruise vessels spent in transit in 2010. It is based on ship monitoring data from the Canadian Coast Guard's Marine Communications and Traffic Services (MCTS). Cruise ships, together with passenger ferries, are estimated to account for 56% of the annual vessel movements in Canada's Pacific waters (BC Ministry of Environment et al. 2006).

All ships operating in Canadian waters must obtain Vessel Traffic Services (VTOSS) clearance before beginning a voyage from a Canadian location or before entering Canadian waters. The Coast Guard monitors ship traffic using radio communication, radar detection and an Automatic Identification System. The Coast Guard documents ship position, direction and speed approximately every 4 minutes with ship-identification (Lloyd's Register name and number), flag-state (country of registry), type of ship and size. All ships over 20 metres in length, and ships engaged in towing or pushing any vessel or object more than 20 metres in length (other than fishing gear) that had a combined length of more than 45 metres are required to report their position to the VTOSS. Vessels towing or pushing inside a log booming ground, pleasure yachts less than 30 metres, or fishing vessels less than 24 metres and 150 tons gross are not required to report their position to the VTOSS.

The vessel traffic data displayed on the main map are shown in hours and classified according to Jenks natural breaks*, which minimizes variance within classes and maximizes variance between classes. The inset map displays the same data, also using Jenks natural breaks, but the data were log-transformed to ensure a more normal distribution.

IN 2010 THE FOLLOWING BC PORTS WERE VISITED BY MAJOR CRUISE SHIPS:

Port	Number of visits
Nanaimo	2
Prince Rupert	22
Vancouver	166
Victoria	222

SOURCE: NORTHWEST CRUISE SHIP ASSOCIATION SCHEDULES

Cruise activity is seasonal, with the vast majority of trips in the summer season. The table to the right provides an indication, by cruise line, of transit legs for 2009 posted cruise dates.

SOURCE: NORTHWEST CRUISE SHIP ASSOCIATION SHIP SCHEDULES, CRUISE LINE WEBSITES.

NOTES: *THE NUMBER OF TRANSITS DOES NOT EQUATE TO THE NUMBER OF TRIPS TAKEN BY EACH SHIP: ONE TRIP MAY INVOLVE SEVERAL LEGS OR TRANSITS. THE NUMBER OF VESSELS USED BY EACH CRUISE LINE IS IN BRACKETS BESIDE THE CRUISE LINE NAME*

TOTAL NUMBER OF TRANSITS ALONG VARIOUS LEGS OF CRUISES -2009

Cruise Line / Transit Leg	Queen Charlotte Sound to Dixon Entrance	Vancouver to Queen Charlotte Sound	Southern Straight of Georgia to SW tip of Vancouver Island	SW tip of Vancouver Is. to Queen Charlotte Sound	Queen Cahrlotte Sound west of Haida Gwaii to Dixon Entrance	Grenville Channel	Victoria - Nanaimo	Nanaimo - Seattle	Seattle - Victoria/Vancouver	Vancouver - Victoria
Carnival (1)	20	20								
Celebrity (3)	48	29	9	27	7		13	12	1	3
Crystal (1)	1	1	1							
Holland America Line (8)	275	240	136	78						3
Norwegian Cruise Line (2)	117	41	81	79	2					
Princess Cruises (7)	188	72	69	116						
Regent (1)	19	19								
Royal Caribbean (2)	78	75	24	24	21					
SilverSea (1)	17	9	10	10	3					
CruiseWest (1)		9				9	7	7	7	
Total	763	515	330	334	33	9	20	19	8	6

* 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. See:

- Fisher, W. D. 1958. On grouping for maximum homogeneity. Journal of the American Statistical Association, 53, 789-798.
- Jenks, G. F. 1977. Optimal data classification for choropleth maps. Occasional paper No. 2. Lawrence, Kansas: University of Kansas, Department of Geography.

data sources

- Canadian Coast Guard - Marine Communications and Traffic Services vessel tracking database
- Processing/analyses were done by Dr. Ron Pelot (MARIN - Dalhousie University) as part of the Oil in Canadian Waters Research Working Group

data resolution

- 5 kilometre by 5 kilometre grid cells

date collected

- 2010

reviewers

A 2007 version of the data were reviewed by:

- Brian Simms and Captain Phillip Nelson, Council of Marine Carriers
- Kevin Obermeyer, Pacific Pilotage Authority Canada
- The following reviewed earlier versions of a map on cruise ship traffic based on the leg transit table shown to the left and spatial data from 2003 created by the BC Ministry of Energy, Mines and Petroleum Resources. Some reviewer comments are based on that map, which was withdrawn due to concerns raised:
  - Jane McIvor, BC Marine Trades Association and Cruise BC
  - Phil Westoby, Prince Rupert Port Authority
  - Greg Wirtz, Port Metro Vancouver
  - Donna Spalding, Northwest CruiseShip Association

reviewer comments

- Most of the ships transiting Seattle or Vancouver to Alaska go through Hecate Strait not Grenville Channel or Principe Channel.. The Island Princess Captain said this is now being done in order to get far enough offshore to discharge waste water.
- Most ships do not transit east of Texada or between Cortez and Redonda Islands. It would be surprising if many ships go west of Haida Gwaii. The Pacific Pilotage Authority would know the routes of all the ships in Canadian waters and how many go west of Haida Gwaii rather than east.
- In looking at the frequency tables, it is reasonable that up to 50 transits per season would take the Grenville Channel route, but no more.
- Concerned that marketing websites from cruise lines are being used as a basis for collecting data. As an example, Norwegian Cruise Line does map a transit via the Inside Passage for the Norwegian Star, but they do not transit the Canadian portion of the Inside Passage for any of their vessels.
- The information inaccurately reflects the number of total transits and the routes taken by the ships. For instance, the Carnival Spirit made 10 trips north 10 trips south between Alaska and Vancouver. This would be 20 transits total, not 40 as represented in the table. This leaves the reader with the inaccurate impression that the ship had twice as many transits of the coast as she actually did.

caveats of use

- This map shows only passenger and cruise vessel traffic in 2010. Other maps showing a different vessel type cannot be compared directly to this map since the range in number of vessel movements will vary from vessel type to vessel type.
- The number of transits in the table above is not equal to the number of trips in BC waters. With the exception of CruiseWest, pocket cruise ships are not included in the table.
- There is radar coverage of most of Georgia Strait and a radar station with 90 nautical mile range in the vicinity of Tofino. The radar coverage extends from Juan de Fuca in the south to an area just north of Kyuquot Sound on the west coast of Vancouver Island. All the other areas are tracked by vessels using the established call-in points indicated on the charts. This means that all of the northern area off Vancouver Island, both coasts of Haida Gwaii and the North Coast mainland are without radar coverage.
- The information used to create this map does not include vessels transiting the portion of the Juan de Fuca Strait, which is the responsibility of the US Coast Guard.
- The map provides minimum estimates of vessel traffic for the various traffic types included here and likely underestimates vessel traffic, particularly west of Haida Gwaii. Reasons for this include: 1) limited extents of Coast Guard radar coverage; 2) many of the vessels transiting the area west of Haida Gwaii are not bound for Canadian destinations and therefore not required to report to the Coast Guard; and 3) the Automatic Identification System is still in process of being brought in by VTOSS.
- The information used to create this map does not include vessels transiting the portion of the Juan de Fuca Strait which is the responsibility of the US Coast Guard. The information also underestimates vessel traffic west of Haida Gwaii for two reasons: 1) there is no Coast Guard radar coverage of this area and 2) many of the vessels transiting the area are not bound for Canadian destinations and therefore not required to report to the Coast Guard. Thus, the map provides minimum estimates of vessel traffic densities for the various traffic types included here.
- Recommended date of expiry for use of these data in a marine planning context: Data should be refreshed every 4 to 5 years.

map, feature data and metadata access

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

references

- BC Ministry of Environment, Fisheries and Oceans Canada, University of Victoria, University of British Columbia, and Environment Canada. *Alive and Inseparable: British Columbia's Coastal Environment.* 2006. *www.env.gov.bc.ca/soe/bcce*
- Northwest CruiseShip Association: *http://bc.nwcruiseship.org/port_schedules.cfm?menuId=43*

BCMCA Atlas

Shipping & Transport
Passenger/Cruise Vessels

Legend

Hours of Traffic (2010)

- 0
- < 57
- 57 - 207
- 207 - 506
- 506 - 911
- 911 - 1,996
- 1,996 - 3,902
- 3,902 - 5,391
- 5,391 - 7,717

Notes:
- Hours of Traffic are mapped showing 8 natural breaks (zeros are separate)
- Inset map shows hours of traffic mapped using natural breaks of log normalized data.

Data Sources:
Oil in Canadian Waters Research Working Group

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.
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Inset Map

1:9,000,000*

Legend
Hours of traffic (2010) on a log normal scale

Low
High

Note: See facing page for more information