

Marine Birds – At-sea Density of Marine Birds

description

This feature displays the at-sea distribution of marine bird species, including those that forage primarily in the offshore marine environment and those that forage in more coastal waters. This group includes the following families: diomedidae (albatrosses), procellariidae (petrels, fulmars, shearwaters), hydrobatidae (storm-petrels), scolopacidae (phalaropes), laridae (skuas, gulls, terns), and alcidae (murrelets, guillemots, murrelets, auklets, puffins). The species included in this feature are:

Ancient Murrelet (<i>Synthliboramphus antiquus</i>)	Leach's Storm-Petrel (<i>Oceanodroma leucorhoa</i>)	Short-tailed Albatross (<i>Phoebastria albatrus</i>)
Arctic Tern (<i>Sterna paradisaea</i>)	Long-tailed Jaeger (<i>Stercorarius longicaudus</i>)	Short-tailed Shearwater (<i>Puffinus tenuirostris</i>)
Black-footed Albatross (<i>Phoebastria nigripes</i>)	Manx Shearwater (<i>Puffinus puffinus</i>)	Slaty-backed Gull (<i>Larus schistisagus</i>)
Black-legged Kittiwake (<i>Rissa tridactyla</i>)	Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	Sooty Shearwater (<i>Puffinus griseus</i>)
Bonaparte's Gull (<i>Chroicocephalus philadelphia</i>)	Mew Gull (<i>Larus canus</i>)	Thayer's Gull (<i>Larus thayeri</i>)
California Gull (<i>Larus californicus</i>)	Mottled Petrel (<i>Pterodroma inexpectata</i>)	Thick-billed Murre (<i>Uria lomvia</i>)
Caspian Tern (<i>Hydroprogne caspia</i>)	Murphy's Petrel (<i>Pterodroma ultima</i>)	Tufted Puffin (<i>Fratercula cirrhata</i>)
Cassin's Auklet (<i>Ptychoramphus aleuticus</i>)	Northern Fulmar (<i>Fulmarus glacialis</i>)	Unidentified Alcids
Common Murre (<i>Uria aalge</i>)	Parakeet Auklet (<i>Aethia psittacula</i>)	Unidentified Gull
Common Tern (<i>Sterna hirundo</i>)	Parasitic Jaeger (<i>Stercorarius parasiticus</i>)	Unidentified Jaeger
Flesh-footed Shearwater (<i>Puffinus carneipes</i>)	Pigeon Guillemot (<i>Cepphus columba</i>)	Unidentified Murrelet
Fork-tailed Storm-Petrel (<i>Oceanodroma furcata</i>)	Pink-footed Shearwater (<i>Puffinus creatopus</i>)	Unidentified Phalarope
Glaucous Gull (<i>Larus hyperboreus</i>)	Pomarine Jaeger (<i>Stercorarius pomarinus</i>)	Unidentified Shearwater
Glaucous-winged Gull (<i>Larus glaucescens</i>)	Red Phalarope (<i>Phalaropus fulicarius</i>)	Unidentified Storm-Petrel
Heermann's Gull (<i>Larus heermanni</i>)	Red-necked Phalarope (<i>Phalaropus lobatus</i>)	Unidentified Tern
Herring Gull (<i>Larus argentatus</i>)	Rhinoceros Auklet (<i>Cerorhinca monocerata</i>)	Western Gull (<i>Larus occidentalis</i>)
Horned Puffin (<i>Fratercula corniculata</i>)	Ring-billed Gull (<i>Larus delawarensis</i>)	Western-Glaucous-winged Gull (<i>Larus occid. s. glauces.</i>)
Laysan Albatross (<i>Phoebastria immutabilis</i>)	Sabine's Gull (<i>Xema sabini</i>)	Xantus's Murrelet (<i>Synthliboramphus hypoleucus</i>)

Source data used to develop this map consisted of a range of ship-based surveys, which were focused on recording pelagic seabird counts and locations. Midpoints were generated for each survey transect from each dataset. Observations of the marine bird species were totalled and divided by the survey area of each transect to generate a density of marine birds for each transect midpoint. All of the midpoints that fell within a single planning unit were averaged, adjusting for survey effort, to calculate the illustrated metric: average density of marine birds by planning unit. The density values range from 0.09 birds per square kilometre to 34,000 birds per square kilometre with the vast majority of the density values at the low end of the range. The values were symbolized using 6 quantiles so that the number of values within each class is the same but the class intervals vary in size and are larger at the extremes. (A quantile is established by dividing the frequency distribution of a variable into equal groups: that is, each quantile contains the same fraction of the total number of values being measured.)

This feature will look different from the species density map that appears in "Atlas of Pelagic Seabirds off the West Coast of Canada and Adjacent Areas" (Kenyon *et al.* 2009). This is due to a difference in grid cell size and number of records used. The CWS Atlas used only data from the Pelagic Seabird Survey dataset whereas the BC Marine Conservation Analysis (BCMCA) Atlas used data from a variety of sources. Also, the CWS Atlas used more records from the Pelagic Seabird Survey dataset while the BCMCA used only post 1996 records.

data sources

- Alan Burger – Southwest Vancouver Island Shelf Surveys
- Environment Canada (Canadian Wildlife Service) – BC Ferry Surveys
- Environment Canada (Canadian Wildlife Service) – Pelagic Seabird Surveys
- Environment Canada (Canadian Wildlife Service) – Marine Bird Database
- Laskeek Bay Conservation Society – Laskeek Bay Surveys
- Parks Canada Agency – West Coast Trail Surveys

Additional data that could be used to inform the at-sea density of marine birds are known to be available from:

- Raincoast Conservation Society – At-sea surveys of marine birds and mammals

data resolution

- Source survey data transects were generally about 1 kilometre in length. We calculated weighted averages for each 2 kilometre x 2 kilometre planning unit.

date collected

- 1987-2012

date compiled

- 2012

reviewers

- Bernard Schroeder, Consultant
- Representatives from Environment Canada, Canadian Wildlife Service

reviewer comments

- None provided.

caveats of use

- The density values in an area can change over time in response to natural population fluctuations and changes in habitat conditions (natural or anthropogenic).
- Survey effort is not consistent across all planning units or across all areas of the coast and some species tend to be under-represented by some survey methods. Areas with no data may not have been surveyed and these data gaps are not necessarily indicative of an absence of marine birds. Some locations may still be important to marine birds but currently lack associated data to confirm their value.
- This feature is a compilation of data collected by many people, for different purposes, using different survey techniques with different methodologies within each technique and, therefore, considerable care must be taken when using the data.
- 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

- Kenyon, J.K., K.H. Morgan, M.D. Bentley, L.A. McFarlane Tranquilla, and K.E. Moore. *Atlas of pelagic seabirds off the west coast of Canada and adjacent areas*. Technical Report Series No. 499. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia. 2009. 308p.

BCMCA Atlas

Marine Birds

At-sea Density of Marine Birds

Legend

Birds per square kilometre standardized by effort

- 0.00
- 0.01 - 2.33
- 2.34 - 3.93
- 3.94 - 7.05
- 7.06 - 14.97
- 14.98 - 34283.64

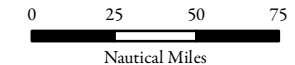
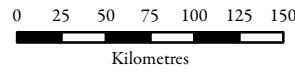
Note:
- Classification based on 6 quantiles.

Data Sources:
Alan Burger,
Environment Canada
(Canadian Wildlife Service),
Laskeek Bay Conservation Society,
Parks Canada

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 *

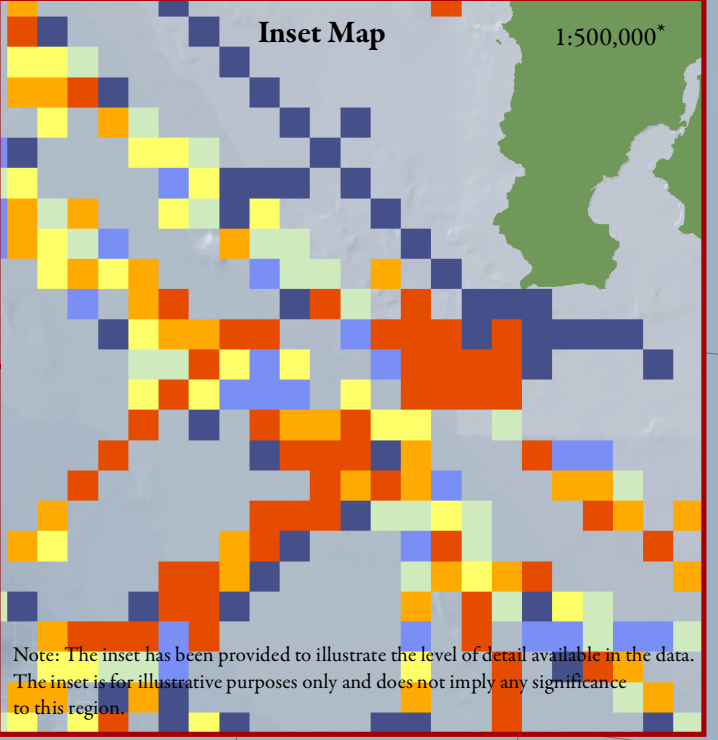
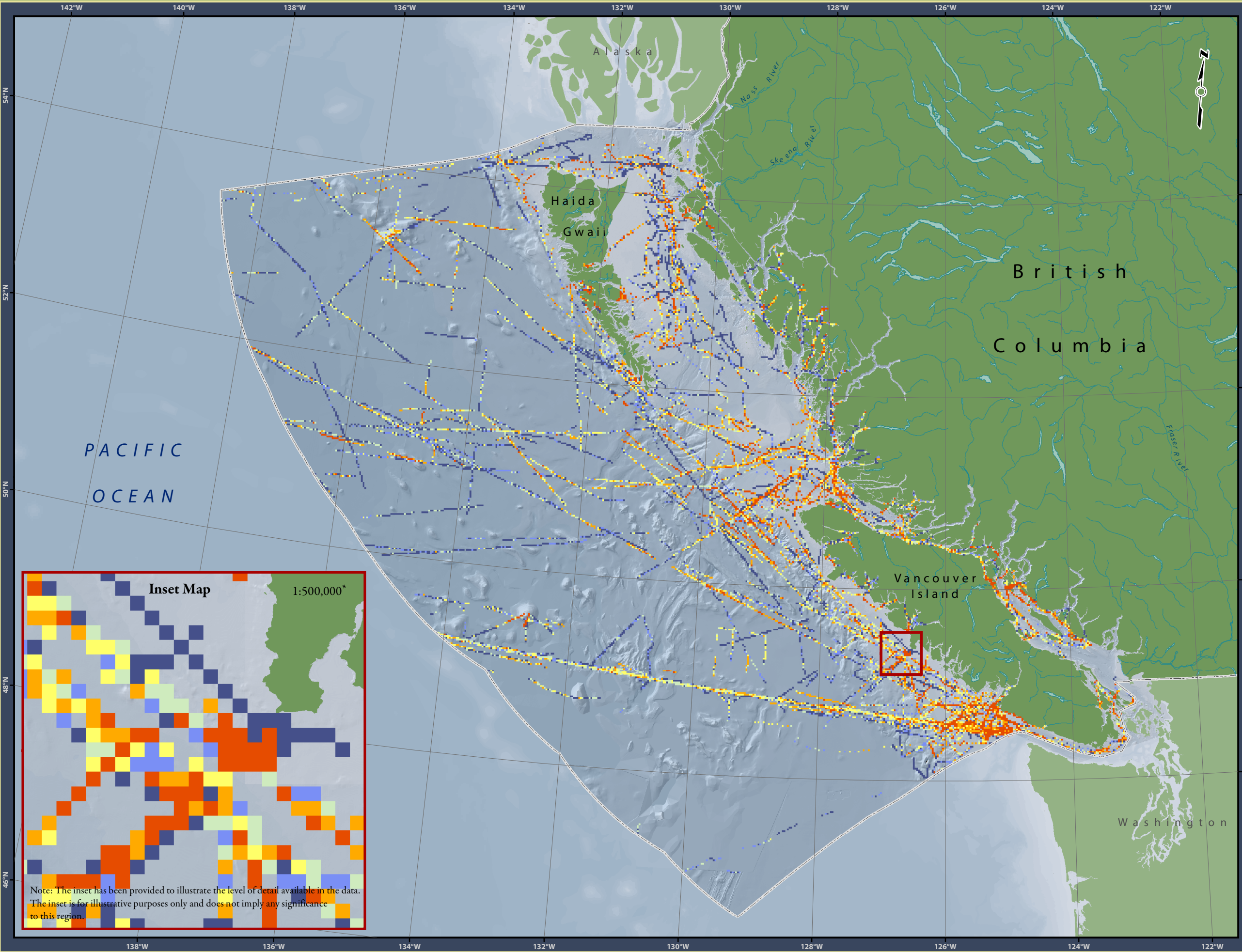
* Written scales are approximate and are based on a 11 x 17 inch paper size.

Prepared for:



Map template by Caslys Consulting Ltd.

December 5, 2012



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.