Report Date: April 25, 2004

Metadata Data Set Name:

Pacific Estuary Conservation Program (PECP) identified estuaries of British Columbia mapping project (April 2004)

1 Identification Information

1.1 Citation:

Pacific Estuary Conservation Program. 2004. Pacific Estuary Conservation Program (PECP) identified estuaries of British Columbia mapping project. Digital datafiles.

8 Citation Information:

8.1 Originator:

Pacific Estuary Conservation Program (PECP)

8.2 Publication Date

Unpublished Material

8.4 Title:

Pacific Estuary Conservation Program (PECP) identified estuaries of British Columbia mapping project

1.2 Description

1.2.1 Abstract:

This dataset contains maps of 442 estuaries found in British Columbia, showing site-specific physiographic features of each estuary depicted as polygons. Estuaries are located on Vancouver Island, the Mainland coast, the Queen Charlotte Islands, and nearshore islands adjacent to the coastline. The dataset was created with the intention of providing a province wide, landscape GIS map of identified estuaries in order to: (a) provide the information base on which to update the PECP's strategic planning process with respect to habitat securement, and (b) to provide a spatially explicit overview of estuaries found in B.C. for future resource assessment. The mapped estuaries represent those sites that met a specific selection criteria that was intended to identify larger estuary systems, using river/stream width and order as indices of estuary size. The specific queries used to identify estuaries are detailed below. While the majority of B.C.'s large estuaries were likely captured in this exercise, the identified sites do not represent all of the estuaries in the province.

The dataset was created from existing, diverse mapping products with differing purposes, standards, scales, currencies, and release dates. Owing to differences between the various products, on a site-specific basis there are likely discrepancies between the "true" estuary area and the estimates derived from this product. Air photo interpretation and ground-truthing of specific physical and/or vegetative features were not part of the mapping methodology. As a result, the accuracy of estuary features (i.e. marsh, swamp, etc.) and attributes captured in the dataset are unconfirmed. The product is intended to provide coarse estimates of estuary area only. It is recommended that the user not draw broad inference with respect to assessing the status or area of specific estuary features (including intertidal, backshore, and upstream areas), either within or across sites. For coastal planning, it is imperative to note that there are many other coastal habitats of importance to fish and wildlife resources, including smaller estuaries, that are neither captured nor depicted in this dataset.

Estuaries were located using one or both of the following queries: a) 1:20,000 scale TRIM left-bank (GA90000110) feature code intersection with coastline (GG05800000 "coastline definite" or GG95800130 "coastline indefinite") or island shoreline (GE14850000) and, b) 1:50,000 scale NTS Watershed Atlas (WSA) $\geq 4^{th}$ order river/stream intersection with coastline. Hanging double-lined river/streams from TRIM that would intersect the coastline if they continued were also included. The rationale for using these queries was that they would capture the larger estuary systems and complexes in the province. From this exercise, 435 estuaries were located and mapped. Seven additional estuaries not located on queries were also mapped, bringing the total to 442 mapped estuaries [see PECP_estuarypolys_20apr04.shp]. Five of the additional estuaries have been surveyed by CWS for migratory bird abundance; two sites were identified by Hunter et al. (1985) and the PECP. Refer to the location method field (loc_method) to determine the estuary identification method. The compiled list of estuaries was compared to that documented by Hunter et al. (1985); estuaries identified from TRIM, WSA, Hunter et al. (1985), CWS migratory bird survey, or other method were noted in the database. Estuaries located solely by Hunter et al. (1985) have not been included in this version.

The physiographic features included for capturing and/or digitizing polygons, for each estuary system or complex, included marsh, swamp, islands, river/streams, ditches, sand/gravel bars, lakes, and intertidal areas (shown as mudflat, rock, gravel, and/or sand substrate on CHS charts). Estuary complexes included areas where more than one

river/stream flowed into a shared intertidal delta. Features found within the backshore/supratidal and upstream zones for each estuary, above TRIM coastline, were located and mapped to an upstream distance of 500m. The 500m upstream breakline was based on an estimate of the maximum distance that surface salinity was detected upstream from the mouth of the Campbell River estuary on Vancouver Island (C. Levings, DFO, personal communication, 2002), and is consistent with the limit suggested by Durance, 2001 (C. Durance, Estuarine and Freshwater Habitat Classification: Templates, Fisheries and Oceans Canada, Vancouver, BC. Unpublished report, 2001). For the Fraser, Skeena, and Nass River systems other upstream breakline distances were developed and applied. Features found within the intertidal zone for each estuary, below TRIM coastline, were located and mapped to the 0 chart datum contour line depicted on CHS/NDI marine charts. Subtidal estuary habitats, forested areas, and other upland features were not included in the estuary mapping.

The relevant map layers used to capture and digitize estuary features included 1:20,000 TRIM I&II, 1:50,000 NTS Watershed Atlas, 1:variable scale CHS charts, 1:variable scale NDI digital raster charts (BSB v.3.0 2000), 1:20,000 TRIM orthophotos (various years, where available for feature verification), and 1:15,000 to 1:70,000 scale provincial airphotos (various years, where available for feature verification). Orthophotos/airphotos were used to verify questionable boundaries and marsh features for 41 estuaries. For the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuaries (lower mainland), additional features from the Fraser River Estuary Management Plan (FREMP) habitat polygons v.1.0 August 1998 (1:2,500 scale) were also included. The FREMP polygons were originally digitized from 1996-98 from airphotos taken in 1986 and 1989. Complete estuary mapping specifications, guidelines and criteria for all sites are found in the attached companion document (J.L Ryder, K. Roger, K. Moore, and D. Buffett. Mapping specifications and guidelines for British Columbia estuaries, unpublished document, 2004) [see PECP estuary mapping specifications_25April04.pdf].

1.2.2 Purpose:

This dataset was produced with the goal to identify and map estuaries, and their associated features, at the landscape level of British Columbia for use in PECP conservation planning and resource assessment.

1.2.3 Supplemental Information:

This is a final dataset [PECP_estuarypolys_20apr04.shp]. Complete estuary mapping specifications, guidelines, and criteria for all sites are included in the attached companion document (J.L. Ryder et al., Mapping specifications and guidelines for PECP identified estuaries in British Columbia, unpublished document, 2004) [PECP estuary mapping specifications_25April04.pdf]. Note that this dataset was created from existing, diverse mapping products with differing purposes, standards, scales, currencies, and release dates. The estuary maps are intended to show estuary locations and provide coarse estimates of estuary area. The accuracy in capturing site-specific features has not been estimated or verified through ground-truthing.

The following documents and publications have been used or cited in the creation of this dataset:

Ages, A.B. 1988. The salinity intrusion in the Fraser River: time series of salinities, temperatures and currents 1978, 1979. Canadian Data Report of Hydrography and Ocean Sciences 66: 187 pp.

Ages, A.B., and A.L. Woollard. 1994. The salinity intrusion in the Fraser River: observations of salinities, temperatures and currents by time series and hovercraft coverage 1985, 1986, 1987. Canadian Data Report of Hydrography and Ocean Sciences 126: 166 pp.

British Columbia Land Use Coordination Office. 1999. British Columbia estuary mapping system. LUCO, Victoria, BC, 70 pp.

British Columbia Ministry of Environment, Lands and Parks (Geographic Data BC). 1992. British Columbia specifications and guidelines for geomatics. Content series volume 3: Digital baseline mapping at 1:20,000. BCMELP, Victoria, BC, 303 pp.

British Columbia Ministry of Environment, Lands and Parks (Fisheries Branch). 1996. Physical data model of the British Columbia watershed atlas. BCMELP, Victoria, BC, 99 pp.

Canadian Hydrographic Service. 1996. Chart No. 1 symbols, abbreviations, and terms. CHS, Ottawa, ON, 99 pp.

Canessa, R. British Columbia Marine Ecological Classification Update—Final Report. Ministry of Sustainable Resource Management, Victoria, BC. Unpublished report, 2001.

Demarchi, 1995. Map of the Ecoregions of British Columbia boundaries, scale 1:250,000. Ministry of Sustainable Resource Management, Victoria, BC. Website: http://srmwww.gov.bc.ca/ecology/ecoregions/ecoclass.html Accessed 6 November 2003.

Durance, C. Estuarine and Freshwater Habitat Classification: Templates. Fisheries and Oceans Canada, Vancouver, BC. Unpublished report, 2001.

Elliott, M., and D.S. McLusky. 2002. The need for definitions in understanding estuaries. Estuarine, Coastal and Shelf Science 55: 815-827.

Environment Canada. 2002. Map of the Georgia Basin Ecosystem Initiative (GBEI) boundary, scale 1:250,000. Environment Canada, Pacific and Yukon Region, Vancouver, BC.

Fraser River Estuary Management Plan (FREMP). 1998. Fraser River Estuary Management Plan (FREMP) habitat inventory mapping v.1.0 August 1998, scale 1:2,500. BIEAP/FREMP Organization, Burnaby, BC. Website: http://www.bieapfremp.org/main_fremp.html (accessed 6 November 2003).

Hoos, L.M. 1975. The Skeena River estuary status of environmental knowledge to 1975. Special Estuary Series No. 3. Environment Canada, Vancouver, BC, 418 pp.

Hunter, R.A., K.R. Summers, and R.G. Davies. 1985. A rating scheme for British Columbia's major coastal wetlands. Unpublished Report, B.C. Ministry of Environment, 29 pp.

National Oceanic and Atmospheric Administration (NOAA). 2003. Chartviewer v.2.0, Digital NOAA Nautical Chart Reprojection. NOAA, Washington, DC, USA. Website: http://www.csc.noaa.gov/crs/Products/chartreproj/ (accessed 13 November 2003).

Nautical Data International (NDI). 2002. Digital Ocean BSB v.3.0 2000. NDI, St. John's, NF, Canada.

North, M.S. Fraser River Estuary Management Plan (FREMP) Habitat Inventory Metadata v.1.0 August 1998. BIEAP/FREMP Organization, unpublished document, 1998.

Ryder, J.L., K. Roger, K. Moore, and D. Buffett. Mapping specifications and guidelines for PECP identified estuaries in British Columbia. Canadian Wildlife Service, Delta, BC. Unpublished document, 2003.

Trites, R.W. 1956. The Oceanography of Chatham Sound, British Columbia. J. Fish. Res. Board of Canada 13(3): 385-434.

1.3 Time Period Of Content

Currentness Reference: April 2004.

1.4 Status

1.4.1 Progress:

Final dataset completed April 2004.

1.4.2 Maintenance and Update Frequency:

Further work may be done to add other estuaries to dataset, including sites identified solely by Hunter et al. (1985). Work continuing, maintenance planned after dataset complete.

1.5 Spatial Domain

99.1.5.1 Description of Geographic Extent:

The BC coast (includes Vancouver Island, Queen Charlotte Islands, Mainland coast, and nearshore islands)

1.5.1 Bounding Coordinates

1.5.1.1 West Bounding Coordinate:

-133

1.5.1.2 East Bounding Coordinate:

-123

1.5.1.3 North Bounding Coordinate:

56

1.5.1.4 South Bounding Coordinate:
48
1.6 Keywords
1.6.1 Theme
1.6.1.1 Theme Keyword Thesaurus:
None
1.6.1.2 Theme Keyword:
Kathleen Moore
1.6.1.2 Theme Keyword:
PECP
1.6.1.2 Theme Keyword:
estuaries
1.6.1.2 Theme Keyword:
estuary
1.6.1.2 Theme Keyword:
estuary mapping
1.6.1.2 Theme Keyword:
estuary landscape
1.6.1.2 Theme Keyword:
supratidal
1.6.1.2 Theme Keyword:
intertidal
1.6.1.2 Theme Keyword:
upstream
1.6.1.2 Theme Keyword:
coastal
1.6.1.2 Theme Keyword:
nearshore
1.6.1.2 Theme Keyword:
British Columbia
1.6.2 Place
1.6.2.1 Place Keyword Thesaurus:
None
1.6.2.2 Place Keyword:
British Columbia
1.6.2.2 Place Keyword:
coast
1.6.2.2 Place Keyword:
estuary
1.6.2.2 Place Keyword:
estuaries
1.6.2.2 Place Keyword:
Vancouver Island
1.6.2.2 Place Keyword:
Queen Charlotte Islands
1.6.2.2 Place Keyword:
Georgia Basin
1.6.2.2 Place Keyword:
Northern Coastal Mountains
1.6.2.2 Place Keyword:
Coastal Gap
1.6.2.2 Place Keyword:
Pacific Ranges

1.6.2.2 Place Keyword:
Lower Mainland
1.6.2.2 Place Keyword:
Queen Charlotte Lowlands
1.6.2.2 Place Keyword:
Queen Charlotte Ranges
1.6.2.2 Place Keyword:
Western Vancouver Island
1.6.2.2 Place Keyword:
Eastern Vancouver Island
1.6.2.2 Place Keyword:
Hecate Continental Shelf

1.6.4 Temporal

1.6.4.1 Temporal Keyword Thesaurus:
None
1.6.4.2 Temporal Keyword:
NA

99.1.7 Taxonomy

99.1.7.1 Taxonomy Keyword Thesaurus:
None
99.1.7.2 Taxonomy Keyword:
NA

1.8 Use Constraints:

The Canadian Wildlife Service and Ducks Unlimited Canada are the exclusive or joint owners of this dataset. This dataset may be used for projects within your organization, but you may not distribute, sell or transfer the dataset, in whole or in part, in its current or modified form, to any other person or agency. You must receive advance written permission from the Canadian Wildlife Service or Ducks Unlimited Canada to use this dataset for any other purpose. This dataset may not be displayed on the Internet, in any form, without advance written permission of the Canadian Wildlife Service or Ducks Unlimited Canada.

Any intellectual property rights arising from the value-added or derived products will be vested with you provided that you hereby grant to the Minister of Environment and Ducks Unlimited Canada the licensed rights to produce, publish, translate, reproduce, adapt, broadcast or use at no cost, any work subject to such intellectual property rights. The Canadian Wildlife Service and Ducks Unlimited Canada must be acknowledged as the source(s) of the dataset in any published or printed maps, or reports.

The Canadian Wildlife Service and Ducks Unlimited Canada are 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 intended purpose. You agree to indemnify and save harmless Her Majesty and Ducks Unlimited Canada 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 and mapping.

THE USER IS DIRECTED TO THE DISTRIBUTION LIABILITY SECTION OF THIS METADATA FILE FOR A COMPLETE LIST OF TERMS AND CONDITIONS ON THE AUTHORIZED USE AND DISTRIBUTION OF THIS DATASET.

1.9 Point of Contact

10.1 Contact Person Primary

10.1.1 Contact Person: Kathleen Moore

10.1.2 Contact Organization: Environment Canada, Canadian Wildlife Service

10.4 Contact Address

10.4.1 Address Type: Mailing Address

10.4.2 Address: 5421 Robertson Road, RR#1

10.4.3 City: Delta

10.4.4 State or Province: B.C.

10.4.5 Postal Code: V4K 3N2

10.4.6 Country: Canada

10.5 Contact Voice Telephone: (604) 940-4660

10.8 Contact Electronic Mail Address: Kathleen.Moore@ec.gc.ca

10.1 Contact Person Primary

10.1.1 Contact Person: Dan Buffett

10.1.2 Contact Organization: Ducks Unlimited Canada

10.4 Contact Address

10.4.1 Address Type: Mailing Address

10.4.2 Address: 511 - 13370 78th Ave

10.4.3 City: Surrey

10.4.4 State or Province: B.C.

10.4.5 Postal Code: V3W 0H6

10.4.6 Country: Canada

10.5 Contact Voice Telephone: (604) 592-5003

10.8 Contact Electronic Mail Address: d_buffet@ducks.ca

1.11 Data Set Credit:

John Ryder, Katrina Roger, Kathleen Moore, Dan Buffett, and Marianne Ceh

1.13 Native Data Set Environment:

Arcview 3.2 shapefile

1.14 Cross Reference

Ryder, J.L., K. Roger, K. Moore, and D. Buffett. Mapping specifications and guidelines for PECP identified estuaries in British Columbia. Canadian Wildlife Service, Delta, BC. Unpublished document, 2004.

2 Data Quality Information

2.1 Attribute Accuracy

2.1.1 Attribute Accuracy Report:

Attributes are as accurate as the TRIM I&II 1:20,000 source linework used to capture and digitize relevant estuary polygon features (i.e. marsh, swamp, lake), and the CHS/NDI variable scale marine charts (raster format, BSB v.3.0 2000) used to identify and digitize intertidal or marsh polygons for each estuary system or complex. Where vector linework was unavailable, accuracy is further limited by the requirement to interpolate features from raster images when digitizing. Where mapping deficiencies existed between the marine charts and TRIM, owing to differences in the referencing or definition of features, the questionable feature was verified, as accurately as possible, using 1:50,000 NTS maps, orthophotos or airphotos (where available). TRIM was the source reference layer for all coastline linework.

For the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuaries, additional attributes are as accurate as the Fraser River Estuary Management Plan (FREMP) polygons v.1.0 August 1998 originally digitized from 1996-1998 at 1:2,500 scale. Accuracy at these three sites is limited by the ability to overlay FREMP polygons with TRIM linework to capture features. Where difficulties were encountered, they were noted in the comments section of the attribute tables.

The dataset was created from existing, diverse mapping products with differing purposes, standards, scales, currencies, and release dates. Owing to differences between the input data sources used to produce the maps from these various products, on a site-specific basis there are likely to be discrepancies between the “true” estuary area

and the estimates derived from this product. The accuracy of various estuary attributes, and the ability to obtain reliable areal estimates of specific features captured in the dataset (i.e. marsh, swamp, etc.), are not guaranteed. Air photo interpretation and ground-truthing of physical and/or vegetative features were not part of the mapping methodology. The estuary maps are intended to provide information on estuary locations and coarse estimates of area.

The following are specific problems that were encountered during the estuary mapping that may limit the accuracy of the dataset in some areas:

1. All NDI Marine charts are provided in a specific file format and projection (*.KAP, *.BSB) readable by marine software. Free software available on the NOAA website (http://www.csc.noaa.gov/crs/Products/chartreproj/) (accessed 13 November 2003) was used to convert these files to TIF images, in Albers projection, to be compatible with TRIM linework. In a few cases the projection conversion did not work properly, resulting in difficulty digitizing the 0 chart datum line. In these instances, the line was digitized from the digital chart, and then shifted to match TRIM using control points to register the linework. It is assumed that the original marine chart dataset was not spatially correct.

2. The scales of the marine charts vary along the coast, resulting in difficulties using TRIM and the charts together to capture specific features. The best possible scale of marine chart was used in most cases, but these scale discrepancies resulted in poor overlays between products for some areas. Some interpretation was necessary to capture/digitize features where comparisons were problematic. At several locations the charts showed no intertidal zone for a given river/stream; NTS sheets were consulted in these cases and an intertidal zone was digitized from NTS sheets where depicted. At one location (Tlell River) an intertidal zone was approximated and digitized from a digital orthophoto.

3. In TRIM there was considerable variation in the location of the digitized coastline, within and across mapsheets, and several discrepancies existed where CHS charts depicted the coastline differently (comparisons made between TRIM tiles and charts of similar scale). In several cases the TRIM coastline linework appeared to follow the 0 chart datum contour shown on CHS charts. In these cases the area above TRIM coastline was likely intertidal delta, but these were digitized from the CHS charts as backshore marsh. The result is that some estuaries have no intertidal zone due to a TRIM interpretation of the coastline that more closely follows the 0 chart datum contour. The user is cautioned to consult the CHS charts where this situation exists.

4. Some marsh areas were identified by TRIM, but not by CHS charts, and vice versa. In a few cases, TRIM marsh was identified as intertidal zone on CHS charts. Both map sources were used to capture all marsh areas shown (as accurately as possible). Where there was a significant discrepancy between the two data sources, marsh/intertidal areas were approximately verified by NTS 1:50,000 maps, 1:20,000 orthophotos, and 1:variable scale airphotos (where available) to more accurately identify/capture marsh and intertidal zone polygons. Orthophotos/airphotos were used to approximately verify questionable marsh features for 41 estuaries.

5. A few errors were encountered on some of the TRIM mapsheets, specifically: (a) hanging double-lined river/streams that did not intersect coastline, (b) adjoining mapsheets with different codes for the same feature, and (c) inlets/lagoons coded as double-lined streams (approximately 13 locations). These errors were accounted for and corrected in the estuary mapping. See comments section of the attribute tables for more detail.

6. In some cases there were discrepancies between what was considered the river/stream mouth of an estuary, defined as the location where a river/stream channel(s) opens into the nearshore bay or delta (based on TRIM map features), and what was shown in TRIM as the apparent high water mark. In these cases, a river/stream mouth was digitized at a location considered appropriate and consistent with this definition, and sourced as CWS linework.

7. For the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuary mapping (lower mainland), FREMP estuary polygons v.1.0 August 1998 (digitized in 1996-98 from 1:2,500 airphotos taken in 1986 and 1989) were overlayed with TRIM linework to capture specific estuary features. Differences between these two products created difficulty in adequately capturing features within these estuaries. Problems were encountered in assigning polygons to intertidal, backshore, and upstream areas where portions of FREMP polygons were present above or below TRIM coastline, the river/stream mouth, river channel banks, islands, and dykes. FREMP features were originally identified and digitized as polygons from existing 1:2,500 paper maps and airphotos when TRIM was not available. A few small, isolated, and unconfirmed polygons are included as donuts where they were not captured by TRIM or FREMP (i.e. polygon slivers above TRIM left/right bank surrounded by FREMP marsh).

8. For the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuaries, several small, disjointed polygons were nested between TRIM left/right banks and FREMP polygon boundaries, or below coastline and FREMP polygon boundaries. These polygons were associated with other upstream river (UR) or intertidal delta (ID) polygons, rather than assigning unique id's to each. As a result, some UR or ID polygons in these areas are multipart features and this may affect adjacency/perimeter analysis in these estuaries. Similarly, several small, disjointed polygons were nested above TRIM left/right banks and between FREMP polygon boundaries, or above coastline and between FREMP polygon boundaries. These polygons were excluded as donuts because they are above TRIM linework and are not defined as estuarine habitat in FREMP.

2.2 Logical Consistency Report:

Care has been taken to eliminate slivers from the dataset, and there should be no duplications.

2.3 Completeness Report:

The identification and mapping of estuaries is based primarily on the outcome of the queries (TRIM double-lined river/stream intersection with coastline, or island shoreline, and WSA query of ≥4th order river/stream intersection with coastline). The queries were intended to provide an estimate of the number of larger estuary systems/complexes in B.C., but obviously not all estuaries were identified in this exercise. Many (perhaps most) of the smaller estuaries in the province would likely be missed on the queries, thus the total number and area of small estuaries are underestimated. Five additional sites surveyed by CWS and two sites identified by Hunter et al. (1985) and the PECP are included in the dataset. Estuaries identified solely by Hunter et al. (1985) are not included in this release. An accurate estimate of the total number of provincial estuaries is presently unavailable.

There are a few obvious omissions of estuaries not detected from the queries that have been added to the dataset (i.e. Goldstream River). Identification of estuary systems resulting from the queries is limited by the ability of TRIM and the WSA to identify and capture all relevant double-lined river/streams, or 4th order or higher river/streams, where they enter the coastline. Additional estuaries may have been identified using different queries and selection criteria, but it was decided the existing queries would capture the larger estuary systems and complexes in the province.

The ability to completely capture all relevant estuary features, on a site-specific basis, is limited by inconsistencies between the various mapping products used. There are differences between products in terms of map scales, georeferencing of features, feature definition, and assignment of feature attributes. Owing to these limitations, the ability to accurately and completely interpret or capture estuary features, within and/or across sites, is neither implied nor guaranteed.

2.4 Positional Accuracy

2.4.1 Horizontal Positional Accuracy

2.4.1.1 Horizontal Positional Accuracy Report:

Unknown. Dependent on the source lines of TRIM I&II 1:20,000 mapping, the digital marine charts (scales ranged between 1:10,000 to 1:525,000), NTS 1:50,000 mapping, and FREMP polygons. All digitized linework was done at 1:10,000 scale.

2.4.2.1 Vertical Positional Accuracy Report:

NA

2.5 Lineage

2.5.1 Source Information:

1) TRIM I&II linework and attributes used in this dataset. See http://srmwww.gov.bc.ca/bmgs/trim/trim/trim_overview/trim_program.htm (accessed 20 October 2003) for information regarding this dataset.

2) CHS/NDI Digital Marine Charts raster images (BSB v.3.0 2000). See http://www.digitalocean.ca/DigitalOcean%20E-Store/ (accessed 20 October 2003) for information regarding this dataset.

3) BC Watershed Atlas 1:50,000 and attributes used in this dataset. See http://wlapwww.gov.bc.ca:8000/dr_pub_prod/owa/drwp_info_source_dtls.display?forInfoSrceID=9 (accessed 20 October 2003) for information regarding this dataset.

4) Fraser River Estuary Management Plan (FREMP) v.1.0 August 1998 1:2,500 habitat polygons. See http://www.bieapfremp.org/main_fremp.html (accessed 6 November 2003) for information regarding this dataset.

5) BC Provincial airphotos. See http://srmwww.gov.bc.ca/bmgs/airphoto/index.htm (accessed 20 October 2003) for information regarding airphotos.

6) BC 1:20,000 Provincial orthophotos. See http://www.mcelhanney.com/products/prod_bco_details.html (accessed 20 October 2003) for information regarding orthophotos.

99.2.5.1 Methodology

99.2.5.1.1 Methodology Type:

GIS-lab

99.2.5.1.3 Methodology Description:

The methods used to identify and produce point locations for each estuary were as follows:

Extract the double-lined TRIM river/streams (fcode attribute = GA90000110 left bank or GA90000120 right bank) from TRIM mapsheets. Select where double-lined river/stream fcodes intersect coastline (fcode attribute = GG05800000 for "definite" coastline, fcode attribute = GG95800130 for "indefinite" coastline, or fcode attribute = GE14850000 for "islands"). Hanging double-lined river/streams from TRIM that would normally intersect the coastline if they continued were included. The point locations from these queries were identified as TRIM estuaries. The Watershed Atlas (WSA) was queried for $\geq 4^{th}$ order river/stream intersections (from L_order field) with WSA coastline (fcode attribute = WA21100000 coastline, or WA21100111 construction line, coastline). The point locations from these queries were identified as WSA estuaries. The rationale for using these queries was that they would: (a) capture the larger estuary systems and complexes in the province, and (b) keep the project manageable from a time commitment standpoint. For comparison, a query of $\geq 3^{rd}$ order river/streams from the WSA located approximately 750 total sites; including these additional areas would have added substantially to the required digitizing time. It is also likely that many of these sites are small streams that might not be considered estuaries.

Locating additional estuaries from a query of river/stream magnitude within the WSA was considered, but it was undecided as to what an appropriate "magnitude" would be to locate additional estuaries that were not already located from the two main queries. For individual estuaries with duplicate or multiple query "hits" resulting from (a) both TRIM and WSA identified intersections, or (b) the presence of ≥ 1 channel for a given river/stream, where multiple intersections with coastline were possible, one point was retained as an identifier for each river/stream. Each identified river/stream from the queries was referred to as the primary river/stream; other river/streams or ditches that entered the primary river/stream or coastline were referred to as secondary river/streams. Point locations for an additional seven estuaries identified by CWS, Hunter et al. (1985), or other method were also included. These additional sites were not located on the queries. The attribute tables contain information on whether the estuaries were identified by TRIM, WSA, CWS, Hunter et al. (1985), other method, or a combination of these.

Several of the located estuaries did not have a river/stream name associated with them. In these cases, the estuary was given a name coinciding with the nearest geographic reference point to the river/stream. These names included references to points, bays, coves, sounds, lakes, inlets, islands, islets, lagoons, basins, bights, etc. In a few cases, a name could not be assigned to an estuary and it was recorded as Unnamed. The closest geographic reference point and general direction to that point was recorded in the comments field for unnamed estuaries.

The methods used to map estuary systems and estuary complexes were as follows:

Each identified estuary (n=435 from queries, + 7 additional added by PECP) was captured and digitized as per PECP mapping specifications and guidelines detailed in Ryder et al. (2004) unpublished document. The map layers used to capture, digitize and verify estuary features were 1:20,000 TRIM I&II, 1:50,000 NTS Watershed Atlas, 1:variable scale CHS charts, 1:variable scale NDI digital raster charts (BSB v.3.0 2000), 1:20,000 TRIM orthophotos (various years, where available for feature verification), and 1:15,000 to 1:70,000 scale provincial airphotos (various years, where available for feature verification). Features for the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuaries (lower mainland) were also included from Fraser River Estuary Management Plan (FREMP) polygons v.1.0 August 1998 (digitized in 1996-98, at 1:2,500 scale, from airphotos taken in 1986 and 1989). For the Fraser River estuary, features were also verified/included from TRIM ttrn coverage layer. TRIM was the primary reference layer for capturing and digitizing polygon features for most estuaries, with exceptions being the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuaries (lower mainland) where FREMP was used as a primary reference layer.

Required linework was transferred from TRIM twtr and tcvr layers, and included the following feature codes: [(GA90000110 (left bank), and GA90000120 (right bank), GA24850000 (river/stream "definite"), GA24850140 (river/stream "indefinite"), GA24850150 (river/stream “intermittent”), GA08800110 (ditch), GA08800130 (indefinite ditch), GG05800000 (coastline "definite"), GG95800130 (coastline "indefinite"), GE25850000 (sand/gravel bar), GC17100000 (Marsh area outline), GC30050000 (Swamp area outline), GE14850000 (island to scale), GB15300000 (lake definite), GB15300130 (lake indefinite), GB15300140 (lake intermittent), GA10450000 (falls -to scale), GE09400000 (dyke), GE03050110 (breakwall/breakwater-large), GE26250000 (seawall), GA08450000 (dam-section.top), GA98450100 (dam-section.bottom), and JA33750000 (wooded area)]. The 0 chart datum line and some CHS marsh areas that were not shown in TRIM were interpolated and digitized from NDI digital marine chart raster images using best available scales. For several estuaries, the digital charts showed no intertidal zone present, primarily where the chart scale comparisons were poor. NTS mapsheets were consulted for the presence of intertidal deltas in these cases; if an intertidal delta was shown it was digitized from the NTS sheet. The relevant polygons transferred from the FREMP layer included estuarine marsh, intertidal mudflat, and intertidal sandflat. FREMP riparian grass/shrub or riparian tree polygons shown in FREMP were excluded.

All estuary features were captured and digitized at a scale of 1:10,000. All existing/digitized linework and polygons used to create the estuaries was sourced as TRIM, marine chart, NTS, buffer, FREMP or CWS. Estuary features were digitized as polylines in ArcView 3.2, and converted to polygons after digitizing was complete (except for FREMP features that were already shown as polygons). Common area boundaries for polygons were digitized only once.

Relevant estuary features included marsh, swamp, islands, river/streams, ditches, sand/gravel bars, lakes, and intertidal areas (shown as mudflat, rock, gravel, and/or sand substrate on CHS charts). The estuary features captured within each river/stream system or complex (a complex being more than one river/stream sharing a common intertidal delta) included those found within the following zones: (a) the intertidal zone between the TRIM coastline and 0 chart datum contour line shown on NDI digital marine charts or NTS sheet, and (b) the supratidal and upstream zones, above the river/stream mouth(s) and TRIM coastline, to an upstream distance of 500m (see exceptions below for upstream limit of Fraser, Skeena, and Nass estuaries). The 500m upstream breakline used for most estuaries was based on an estimate of the maximum distance that surface salinity was detected upstream from the mouth of the Campbell River estuary on Vancouver Island (C. Levings, DFO, personal communication, 2002), and is consistent with the limit suggested by Durance, 2001 (C. Durance, Estuarine and Freshwater Habitat Classification: Templates, Fisheries and Oceans Canada, Vancouver, BC. Unpublished report, 2001). Subtidal estuary features, forested areas, and other upland areas were not included in the estuary mapping.

In this version of the estuary mapping, slope of the river/stream was not considered in developing criteria to delineate upstream breaklines. The rationale for not considering slope in developing breakline criteria was: (a) TRIM depicts broad slope classes that are not particularly useful for defining/delineating upstream breaklines, and (b) For most estuary systems, the upstream river area contributes little to the cumulative estuary area anyway, so the exact location of the breakline is relatively unimportant in this respect (the majority of area is contributed by intertidal zone).

For three large estuary systems, the Fraser, Skeena, and Nass, a 500m upstream breakpoint was not considered a reasonable approximation of the upstream extent of salinity intrusion. Data on upstream surface salinity concentrations for the Fraser and Skeena were obtained from DFO/IOS to quantify an approximate upstream limit of saltwater intrusion to delineate a more appropriate breakline for these areas. This breakline was applied to that portion of the river described as the limnetic or non-tidal zone, with <0.5 parts salt per unit mass of seawater (Elliott and McLusky, 2002). Breaklines were delineated as follows: 1) Fraser River: South and Main arm breakline created at east end of Annacis Island (salinity data from Ages, 1988, Ages and Woollard, 1994), 2) Skeena River: breakline created at confluence of Ecstall and Skeena River (salinity data from Trites, 1956), and 3) Nass River: breakline created at confluence of Nass and Ishkseenickh River (<<NO SALINITY DATA AVAILABLE>>, freshwater influence from Ishkseenickh River was expected to dilute remaining saltwater).

For the backshore/supratidal and upstream areas of each estuary system or complex, relevant linework or polygons that intersected or overlapped the river/stream banks were captured or digitized to the limit of the upstream breakline. Islands present between the river/stream banks, below the upstream breakline, were also captured (provided they were not a forest cover polygon from the tcvr layer, or islands with residential/commercial development present in the Fraser River). Backshore/supratidal features connected by single-lined features to the intertidal zone of the estuary, within the digitized boundary of the intertidal zone, were included provided the single-lined connecting feature was ≤ 500m in length. Single-lined TRIM river/streams, or other single-lined features within the estuary, were captured and a 10m buffer was digitized around them (5m buffer either side) to produce a closed polygon). TRIM defines a double-

lined river/stream as >20m in width, and the 10m buffer around single-lined features represents an area half the width of the minimum distance for a double-lined river/stream.

Within the intertidal delta shown on marine raster images, features were captured or digitized from existing linework or polygons. One or more of the following criteria were used to digitize breaklines to delineate the boundaries of each intertidal delta: (a) the point where the 0 chart datum line intersects TRIM coastline, (b) for a non-intersecting 0 chart datum contour line with TRIM coastline, the point where the contour line narrows to ≤ 120m distance from TRIM coastline (the rationale here is that previously a narrowing distance of 2mm as shown on CHS paper charts was used to create a breakline / the average CHS chart scale is 1:60,000, AND 2mm=120m at 1:60,000), (c) the location where coastline habitat changes are evidenced from any map layer (i.e. mudflat to rocky shoreline), (d) the location where coastline geographic features are present that create natural breakpoints (i.e. peninsulas, spits, jetty's), or (e) the location where a named secondary river/stream, not located on queries, is present and a breakline can be created midway to the named/river stream. These criteria were followed, in sequence, to delineate intertidal zone breaklines for each system or complex.

Intertidal mapping criteria were applied effectively to all estuaries, with the exception of two sites: the Skeena and Tlell River estuaries. The Skeena River does not have a distinct intertidal delta typical of most estuary systems. In this system, suspended particles from the river are deposited in banks or shoals along, or in, the lower river and channels connecting the estuary with the open ocean, forming several intertidal deltas (Hoos, 1975). Each of the Skeena intertidal deltas was captured separately according to supplemental mapping criteria detailed in Ryder et al. (2004) unpublished document. For the Tlell River estuary, the available chart scale was poor (1:525,000) and the TRIM/NTS linework was offset from the chart at this location. An approximate intertidal zone was digitized here using an orthophoto.

Any additional linework digitized by GIS technicians (i.e. buffers, intertidal zone breaklines between 0 chart datum lines and TRIM) was sourced as CWS linework. A detailed description of the estuary source locations, linework, and/or polygons for all mapped estuaries is available from the contact person at the CWS office in Delta, B.C. Full mapping specifications and supplemental mapping specifications for the Fraser, Serpentine/Nickomekl, Campbell River (1), Skeena, and Nass rivers, as noted above, are documented in the companion document to this metadata (J.L Ryder, K. Roger, K. Moore, and D. Buffett. Mapping specifications and guidelines for PECP identified estuaries in British Columbia. Canadian Wildlife Service, Delta, BC. Unpublished document, 2004).

<u>Additional mapping criteria for Fraser River, Serpentine/Nickomekl, and Campbell River (1) estuaries (using FREMP v.1.0 August 1998 and TRIM overlays):</u>

For the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuaries (lower mainland region), FREMP was the primary reference layer for capturing relevant estuary polygons, using TRIM linework as an overlay. The relevant polygons included from the FREMP layer were estuarine marsh (EM), intertidal mudflat (IM), and intertidal sandflat (IS). Riparian grass/shrub or riparian tree polygons were clipped and excluded as donuts. FREMP polygons were reclassified according to the PECP mapping codes (i.e. estuarine marsh from FREMP would either be intertidal marsh or backshore marsh). The boundaries of FREMP intertidal mudflat and intertidal sandflat polygons, where present below or above TRIM left/right banks, dykes, islands, or coastline, were merged with the PECP estuary layer for the Fraser, Serpentine/Nickomekl, and Campbell River (1) estuaries. Areas that were not defined or captured by FREMP or TRIM were excluded as donuts; this applied to areas <u>above</u> TRIM islands, left/right banks, or coastline, and also included areas on TRIM islands, above or below the river mouth, that were not captured as FREMP estuarine marsh or intertidal mudflat/sandflat. All areas below TRIM islands, left/right banks, or coastline were captured as per existing criteria.

If FREMP IM or IS intertidal polygons were completely contained within the PECP estuary layer boundaries for each site, below TRIM linework and above CHS 0 chart contour, the polygon boundaries were dissolved and/or erased and included as intertidal delta or upstream river. Where FREMP IM or IS polygon boundaries extended above TRIM linework, the polygon boundaries were left intact and the areas were included as either intertidal delta or upstream river. Where portions of FREMP intertidal polygons extended above TRIM coastline, below the river mouth, the feature boundaries were coded as intertidal delta.

FREMP IM or IS polygons were separated/split at the Fraser, Serpentine/Nickomekl, and Campbell River (1) mouth breaklines, if portions of the polygons were present above and below the river mouths. Above the river mouths, all intact or split FREMP intertidal polygons were coded as upstream river, regardless of their location relative to TRIM islands, left/right banks, or dyke linework. Below the river mouths, all intact or split FREMP intertidal polygons were coded as intertidal delta, regardless of their location relative to TRIM islands or coastline linework. Upstream areas,

that were not shown in FREMP, but were between TRIM left/right banks or below islands, were captured as per existing criteria and coded as upstream river (if not otherwise excluded as donuts). Intertidal areas, that were not shown in FREMP, but were below TRIM coastline and above CHS 0 chart datum, were captured as per existing criteria and coded as intertidal delta (if not otherwise excluded as donuts). Several small, disjointed polygons present below TRIM left/right banks or coastline, between FREMP polygons, were associated with larger upstream river or intertidal delta polygons rather than assigning unique id's to each. As a result, some ID or UR polygons have multipart features that would affect adjacency/perimeter analysis for these areas.

FREMP EM polygons were captured as distinct areas with a unique identifier, regardless of their position relative to all TRIM linework, and coded as intertidal marsh or backshore marsh. If the majority of a given EM polygon was present below TRIM coastline or the river mouth, the ENTIRE polygon feature was coded as intertidal marsh. If the majority of a given EM polygon was present above TRIM coastline or the river mouth, the ENTIRE feature was coded as backshore marsh. All FREMP EM polygons upstream of the river mouth were coded as backshore marsh regardless of their position relative to TRIM linework.

One swamp area was shown in TRIM for the Fraser River. The swamp area was partially overlapped by FREMP estuarine marsh; that portion covered by FREMP was coded as a backshore marsh polygon. The remainder of the TRIM swamp feature outside the FREMP estuarine marsh was coded as backshore swamp. No TRIM marsh linework was present in the Fraser, Serpentine/Nickomekl, or Campbell River (1) estuaries; thus FREMP EM polygons were the only marsh features captured.

99.2.5.1.4 Methodology Citation:

See following companion document for detailed information on mapping criteria, field definitions, and attributes:

Ryder, J.L., K. Roger, K. Moore, and D. Buffett. Mapping specifications and guidelines for PECP identified estuaries in British Columbia. Canadian Wildlife Service, Delta, BC. Unpublished document, 2004.

2.5.2 Process Step

2.5.2.1 Process Description:

(see Methodology Description section for details)

2.5.2.3 Process Date:

April 2004

2.5.2.4 Process Time:

NA

2.5.2.6 Process Contact

10 (see primary person contact above)

2.7 Taxonomic Procedures

99.2.7.4 Taxonomic Procedures:

NA

3 Spatial Data Organization Information

3.1 Indirect Spatial Reference:

Each digitized estuary system or complex in B.C. can be indirectly located from the intersection of TRIM double-lined river/streams with coastline or island shoreline, the intersection of WSA $\geq 4^{th}$ order river/stream with coastline, a CWS survey location, or an area identified by Hunter et al. (1985) or the PECP. Estuaries are also identifiable and query able by general geographic location (Vancouver Island, Mainland coast, Queen Charlotte Islands), Provincial Ecoregion, Provincial Marine Ecounit, or presence inside/outside Georgia Basin Ecosystem Initiative (GBEI) boundary.

3.2 Direct Spatial Reference:

Polygon

3.3 Point and Vector Object Information

3.3.1.1 SDTS Point and Vector Object Type:

Polygon

3.3.1.2 Point and Vector Object Count:

2663

4 Spatial Reference Information

4.1.1.3 Geographic Coordinate Units:

Decimal degrees

4.1 Horizontal Coordinate System Definition

4.1.2 Planar

4.1.2.1 Map Projection

4.1.2.1.1 Map Projection Name:

Albers Conical Equal Area

4.1.2.1.2.1 Standard Parallel:

50

4.1.2.1.2.1 Standard Parallel:

58.5

4.1.2.1.2.2 Longitude Of Central Meridian:

-126

4.1.2.1.2.3 Latitude Of Projection Origin:

45

4.1.2.1.2.4 False Easting:

1000000

4.1.2.1.2.5 False Northing:

0

4.1.4 Geodetic Model

4.1.4.1 Horizontal Datum Name:

North American Datum of 1983

4.1.4.2 Ellipsoid Name:

Geodetic Reference System 80

5 Entity and Attribute Information

See following companion document for detailed information on mapping criteria, field definitions, and attributes: Ryder, J.L., K. Roger, K. Moore, and D. Buffett. Mapping specifications and guidelines for PECP identified estuaries in British Columbia. Canadian Wildlife Service, Delta, BC. Unpublished document, 2004.

5.1 Detailed Description

5.1.1 Entity Type Label

Unique_id

5.1.1.2 Entity Type Definition

Unique numerical ID for each polygon in the database

5.1.1 Entity Type Label

Est_name

5.1.1.2 Entity Type Definition

Name of the river/stream estuary system or complex determined from any map source (unnamed river/stream = Unnamed). River/stream names within a complex are separated by a backslash (/).

5.1.1 Entity Type Label

Est_no

5.1.1.2 Entity Type Definition

Unique numerical ID for each estuary system or estuary complex

5.1.1 Entity Type Label

Area_id

5.1.1.2 Entity Type Definition

This field refers to whether a polygon is located in the intertidal, backshore (AKA supratidal), or upstream zone. Features above TRIM coastline are “backshore”; features below the TRIM coastline to CHS 0 chart datum contour are “intertidal”; features present above river/stream mouth are upstream (features such as river channels, islands, and sand/gravel bars between river/stream mouth and upstream breakline).
[B = Backshore, I = Intertidal, U = Upstream]

5.1.1 Entity Type Label

Unit_id

5.1.1.2 Entity Type Definition

This field specifically codes each polygon, relative to its assigned area_id, as river, marsh, island, etc. [BM = Backshore Marsh, BMC = Backshore Marsh (NTS Chart derived), BS = Backshore Swamp, BL = Backshore Lake, BR = Backshore River, BU = Backshore Unidentified (unconfirmed/miscoded), II = Intertidal Island, IM = Intertidal Marsh, IS = Intertidal Swamp, IL = Intertidal Lake, ID = Intertidal Delta
IU = Intertidal Unidentified (unconfirmed/miscoded), UU = Upstream Island, UR = Upstream River, UU = Upstream Unidentified (unconfirmed/miscoded)]

5.1.1 Entity Type Label

Loc_method

5.1.1.2 Entity Type Definition

The query method by which each estuary was identified.
[0 = Hunter et al. (1985), 1 = TRIM, 2 = WSA, 3 = TRIM & WSA, 4 = TRIM & Roger Hunter (also found by Hunter et al. 1985), 5 = WSA & Roger Hunter (also found by Hunter et al. 1985), 6 = TRIM & WSA & Roger Hunter (also found by Hunter et al. 1985), 7 = CWS (estuary surveyed for waterbird abundance), 8 = TRIM & CWS, 9 = WSA & CWS, 10 = CWS & Roger Hunter (also found by Hunter et al. 1985), 11 = TRIM & CWS & Roger Hunter (also found by Hunter et al. 1985), 12 = WSA & CWS & Roger Hunter (also found by Hunter et al. 1985), 13 = TRIM & WSA & CWS, 14 = TRIM & WSA & CWS & Roger Hunter (also found by Hunter et al. 1985), 15 = other]

5.1.1 Entity Type Label

Spit_pres

5.1.1.2 Entity Type Definition

presence of a spit beyond mouth of estuary, that shelters all or part of estuary from ocean influence
[Y = Yes, N = No]

5.1.1 Entity Type Label

M_int_dist

5.1.1.2 Entity Type Definition

straight-line connection distance (metres) from estuary river/stream mouth to 0 chart datum line.

5.1.1 Entity Type Label

Dig_crit

5.1.1.2 Entity Type Definition

criteria from PECP mapping specifications and guidelines document used to capture and digitize estuary polygons. Format is [supratidal #, intertidal #] as follows:

<u>Supratidal:</u>

1 = No marsh, swamp, island, lake, or wooded area features present, within lateral extent of intertidal zone, above or below coastline. No secondary river/streams connect polygons to primary river/stream. No islands present between primary river/stream channel(s).
2 = Marsh, swamp, island, or wooded area features present, within lateral extent of intertidal zone, between coastline and 0 chart datum contour. No secondary river/streams connect polygons to primary river/stream. No islands present between primary river/stream channel(s).
3 = Marsh, swamp, island, lake, or wooded area features present, within lateral extent of intertidal zone, above coastline. No secondary river/streams connect polygons to primary river/stream. Islands may be present between double-lined river/stream channel(s).
4 = Marsh, swamp, island, lake, or wooded area features present, within lateral extent of intertidal zone, above coastline. Secondary river/streams connect polygons to primary river/stream. Islands may be present between double-lined river/stream channel(s).

<u>Intertidal</u>:

0 = << No intertidal zone present >>
5 = Below primary river/stream mouth(s), the 0 chart datum contour line intersects TRIM coastline at 2 locations, closed intertidal polygon can be digitized.

6 = Below primary river/stream mouth(s), the 0 chart datum contour line does not intersect TRIM coastline at >1 location, but distance between 0 chart datum and coastline narrows to 120m, closed intertidal polygon can be digitized.
7 = Below primary river/stream mouth(s), the 0 chart datum contour line does not intersect with TRIM coastline at >1 location, distance between 0 chart datum and coastline does not narrow to 120m at > 1 location, but shoreline habitat has changed above or below coastline, closed intertidal polygon can be digitized.
8 = Below primary river/stream mouth(s), the 0 chart datum contour line does not intersect with TRIM coastline at >1 location, distance does not narrow to 120m at > 1 location, shoreline habitat does not change, but spit, jetty or peninsula is present and forms logical breakpoint, closed intertidal polygon can be digitized.
9 = Below primary river/stream mouth(s), the 0 chart datum contour line does not intersect with TRIM coastline at >1 location, distance does not narrow to 120m at >1 location, shoreline habitat does not change, no spit, jetty or peninsula present, but secondary named river/stream is present upstream or downstream, breakpoint can be digitized midway between named secondary river/stream and primary river/stream, closed intertidal polygon can be digitized.

5.1.1 Entity Type Label

Code_let

5.1.1.2 Entity Type Definition

Four letter/numeric ID code for each estuary system/complex (unknown estuaries numbered sequentially)

5.1.1 Entity Type Label

Nts_used

5.1.1.2 Entity Type Definition

NTS maps required and used for feature verification
[Y = Yes, N = No]

5.1.1 Entity Type Label

Ndi_chart

5.1.1.2 Entity Type Definition

CHS chart reference number for estuary system/complex

5.1.1 Entity Type Label

Location

5.1.1.2 Entity Type Definition

General geographic location of estuary
[Vancouver Island, Mainland coast, Queen Charlotte Islands]

5.1.1 Entity Type Label

A20k_tag

5.1.1.2 Entity Type Definition

TRIM mapsheet reference number for estuary system/complex

5.1.1 Entity Type Label

Marsh_corr

5.1.1.2 Entity Type Definition

Marsh/swamp area depicted on CHS chart but not captured in TRIM. Marsh area polygon corrected/digitized from NDI digital chart raster image (above or below TRIM coastline)
[Y = Yes or NA = Not applicable]

5.1.1 Entity Type Label

Photo_ver

5.1.1.2 Entity Type Definition

Estuary features verified from most recent airphoto or orthophoto (where available)
[Y = Yes, N = No]

5.1.1 Entity Type Label

Comments

5.1.1.2 Entity Type Definition

General comments about estuary system or complex

5.1.1 Entity Type Label

Hectares

5.1.1.2 Entity Type Definition

Area of each estuary polygon (in hectares)

5.1.1 Entity Type Label

Gbei_est

5.1.1.2 Entity Type Definition

Estuary present within the boundaries of the Georgia Basin Ecosystem Initiative (GBEI) (from Environment Canada, map of Georgia Basin Ecosystem Initiative boundary, 2002).
[Y = Yes, N = No]

5.1.1 Entity Type Label

Ecoregion

5.1.1.2 Entity Type Definition

British Columbia provincial Ecoregion in which estuary system or complex is located (from Demarchi, map of the Ecoregions of British Columbia boundaries, 1995)
[COG = Coastal Gap, EVI = Eastern Vancouver Island, HCS = Hecate Continental Shelf, LOM = Lower Mainland, NOM = Northern Coastal Mountains, PAC = Pacific Ranges, QCL = Queen Charlotte Lowlands QCR = Queen Charlotte Ranges, WVI = Western Vancouver Island]

5.1.1 Entity Type Label

Substrate

5.1.1.2 Entity Type Definition

British Columbia provincial Marine Ecounit (benthic component, Substrate class) in which estuary system or complex is located (from Canessa, British Columbia Marine Ecological Classification update, 2001)
[H = Hard, M = Mud, S = Sand, U = Undefined]

5.1.1 Entity Type Label

Exposure

5.1.1.2 Entity Type Definition

British Columbia provincial Marine Ecounit (benthic component, Exposure class) in which estuary system or complex is located (from Canessa, British Columbia Marine Ecological Classification update, 2001)
[H = High, L = Low, M = Moderate]

5.1.1 Entity Type Label

Current

5.1.1.2 Entity Type Definition

British Columbia provincial Marine Ecounit (benthic component, Current class) in which estuary system or complex is located (from Canessa, British Columbia Marine Ecological Classification update, 2001)
[H = High, L = Low]

5.1.1 Entity Type Label

Slope

5.1.1.2 Entity Type Definition

British Columbia provincial Marine Ecounit (benthic component, Slope class) in which estuary system or complex is located (from Canessa, British Columbia Marine Ecological Classification update, 2001)
[F = Flat, S = Sloping, T = Steep]

5.1.1 Entity Type Label

Depth

5.1.1.2 Entity Type Definition

British Columbia provincial Marine Ecounit (benthic component, Depth class) in which estuary system or complex is located (from Canessa, British Columbia Marine Ecological Classification update, 2001)
[D = Deep, M = Mid-depth, P = Photic, S = Shallow]

5.1.1 Entity Type Label

Temp

5.1.1.2 Entity Type Definition

British Columbia provincial Marine Ecounit (benthic component, Temperature class) in which estuary system or complex is located (from Canessa, British Columbia Marine Ecological Classification update, 2001)
[C = Cold, W = Warm, U = Undefined]

5.1.1 Entity Type Label

Roughness

5.1.1.2 Entity Type Definition

British Columbia provincial Marine Ecounit (benthic component, Roughness class) in which estuary system or complex is located (from Canessa, British Columbia Marine Ecological Classification update, 2001) [H = High, L = Low, M = Moderate]

6 Distribution Information

6.1 Distributor

10.2 Contact Organization Primary

10.1.2 Contact Organization: Environment Canada, Canadian Wildlife Service

10.1.1 Contact Person: Kathleen Moore

10.4 Contact Address

10.4.1 Address Type: Mailing Address

10.4.2 Address: 5421 Robertson Road, RR1

10.4.3 City: Delta

10.4.4 State or Province: B.C.

10.4.5 Postal Code: V4K 3N2

10.4.6 Country: Canada

10.5 Contact Voice Telephone: (604) 940-4660

10.8 Contact Electronic Mail Address: Kathleen.Moore@ec.gc.ca

6.3 Distribution Liability

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

The Canadian Wildlife Service and Ducks Unlimited Canada are 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 and Ducks Unlimited Canada 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.

6.4 Standard Order Process

Dataset delivered via CDROM or FTP. Please contact above person for more information.

6.4.2 Digital Form

6.4.2.1.1 Format Name:

Arcview shapefile, Adobe Acrobat pdf

6.4.2.1.2 Format Version Number:

Arcview 3.2, Adobe Acrobat Reader 5.0

6.4.2.2 Digital Transfer Option

Network Address NA

7 Metadata Reference Information

7.1 Metadata Date:

May 13, 2003

7.2 Metadata Review Date:

April 25, 2004

7.4 Metadata Contact:

10.2 Contact Organization Primary

10.1.2 Contact Organization:	Environment Canada, Canadian Wildlife Service
10.1.1 Contact Person:	Kathleen Moore

10.4 Contact Address

10.4.1 Address Type:	Mailing Address
10.4.2 Address:	5421 Robertson Road, RR1
10.4.3 City:	Delta
10.4.4 State or Province:	B.C.
10.4.5 Postal Code:	V4K 3N2
10.4.6 Country:	Canada

10.5 Contact Voice Telephone: (604) 940-4660

10.8 Contact Electronic Mail Address: Kathleen.Moore@ec.gc.ca

7.5 Metadata Standard Name:

NBS Content Standards for National Biological Information Infrastructure Metadata

7.8 Metadata Access Constraints:

None

7.9 Metadata Use Constraints:

None