DESCRIPTION

Metadata Data Set Title: British Columbia Seabird Colony Inventory

Citation: British Columbia Seabird Colony Inventory: Digital dataset. March 2022. Canadian Wildlife Service, Environment and Climate Change Canada, Pacific Region

Citation: Originators: Environment and Climate Change Canada, Canadian Wildlife Service, Pacific Region.

DATASET IDENTIFICATION

Abstract / Description

This data set includes the locations of all known seabird colonies along the coast of British Columbia, and provides a compilation of the population estimates of seabirds breeding at those colonies since 1980, and historical estimates prior to 1980 for some colonies. **It does not include an estimate of the numbers of juvenile birds or non-breeders in the population.**

The rationale for developing this inventory was the recognized need for a product that could assist with: coastal zone and conservation area planning; emergency response to environmental emergencies and identifying areas of potential interactions between seabirds and anthropogenic activities. In addition, the data used to develop the document provides a baseline to compare with future seabird population estimates in order to measure the impacts of shifts in composition, abundance and/or distribution of prey, and climatic and oceanographic changes. The database is not a substitute for on-site surveys usually required for environmental assessment.

Here we present data on the breeding colony population estimates of the 15 species of seabirds (including two storm petrels, three cormorants, one gull and nine alcids) and one shorebird (Black Oystercatcher *Haematopus bachmani)* that breed on the coast of British Columbia. Over 5.5 million colonial birds are currently estimated to nest at 627 sites, based on surveys primarily conducted in the 1980's. Five species (Cassin's Auklets *Ptychoramphus aleuticus,* Fork-tailed Storm-petrels *Oceanodroma furcata,* Leach's Storm-petrels *Oceanodroma leucorhoa,* Rhinoceros Auklets *Cerorhinca monocerata, and* Ancient Murrelets *Synthliboramphus antiquus)* comprise the vast majority of that population, although Glaucous-winged Gulls (*Larus glaucescens)* and Pigeon Guillemots (*Cepphus columba)* nest at the most sites. **Marbled Murrelets** (*Brachyramphus marmoratus)*, which nest on the mossy limbs of mature and old-growth trees within the coastal forests**, are not included in this database**, due to their dispersed nesting habit.

The population estimates presented in this database are compiled from the results of several surveys. Many of the seabird breeding colonies in British Columbia have been known for more than 50 years, but because of the remoteness of the sites, visits to them have been rare. The majority of the data are the results of a comprehensive inventory of colonial nesting seabirds along the British Columbia coastline conducted between 1980 and 1989 by the Canadian Wildlife Service of Environment and Climate Change Canada. The goal of that program was to establish baseline estimates of breeding seabird populations in BC using standardized survey techniques to allow future comparisons and monitoring of those populations. A few colonies on small remote islands were not visited during that survey. Therefore, for some colonies the most current population estimates are from the first complete survey of the BC coastline, carried out by the Royal British Columbia Museum in the mid 1970's. That survey identified colony sites and provided rough assessments of the population sizes of breeding seabirds.

Since 1989, surveys have been conducted on some alcid, cormorant and gull colonies along the BC coast, and results have been included in the dataset (data entry ongoing). As well as data from Canadian Wildlife Service surveys, we have attempted to obtain recent data from all other sources including Parks Canada, the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, the Bamfield Marine Station and the Laskeek Bay Conservation Society.

Since 2000, inventories of nesting Black Oystercatchers have been conducted in some regions of the coast by Parks Canada and partners (Gulf Islands National Park Reserve, Pacific Rim National Park Reserve, and Gwaii Haanas National Park Reserve) and results have been included in the dataset (data entry ongoing). A long time

series of nesting Black Oystercatcher data collected by Laskeek Bay Conservation Society in the Laskeek Bay area of the East Coast of Moresby Island has also been included in this dataset.

Supplemental Information
This supplemental information includes data citation documents and data source documents.

Data Citation Documents
This digital dataset contains a comprehensive summary of past and current information on the number of breeding seabirds in British Columbia.

A comprehensive summary of surveys conducted up to 1989 has been published in:
Rodway, M.S. 1991. **Status and conservation of breeding seabirds in British Columbia.** In: Croxall, J.P. (ed.). Seabird status and conservation: a supplement. ICBP Technical Publication No. 11.

In addition to the 97 source documents listed below, parts of the data are presented in the following two publications:
Campbell, R.W., N.K. Dawe, I.C. McTaggart-Cowan, J.M. Cooper, G.W.Kaiser and M.C.E. McNall. 1990. **The Birds of British Columbia**. Roy. Brit. Col. Mus., Victoria.

Rodway, M.S.,M.J.F. Lemon, and K.R. Summers. 1992. **Seabird breeding populations in the Scott Islands on the west coast of Vancouver Island. 1982-89**. Pp 52-59 in The ecology, status, and conservation of marine and shoreline birds on the west coast of Vancouver Island. (K Vermeer, R.W. Butler, K.H. Morgan, eds.) Occasional Paper No. 75. Canadian Wildlife Service, Ottawa

More recently, parts of the data have also been included in the Status of Birds in Canada 2019 website (https://wildlife-species.canada.ca/bird-status/index-eng.aspx?sY=2019&sL=e), and in the State of Canada's Birds, 2019 (www.stateofcanadasbirds.org).

Data Source Documents
The seabird colony data are extracted from Canadian Wildlife Service Technical Reports and other publications. These source documents are referenced in the attribute table for each colony by a number which corresponds to the following list.

1. Rodway, M.S.,M.J.F. Lemon, and G.W. Kaiser 1988. **British Columbia Seabird Colony Inventory: Report #1 - East Coast Moresby Island.** Technical Report Series No. 50. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

2. Rodway, M.S.,M.J.F. Lemon, and G.W. Kaiser 1990. **British Columbia Seabird Colony Inventory: Report #2 - West Coast Moresby Island.** Technical Report Series No. 65. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

3. Rodway, M.S. 1988. **British Columbia Seabird Colony Inventory: Report #3 - Census of Glaucous-winged Gulls, Pelagic Cormorants, Black Oystercatchers, and Pigeon Guillemots in the Queen Charlotte Islands, 1986**. Technical Report Series No. 43. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

4. Rodway, M.S.,M.J.F. Lemon, and K.R. Summers. 1990. **British Columbia Seabird Colony Inventory: Report #4 - Scott Islands. Census results from 1982 to 1989 with reference to the Nestucca oil spill.** Technical Report Series No. 86. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

5. Rodway, M.S. and M.J.F. Lemon, 1990. **British Columbia Seabird Colony Inventory: Report #5 - West Coast Vancouver Island.** Technical Report Series No. 94. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia

6. Rodway, M.S.,M.J.F. Lemon, and G.W. Kaiser 1994. **British Columbia Seabird Colony Inventory: Report #6 - Major colonies on the west coast of Graham Island.** Technical Report Series No. 95. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

7. Rodway, M.S. and M.J.F. Lemon, 1991. **British Columbia Seabird Colony Inventory: Report #7 - Northern Mainland Coast.** Technical Report Series No.121. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

8. Rodway, M.S. and M.J.F. Lemon. 1991. **British Columbia Seabird Colony Inventory: Report #8 - Queen Charlotte Strait and Johnstone Strait.** Technical Report Series No. 123. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia

9. Rodway, M.S. 1991. **Status and conservation of breeding seabirds in British Columbia.** In: Croxall, J.P. (ed.). Seabird status and conservation: a supplement. ICBP Technical Publication No. 11

10. Drent, R.H. and C.J. Guiguet. 1961. **A catalogue of British Columbia sea-bird colonies.** British Columbia Provincial Museum. Occasional Paper No. 12.

11. Royal British Columbia Provincial Museum. **British Columbia Nest Record Scheme.** Unpublished.

12. Campbell, R.W. 1976. **Seabird colonies of Vancouver Island area.** Victoria, B.C.: British Columbia Provincial Museum (Special Publication). [Map].

13. Campbell, R.W. and H. M. Garrioch. 1979. **Seabird colonies of the Queen Charlotte Islands.** Victoria, B.C.: British Columbia Provincial Museum (Special Publication). [Map].

14. Vermeer, K and Devito, K. 1989. **Population trend of nesting Glaucous-winged Gulls in the Strait of Georgia.** Pp. 88-93 *in* K. Vermeer and R. W. Butler (eds.). The ecology and status of marine and shoreline birds in the Strait of Georgia, British Columbia. Special Publication, Canadian Wildlife Service, Ottawa.

15. Emms, S. K. and K. H. Morgan. 1989. **The breeding biology and distribution of the Pigeon Guillemot (*Cepphus columba*) in the Strait of Georgia**. Pp. 100-106 *in* K. Vermeer and R. W. Butler (eds.). The ecology and status of marine and shoreline birds in the Strait of Georgia, British Columbia. Special Publication, Canadian Wildlife Service, Ottawa.

16. Vermeer, K., K. H. Morgan and G. E. J. Smith. 1989. **Population and nesting habitat of American Black Oystercatchers in the Strait of Georgia.** Pp. 118-122 in K. Vermeer and R. W. Butler (eds.). The ecology and status of marine and shoreline birds in the Strait of Georgia, British Columbia. Special Publication, Canadian Wildlife Service, Ottawa.

17. Vermeer, K., K. H. Morgan and G. E. J. Smith. 1989. **Population trends and nesting habitat of Double-crested and Pelagic Cormorants in the Strait of Georgia**. Pp. 94-99 in K. Vermeer and R. W. Butler (eds.). The ecology and status of marine and shoreline birds in the Strait of Georgia, British Columbia. Special Publication, Canadian Wildlife Service, Ottawa.

18. Vermeer, K., D. Power, and G.E.J. Smith 1988. **Habitat Selection and Nesting Biology of roof-nesting Glaucous-winged Gulls.** Colonial Waterbirds Vol 11, No. 2. 1988. Pp. 129-345

19. Chatwin, T., M.H. Mather, and T.D. Giesbrecht. 2002. **Nesting Population Changes in Pelagic and Double-Crested Cormorant Colonies in the Strait of Georgia, British Columbia.** Northwestern Naturalist Vol 83, No. 3 2002. Pp. 109-117.

20. Hipfner, M.J. 2005. **Population Status of the Common Murre *Uria aalge* in British Columbia, Canada.** Marine Ornithology Vol. 33 2005, Pp. 67-69.

21. Sullivan, T. M., S. L. Hazlitt and M. J. F. Lemon. 2002. **Population trends in nesting Glaucous-winged Gulls, Larus glaucescens, in the southern Strait of Georgia, British Columbia.** Canadian Field-Naturalist 116: 603-606.

22. Gaston, A.J. and M.J.F. Lemon. 1996. **A tale of two islands: Comparison of population dynamics of Ancient Murrelets at two colonies in Haida Gwaii, Canada.** Pp. 29 - 38 in Gaston A. J. (ed.) 1996. Laskeek Bay Research 6. Laskeek Bay Conservation Society, Queen Charlotte City, B.C.

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24. Harfenist, A. 1994. **Effects of introduced rats on nesting seabirds of Haida Gwaii.** Technical Report Series No. 218. Canadian Wildlife Service, Pacific and Yukon Region, Delta, B.C.

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26. Lemon, M.J.F. 1997. **Seabird colony monitoring on George Island, 1996.** Pp. 27 - 48 in A.J. Gaston (ed) Laskeek Bay Research 7

27. Lemon, M.J.F. 2003. **Surveys of permanent Seabird Monitoring Plots on George Island and East Copper Island, Gwaii Haanas National Park, June 2003.** unpublished CWS report to Parks Canada, Dec. 2003.

28. Lemon, M.J.F. and A.J. Gaston, 1999. **Trends in Ancient Murrelet populations since 1980.** in Bird Trends, Canadian Wildlife Service, Environment Canada. No. 7, Spring 1999 : 22 – 25

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38. Laskeek Bay Conservation Society, unpubl. data, pers. comm. A. Gaston, 2006

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41. Rodway, M.S. 1990. **Attendance patterns, hatching chronology, and breeding population of Common Murres on Triangle Island, British Columbia, following the *Nestucca* oil spill**. Technical Report Series No. 87. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

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48. Parks Canada - Gwaii Haanas National Park Reserve. **Skidegate Inlet Black Oystercatcher surveys 1996**

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51. Gaston, A.J. - Environment Canada S&T NCR Region - unpublished field notes

52. Parks Canada - Gulf Islands National Park Reserve. **Strait of Georgia Black Oystercatcher surveys 2005 and 2006**

53. Parks Canada - Pacific Rim National Park Reserve. **Black Oystercatcher surveys 2000**

54. Parks Canada - Pacific Rim National Park Reserve. **Black Oystercatcher surveys 2001**

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56. Parks Canada - Pacific Rim National Park Reserve. **Black Oystercatcher surveys 2003**

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58. Parks Canada - Pacific Rim National Park Reserve. **Black Oystercatcher surveys 2005**

59. Environment Canada, Canadian Wildlife Service P&Y Region**. Gwaii Haanas National Park Reserve (southern section) Black Oystercatcher surveys 2005**

60. Bamfield Marine Station **Black Oystercatcher survey records 2004**

61. Laskeek Bay Conservation Society. **Gwaii Haanas National Park Reserve (northern section) Black Oystercatcher surveys 2004**

62. Laskeek Bay Conservation Society. **Gwaii Haanas National Park Reserve (northern section) Black Oystercatcher surveys 2005 and 2006**

63. Environment Canada, Canadian Wildlife Service P&Y Region - unpublished field notes

64. Laskeek Bay Conservation Society. **Black Oystercatcher surveys in Laskeek Bay 1992 - 2007**

65. Vermeer K., K.H. Morgan, and P.J. Ewins 1992. **Population trends of Pelagic Cormorants and Glaucous-winged Gulls nesting on the west Coast of Vancouver Island**. Pp 60 - 64 in K. Vermeer, R.W. Butler, and K.H. Morgan (eds) The ecology, status and conservation of marine and shoreline birds on the west coast of Vancouver Island. Occasional Paper Number 75 Canadian Wildlife Service, Ottawa.

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69. Laskeek Bay Conservation Society. **Summary of the 1993 Field Season**

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72. Laskeek Bay Conservation Society. **Report from the 1996 Field Season**

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82. Laskeek Bay Conservation Society. **East Limestone Field Station. Report on the 2006 Field Season**

83. Laskeek Bay Conservation Society. **East Limestone Field Station. 2007 Field Season Report**

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90. Laskeek Bay Conservation Society. **East Limestone Field Station. Field Season Report 2014**

91. Laskeek Bay Conservation Society. **East Limestone Field Station. Field Season Report 2015**

92. Laskeek Bay Conservation Society. **East Limestone Field Station. Field Season Report 2016**

93. Laskeek Bay Conservation Society. **East Limestone Field Station. Field Season Report 2017**

94. Laskeek Bay Conservation Society. **East Limestone Field Station. Field Season Report 2018**

95. Rodway, M.S., R.W. Campbell, M.J.F. Lemon. 2019. **Seabird Colonies of British Columbia: A history to 1990 (with appended data to 2019). Part 2: Haida Gwaii.** Wildlife Afield 16(1&2):1-480.

96. Parks Canada – Pacific Rim National Park Reserve, unpubl. data, pers. comm. Y Zharikov, 2021

97. Gaston A.J., D.T. Iles, M.J.F. Lemon, and L Wilson. In prep. **Seabird population changes and raccoon (*Procyon lotor*) management in Haida Gwaii, British Columbia**.

DESCRIPTION

Methods

Data Collection

Seabird population estimates have been derived by various methods, and vary in quality, depending on species, habitat, size of colony and survey effort. Only total counts and transect estimates are considered comparable between observers and between visits. Total count, transect, or partial count has been specified in the Technique field (Refer to Entity Type Definition), however, **the user must refer to the original documents to determine the specific survey methodology and for a complete description of the various survey techniques, and for interpretation of the data.**

A full account of the survey methodology is contained in the original publications. A brief description of the survey methods employed follows:

Census methods were selected according to the area, habitat, and species of birds nesting on an island. All islands were first explored to determine if nesting occurred. Small islands were completely examined. On large islands the entire perimeter was explored to a distance of 50m from shore, plus frequent sections of the interior up to 200m from shore. If no nesting seabirds were found no further searching was undertaken. If nesting was encountered exploration was continued to determine colony boundaries and the appropriate census techniques.

1. **Total Count**. Breeding population numbers of Glaucous-winged Gulls, Pelagic Cormorants, Double-Crested Cormorants, Brandt's Cormorants and Black Oystercatchers (which construct nests on the surface rocks, cliffs etc) are determined through absolute counts where every nest is counted. Population estimates of **nesting pairs** equal the number of nests counted. For burrowing species of alcids and storm-petrels, total counts were made where all burrows were accessible and easily tallied during the exploration of the island. Population estimates (in **pairs of nesting birds**) equal the number of burrows counted multiplied by the occupancy rate. Total numbers of **individual** Pigeon Guillemots seen around colonies during surveys for other nesting seabirds were counted. No standardized observation techniques such as counts of birds around the breeding sites at particular times of day and tide heights, which provide an estimate of the breeding population, were employed. Therefore the numbers provided in this database do not attempt to estimate the actual nesting population of Pigeon Guillemots. Similarly, on small colonies of Tufted Puffins, Horned Puffins, Common Murres, and Thick-billed Murres where it is difficult to survey the nesting sites, numbers presented represent the number of **individuals** seen on the colonies during surveys for other nesting seabirds, and do not represent an estimate of the nesting population.

2. **Partial Count.** On small islands where a total count of burrow-nesting species was not feasible or practical, but the colony area or population was too small to warrant sampling by transects, burrows in representative portions of the island were counted and figures were extrapolated to the rest of the area. Population estimates of **nesting pairs** equal the number of burrows estimated multiplied by the occupancy rate.

3. **Strip Transects**. These were used primarily on storm-petrel colonies that were too small to sample effectively with line transects. Measured strips of uniform width were run at systematic intervals across the colony area, and all burrows were counted within them to give an estimate of the overall density of burrows. Total population was calculated as described below under line transects.

4. **Line Transects With Quadrats**. Line transects were used on all large, dense colonies of burrow-nesting species (Ancient Murrelets, Cassin's Auklets, Rhinoceros Auklets, Tufted Puffins, Fork-tailed storm-petrels and Leach's storm-petrels). After the colony was mapped during exploration, equally spaced transects were run throughout colony areas. Burrows were counted within quadrats set at pre-determined intervals along these transect lines, and the average burrow density extrapolated over the total colony area, to obtain an estimate and standard error of the number of burrows within the colony. The estimate of the total number of burrows within the colony was then adjusted by the percentage of burrows in which breeding occurred (the current years nesting effort derived from the examination of a sample of burrows) to obtain an estimate **and standard error** of the breeding population **(nesting pairs)** within the colony.

5. **Photographic counts.** Common Murres on Triangle Island were censused using counts from photographs. This number, adjusted by a ratio of direct counts to counts from photographs determined at a study plot and the proportion of breeding sites to total birds present, provides an estimate of the **nesting pairs** on the colony.

Methodology citation
See Supplemental Information for full list of data sources and their corresponding methodologies.

Purpose
To create a detailed inventory of the seabird colonies of British Columbia and to provide baseline data on spatio/temportal distribution patterns of breeding seabird colonies along the coast of British Columbia. The purpose of this inventory is to assist with coastal zone and conservation area planning; emergency response to environmental emergencies; and identifying areas of potential interactions between seabirds and anthropogenic activities. In addition, it may be possible to compare with future seabird colony population census in order to

measure the impacts of shifts in composition, abundance and/or distribution of prey, and climatic and oceanographic changes.

Description of geographic extent
Coast and coastal islands of BC from southern tip of Vancouver Island to northern tip of Haida Gwaii, including Chatham Sound, Hecate Strait, Queen Charlotte Strait, Johnstone Strait and Georgia Strait.

EXTENT
Geographic Extent
West bounding coordinate: -133.179167; east bounding coordinate: -122.836667, north bounding coordinate: 54.608333, south bounding coordinate: 48.298056

DESCRIPTION
Geographic region
Provinces - British Columbia (BC)

Taxonomy

LSPE	Leach's Storm-Petrel	*Oceanodroma leucorhoa*
FTSP	Fork-tailed Storm-Petrel	*Oceanodroma furcata*
STPE	Unidentified Storm-petrel spp.	
BRCO	Brandt's Cormorant	*Phalacrocorax penicillatus*
PECO	Pelagic Cormorant	*Phalacrocorax pelagicus*
DCCO	Double-crested Cormorant	*Phalacrocorax auritus*
BLOY	Black Oystercatcher	*Haematopus bachmani*
GWGU	Glaucous-winged Gull	*Larus glaucescens*
COMU	Common Murre	*Uria aalge*
TBMU	Thick-billed Murre	*Uria lomvia*
PIGU	Pigeon Guillemot	*Cepphus columba*
ANMU	Ancient Murrelet	*Synthliboramphus antiquus*
CAAU	Cassin's Auklet	*Ptychoramphus aleuticus*
RHAU	Rhinoceros Auklet	*Cerorhinca monocerata*
TUPU	Tufted Puffin	*Fratercula cirrhata*
HOPU	Horned Puffin	*Fratercula corniculata*

Use Constraints
The Canadian Wildlife Service is the exclusive or joint owner of this dataset and must be acknowledged as the source of the dataset in any published or printed maps or reports.

As a condition of receiving the dataset, the user hereby acknowledges the limitations of the dataset as contained in the accompanying metadata file. Canadian Wildlife Service datasets require a certain degree of biological expertise for proper analysis, interpretation and application. The Canadian Wildlife Service accepts no responsibility for modified datasets and the user is not permitted to represent copies or modified datasets as an official version nor as having been made in affiliation or with the endorsement of the Canadian Wildlife Service. The Canadian Wildlife Service shall not be liable for lost profits, lost savings or other damages, the fitness of the dataset for a particular purpose, or the installation of the dataset, its use, or the results obtained.

The Canadian Wildlife Service reserves the right to revise the master copy of the dataset and to make changes from time to time in content without any obligation to notify you of such revision or changes.

The Canadian Wildlife Service is not responsible for damages resulting from any omissions, deletions, or errors that may be contained in this dataset and expressly disclaims any warranty of merchantability or fitness for a particular purpose. The entire risk as to results and performance of the dataset is with you. You assume the entire risk as to the suitability of the dataset for your proposed use. You agree to indemnify and save harmless Her Majesty against all claims, demands, losses, costs, damages, suits or other proceedings, by whomsoever made, brought or prosecuted, in any manner based upon, arising out of, related to, occasioned by or attributable to the use of the dataset.

This dataset was developed to assist with general conservation planning, and is not a substitute for on-site surveys usually required for environmental assessment.

Data Set Credit: These seabird surveys were supported in part by Environment and Climate Change Canada and number partner organizations (see Abstract & Supplemental Information for full list). The database development was supported by Environment and Climate Change Canada.

Process Contact: Laurie Wilson

TEMPORAL EXTENT
Time Period Coverage Start Date: 1931-05-14
Time Period Coverage End Date: 2019-06-16

DATA QUALITY
Attribute accuracy report
This dataset represents the location and population details of known seabird colonies on the British Columbia coast as of 2019 (some updates still to be included). This doesn't preclude the existence of small colonies that have not been found in any of the previous surveys. This dataset depicts data from surveys which represent a specific point in time. The colony sizes can vary from year to year so caution must be used in extrapolating these data to other years. There may be more recent population estimates for some seabird colonies. For more information please refer to contact person below.

This dataset was developed by compiling data from several different sources. This metadata file must be referred to in order to interpret the information properly. Where possible, the original source document should be referenced. This dataset cannot be compared to future bird surveys unless the original documents are consulted in order to determine any limitations in the individual survey that may affect the analysis.

The seabird population estimates that are presented have been derived by various methods, over different years, and vary in quality, depending on species, habitat, size of colony and survey effort. The breeding population data is compiled from summary tables included in Canadian Wildlife Service Technical Reports and other documents, and as such does not include the measure of variance (standard error) around the estimated number of breeding pairs of burrow-nesting seabirds derived from surveys of dense colonies. The original documents must be consulted for this information.

Logical consistency report
Note that some values are expressed in numbers of nesting (breeding) **pairs** of birds while others are reported as number of **individuals**. Refer to Methodology Description Section and Entity Type Definition for complete explanation.

Completeness report
Where a **zero** appears as an entry for a value of the number of pairs of birds or individuals, this indicates that no nesting birds of that species were found in that particular recent survey, but had been present in a previous survey. It is used for these abandoned sites of surface-nesting species such as cormorants which are known to use nest sites intermittently, and for previously suspected, but unconfirmed, colonies of burrow-nesting seabirds.

For some island colonies the "current" estimate of the breeding population is a compilation of the results from surveys conducted over several years. That is, surveys of some of the nesting seabirds were conducted in one year, while the remaining species were surveyed in another year. Therefore, some colonies will show that species estimates were obtained on different survey years.

Horizontal positional accuracy report
Points representing seabird colonies locations were originally digitized using fine scale marine charts with their position interpolated onto a 1:250 000 base map. Point symbols define an island on which the colony is located, not the extent of the colony on the island. At that source scale (1:250,000), some colonies located on small islets that do not appear on 1:250,000 maps, therefore appeared to be located in water.

In November of 2005, the locations of all the colonies were checked against the 1:20,000 TRIM and digital marine charts. Some of the colonies (primarily those associated with small rocky islets) were shifted slightly to correspond to visible islands.

In July of 2021, the locations of all the colonies were checked against Bing Maps, digital marine charts, and locations provided in Michael Rodway et al seabird colony inventories (2020, 2021, in prep; references at end of this section). Some of the colonies (primarily those associated with small rocky islets) were shifted slightly to correspond to the center of visible islands. This was done to improve the accuracy of the dataset and to facilitate GIS analysis.

Rodway, M.S., R.W. Campbell, and M.J.F. Lemon. 2020. Seabird colonies of British Columbia, Part 2: Haida Gwaii. Wildlife Afield 16(1&2):1-480.

Rodway, M.S., R.W. Campbell, and M.J.F. Lemon. 2021. Seabird colonies of British Columbia, Part 3: Outer Coast. Wildlife Afield 17(1&2).

Rodway, M.S., R.W. Campbell, and M.J.F. Lemon. in prep. Seabird colonies of British Columbia, Part 4: Salish Sea. Wildlife Afield.

Vertical positional accuracy report: N/A

Lineage source information: Refer to “Supplemental Information” in the Description Section

DATASET IDENTIFICATION
Spatial representation type: Vector

SPATIAL INFORMATION
Vector spatial data type: Point

REFRENCE SYSTEM INFORMATION
Coordinate system type: Projected
Projection: Albers
Coordinate system: NAD 1983 BC Environment Albers
Datum: North American 1983 (NAD83)
Ellipsoid: GRS 1980
Reference system code: EPSG; 3005

ENTITY AND ATTRIBUTE INFORMATION

Entity Type Label: **OBJECTID**
Entity Type Definition: ArcInfo system field

Entity Type Label: **SiteID**
Entity Type Definition: Unique number assigned to seabird colonies in British Columbia – a combination of letters and numbers.

Haida Gwaii
NG - North Coast Graham Island
MI - Masset and Juskatla Inlets
WG – West Coast Graham Island
SI – Skidegate Inlet
WM – West Coast Moresby Island
EM - East Coast Moresby Island

Northern Mainland Coast
MC - Northern Mainland Coast – East Side of Hecate Strait

Vancouver Island
QS - Queen Charlotte Strait to Johnstone Strait
SC – Scott Islands
WV - West Coast Vancouver Island
SG - Northern Strait of Georgia
GI – Gulf Islands – Southern Strait of Georgia

When there is a number after the decimal, it represents a discrete location within the colony (i.e. SC-010.01 represents Murre Rock on Triangle Island, SC-010.02 represents Puffin Rock on Triangle Island, etc). See SiteName label for additional details.

Entity Type Label: **SiteName1**
Entity Type Definition: Name of the seabird colony - usually the same as the name of the island on which it is located [these location names are from the *Gazeteer of Canada: British Columbia (2000)*].

On a few of the islands along the B.C. coast, seabird nesting sites were located in several discrete locations. In these cases the main island is named first, followed by the specific location. If both the main island and specific location are listed in the Gazetteer, then the names are separated by a comma **(i.e. Kunghit Island, Annis Point)**. If the colony is on an island listed in the Gazetteer but the discrete location of the colony isn't in the Gazetteer, then the names are separated by a dash **(i.e. Kunghit Island - Blackburn Rock)**. Following are a list of some of these sites:

- Kunghit Island in Haida Gwaii. Thirteen different sites are documented, identified for example as "Kunghit Island, Jenkins Point". In the Source Document # 1, the summary tables list all sites together as Kunghit Island for surveys in 1986.
- Similarly, the two islands (Herbert and Bright) in the Buckle Group in Queen Charlotte Strait, are listed individually, as Buckle Group, Herbert Island and Buckle Group, Bright Island. However, they are listed as the Buckle Group in the summary tables in the source documents.
- Triangle Island – for Common Murres, the data is presented for individual sub-colonies in 2003-2004.

For Wilf Rock (WV-422), the 1989 survey reports BLOY data for Wilf Rock (Source Document #45). The site includes a number of rocks / islets and BLOY surveys conducted by Parks Canada staff in recent years have reported data for individual rock / islets separately (Wilf Dome (49.1421935, -125.9770854), Wilf Reef (49.13895624, -125.9784134), Wilf Plateau (49.14145551, -129.983363), Wilf Rock (49.13697898, -125.9769373), Wilf Seal Haulout (49.14137259, -125.9855248)). In this dataset, we have presented the total number of nesting pairs; refer to the Source Documents (#57, 58) for specific details.
Data for some of the colonies, particularly in the Strait of Georgia (Source Documents 14-17; 19; 21; 35) combine records for two locations as one site. Following are a list of these sites:

- Christie Island and Pam Rocks are counted together for PECO, DCCO, PIGU, and BLOY, but separately for GWGU.
- Prospect Point has been combined with Siwash Rocks for PECO and PIGU.
- Oaks Bluff is referred to as the North Pender Island Cliffs for PECO in the source documents 17 and 19.
- Prevost Island - South Cliffs are referred to as "Liddell" Cliffs for PIGU (source document 15).
- Saturna Point, Saturna Island is referred to as Lyall Harbour (source document 14).
- Shoal Island is reported as "Crofton" for DCCO in source document # 19.
- Chain Islets (located near Victoria) includes Great Chain Island (source document # 19).
- Chain Islands (in Ganges Harbour – Saltspring Island) includes Second Sister Island
- Little Group in the Strait of Georgia includes Dock Island and associated rocks.
- Mandarte Island includes Mandarte – South Islet.
- Franklin Island and Merry Island (reported as Franklin Rk and Merry Island in Source Document # 19).
- Cleland Island includes Murre Reef (West Coast Vancouver Island).
- "Dyer Point" Rocks includes Weed Rock (Skidegate Inlet – QCI).

- Vesuvius Dock and Bay Rocks and Dock Point, Saltspring Island (from source document 14) are combined into one record – Vesuvius Bay.
- For Franklin and Merry Islands, Christie Island and Pam Rock, and Prospect Point and Siwash Rock, nesting occurred in both areas, but numbers were reported together for each pair of PECOs.

Some small rocks and islets that support nesting seabirds do not have an officially gazeteered name, and will not be named on any map or marine chart. In the Canadian Wildlife Service technical reports and other publications that are the source documents for this database, the seabird colonies located on these islets were given a name related to a nearby named geographic feature In this database, those names are distinguished by quotations **(i.e. "Pelican" Rock).**

In March 2022, all SiteNames in the database were checked against those reported in Michael Rodway et al Seabird Colony Inventories.

Entity Type Label: **SiteName2**
Entity Type Definition: The alternative name of the seabird colony. Many islands are recognized by their Indigenous Name. SiteName2 provides these Indigenous Names for colonies / islands, when known. SiteName1 details have been retained to cross-reference original Source Documents.

Entity Type Label: **Region**
Entity Type Definition: Broad regional zone of the BC coast

Entity Type Label: **SubRegion**
Entity Type Definition: Region broken down into smaller zones.

Entity Type Label: **Datum**
Entity Type Definition: Geographic datum type

Entity Type Label: **Longitude**
Entity Type Definition: Longitude of island site

Entity Type Label: **Latitude**
Entity Type Definition: Latitude of island site.

Entity Type Label: **SurveyYear**
Entity Type Definition: Year the seabird colony was surveyed. For some colonies, not all species breeding at the site were conducted in the same year. Therefore, certain colonies will show different survey dates for different species.

The dataset states that the survey of Wigwam Inn was conducted by the Royal British Columbia Provincial Museum in 1940 – this is an approximation - as the original RBCM dataset states the 1940s.

Entity Type Label: **DateStart**
Entity Type Definition: For BLOY, survey dates are provided, generally as a range, bounded by the beginning and end date of the survey. If the precise date was not available, the start date was listed as April 15 of the associated year (generally the earliest any survey would begin).

Entity Type Label: **DateFin**
Entity Type Definition: For BLOY, survey dates are provided, generally as a range, bounded by the beginning and end date of the survey. If the precise date was not available, the end date was listed as July 31 of the associated year (generally the latest any survey would end).

Entity Type Label: **SpeciesID**
Entity Type Definition: The four-letter bird codes for the various species, as specified below.
- **LSPE** – Leach's storm-petrels – estimated number is rounded off. Population estimate presented as **nesting pairs.**

- **FTSP** – Fork-tailed storm-petrels - estimated number is rounded off. Population estimate presented as **nesting pairs.**
- **STPE** – Unidentified species of storm-petrels (Fork-tailed and Leach's storm-petrels). In some colony surveys the identify of the nesting storm-petrel species was not determined. Population estimate presented as **nesting pairs**.
- **BRCO** – Brandt's Cormorant. Population estimate is rounded off. Population estimate presented as **nesting pairs**
- **PECO -** Pelagic Cormorants. Population estimate presented as **nesting pairs.**
- **DCCO -** Double-crested Cormorants. Population estimate presented as **nesting pairs.**
- **BLOY -** Black Oystercatchers. Population estimate presented as **nesting pairs.**
- **GWGU** – Glaucous-winged Gulls. Population estimate presented as **nesting pairs**.
- **COMU -** Common Murres. On most islands the maximum number of **individuals** seen during the survey is provided - value is presented as individual birds, since it does not represent an actual estimate of the breeding population. Refer to Methodology Description section for explanation. **The exception is Triangle Island** where the data is reported as the number of **breeding individuals**, in both 1989 and the more recent surveys in 2003 and 2004 (see source document #20). In these two survey years, the data is provided for specific sub-colonies on Triangle Island (Castle Rock, Murre Rock, Puffin Rock, and Southeast Point). An estimate is of breeding pairs for all of Triangle Island in 1989 is also provided from Source document # 41.
- **TBMU -** Thick-billed Murres. Population estimate presented as maximum number of **individuals** seen during survey - value is presented as **individual birds**, since it does not represent an actual estimate of the breeding population. Refer to Methodology Description section for explanation.
- **PIGU -** Pigeon Guillemots. Maximum number of **individuals** seen during survey is presented - value is presented as **individual birds** since it does not represent an actual estimate of the breeding population. Refer to Methodology Description section for explanation.
- **ANMU -** Ancient Murrelets - estimated number is rounded off. Population estimate presented as **nesting pairs.**
- **CAAU -** Cassin's Auklet - estimated number is rounded off. Population estimate presented as **nesting pairs.**
- **RHAU -** Rhinoceros Auklets - estimated number is rounded off. Population estimate presented as **nesting pairs.**
- **TUPU** - Tufted Puffins. On islands with small numbers of breeding TUPU, the maximum number of **individuals** seen during the survey is provided - value is presented as **individual birds** since it does not represent a comparable estimate of the breeding population. Refer to Methodology Description section for explanation. **The exceptions are Triangle Island, Sartine Island, Beresford Island, Solander Island, Volcanic Islets, and Seabird Rocks** where the estimate is of breeding pairs.
- **HOPU -** Horned Puffins. Maximum number of **individuals** seen during survey is presented - value is presented as **individual birds** since it does not represent an actual estimate of the breeding population. Refer to Methodology Description section for explanation.

Entity Type Label: **NestPairs**
Entity Type Definition: Nesting Pairs - The number of pairs of nesting birds (only used for those species which are reported as pairs – as described for each species in Attribute Accuracy Logical Consistency Report and Entity Type – SpeciesID, and Entity Type – Technique). **Note: A value of 0** indicates that there were no birds of the particular species breeding in that particular year, but had been reported as breeding in previous surveys. If a species simply does not have an entry for a given survey year, then that species was not surveyed in that year (this does not, in any way, reflect the current status of that species in the given area).

A blank cell in this column means **Not Applicable**; that is when the number of birds is not reported as pairs, but rather as individuals. In these cases, there will be a value in the Individual column.

Entity Type Label: **Individuals**
Entity Type Definition: Number of individuals of the particular species (only used for those species which are reported as individuals – as described for each species in Attribute Accuracy Logical Consistency Report and Entity Type – SpeciesID, and Entity Type – Technique). **Note: A value of 0** indicates that there were no birds of the particular species breeding in that particular year, but had been reported as breeding in previous surveys. If a

species simply does not have an entry for a given survey year, then that species was not surveyed in that year (this does not, in any way, reflect the current status of that species in the given area).

A blank cell in this column means **Not Applicable**; that is when the number of birds is not reported as individuals, but rather as pairs. In these cases, there will be a value in the NestPairs column.

Entity Type Label: **Eggs**
Entity Type Definition: Only applicable to Black Oystercatchers and Glaucous-winged Gulls. Where the data is available, the total number of eggs counted within all the nests found on the survey is provided. If the value is 0, there were either young of the year found; or no nest was located, but a territorial pair or pairs were present displaying breeding behaviour.

A blank cell in this column means **Data Not Available** (for Black Oystercatchers and Glaucous-winged Gulls) and **Not Applicable** for all species other than Black Oystercatchers and Glaucous-winged Gulls.

Entity Type Label: **LiveYoung**
Entity Type Definition: Only applicable to Black Oystercatchers and Glaucous-winged Gulls. Where the data is available, the total number of live young (chicks) counted within all the nests found on the survey is provided. If the value is 0, there were either eggs found; or no nest was located, but a territorial pair or pairs were present displaying breeding behaviour.

A blank cell in this column means **Data Not Available** (for Black Oystercatchers and Glaucous-winged Gulls) and **Not Applicable** for all species other than Black Oystercatchers and Glaucous-winged Gulls.

Entity Type Label: **EmptyNests**
Entity Type Definition: Only applicable to Black Oystercatchers and Glaucous-winged Gulls. Where the data is available, the total number of empty nests found on the survey is provided. If the value is 0, there were no empty nests located in that breeding year.

A blank cell in this column means **Data Not Available** (for Black Oystercatchers and Glaucous-winged Gulls) and **Not Applicable** for all species other than Black Oystercatchers and Glaucous-winged Gulls.

Entity Type Label: **Technique**
Entity Type Definition: General surveying methodology (total count, transects, or partial count). Further details on applicable methodology can be found in Lineage – Methodology Description or in the source documents (Supplemental Information).

Entity Type Label: **ColSize**
Entity Type Definition: The size (in hectares) of the colonies for burrowing species (Storm Petrels, Cassin's Auklet, Rhinocerous Auklet, Ancient Murrelet, Tufted Puffin) where results were available. If results were not available, or where inapplicable, a size of 0 is given.

Entity Type Label: **DataRef**
Entity Type Definition: The number corresponds to the numbered list of source documents (Canadian Wildlife Service Technical Reports and other publications) in the Supplemental Section of this Metadata file, from which the population data has been extracted.

Entity Type Label: **ObserverID**
Entity Type Definition: The organization or individuals who collected the data.

Entity Type Label: **LocDesc** (**Location Description)**
Entity Type Definition: Brief general description of seabird colony location in proximity to neighbouring land features.

Entity Type Label: **GeorefPt (Georeferenced Point (if needed for clarity))**
Entity Type Definition: Additional description of seabird colony location, if needed for clarity.

Entity Type Label: **GazetteName** (**Gazetteered Name)**
Entity Type Definition: Name of seabird colony (SiteName1) in listed in the *Gazeteer of Canada: British Columbia (2000)*. Two categories – Yes, No.

Entity Type Label: **CorrespLoc** (**Correspondence between Designated Colony and Gazetteered Location)**
Entity Type Definition: Four categories that provide additional information on the relationship between the designated colony and the Gazetteered location.

- "Complete" – colony includes location described in the Gazetteer
- "More than" - colony includes additional islets, rocks etc beyond location described in the Gazetteer
- "Part of" – colony is contained within the Gazetteered location
- "None" – colony is not listed in the Gazetteer (and SiteName1 would have quotations)

Entity Type Label: **DataEntryPers**
Entity Type Definition: Name of person who entered data or, in the case when data has been modified, it is the name of the person who most recently updated details.

Entity Type Label: **DateEntered**
Entity Type Definition: Date file was created or, in the case when data has been modified, it is the date of the most recent update.

Entity Type Label: **Notes**
Entity Type Definition: Any relevant notes or comments

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