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February 5, 2007

David Stevenson
Rivers and Smith Salmon Ecosystems Planning Society
1719 Beaufort Ave, Comox, B.C. V9M 1R8
Phone: 250 890 0297 Email: rsseps@island.net

RE: Sensitive Habitat Review and Habitat Atlas for the Smith Inlet Area.

Dear David,

Thank you for the opportunity to complete a Sensitive Habitat Review for the Smith Inlet watersheds. Please find attached a report detailing the methodology, scope and limitations, metadata to describe study details and a list of references. Other deliverables include the online [FISS habitat atlas mapping tool](#) as well as a series of 20 maps at 1:50,000 scale illustrating the location of sensitive spawning and rearing habitat by species for the Smith Inlet study area.

The purpose of this project was to complete a review of existing information in order to identify critical salmonid spawning and rearing habitat within the study area. From the reference material, a total of 50 new points with associated spawning and/or rearing habitat information was added to the existing web based FISS habitat atlas. Based on this information, a database and accompanying GIS map files were developed to highlight sensitive fish habitat in the study area. The database provides a user-friendly Internet access to compiled information as well as tools to add or update information. This will allow the RSSEPS to iteratively build capacity within the database and update maps subsequent to the current project. These maps are available over the Internet for anyone with a web-browser to view as a dynamic map that can be tailored to the viewers specific interests. In addition, the data will be retained in formats customized for RSSEPS desktop GIS use for subsequent analyses and hard-copy map making.

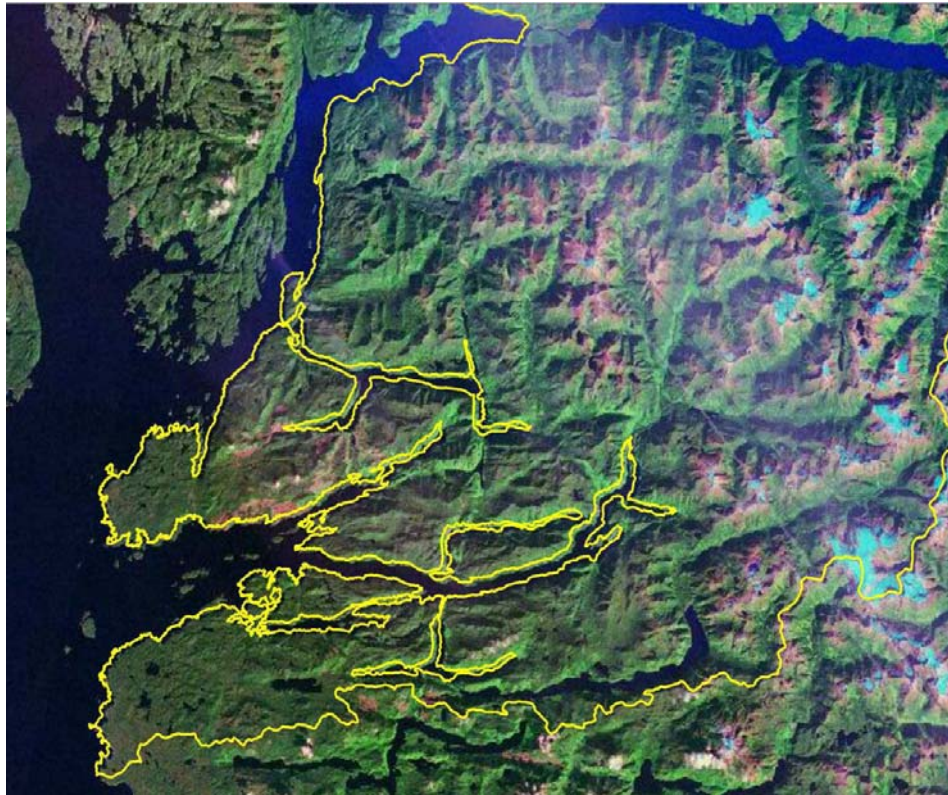
These products were developed as a tool for operational and strategic planning purposes. If you have any questions or wish to discuss the report or GIS deliverables, please contact either one of the undersigned.

Sincerely,

Violet Komori
Partner
V. Komori and Assc.

Don Chamberlain
Principal
Don Chamberlain and Assc.

Sensitive Fisheries Habitat Survey of the Smith Inlet Basin



February 5, 2007

Prepared for: Rivers and Smith Salmon Ecosystems Planning Society
1719 Beaufort Ave, Comox, B.C. V9M 1R8

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1 INTRODUCTION

In order to assist the efforts of the Salmon Recovery Plan for Rivers and Smith Inlets, the Rivers and Smith Salmon Ecosystems Planning Society (RSSEPS) is interested in developing a database and digital maps identifying sensitive and critical salmonid spawning and rearing habitat for the Smith Inlet basin. A similar review and online mapping tool was completed for the Owikeno Basin in January 2006. For both areas, valuable spawning and rearing habitat has been collected in the field but is not readily available or widely accessible in a central repository. An information review that is integrated with the development of a database and GIS maps provides an important tool to assist resource managers in the conservation and protection of sensitive salmon habitat features from future resource development activities.

The purpose of this project is to review available references, interview key personnel and summarize relevant spawning and rearing habitat information for chinook, sockeye, coho, pink and chum salmon. When available, sensitive habitat information and fish distribution for trout species has also been included. Based on the information review, habitat type data was entered into the FISS online mapping program. After which, the development of a database and GIS maps was completed with the goal to provide an important tool to assist resource planners and managers.

The study area included for the Smith Inlet sensitive habitat atlas includes the Long lake basin and Takush River to the south, the Nekite River and Walkum Creek to the east and north to Rivers Inlet. Within the study area, the majority of chinook salmon are produced in the Docee River with a smaller run returning to the Nekite River watershed. Coho production is the most widespread with known populations produced in the Nekite River, Takush River, Johnston Creek as well numerous smaller systems throughout the study area. Notable runs of chum are produced in the Nekite River, Takush River, Johnston Creek, Draney Inlet systems and Walkum Creek as well as a few other smaller systems throughout the study area. Pink salmon are primarily produced in the Nekite River, Johnston Creek and the Draney Inlet drainages.

Significant runs of sockeye have historically been produced within the Long Lake watershed in the lower Smith Inlet basin. This stock represents one of the 4 major sockeye producing systems within the north and central coast of B.C., along with other noted sockeye runs originating from Babine Lake (Skeena R), Meziadin Lake (Nass R) and Owikeno Lake (Riddell 2004). Between 1951 and the mid 1980's, the total run size for Long Lake sockeye has ranged between 200,000 and 400,000 annually. Sockeye escapement peaked during 1991 and 1992 when the total sockeye return was 800,000 and 1,000,000 respectively (Riddell 2004).

However, sockeye stocks in Smith Inlet, along with River Inlet have significantly declined in total abundance with relatively low escapements to Long Lake since 1995 (Rutherford and Wood 2000). Declining stocks have resulted in complete closure of the Smith Inlet commercial fishery in 1997 and a record low escapement of 1430 adults recorded in 2000 (Riddell 2004). Available data indicates that the decline in sockeye escapement is the result of very poor marine survival and even with an increase in marine productivity; full stock recovery will take several years (Riddell 2004).

A comprehensive recovery plan was developed to address critically low sockeye escapement (Holtby 2000). One of the objectives of the habitat strategy is to "manage habitat to ensure optimal natural productive capacity at all life stages" (DFO 1986). In order to facilitate the recovery of sockeye stocks, Limit Reference Points (LRPs) for defined conservation units have

been established, with a LRP of 8,000 for spawners identified for Long Lake sockeye. The LRP is an escapement threshold below which there is a significant risk of extirpation. However, a target escapement of 200,000 has been established for Long lake sockeye to ensure long-term productivity. An overall assumption is that habitat must be managed to accommodate historic stock levels, rather than either the LRP or the target levels (Holtby 2000).

Almost all sockeye salmon production from Smith Inlet originates from spawning habitat associated with Long Lake (Rutherford and Wood 2000). The availability of known spawning habitat includes only approximately 6 km of spawning habitat in Smokehouse and Canoe Creeks and two beach spawning areas along the Long Lake system (Holtby 2000). Very little logging has occurred in the Long Lake system and has been limited to small-scale A-frame and hand logging that removed minor volumes of wood from Long Lake in the 1960s and 1970s. As well, both Smokehouse River and Canoe Creek watersheds remain undeveloped.

Wyclees Lagoon represents a unique ecotype consisting of a narrow T-shaped brackish inlet between Long Lake and Smith Inlet. Due to a constriction at the outlet of the lagoon (Quashella Narrows) in combination with discharge from the Docee River, the inland waters levels are relatively consistent and vary less than 0.2 m in contrast to 4-5 m fluctuations in Rivers Inlet. As well, the lagoon has very low salinity and provides valuable rearing habitat for salmonids. Resource development within the lagoon include limited logging activity since 1997 and log handling activities (Holtby 2000).

Protection of sensitive habitat within the Smith Inlet basin can be advocated through higher level planning processes including the CCLRMP as well as the federal *Species At Risk Act* (SARA). Since the Long Lake Basin is largely undeveloped, it is being considered for a Goal 1 or 2 status Protected Area. Goal 1 protected areas are designed to protect representative examples of natural diversity including marine, terrestrial, and freshwater ecosystems. Goal 2 protected areas protect special natural features, including critical habitats. From an operational perspective, sensitive fish habitat can be sustained through the provincial Landscape Unit Planning through designation as Old Growth management Areas that have the potential to offer a higher level of protection from resource development activities (Holtby 2000).

2 METHODOLOGY

The identification of sensitive habitat types can be used to identify critical habitat including major spawning habitat, high value rearing habitat or habitat that are rare and significantly contribute to salmonid production, that that are priorities for protection. Within the scope of this project, sensitive habitat types include river deltas, mainstem riffles and floodplain margins utilized for spawning habitat and include spring fed ponds, side channels, tributary creeks and groundwater upwelling areas. Sensitive rearing habitat types also mainstem pool habitat or low gradient tributaries as well as floodplain habitat providing slough and sidechannel habitat as well as estuaries, lagoons and nearshore residence habitat utilized by 0+ fry and smolts.

In order to complete the review of sensitive habitat types, reference information was solicited from FOC personnel, members of the RSSEPS planning committee and the Gwasala Nakwaxda'xw First Nation. Reference information included published and unpublished reports, data reports and online references. The references were reviewed with relevant information transferred to a set of working maps for the study area. In addition to the reference information, personal interviews were undertaken with Steve Bachen from Fisheries and Oceans Canada (FOC) and Doug McCorquodale in consultation with the Gwasala Nakwaxda'xw First Nation.

In order to generate the working maps for the study area, FISS data was located and downloaded from MSRM and DFO websites and clipped to include the Owikeno/Smith Watershed Group. In addition to FISS data, FHIIP information was downloaded from the FIDQ website and converted to a format for Arcview GIS use. CC LCRMP Fish Data was also downloaded and added to the GIS for comparison. Historical and well as current sensitive spawning and rearing habitat in lakes, streams, wetlands and estuaries was made available on the existing FISS database and maps.

A series of 5 maps, subdivided into a subset of 4 maps (20 maps in total) at a 1:50,000 scale were generated to update and delineate spawning and rearing habitat for 1) any species of salmon 2) chinook salmon, 3) sockeye salmon/ kokanee, 4) coho salmon and 5) chum/pink salmon. The review information was interpreted and recorded into a geo-referenced database that is linked to GIS mapping tools that allow for data updates through the Internet and which can generate reports. All data entries are linked to metadata (a summary of study details and reference information provided for record) that is listed in Appendix A. The database and mapping programs were modified to meet information requirements of the Smith Inlet basin. Existing data entry and reporting tools that record Fisheries Information Summary System (FISS) data, Sensitive Habitat Inventory and Mapping Information as well as anecdotal, metadata and other information were modified to meet the business needs of the Salmon Recovery Plan for Rivers and Smith Inlets.

The habitat summary information was added into the database and used to generate mapping files. The data was entered through a series of web-based data entry forms available using Internet Explorer with the AutoDesk Mapguide plug-in. Customized Forms were developed in an atlas unique to the Salmon Recovery Plan for Rivers and Smith Inlets. Data was digitized at approximately 1:10,000 scale for use at 1:50,000 (NTS) scale.

An MS Access database with the FISS point information added through the Internet was obtained for use in ArcView GIS. This was used to generate point and line data for displaying fish species distributions and sensitive habitat locations on hard copy maps and in the online 'Rivers and Smith Inlets Atlas' (<http://www.shim.bc.ca/RSSEPS>).

A separate GIS process was used to generate updated 'FISS zone' watercourse segments (lines showing holding, rearing, spawning and major spawning areas). This task was done by a subcontractor, who had access to MapInfo GIS, when it was determined that this task would be too time-consuming and complex using ArcView GIS. ArcView GIS was used to display the data created in MapInfo and generate hard copy and PDF maps showing distributions and sensitive habitat locations by species groups.

The 'Rivers And Smith Inlets Atlas' was created using an existing template available through the Community Mapping Network. The atlas includes existing FISS themes (layers) showing fish distributions by species, as well as a series of updated salmon distribution themes and base themes. The atlas is a 'stand-alone atlas' with accompanying web pages describing the use and contact information for those who created it.

An ArcView GIS series of 20 maps and associated data were stored on CD so that updates to the maps can be achieved in the future by GIS technical staff using Arcview. Acrobat Reader (PDF) format files for each map were also produced and stored on the same CD using the same format used to plot the maps (36inch wide x 24inch tall).

3 SCOPE, LIMITATIONS AND ASSUMPTIONS

The identification of sensitive salmonid spawning and rearing habitat in this report, metadata and maps is limited to the available reference materials and existing knowledge of the contributors. Therefore, the information provided in these products should be considered as a starting point with the assumption that additional information identifying sensitive habitat will be added with ongoing assessment and inventory work.

Smokehouse Creek is glacial with poor visibility, making spawner enumeration and the corresponding identification of critical spawning and rearing habitat difficult. “Clearer” systems with golden or tea stained waters include Canoe Creek, the Nekite River and the Takush River where enumeration can be considered most accurate. Therefore, for some systems, site-specific identification of sensitive spawning and rearing habitat is difficult and may include an entire reach rather than a concise location in the atlas produced for this project.

With respect to the identification of rearing habitat in the Johnston Creek, accessible floodplain and off channel habitat are considered to be high value rearing habitat and estimated from 1:50,000 NTS maps. This assumption is based on literature and isolated fish sampling that verify extensive use of floodplain habitat including side channels, sloughs, back channels, spring fed ponds and lower tributaries for sockeye, coho and chinook. In addition to floodplain habitat, several estuarine areas have been highlighted as sensitive salmonid habitat but the limit of estuary areas has been estimated for strategic planning purposes only.

In the hard copy and PDF maps generated, the proper display of species ‘zone’ information was challenging and the resultant maps do not display all the information contained in the existing and updated FISS datasets for FISS zones. This is because some watercourse segments have multiple attributes for species ‘zones’ and they lie ‘one-on-top-of-another’. For instance, many segments have attributes for both “Spawning Location” and “Major Spawning Location” within a species category (in existing FISS data). The hard copy maps are displaying only the former and not the latter where duplication exists. On the hard copy maps, the newly updated ‘FISS zone’ data is displayed as an offset on one side of the actual watercourse and the existing ‘FISS zone’ data is displayed as an opposite offset. The data is adequately displayed in the interactive online Atlas, however, because the species zones information can be turned ‘on’ and ‘off’ at the will of the user.

4 REFERENCES REVIEWED AND/OR CITED

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- Routledge, R. 2003. Juvenile sockeye salmon ecosystem research project in Rivers and Smith Inlets Report for 2002-3 Fiscal Year and Outlook for 2003-4. 9 pp.
- Rutherford, D and C. Wood. 2000. Assessment of Rivers and Smith Inlet Sockeye with commentary on small sockeye salmon stocks in Area 8. Can. Stk. Ass. Secretariat. 2000/162. (RSSEPS-15).
- Tredger, D. 1986. Nekite River chum spawning channel reconnaissance report. Ministry of Environment, Fisheries Improvement Unit File 0140-5. 75 pp.
- Whelen, M.A. and Assc. Ltd. 1999. Central coast overview fish and fish habitat inventory. Prepared for Sierra Club of B.C. 41 pp + appendices.

Appendix A: Metadata for Sensitive Habitat Survey of the Smith Inlet Basins

Title: Bcfshp_owik_cmn_project_area.shp
Description: Point theme representing the existing FISS fish distribution information for Owikeno and Smith Inlet Basins, downloaded for use in developing Rivers and Smith Salmon Ecosystems Planning Society Fish Distribution Atlas
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Point
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: bcfshp_owik.e00 , 10/31/05
Original Data Source: ftp://ftpfish.env.gov.bc.ca/pub/outgoing/fiss_events/fish_dist/eventarcs/r5/
Original Data Scale: 1:50,000
Updates/History/Corrections: file was imported in to ArcView and clipped to project area, Smith Inlet area appended 7/23/06
Accuracy: Unknown
Warning/Data Limitations: None
Comments: see text file 'fish_distribution_streams.txt for description

Title: Bcfshs_owik_cmn.shp
Description: mouth of fish bearing streams
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Point
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: Bcfshs_owik.shp, 10/31/05
Original Data Source: downloaded from
ftp://ftpfish.env.gov.bc.ca/pub/outgoing/fiss_events/fish_dist/eventarcs/r5/
Original Data Scale: 1:50,000
Updates/History/Corrections: file was imported in to ArcView clipped to project area, Smith Inlet area appended 7/23/06
Accuracy: Unknown
Warning/Data Limitations: None
Comments: see text file 'fish_distribution_streams.txt for description

Title: Bcfshz_owik_cmn_project_area.shp
Description: line theme representing the existing FISS fish distribution information for Owikeno Basin and Smith Inlet Basins, downloaded for use in developing Rivers and Smith Salmon Ecosystems Planning Society Fish Distribution Atlas
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Polyline
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: bcfshp_owik.e00 , 10/31/05
Original Data Source: ftp://ftpfish.env.gov.bc.ca/pub/outgoing/fiss_events/fish_dist/eventarcs/r5/
Original Data Scale: 1:50,000
Updates/History/Corrections: file was imported in to ArcView and clipped to project area, Smith Inlet area appended 7/23/06
Accuracy: Unknown
Warning/Data Limitations: None
Comments: see text file 'fish_distribution_streams.txt for description

Title: Fish_distribution_(new).shp
Description: NEW fish distribution theme representing segments of watercourses representing associated points captured in the CMN FISS database for Owikeno basin.
Creation Date: March 4, 2006
Produced By: Suzanne Richer
Data Type: Polyline
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: FISS_Entry_Tool_021406, 02/14/06
Original Data Source: Theme created using MapInfo and FISS_Entry_Tool_021406 database to produce lines
Original Data Scale: 1:50,000
Updates/History/Corrections: associated point data was appended as attributes
Accuracy: Unknown
Warning/Data Limitations: None
Comments: None

Title: Floodplain Rearing
Description: Floodplain and estuary rearing areas for salmon.
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Polygon
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: 1:50000 NTS Topographic contour images downloaded 08/02/06
Original Data Source: <http://toporama.cits.nrcan.gc.ca/>
Original Data Scale: 1:50,000
Updates/History/Corrections: images downloaded as gif files and converted to ecw for use in arcview, floodplain and estuary areas digitized by hand in ArcView and converted to Albers, Smith Inlet area appended 02/06/07
Accuracy: same as NTS topos
Warning/Data Limitations: None
Comments: <http://members.shaw.ca/pdops/toporama.html> has descriptions of how to convert Toporama images for use in GIS.

Title: Fshdistrjan2007.shp
Description: NEW fish distribution theme representing segments of watercourses representing associated points captured in the CMN FISS database for the Smith inlet area.
Creation Date: Feb 7, 2006
Produced By: Suzanne Richer
Data Type: Polyline
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: FISS_Entry_Tool_Violet, 01/25/07
Original Data Source: Theme created using MapInfo and FISS_Entry_Tool_Violet database to produce lines
Original Data Scale: 1:50,000
Updates/History/Corrections: associated point data was appended as attributes for the Smith inlet area
Accuracy: Unknown
Warning/Data Limitations: None
Comments: For Smith Inlet

Title: Lakes (50k)
Description: BC Watershed Atlas lakes theme clipped to project area
Creation Date: March 4, 2006
Produced By: Don Chamberlain

Data Type: Polygon
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: None
Original Data Source: ftp://ftp.elp.gov.bc.ca/dist/arcwhse/watershed_atlas/region5/owik/lwslowik.zip
Original Data Scale: 1:50,000
Updates/History/Corrections: data clipped to project area
Accuracy: see comments
Warning/Data Limitations: see comments
Comments: Source Metadata: TITLE : B.C. Wsd Atlas: Owikeno Lake Watershed Group-Rivers,Lakes,Wetlands+Man-made Waterbodies Layer

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Coastline Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Coastline
DESCRIPTION : Coastline extracted from the Parent Layer
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Zero Order Remnant Polygon Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY :
DESCRIPTION : Remnant polygons extracted from the parent layer that have no streams within them.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - 1st Order Remnant Polygon Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Ordered Watershed Layers
DESCRIPTION : Remnant polygons extracted from Parent layer that have only 1st order streams within them
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - 2nd Order Remnant Polygon Layer
WARNING : Provisional - errors may be detected

ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Ordered Watershed Layers
DESCRIPTION : Remnant Polygons extracted from the parent layer that have a maximum stream order of two
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP.
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - 3rd order Watershed Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Ordered Watershed Layers
DESCRIPTION : Watersheds extracted from the parent layer that have a maximum stream order of three
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MOELP
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - 4th Order Watershed Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Ordered Watershed Layers
DESCRIPTION : Watersheds extracted from the Parent layer that have a maximum stream order of four
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP.
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - 5th Order Watershed Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Ordered Watershed Layers
DESCRIPTION : Watersheds extracted from the Parent layer that have a maximum stream order of five.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP.
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Linear Boundaries Layer
WARNING : Provisional - errors may be detected

ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual.
REGISTRY :
DESCRIPTION : Linework for all the polygons extracted from the Parent Layer.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP.
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Parent Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec. Manual
REGISTRY : See BC Environment Data Registry under Combined Layers
DESCRIPTION : Contains all the spatial and attribute elements defining this Watershed Group.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

Title: lwsd_chuckw.shp
Description: Chuckwalla basin
Creation Date: March 4, 2006
Produced By: DOn Chamberlain
Data Type: Polygon
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: lwsdowik.e00, 20/10/05
Original Data Source: ftp://ftp.elp.gov.bc.ca/dist/arcwhse/watershed_atlas/region5/owik/lwsdowik.zip
Original Data Scale: 1:50,000
Updates/History/Corrections: Chuckwalla sub-basin merged and exported as new file
Accuracy: see comments
Warning/Data Limitations: see comments
Comments: source metadata : TITLE : B.C. Watershed Atlas : Owikeno Lake Watershed Group - Watershed Layer

Title: lwsd_kilb.shp
Description: Kilbella basin
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Polygon
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: lwsdowik.e00, 20/10/05
Original Data Source: ftp://ftp.elp.gov.bc.ca/dist/arcwhse/watershed_atlas/region5/owik/lwsdowik.zip
Original Data Scale: 1:50,000
Updates/History/Corrections: Kilbella sub-basin merged and exported as new file
Accuracy: see comments
Warning/Data Limitations: see comments
Comments: source metadata : TITLE : B.C. Watershed Atlas : Owikeno Lake Watershed Group - Watershed Layer

Title: lwsd_wannock.shp
Description: Wannock basin
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Polygon
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: lwsdowik.e00, 20/10/05
Original Data Source: ftp://ftp.elp.gov.bc.ca/dist/arcwhse/watershed_atlas/region5/owik/lwsdowik.zip
Original Data Scale: 1:50,000
Updates/History/Corrections: Wannock sub-basin merged and exported as new file
Accuracy: see comments
Warning/Data Limitations: see comments
Comments: source metadata : TITLE : B.C. Watershed Atlas : Owikeno Lake Watershed Group - Watershed Layer

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Watershed Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Watershed Layer
DESCRIPTION : 3rd order watersheds and higher extracted from Parent Layer, and summary table of water features.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP.
TECH_NOTES :
ORACLE_NOTES :

Title: Lwsg_bc_ccoast.shp
Description: Watershed Atlas of BC Watershed Groups for Central Coast
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Polygon
Projection: Universal Transverse Mercator - Zone 10
Datum: North American Datum 1983
Starting Product and Date: lwsg_bc.e00
Original Data Source: ftp://ftp.elp.gov.bc.ca/dist/arcwhse/watershed_atlas/watershed_groups/
Original Data Scale: 1:50,000
Updates/History/Corrections: clipped for showing central coast area
Accuracy: Unknown
Warning/Data Limitations: None
Comments: TITLE : Watershed Groups of B.C.

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Watershed Group Boundary Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec. Manual
REGISTRY : See BC Environment Data Registry under Combined Layers
DESCRIPTION : Contains the polygon(s) defining the extent of this Watershed Group.

SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Wsd Atlas: Niel Creek Watershed Group-Rivers,Lakes,Wetlands+Man-made Waterbodies Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual.
REGISTRY : See BC Environment Data Registry under Rivers, Lakes, Wetlands and Man-made Waterbodies
DESCRIPTION : This layer contains Rivers, Lakes, Wetlands and Man-made waterbody Features.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP.
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Point Features Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec. Manual
REGISTRY : See BC Environment Data Registry under Combined Layers
DESCRIPTION : Contains all the point features for this Watershed Group.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Stream Network Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE : BL Routes built on 99-03-11.05:14:22.Thu
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Stream Network Layer
DESCRIPTION : Stream flow network. Routes have been built from this layer.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

TITLE : B.C. Watershed Atlas : Niel Creek Watershed Group - Text Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Fri Feb 26 14:01:17 PST 1999
MODIFIED_DATE :
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual.
REGISTRY : See BC Environment Data Registry under Watershed Annotation
DESCRIPTION : Annotation for aquatic features

SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

Title: Map_plots.shp
Description: grid showing maps 1-4 as plot areas
Creation Date: July 23, 2006
Produced By: Don Chamberlain
Data Type: Polygon
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: digitized by hand in arcview
Original Data Source: N/A
Original Data Scale: 1:50,000
Updates/History/Corrections: None
Accuracy: Unknown
Warning/Data Limitations: None
Comments: None

Title: New_points_07_albers_4.shp
Description: Point theme representing the fish distribution information for Rivers and Smith Inlet and entered into Community Mapping Network FISS Data entry database for Rivers and Smith Salmon Ecosystems Planning Society
Creation Date: Feb 6, 2007
Produced By: Don Chamberlain
Data Type: Point
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: FISS_Entry_Tool_Violet, obtained 01/25/07
Original Data Source: database obtained from Suzanne Richer, GIS coordinator for Community Mapping Network <www.shim.bc.ca>
Original Data Scale: 1:50,000
Updates/History/Corrections: event tables were created by sql connection to database and joined to produce one table with UTM coordinate data used as georeferencing to create an event theme. Theme was converted to Albers (BC) to display with other data.
Accuracy: Unknown
Warning/Data Limitations: Data was digitized online using CMN's FISS data entry tool and therefore points are not exactly positioned on top of corresponding BC Watershed Atlas data.
Comments: None

Title: New_points_albers_2.shp
Description: Point theme representing the fish distribution information for Owikeno Basin, entered into Community Mapping Network FISS Data entry database for Rivers and Smith Salmon Ecosystems Planning Society
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Point
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: FISS_Entry_Tool_02_14_06, obtained 02/14/06
Original Data Source: database obtained from Suzanne Richer, GIS coordinator for Community Mapping Network <www.shim.bc.ca>
Original Data Scale: 1:50,000
Updates/History/Corrections: event tables were created by sql connection to database and joined to produce one table with UTM coordinate data used as georeferencing to create an event theme. Theme was converted to Albers (BC) to display with other data.

Accuracy: Unknown

Warning/Data Limitations: Data was digitized online using CMN's FISS data entry tool and therefore points are not exactly positioned on top of corresponding BC Watershed Atlas data.

Comments: None

TITLE : Provincial Administrative Boundry and Coastline
ACCURACY : admin bounds drawn using boundry monuments; coast: 68% data meets 125-250m horizontal positional accuracy
DESCRIPTION : International and interprovincial boundry and coastline for BC
SOURCE : Surveyor General Branch 1992 Survey Control (admin. bounds); NTS (coastline)
REGISTRY :
http://www.elp.gov.bc.ca:8000/dr_pub_prod/owa/drwp_info_source_dtls.display?forinfosrceid
PRODUCTION_DATE : December 1995
MODIFIED : 02/2000 - Scott MacKinnon (MELP ISB) - Added arcs to allow colour filling of Pacific in GOAT.
MODIFIED : Arcs added for Washington coast and San Juan Islands also for colour filling the Pacific.
WARNING : Source of data for Washington coast and San Juan Islands is

TITLE : Provincial Glacier and Water Features
ACCURACY : 68% data meets 125-250m horizontal positional accuracy
DESCRIPTION : Lakes, Double-line rivers, Wetlands and Glaciers
SOURCE : National Topographic Series, (1:250K)
HISTORY : Result of union between qrlw_bc and qglc_bc
PRODUCTION DATE : February 1996
HISTORY : Used procedure on WWW to preserve arc attributes through overlay
MODIFIED : 20-Jul-99 (Nick Zukanovic, ISB): Corrected boundary of Cultus Lake (092G)

TITLE : Provincial Water Features - Rivers, Lakes and Wetlands
ACCURACY : 68% data meets 125-250m horizontal positional accuracy
DESCRIPTION : lakes, double-sided rivers, wetlands and their islands
SOURCE : National Topographic Series (plus north/south admin. bounds from Surveyor General 1992 Survey Control)
REGISTRY : BC Data Registry - NTS rivers lakes and wetlands
WARNING :
PRODUCTION_DATE : January 1996
MODIFIED : 01/96 (SSB). Polygon fcodes added and topology built.
MODIFIED : 08-Oct-96 (SSB) Fcode XX00000000 assigned to polygons with no fcode.
MODIFIED : 07-Nov-96 (SSB): Used unsplit command for polygons based on fcode
MODIFIED : 20-Jul-99 (Nick Zukanovic, ISB): Corrected boundary of Cultus Lake (092G)

Title: Rivers (50k)
Description: BC Watershed Atlas rivers theme clipped to project area
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Polyline
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: None
Original Data Source: ftp://ftp.elp.gov.bc.ca/dist/arcwhse/watershed_atlas/region5/owik/lwssowik.zip
Original Data Scale: 1:50,000
Updates/History/Corrections: data clipped to project area
Accuracy: see comments
Warning/Data Limitations: see comments

Comments: Source Metadata: TITLE : B.C. Watershed Atlas : Owikeno Lake Watershed Group - Stream Network Layer
WARNING : Provisional - errors may be detected
ACCURACY :
PRODUCTION_DATE : Tue Apr 20 22:40:33 PDT 1999
MODIFIED_DATE : BL Routes built on 99-04-21.11:11:19.Wed
RESOLUTION : Captured from 1:50000 NTS Mapsheets. See Geomatics Canada - NTS Database Standards and Spec Manual
REGISTRY : See BC Environment Data Registry under Stream Network Layer
DESCRIPTION : Stream flow network. Routes have been built from this layer.
SOURCE : Inventory and Data Systems Section of the Fisheries Branch - BC MELP
TECH_NOTES :
ORACLE_NOTES :

Title: Shoreline_features.shp
Description: Shoreline fish distribution theme representing segments of shoreline with associated points captured in the CMN FISS database.
Creation Date: March 4, 2006
Produced By: Don Chamberlain
Data Type: Polyline
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: FISS_Entry_Tool_021406, 02/14/06
Original Data Source: digitized by hand in ArcView using data from 'New_points_albers_2.shp' displaying 'U' (upstream) and 'D' (downstream) points as references
Original Data Scale: 1:50,000
Updates/History/Corrections: associated point data was appended as attributes, Smith Inlet area appended 02/06/07
Accuracy: Unknown
Warning/Data Limitations: None
Comments: None

Title: Sidechannels.shp
Description: Sidechannel rearing areas for salmon in Nekite River.
Creation Date: Feb 6, 2007
Produced By: Don Chamberlain
Data Type: Polyline
Projection: BC Albers Equal Area
Datum: North American Datum 1983
Starting Product and Date: 1:50000 NTS Topographic contour images downloaded 08/02/06
Original Data Source: <http://toporama.cits.nrcan.gc.ca/>
Original Data Scale: 1:50,000
Updates/History/Corrections: images downloaded as gif files and converted to ecw for use in arcview, sidechannels digitized by hand (based on sketches made on hard copy maps) in ArcView and converted to Albers
Accuracy: Unknown
Warning/Data Limitations: N/A
Comments: