



2020 Annual Knowledge Plan

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for the Skeena Knowledge Trust

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Executive Summary

The Skeena Knowledge Trust (SKT) is a purpose trust and registered charity dedicated to the preservation and dissemination of information related to salmon and salmon ecosystems within the Skeena River watershed and estuary. The SKT has developed two online tools, the Skeena Salmon Data Centre (SSDC) and the Skeena Maps Portal (SMP), which serve to store, manage, and promote sharing of information related to salmon and salmon habitat within the Skeena River watershed. The SMP is specific to spatial/geographical data, and offers additional functionality related to displaying and exploring spatial data and maps.

The SKT Annual Knowledge Plan (AKP) is prepared every year to identify current and upcoming high-priority items and direct information collection efforts for materials uploaded and hosted on the SSDC and SMP. The AKP development is carried out within the framework provided by the SKT trust agreement, which ensures the information being preserved and shared is unbiased, credible, impactful, and relevant.

On a regional level the SKT AKP framework reflects the various objectives tied to regional land use plans including First Nations land use plans and salmon recovery plans. Nationally, the SKT is guided by Canada's Wild Salmon Policy, and on an international level, the SKT aims to incorporate the Open Standards for the Practice of Conservation (OSPC) as they apply to the Skeena Watershed.

Information priorities for 2020 were identified based on a scan of current and proposed activities within the Skeena watershed, research objectives and findings, input from trustees and stakeholders, a review of the 2019 AKP and current database contents, and public interest (estimated through SSDC visitor traffic). The SKT information priorities are organized by salmon-related objective classes as they relate to the OSPC direct threats classification and further expanded upon based on their relevance to Canada's Wild Salmon Policy as well as regional and sub-regional land use plans built into the AKP framework.

A priority list of information projects was prepared by ranking existing information sources by objective class, value for assessing risk to an objective, and relative cost as per the AKP framework. Individual datasets within the prioritized information projects will be evaluated for relevance to Skeena salmon, credibility, and clarity of presentation as they are acquired.

High priority objective classes and related threats for 2020 include:

- Wild salmon populations
 - Harvesting pressure
 - Climate change
- Wild salmon habitat
 - Development within the Skeena River estuary
 - Climate change

- Hydroriparian ecosystem integrity
 - Land use activities (forestry, agriculture, energy production, mining)
 - Transportation corridors
 - Impacts from recent wildfires within the Skeena River watershed
- Water quality
 - Pollution
 - Climate change (i.e. temperature)
- Salmon fisheries
 - Harvesting pressure

Additional research effort will be allocated towards those categories currently under-represented in the SSDC (i.e. salmon recovery plans, red-listed sockeye assessments, climate change, energy and mining, agriculture and aquaculture, residential and commercial development, pollution, transportation corridors, and wildfire impacts), information on under-represented areas (e.g. Sustut, Zymoetz, Kispiox and Lakelse sub-basins), real-time population (escapement) data, and additional steelhead assessments.

In addition to data acquisition and curation, SKT activities for 2020 are anticipated to include ongoing trust governance, financial management and reporting, operations, community engagement, content and material development, educational activities, and technical infrastructure, maintenance, and development.

In order to increase awareness of the availability of the SSDC and SMP as sources of information on Skeena salmon, as well as a means for data management and preservation, the SKT will continue to deliver workshops and presentations to stakeholders and members of the public throughout the Skeena watershed. The workshops will serve to educate users on how to leverage the SSDC and SMP for their information needs, facilitate connection with new potential users, and identify new sources of information. The focus of 2020 will be building relationships with existing watershed stewardship and conservation groups, extending awareness of the SKT within coastal communities, and promoting data collection and citizen science initiatives through the Water Rangers program.

Data visualizations and information summaries will be developed in order to provide an interactive, user-friendly platform from which visitors may explore available information specific to a particular area or watershed, presented in a non-technical format. The objective of the visualizations is to improve the reach and accessibility of information, provide support to watershed stewardship groups, and raise awareness about the condition of particular Skeena sub-watersheds.

Skeena Knowledge Trust 2020 Annual Knowledge Plan

1.0 Introduction

The Skeena Knowledge Trust (SKT) is a purpose trust and registered charity dedicated to the preservation and dissemination of information related to salmon and salmon ecosystems within the Skeena River watershed and estuary. In order to ensure highly impactful and relevant information is being preserved and shared, an Annual Knowledge Plan (AKP) is prepared every year to identify current and upcoming high-priority items and direct information collection efforts. This document and appendices comprise the SKT AKP for 2020.

2.0 Background

The SKT was formed in September 2017 following a multi-year collaboration between the Bulkley Valley Centre for Natural Resource Research and Management Society, the Wet'suwet'en Treaty Office Society, SkeenaWild Conservation Trust, and the Pacific Salmon Foundation to address the need for greater knowledge management and more informed decision-making pertaining to salmon and salmon habitat within the Skeena River watershed and estuary. A trust model was adopted as the governing framework, as it provides the necessary structure to ensure high quality, unbiased data is gathered, stored, and disseminated in an objective and impartial manner. This level of data governance was considered to be essential in order for the SKT to become a trusted source of data for local First Nations, community members, and decision makers.

The purpose of the SKT as defined in Section 4.1 of the trust agreement¹ is the advancement of public education and other purposes beneficial to the community by educating the public on the wild salmon populations, their genetic diversity, and their ocean and freshwater habitats in the Skeena Watershed and Ocean Approaches, and the implementation and effectiveness of broadly supported plans and policies by collecting and disseminating information on such populations and habitats, through the decision-making procedures set out in the Annual Knowledge Plan Process (Schedule "C" of the trust agreement, SKT 2017).

¹ The Skeena Knowledge Trust agreement is accessible at <https://data.skeenasalmon.info/dataset/skt-trust-agreement-documents>

3.0 Objective

The objective of the 2020 AKP is to establish a data and knowledge acquisition, compilation, and communication plan for 2020 in order to direct information collection and dissemination efforts and further public education on wild salmon and salmon ecosystems within the Skeena river watershed and estuary.

4.0 Accessibility

In order to maximize the accessibility of data relevant to Skeena salmon, the SKT has developed two principal tools to store and deliver information. The Skeena Salmon Data Centre (SSDC, <https://data.skeenasalmon.info/>) is a publicly-accessible, online data warehouse and library based on open-source CKAN software, and provides users with access to a comprehensive collection of relevant reports, data, and spatial files. The Skeena Maps Portal (SMP, <http://maps.skeenasalmon.info/>) is an interactive mapping tool developed based on an open-source GeoNode platform, and allows users to search, view, and download spatial files, as well as create maps.

5.0 Annual Knowledge Plan Development

The information uploaded to the SSDC and SMP is guided by the AKP, which incorporates international, national, and regional conservation policies and guidelines. On a regional level the SKT AKP framework reflects the various objectives tied to regional land use plans including First Nations land use plans and salmon recovery plans. Nationally, the SKT is guided by Canada's Wild Salmon Policy, specifically Strategy 2 (Assessment of Habitat Status) and Strategy 3 (Inclusion of Ecosystem Values and Monitoring) (Fisheries and Oceans Canada, 2005). On an international level, the SKT aims to incorporate the Open Standards for the Practice of Conservation (OSPC) as it applies to the Skeena Watershed.

5.1 Review of framework

The framework for the development of the SKT AKP is outlined by the Skeena Knowledge Trust Agreement Schedule "C" (SKT, 2017) and is summarized in Appendix A. The SKT AKP consists of three components:

- Information management framework;
- Explicit prioritising process; and
- Priority list of information for the year.

No changes were made to the information management framework or the explicit prioritising process from 2019 to 2020.

5.2 Priority setting process

Information priorities for 2020 were identified based on a scan of current and proposed activities within the Skeena watershed, research objectives and findings, input from trustees and stakeholders, a review of the 2019 AKP and current database contents, and public interest (estimated through SSDC visitor traffic). The SKT information priorities are organized by salmon-related objective classes as they relate to the OSPC direct threats classification and further expanded upon based on their relevance to Canada's Wild Salmon Policy as well as regional and sub-regional land use plans built into the AKP framework. Additional discussion of priority objective identification is included as Appendix B.

5.3 Database traffic report

Generalized information on visitor location and page views for the SSDC for 2019 was compiled in order to identify which data sets users were most interested in. Findings indicate the majority of visitors were from Smithers and Vancouver, with smaller numbers of visitors from all over the world. The most popular datasets included the SKT trust agreement, information on fish passage, fish habitat, habitat restoration, and water quality in the Bulkley River watershed, the Morice Land and Resource Management Plan, and steelhead assessments, among others. Detailed results of the database traffic report are included in Appendix C.

5.4 Database contents summary and gap analysis

High-level reviews of the content housed in the SSDC and SMP as of December 2019 were completed in order to assess whether priorities identified in the 2019 AKP were addressed and identify gaps for integration into the 2020 AKP.

5.4.1 Skeena Salmon Data Centre

Datasets on the SSDC as of December 2019 were assessed by geographic distribution, date published, and 2019 AKP knowledge item using tags and categories. Results of the SSDC content review are included in Appendix D and summarized below:

- 319 datasets were added to the SSDC over 2019 across all categories to bring the total number of datasets housed on the SSDC to 895
- The majority of the datasets contain information pertaining to the Bulkley River, and Lower, Middle, and Upper Skeena sub-basins
- Most of the reports and data were published in the 1990s, 2000s, and 2010s
- Well-represented knowledge items included watershed assessment reports, land use plans, water quality and quantity reports, fish passage assessments, salmon populations and genetics, escapement data, impacts of rangeland, and stream crossings and sedimentation data

- Under-represented knowledge items include salmon recovery plans, red-listed sockeye assessments, climate change, energy and mining, agriculture and aquaculture, residential and commercial development, pollution, transportation corridors, and wildfire impacts

While the disparity between certain knowledge items is largely reflective of the availability of information relating to each topic, the SSDC contents review assists in identifying areas with scarce information and ensures research effort continues to be applied to those areas.

5.4.2 Skeena Maps Portal

An additional 55 spatial layers and 23 maps were added to the SMP over 2019, bringing up the totals to 173 layers and 56 maps housed on the SMP. The majority of the spatial layers consist of base map and infrastructure information (Figure 1), but a number of customized layers were added and link back to datasets on the SSDC.

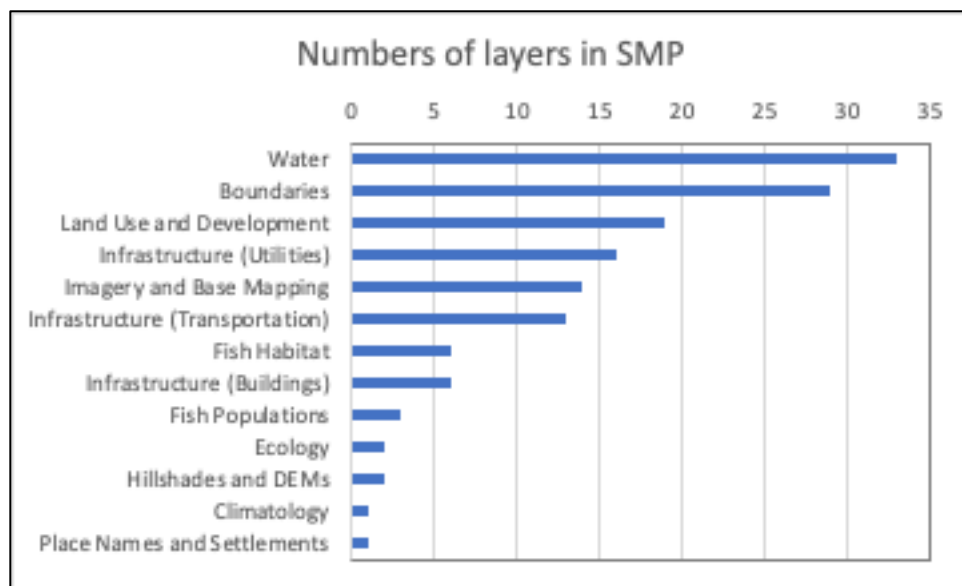


Figure 2: Data layers on the Skeena Maps Portal by category

6.0 Results of the 2020 Annual Knowledge Plan Process

High-priority objective classes and related threats identified for 2020 are summarized in Table 1. Related OPSC threats are discussed in further detail in Appendix B.

A priority list of information projects was prepared by ranking existing information sources by objective class, value for assessing risk to an objective, and relative cost as per the AKP framework (Appendix A) and is presented in the following Table 2. Individual datasets within the prioritized information projects will be evaluated for relevance to Skeena salmon, credibility, and clarity of presentation as they are acquired.

Additional research effort will be allocated towards those categories currently under-represented in the SSDC (i.e. salmon recovery plans, red-listed sockeye assessments, climate change, energy and mining, agriculture and aquaculture, residential and commercial development, pollution, transportation corridors, and wildfire impacts), information on under-represented areas (e.g. Sustut, Zymoetz, Kispiox and Lakelse sub-basins), real-time population (escapement) data, as well as additional steelhead assessments.

Table 1: High-priority objective classes and related threats

SKT AKP Objective Class	Related Threat	SSDC Category	OSPC Threat Class
Wild salmon populations	<ul style="list-style-type: none"> • Harvesting pressure • Climate change • Disease transfer 	<ul style="list-style-type: none"> • Populations • Climatology 	<ul style="list-style-type: none"> • Threat 5 • Threat 11 • Threat 2
Wild salmon habitat	<ul style="list-style-type: none"> • Development within the Skeena River estuary • Climate change 	<ul style="list-style-type: none"> • Habitat • Land use and development • Infrastructure 	<ul style="list-style-type: none"> • Threat 1 • Threat 2 • Threat 3 • Threat 4 • Threat 7 • Threat 11
Hydroriparian ecosystem integrity	<ul style="list-style-type: none"> • Land use activities (forestry, agriculture, energy production, mining) • Transportation corridors • Impacts from recent wildfires within the Skeena River watershed 	<ul style="list-style-type: none"> • Land use and development • Infrastructure • Ecology/vegetation 	<ul style="list-style-type: none"> • Threat 1 • Threat 2 • Threat 3 • Threat 4 • Threat 7
Water quality	<ul style="list-style-type: none"> • Pollution and sedimentation from land use activities (forestry, agriculture, energy production, mining) • Climate change (i.e. temperature) 	<ul style="list-style-type: none"> • Water quality and quantity 	<ul style="list-style-type: none"> • Threat 3 • Threat 4 • Threat 7 • Threat 9 • Threat 11
Salmon fisheries management	<ul style="list-style-type: none"> • Harvesting pressure 	<ul style="list-style-type: none"> • Populations 	<ul style="list-style-type: none"> • Threat 5

Table 2: 2020 priority list of information projects

Knowledge Item	Q1	Objectives ¹							Q2			Q3	Q4		Cost Estimate Ranking	Calculated Rank	Specific Funding Allocations	
	Is knowledge item an existing current assessment?	Habitat	Populations	Ecology/ Vegetation	Water Quality & Quantity	Climatology	Land Use & Development	Infrastructure	Spatial Data	Is knowledge referenced in an existing and current assessment?	Does assessment rank knowledge as high priority due to high risk?	Does assessment rank knowledge as moderate priority?	Does knowledge relate an objective to an indicator ² ?	Does knowledge provide current or historical status of objective?				Does knowledge provide value of an indicator?
Assessment Reports																		
Watershed Assessment Reports including Fisheries Sensitive Watersheds, Salmon Habitat Assessments, Aquatic Reviews)	Yes															Low	HP	
Land Use Plans	Yes	All Assessment Reports are considered a High Priority to include in the SSDC.													Low	HP		
Salmon Recovery Plans	Yes														Low	HP		
Water Quality/Quantity Reports	Yes														Low	HP		
Fish Passage/Culvert Assessments	Yes														Low	HP		
IUCN Red Listed Sockeye Assessments	Yes														Low	HP		
Knowledge Items																		
Populations																		
Salmon Population Status		x							Yes	Yes						Low	HP	
Escapement Data		x							Yes	Yes						Low	HP	
DFO Research/Other research on salmon populations and genetics		x							Yes	Yes						Low	HP	
Reconstructed cannery reports (Shepherd)		x							No			No	Yes		Low	MP		
Alaskan harvest of Skeena salmon		x							No			Yes			Low	HP		
Historical DFO Reports		x							Yes						High	HP with specific budget item approval		

Knowledge Item	Q1	Objectives ¹								Q2			Q3	Q4			Cost Estimate Ranking	Calculated Rank	Specific Funding Allocations
	Is knowledge item an existing current assessment?	Habitat	Populations	Ecology/Vegetation	Water Quality & Quantity	Climatology	Land Use & Development	Infrastructure	Spatial Data	Is knowledge referenced in an existing and current assessment?	Does assessment rank knowledge as high priority due to high risk?	Does assessment rank knowledge as moderate priority?	Does knowledge relate an objective to an indicator ² ?	Does knowledge provide current or historical status of objective?	Does knowledge provide value of an indicator?				
Climate Change																			
NOAA						x				Yes	Yes					Low	HP		
Climate WNA at Uvic						x				Yes	Yes					Low	HP		
BC MOE (V. Foorde)						x				Yes	Yes					Low	HP		
seatemperature.org						x				No			No	No	Yes	Low	MP		
Dan Selby (Babine Lake)						x				Yes	Yes					Low	HP		
Kitimat-Stikine Climate Model						x				Yes	Yes					Low	?		
J of Climate Change						x										Low	?		
Forestry Activities																			
Kispiox TSR review reports																			
Stream sedimentation reports		x			x					No			Yes			Low	HP		
Stream crossing reports/data		x		x	x		x		x	No			Yes			Low	HP		
Road GIS data					x		x	x	x	No			No	Yes		Low	MP		
Energy Production and Mining																			
Telkwa Coal Mine - past and present information					x		x			Yes	No	No	No	Yes		Low	MP		
Equity Silver Mine					x		x			Yes	No	No	No	Yes		Low	MP		
Morrison Mine					x		x			Yes	Yes					Low	HP		
Silver Queen proposed mine					x		x			Yes	No	No	No	Yes		Low	MP		
Upper Skeena coal proposals					x		x			No			No	No	Yes	Low	MP		
Upper Bulkley Nadina Community Futures Library		x	x	x	x		x		x	Yes	Yes					High	HP		
Infrastructure GIS Data		x					x	x	x	Yes						Moderate	HP	MWMT/SkeenaWild	
Agriculture and Aquaculture																			
Disease transfer from Atlantic to Pacific salmon			x							No			No	Yes		Low	HP		
Agricultural impacts to salmon habitat within Upper Bulkley including water allocation		x		x	x		x			Yes	Yes					Low	HP		
Rangelands and riparian impacts on salmon habitat		x		x	x		x			Yes	Yes					Low	HP		

Knowledge Item	Q1	Objectives ¹								Q2			Q3	Q4		Cost Estimate Ranking	Calculated Rank	Specific Funding Allocations
	Is knowledge item an existing current assessment?	Habitat	Populations	Ecology/ Vegetation	Water Quality & Quantity	Climatology	Land Use & Development	Infrastructure	Spatial Data	Is knowledge referenced in an existing and current assessment?	Does assessment rank knowledge as high priority due to high risk?	Does assessment rank knowledge as moderate priority?	Does knowledge relate an objective to an indicator ² ?	Does knowledge provide current or historical status of objective?	Does knowledge provide value of an indicator?			
Residential and Commercial Development																		
Development focused on Lelu island/Flora Bank		x	x	x			x	x		Yes	Yes					Low	HP	
Prince Rupert bulk liquids tank storage and marine export facility		x	x		x		x	x		No	Yes		No	No	No	Low	MP	
Pollution																		
Pesticide treatments along rail line adjacent to Skeena River and tributaries		x					x	x		No			No	No	Yes	Low	MP	
Fire retardant in wildfire areas					x					No	No	No	No	No	No	Low	LP	
Transportation and Service Corridors																		
Chevron Pacific Trail Pipeline/Kitimat LNG		x					x	x	x	Yes	No	Yes				Low	MP	
Transcanada Prince Rupert Gas Transmission Project		x					x	x	x	Yes	Yes					Low	HP	
TransCanada Coastal GasLink /LNG Canada		x					x	x	x	Yes	No	Yes				Low	MP	
PNG Looping Project		x					x	x	x	No	No	Yes				Low	MP	
Enbridge Westcoast Connector Gas Transmission Project		x					x	x	x	No	No	Yes				Low	MP	
Wildfires																		
Research or assessment reports relating to the impact of wildfires on aquatic habitat		x		x	x					No	No	Yes	Yes			Low	MP	
Fire perimeter GIS data		x		x	x				x	No	No	Yes	No			Low	MP	
Multiple Categories																		
ESI Tier 1 Fish and Fish Habitat Report		x		x			x		x	No	No	Yes	No	Yes		Low	HP	
ESI Tier 1 Wetland Report		x		x			x		x	No	No	Yes	No	Yes		Low	HP	

¹ Skeena Knowledge Trust Objectives

² Pressure indicators

7.0 Skeena Knowledge Trust Proposed Activities for 2020

A budget was established by the Skeena Knowledge Trust trustees for 2020 in support of the following activities:

7.1 Governance

The SKT is governed by a board of five trustees with assistance from a legal advisor. The board meets quarterly to approve the operating budget and AKP, oversee administration, and provide direction for activities and resource allocation. SKT activities and administration services are carried out under contract.

7.2 Finance

Day-to-day bookkeeping services and budget tracking are provided by the primary contractor, with financial reporting completed by an independent registered accountant. Grant writing and funding diversification are also carried out by the primary contractor with input and guidance from the trustees.

7.3 Direct expenses

Direct expenses for SKT operations include office space rental, utilities, training/conferences, computer equipment purchase.

7.4 Community engagement

7.4.1 Workshops and presentations

In order to increase awareness of the availability of the SSDC and SMP as sources of information on Skeena salmon, as well as a means for data management and preservation, the SKT will continue to deliver workshops and presentations to stakeholders and members of the public throughout the Skeena watershed. The workshops will serve to educate users on how to leverage the SSDC and SMP for their information needs, facilitate connection with new potential users, and identify new sources of information. The focus of 2020 will be building relationships with existing watershed stewardship and conservation groups, extending awareness of the SKT within coastal communities, and promoting data collection and citizen science initiatives through the Water Rangers program.

7.4.2 General communications

New information projects will be publicly accessible on the SSDC and SMP. Social media platforms and the main SKT website will be used to promote releases. An informational brochure and press release will be prepared in conjunction with the workshop delivery, and the annual year in review publication will be prepared at the end of 2020.

7.5 Content and Material Development

7.5.1 Visualizations

The development of data visualization and information summaries was initiated in response to feedback from users who felt overwhelmed by the large number of datasets in the SSDC, the majority of which are currently in the form of technical PDF reports. The visualizations will provide an interactive, user-friendly platform from which visitors may explore available information specific to a particular area or watershed, presented in a non-technical format. The objective of the visualizations is to improve the reach and accessibility of information, provide support to watershed stewardship groups, and raise awareness about the condition of particular Skeena sub-watersheds.

7.5.2 User self-help tools

User self-help tools include help pages and educational materials developed in order to provide guidance to SSDC and SMP users on how to use the tools to search, filter, and access information as well as display and explore datasets in the case of the SMP. The production of short instructional videos and webinars to supplement written materials is planned for 2020.

7.6 Data Acquisition and Curation

High priority information identified in Section 6.0 and Table 2 will be researched and uploaded into the SSDC and SMP first, followed by medium priority and low priority items as resources allow.

7.7 Educational Direct Expenses

Educational direct expenses are related to the delivery of workshops and include funds for Water Rangers kits, travel expenses, donations/honorariums, and meeting expenses such as venue rentals and refreshments.

7.8 Technical Infrastructure

Technical infrastructure expenses refer to the ongoing costs and subscriptions required to support the SSDC and SMP such as cloud storage, domain maintenance, etc.

7.9 Technical Maintenance

Ongoing technical maintenance is required to ensure the SSDC and SMP are maintained and reset as necessary following outages, and that requests from users for technical support are fulfilled in a timely manner.

7.10 Technical Development

Technical development consists of system upgrades and additions of new features and enhancements to the SSDC and the SMP. A major upgrade was completed for the SMP in 2019, and additional enhancements for the SSDC are anticipated for 2020 subject to funding.

8.0 Evaluation and Reporting

A summary of data acquisition and curated information, financial reporting, and activities report will be prepared after the SKT year end of December 31st and presented to the trustees for review.

9.0 References

Fisheries and Oceans Canada. 2005. Canada's Policy for Conservation of Wild Pacific Salmon DFO. 49p. Retrieved from <http://waves-vagues.dfo-mpo.gc.ca/Library/315577.pdf>.

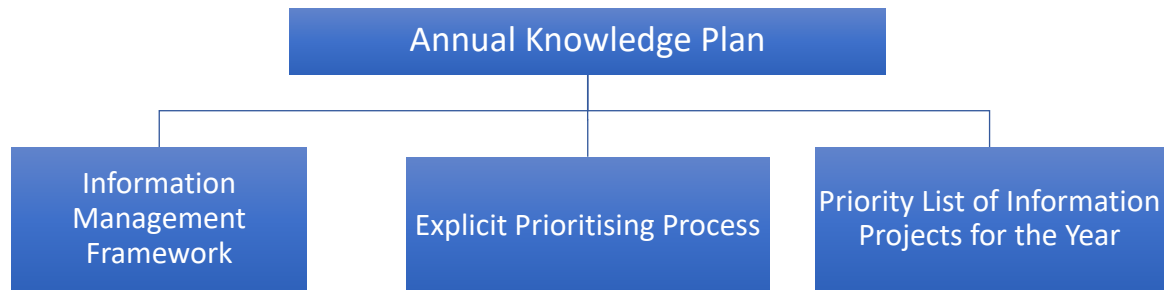
Skeena Knowledge Trust. 2017. Skeena Knowledge Trust Agreement. Retrieved from <https://data.skeenasalmon.info/dataset/skt-trust-agreement-documents>.

APPENDIX A

Annual Knowledge Plan Framework

Annual Knowledge Plan Framework

The framework for the Skeena Knowledge Trust Annual Knowledge Plan is outlined by the Skeena Knowledge Trust Agreement Schedule “C” (SKT, 2017) and consists of the following components:



1.0 Information Management Framework

The information management framework consists of the following (summarized from Schedule ‘C’ Part 4a of the Trust Agreement):

- 1) A list of salmonid policy documents, provincial land-use plans and First Nations land-use plans that apply to the Skeena Watershed and Ocean Approaches and that have demonstrated broad support from the affected public;
- 2) A compilation of salmon-related objectives from the plans and policies organized into the following objective classes:
 - a. maintain wild salmon populations;
 - b. maintain wild salmon genetic diversity;
 - c. for all salmon life stages, maintain habitat in:
 - i. the ocean;
 - ii. the estuary;
 - iii. freshwater;
 - d. maintain hydroriparian ecosystem integrity;
 - e. maintain hydrology (water quantity);
 - f. maintain water quality, including:
 - i. chemistry
 - ii. sedimentation
 - iii. temperature
 - g. manage salmon fisheries for sustainable benefits.
- 3) Relevant pressure indicators of management activities (Table 1); and
- 4) Relevant geographic areas (shown in Schedule ‘A’ of the Trust Agreement).

The identified objective classes have been distilled into the following topics for the purposes of information prioritization and data management:

- **Habitat** (objective c)
- **Populations** (objectives a, b and g)
- **Ecology/Vegetation** (objective d)
- **Water quality and quantity** (objectives e and f)
- **Climatology** (relates to objectives c and f)
- **Land use and development** (relates to objectives c, d, e and f)
- **Infrastructure** (relates to objectives c, d, and f)
- **Spatial data** (may be related to any objective, has specific data management requirements)

Indicators used by the SKT information management framework comprise the pressure indicators of management activities developed in support of Canada’s Policy for Conservation of Wild Pacific Salmon (Fisheries and Oceans Canada, 2005) by Stalberg et al. (2009) presented in Table 1.

Table A3: Refined indicator list (Table 3.4 from Stalberg et al., 2009)

Habitat Type	Indicator Type	Indicator
Stream	Pressure	Total land cover alterations
Stream	Pressure	Watershed road development
Stream	Pressure	Water extraction
Stream	Pressure	Riparian disturbance
Stream	Pressure	Permitted waste management discharges
Stream	State	Suspended sediment
Stream	State	Water Quality
Stream	State	Water temperature: juvenile rearing – stream resident species
Stream	State	Water temperature: migration and spawning – all species
Stream	State	Stream discharge
Stream	Quantity	Accessible stream length based on barriers
Stream	Quantity	Key spawning areas (length)
Lake	Pressure	Total land cover alteration
Lake	Pressure	Watershed: road development
Lake	Pressure	Riparian disturbance
Lake	Pressure	Permitted waste management discharges
Lake	State for sockeye lakes	Coldwater refuge zone
Lake	State for sockeye lakes	Lake productive capacity
Lake	Quantity	Lake shore spawning area (length)
Estuary	Pressure	Marine vessel traffic
Estuary	Pressure	Estuary habitat disturbance
Estuary	Pressure	Permitted waste management discharges
Estuary	State	Estuary chemistry and contaminants (e.g. Nitrogen (N), Phosphorus (P), N:P, Metals, Polycyclic Aromatic Hydrocarbons & PCBs)
Estuary	State	Estuary dissolved oxygen
Estuary	Quantity	Estuarine habitat area (riparian, sedge, eelgrass and mudflats)

The information management framework is reviewed and maintained on an annual basis.

2.0 Explicit Prioritising Process

Incoming information is prioritized according to the following parameters (summarized from Schedule 'C' Part 4b of the Trust Agreement):

- 1) Its relevance to Skeena salmon;
- 2) Its credibility;
- 3) Its value for assessing risk to an objective;
- 4) Its accessibility; and
- 5) Its clarity of presentation.

3.0 Priority List of Information Projects

A priority list of information projects for the year is established using the prioritizing process to:

- 1) Canvas existing information and select and rank candidate information by its value in assessing risk to an objective;
- 2) Where information is found not to exist, rank candidate information projects by the value of newly-generated information to assess risk to an objective by a pressure indicator; and
- 3) Rank previously acquired information projects by the need to improve the accessibility and clarity of existing presentation.

Information projects on the priority list are further ranked by:

- 4) Relative cost in obtaining the information; and
- 5) Changes in the relative priorities of each type of project over time.

The above ranking process is summarized from Schedule 'C' Part 4c of the Trust Agreement (SKT, 2017).

4.0 References

Fisheries and Oceans Canada. 2005. Canada's Policy for Conservation of Wild Pacific Salmon DFO. 49p. Retrieved from <http://waves-vagues.dfo-mpo.gc.ca/Library/315577.pdf>.

Skeena Knowledge Trust. 2017. Skeena Knowledge Trust Agreement. Retrieved from <https://data.skeenasalmon.info/dataset/skt-trust-agreement-documents>.

Stalberg, H. C., Lauzier, R. B., MacIsaac, E. A., Porter, M. and C. Murray. 2009. Canada's Policy for Conservation of Wild Pacific Salmon: Stream, Lake, and Estuarine Habitat Indicators. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2859: 135pp Retrieved from: http://publications.gc.ca/collections/collection_2014/mpo-dfo/Fs97-4-2859-eng.pdf

APPENDIX B

**Discussion of Economic Activities and Priority Concerns
within the Skeena Watershed and Estuary**

Discussion of Economic Activities and Priority Concerns within the Skeena Watershed and Estuary

Introduction

Priority concerns and information needs with respect to salmon and salmon habitat in the Skeena watershed are driven in part by current and proposed economic activities in the region. Information on baseline environmental conditions and fish habitat is crucial to the environmental assessment process for major projects, mitigation, and ongoing monitoring. Threats to salmon population health and habitat may be classified in different ways, and the following discussion provides background on current threats identified for the Skeena watershed and how the SKT AKP incorporates regional, national, and international guidance into the priority setting process.

Available Guidance on Fish Habitat Objective Assessment and Threat Classification

On a regional and sub-regional level the contents of the SSDC are guided by a wide range of land use plans and salmon recovery plans as outlined in Schedule “C” of the Skeena Knowledge Trust Agreement (SKT, 2017).

On a national level the contents of the SSDC are guided by the federal Wild Salmon Policy (Fisheries and Oceans Canada, 2005). Of particular focus is cataloging and warehousing information relevant to Strategy 2 (Assessment of Habitat Status) and Strategy 3 (Inclusion of Ecosystem Values and Monitoring).

On the international level, the SKT aims to incorporate the Open Standards for the Practice of Conservation (OSPC) as it applies to the Skeena Watershed.

The SKT information priorities are organized below by topic as they relate to the OSPC direct threats classification and further expanded upon based on their relevance to the Wild Salmon Policy as well as regional and sub-regional land use plans.

International Conservation Standards

A joint effort by the International Union for Conservation of Nature (IUCN) and Conservation Measures Partnership (CMP) to create a global standard classification system of direct threats to conservation has led to the creation of the OSPC. The SKT aims to incorporate the OSPC as it applies to the contents of the SSDC and SMP. Our focus is specifically centered on the Direct Threats Classification Version 2.0 created as a key component of the Open Standards (Conservation Measures Partnership, 2016). Of the eleven threats identified through the OSPC,

the SKT has identified seven of these threats as relevant to the Skeena watershed and estuary environment for 2020.

The seven threats defined by the CMP and IUCN identified as relevant to the Skeena watershed include:

- Residential and Commercial Development (Threat 1)
- Agriculture and Aquaculture (Threat 2)
- Energy Production and Mining (Threat 3)
- Transportation and Service Corridors (Threat 4)
- Biological Resource Use (Threat 5)
- Natural System Modifications (Threat 7)
- Pollution (Threat 9)
- Climate Change (Threat 11)

The threats listed above are not ranked by priority as their significance to the Skeena watershed varies by geographical scope and activity. They are all relevant for different reasons outlined below.

Salmon Populations

The highest priorities within the Skeena sub-watersheds and estuary are to understand the status of different salmon populations and the impact of climate change across the watershed and estuary. These two priorities align with the CMP Classification Threat 5: Biological Resource Use and Threat 11: Climate Change and Severe Weather and apply to the entire Skeena watershed and estuary.

The knowledge base relevant to understanding the status of different salmon populations is continually growing and to date includes sockeye, chinook, coho, pink and steelhead summaries provided by Fisheries and Oceans Canada and the Pacific Salmon Foundation. The SKT continually searches for additional up-to-date information on harvesting pressure and population status with respect to Skeena salmon. Any knowledge relevant to the status of salmon populations and salmon harvesting is considered a high priority knowledge item to be included in the SSDC.

Forestry Activities

Knowledge items cataloged under Threat 5: Biological Resource Use also include habitat concerns with respect to resource-based activities such as forest harvesting. Information relevant to sedimentation, the status of stream crossings, road density, and expanding harvesting activities into previously unlogged areas are all high priority knowledge to include in the SSDC.

Climate Change

The impacts of Threat 11: Climate Change with respect to salmon fisheries and water quantity are relevant across the entire Skeena watershed and estuary. Specifically, main knowledge concerns are focused on:

- Sea temperature increase resulting in changes to zooplankton communities and negatively impacting salmon survival at sea
- Atmospheric warming resulting in changes in weather patterns, increase of severe weather events including drought (related to low stream flow conditions and reduced access to smaller streams) and extreme rainfall events (resulting in high stream flow and turbidity conditions)
- Stream temperature increase
- Glacial melting

Information added to the SSDC will focus on increasing the current knowledge base with respect to current projected climate impacts at a regional and sub-watershed level scale. Select information items will be also included as they relate to the broader climate change scenario within the Pacific Northwest.

Agriculture and Aquaculture

Concerns with respect to Threat 2: Agriculture and Aquaculture include disease transfer from Atlantic farmed salmon to Pacific wild salmon populations. Sea lice are less of a concern on the northern coast of British Columbia due to the smaller number of aquaculture operations than on the southern coast. Agricultural concerns are mostly focused within the Upper Bulkley River sub-watershed, in particular fish-related impacts related to range lands and maintaining and restoring riparian areas.

Energy Production and Mining

All information relevant to the assessment of Threat 3: Energy Production and Mining including current, proposed and past mining activity within the Skeena watershed and estuary is a priority knowledge item, particularly as it pertains to water quality. Currently, particular projects of interest are the proposed Telkwa coal mine, proposed Morrison mine, several upper Skeena coal proposals, exploration activities at Silver Queen mine, and maintenance at Equity Silver mine.

Residential and Commercial Development

Key Threat 1: Residential and Commercial Development concerns are centered on development within the Skeena River estuary, in particular Lelu Island and Flora Bank. Also of interest as it relates to salmon habitat is the proposed bulk liquids tank storage and marine export facility development within the Prince Rupert harbor.

Pollution

Current concerns pertaining to Threat 9: Pollution include the application of pesticides along rail lines due to a recent blanket application along the rail line between Terrace and Prince Rupert and the proximity of the rail line to the Skeena River and its tributaries. Fire retardants dispersed across wildfire areas also represent a concern.

Transportation and Service Corridors

Threat 4: Transportation and Service Corridors including resource road development and pipeline development are of interest within the Skeena watershed due to their impact on fish habitat. Of particular relevance are the TransCanada Pacific Trails Pipeline, the Coastal GasLink Pipeline, the Prince Rupert Gas Transmission Line, and the PNG Looping Project. In addition, increased volumes of dangerous goods transported by rail (i.e. propane and other petroleum products) are anticipated with the expansion of marine export facilities in Prince Rupert.

Wildfire Impacts

The 2018 season was the worst on record for wildfires in British Columbia, with a larger burn area than the previous record set in 2017. Increased severity and frequency of wildfires are related to Threat 7: Natural System Modifications through fire suppression and reduction in the natural resilience of ecosystems to wildfires and Threat 11: Climate Change with respect to increases in seasonal air temperatures and frequency of drought conditions. Impacts to salmon and salmon habitat from wildfire activity include increased sedimentation from access road and fire guard construction, impacts to water quality and quantity from hydrophobic soils, fire retardant application, and mass wasting events, and impacts to riparian habitat in burn areas and from salvage harvesting.

Summary

The Skeena watershed and estuary are constantly experiencing pressures and threats to salmon and these pressures will change over time based on a variety of reasons including the unpredictable nature of climate change and new economic activities initiated both locally and from agents outside the watershed. To ensure the information available in the SSDC reflects current pressures on Skeena salmon, the SKT will revisit the high priority concerns within the watershed on an annual basis.

References

- Conservation Measures Partnership. 2016. Classification of Conservation Actions and Threats. Version 2.0. Retrieved from <http://cmp-openstandards.org/tools/threats-and-actions-taxonomies/> on June 14, 2018.
- Fisheries and Oceans Canada. 2005. Canada's Policy for Conservation of Wild Pacific Salmon DFO. 49p. Retrieved from <http://waves-vagues.dfo-mpo.gc.ca/Library/315577.pdf>.
- Skeena Knowledge Trust. 2017. Skeena Knowledge Trust Agreement. Retrieved from <https://data.skeenasalmon.info/dataset/skt-trust-agreement-documents>.

APPENDIX C

2019 Skeena Salmon Data Centre Traffic Report

2019 Skeena Salmon Data Centre Traffic Report

Geographical distribution of Skeena Salmon Data Centre (SSDC) visitors

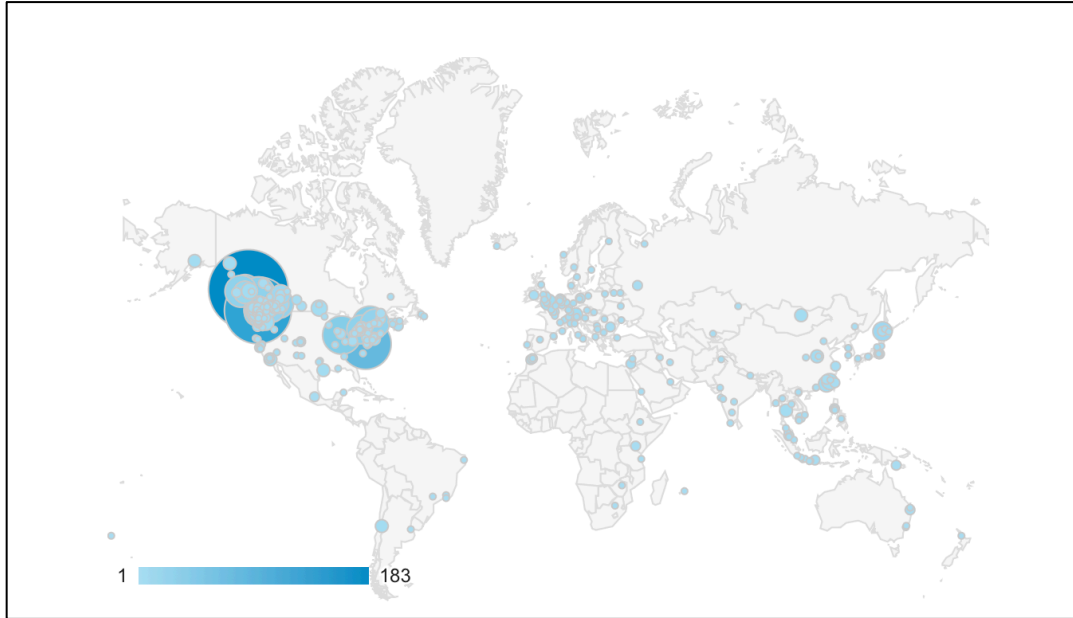


Figure C3: Geographical distribution of SSDC site visitors in 2019

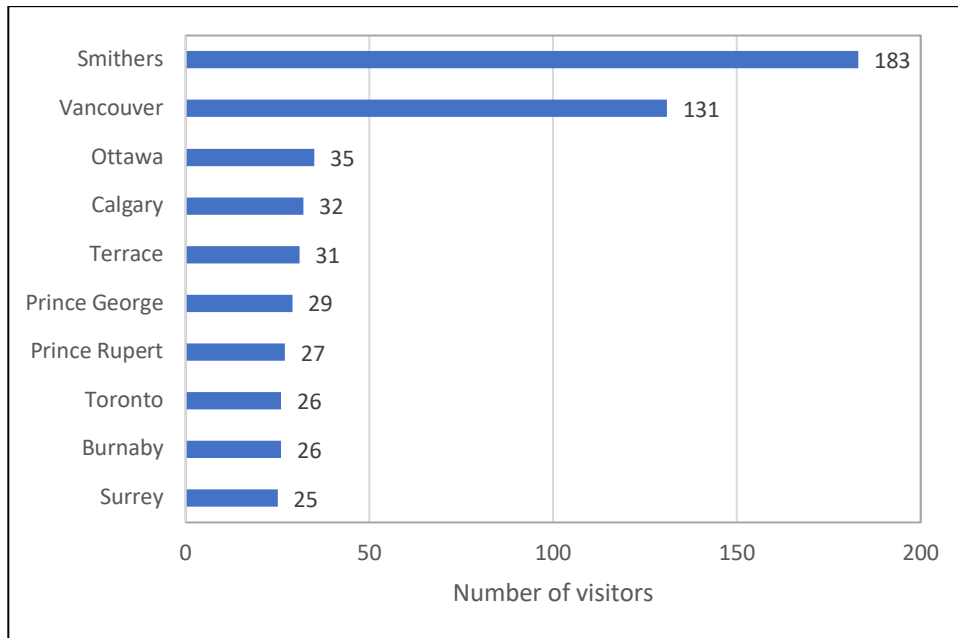


Figure C4: Top ten cities by number of SSDC visitors in 2019

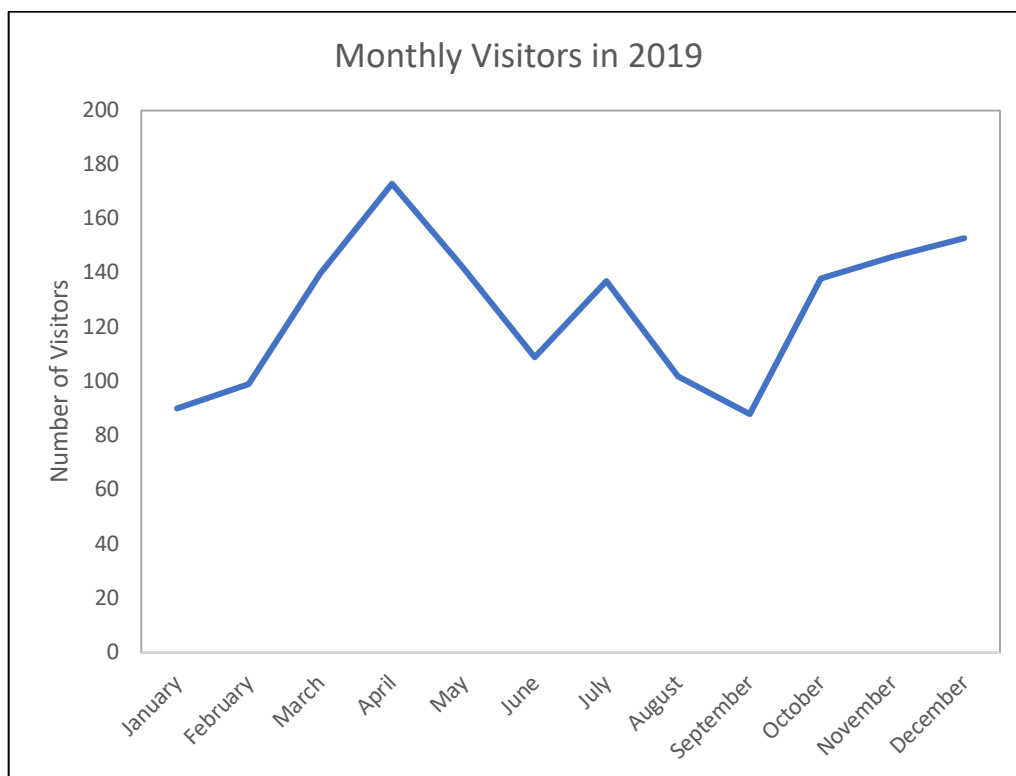


Figure C5: Number of SSDC visitors by month in 2019

Table C4: Top 20 most viewed SSDC datasets in 2019

Ranking	Dataset Title	URL	Page views
1	Skeena Knowledge Trust Agreement	https://data.skeenasalmon.info/dataset/skt-trust-agreement-documents	84
2	Analysis and Priority Identification of Existing Fish Passage Data: Bulkley River Watershed	https://data.skeenasalmon.info/dataset/fish-passage-site-prioritization-maps-bulkley-river	81
3	Water Temperature Data: Morice River at Walcott FSR	https://data.skeenasalmon.info/dataset/water-temperature-monitoring-data-morice-river-at-walcott-fsr	79
4	Water Quality in British Columbia Objectives Attainment	https://data.skeenasalmon.info/dataset/water-quality-in-british-columbia-objectives-attainment	74
5	Reconnaissance Level Fish and Fish Habitat Inventories in the Bulkley T.S.A.	https://data.skeenasalmon.info/dataset/reconnaissance-level-fish-and-fish-habitat-inventories-in-the-bulkley-t-s-a	69

Ranking	Dataset Title	URL	Page views
6	Upper Bulkley Fish and Aquatic Review: Summary of Data, Methodology, Results, and Thresholds For Pressure Indicator Road Density	https://data.skeenasalmon.info/dataset/upper-bulkley-fish-and-aquatic-review-road-density	63
7	Morice Land and Resource Management Plan	https://data.skeenasalmon.info/dataset/morice-land-and-resource-management-plan	61
8	Water Temperature Data: Bulkley River Near Houston	https://data.skeenasalmon.info/dataset/water-temperature-monitoring-data-bulkley-river-near-houston	60
9	Enumeration of Adult Steelhead in the Upper Sustut River	https://data.skeenasalmon.info/dataset/enumeration-of-adult-steelhead-in-the-upper-sustut-river-1999	59
10	Toboggan Creek Steelhead Assessments	https://data.skeenasalmon.info/dataset/1994-toboggan-creek-steelhead-assessment	58
11	Upper Bulkley River Coho Assessment Fence Program Reports	https://data.skeenasalmon.info/dataset/upper-bulkley-river-coho-assessment-fence-program-reports	57
12	Skeena & Nass Sockeye Lakes Hydroacoustic Surveys	https://data.skeenasalmon.info/dataset/skeena-nass-sockeye-lakes-hydroacoustic-surveys-2008	54
13	Juvenile Steelhead Surveys in the Sustut River 1993	https://data.skeenasalmon.info/dataset/juvenile-steelhead-surveys-in-the-sustut-river-1993	49
14	Mid-Bulkley Photo Mosaics	https://data.skeenasalmon.info/dataset/mid-bulkley-photo-mosaics	48
15	Water Survey of Canada Hydrometric Stations	https://data.skeenasalmon.info/en/dataset/water-survey-of-canada-hydrometric-stations	47
16	Mid-Bulkley Overview Fish and Fish Habitat Assessment for Watershed Restoration	https://data.skeenasalmon.info/dataset/mid-bulkley-overview-fish-and-fish-habitat-assessment-for-watershed-restoration	44
17	Skeena Knowledge Trust Annual Knowledge Plans	https://data.skeenasalmon.info/dataset/skt-annual-knowledge-plans	42

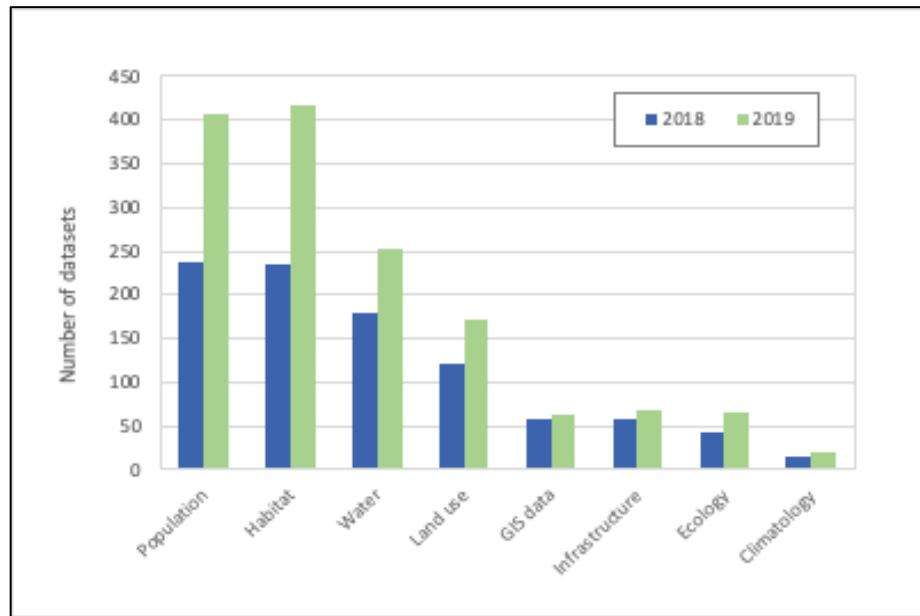
Ranking	Dataset Title	URL	Page views
18	Bulkley Higher Level Plan GIS Data Cut to Babine Watershed	https://data.skeenasalmon.info/dataset/bulkley-higher-level-plans	38
19	Upper Bulkley and Morice Water and Salmon Sustainability Views: Inventory of Interests, Activities and Potential Collaborative Opportunities Among 36 Organizations	https://data.skeenasalmon.info/dataset/upper-bulkley-and-morice-water-and-salmon-sustainability-views	37
20	Morice and Upper Bulkley Fisheries Sensitivity Watershed Process Reports	https://data.skeenasalmon.info/dataset/morice-and-upper-bulkley-fisheries-sensitivity-watershed-process-reports	36

APPENDIX D

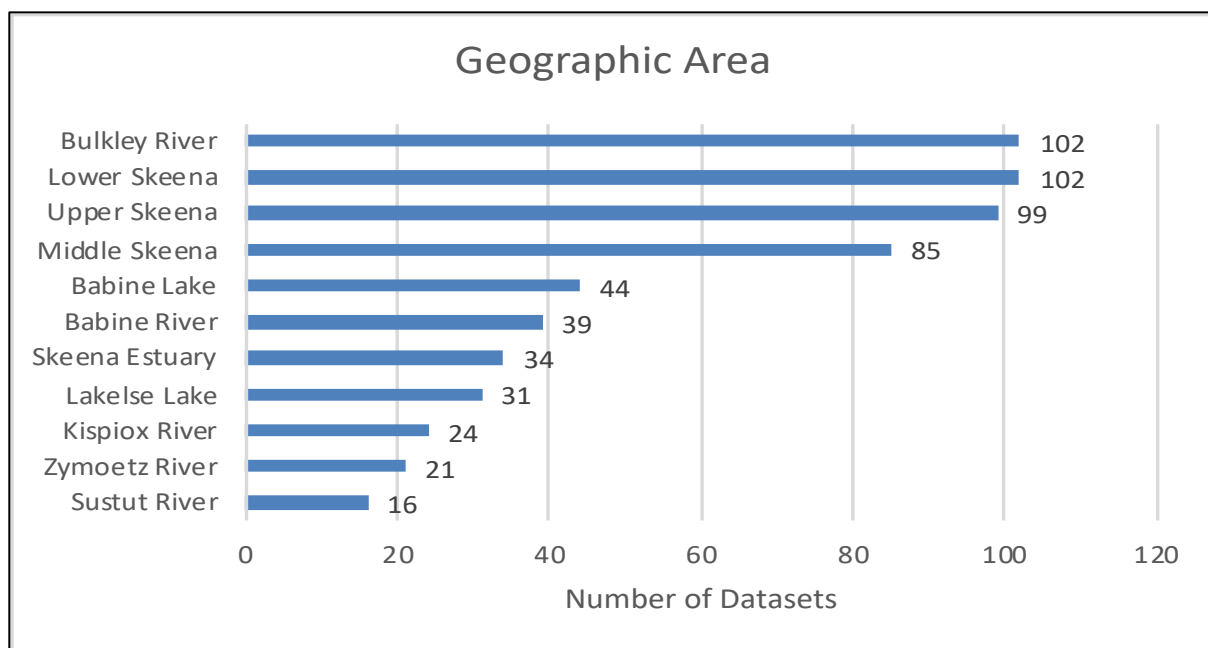
Skeena Salmon Data Centre Contents Summary

Skeena Salmon Data Centre Contents Summary

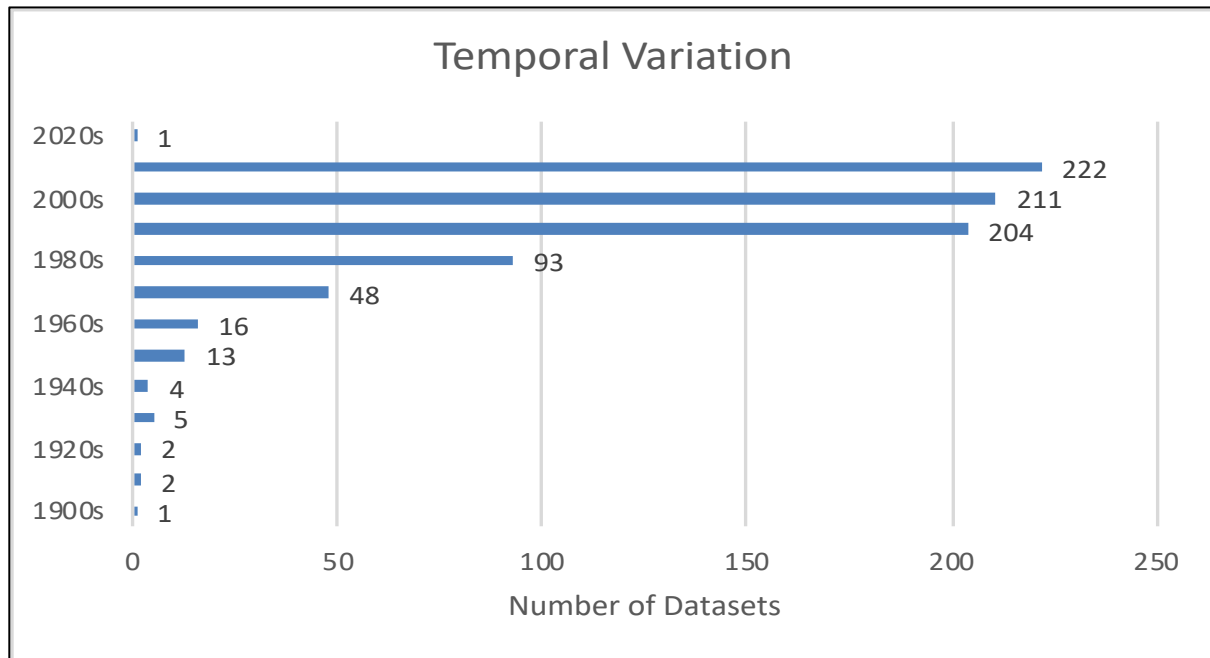
The number of datasets housed in the SSDC increased from 576 to 895 with additions across all categories from 2018 to 2019. Datasets may be classified into more than one category as warranted.



Geographic distribution of datasets by sub-basin



Temporal variation of datasets by decade published



Number of datasets based on categories from 2019 Annual Knowledge Plan

Red = high priority; orange = medium priority; green = unknown

