Skeena Knowledge Trust

2022 Annual Knowledge Plan

March 2022

Prepared by Eclipse Geomatics Ltd.
for the Skeena Knowledge Trust

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 as resources allow. 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 United Nations Sustainable Development Goals (SDGs) through the Open Standards for the Practice of Conservation (OSPC) as they apply to the Skeena Watershed. Relevant SDGs include (6) clean water and sanitation, (13) climate action, (14) life below water, and (15) life on land.

Information priorities for 2022 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 2021 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 categories and projects was prepared, which will serve to guide data curation efforts over the coming year. Individual datasets within the prioritized information projects will be vetted for accuracy and clarity of information according to the SKT information management framework.

High priority information categories for 2022 include:

- Climate change,
- Salmon populations,
- Vegetation/Ecology, and
- Land use and development.

Climate change continues to pose a major threat to wild salmon populations and habitat on several fronts including rising ocean and river/stream temperatures, increasing the frequency and severity of drought and flood events, increasing impacts from wildfires on riparian habitat and water quality, and reducing ocean survival through increased competition for food resources. Forest harvesting continues to be a major driver of land cover alteration in the Skeena, with potential impacts including increased sedimentation of waterways, changes in watershed hydrology, riparian disturbance, introduction of stream crossings and fish passage barriers, and elevated water temperatures. Information relating to several major infrastructure projects under environmental assessment or permitting in the region as well as information relating to the ongoing Wetzin'kwa land use planning process was identified as high priority and timely due to the need for accessible and relevant information for public review and comment. Current salmon population data continues to be a key input for sustainable fisheries management and decision-making.

In addition to data acquisition and curation, SKT activities for 2022 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. Major upgrades for both the SSDC and SMP were undertaken in 2021 and are expected to be completed in early 2022, which will see both platforms updated to current software versions and function. Additional enhancements and functionality will continue to be prioritized and incorporated as resources allow.

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 2022 will be sharing the new features and enhancements of the updated SSCD and SMP, deepening relationships with existing watershed stewardship and conservation groups, extending awareness of the SKT within coastal communities, and expanding data collection and community science initiatives through the Water Rangers program.

Data visualizations and information summaries will continue to be developed 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, raise awareness about the condition of particular Skeena sub-watersheds, and provide information on salmon run size and timing.

Table of Contents

Tables

Figures

Appendices

Skeena Knowledge Trust
2022 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. 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 2022.

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 essential 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 agreement[1] 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 (attached as Schedule "C")" (SKT, 2017). The extent of the Skeena Watershed and Ocean Approaches as per the SKT Trust Agreement is shown as Figure 1.

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

Figure 1: Map of BC with the Skeena Watershed and Ocean Approaches outlined in green.

3.0 Objective

The objective of the 2022 AKP is to establish a data and knowledge acquisition, compilation, and communication plan for 2022 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

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 each year 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 Annual Knowledge Plan Framework

The framework for the development of the SKT AKP is set out by the Skeena Knowledge Trust Agreement Schedule "C" (SKT, 2017) and consists of three components which inform information project prioritization for the year:

5.1.1 Information Management Framework

The Information Management Framework (IMF) consists of a list of relevant salmonid policy documents and land-use plans (the "Plans and Policies"), a compilation of salmon-related objectives from the Plans and Policies by objective class (the "Objectives"), a list of relevant pressure indicators of management activities that influence whether an Objective will be achieved (the "Pressure Indicators"), and relevant geographic area. A diagram illustrating selected interactions between salmon objectives, pressure indicators, and human activities is included as Figure 2. The IMF is reviewed on an annual basis and updated as required, and is included as Appendix A.

5.1.2 Information Project Prioritizing Process

The Information Project Prioritizing Process consists of an explicit prioritizing process that determines the relative value of information projects based on the relevance, credibility, value for assessing risk to an Objective, accessibility, and clarity of presentation of the information. The Information Project Prioritizing Process is reviewed on an annual basis and updated as needed. A process diagram illustrating the Information Project Prioritising Process is included as Figure 3.

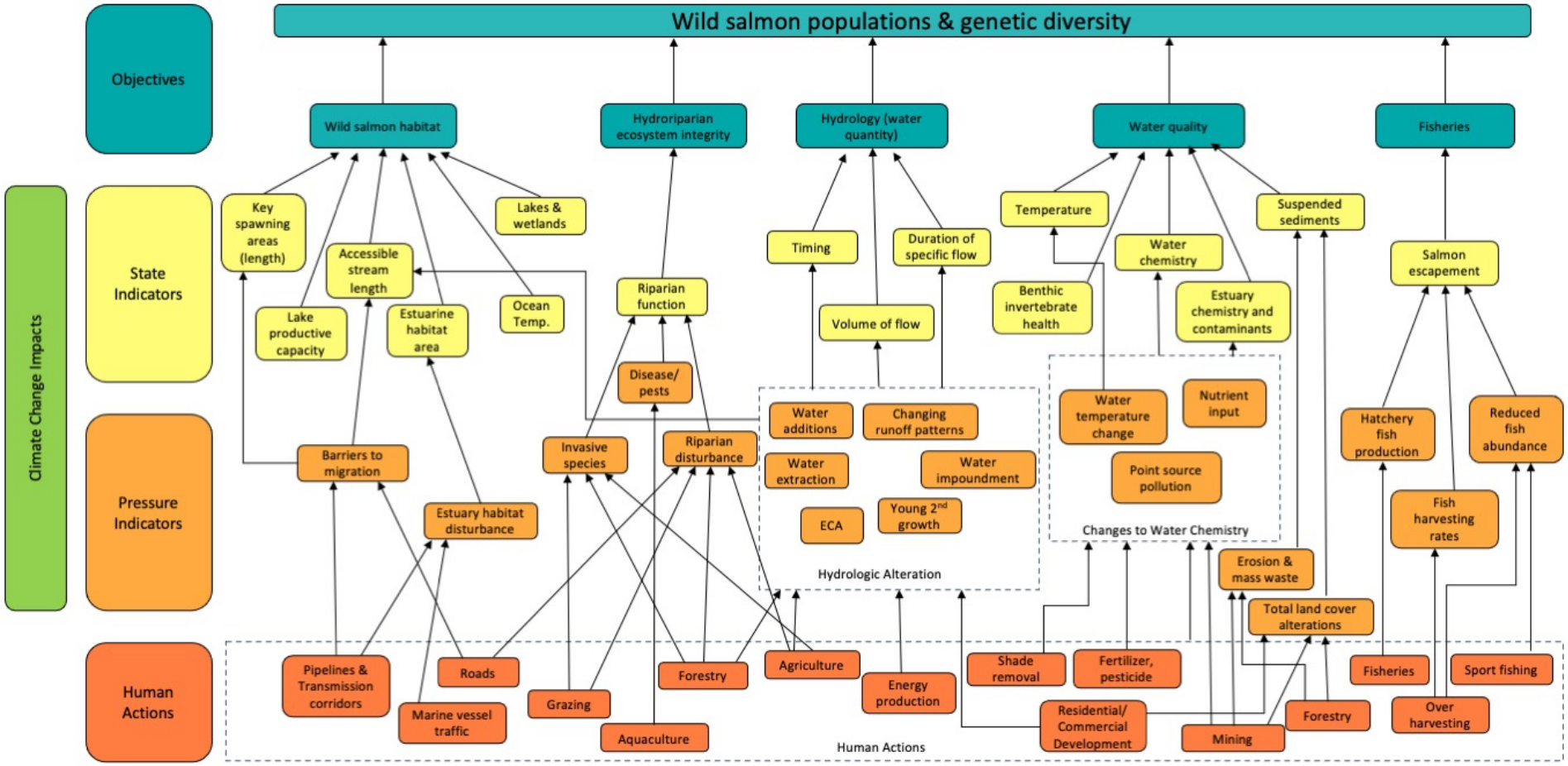

Figure 2. Conceptual model illustrating selected interactions between salmon objectives, pressure indicators, and human activities

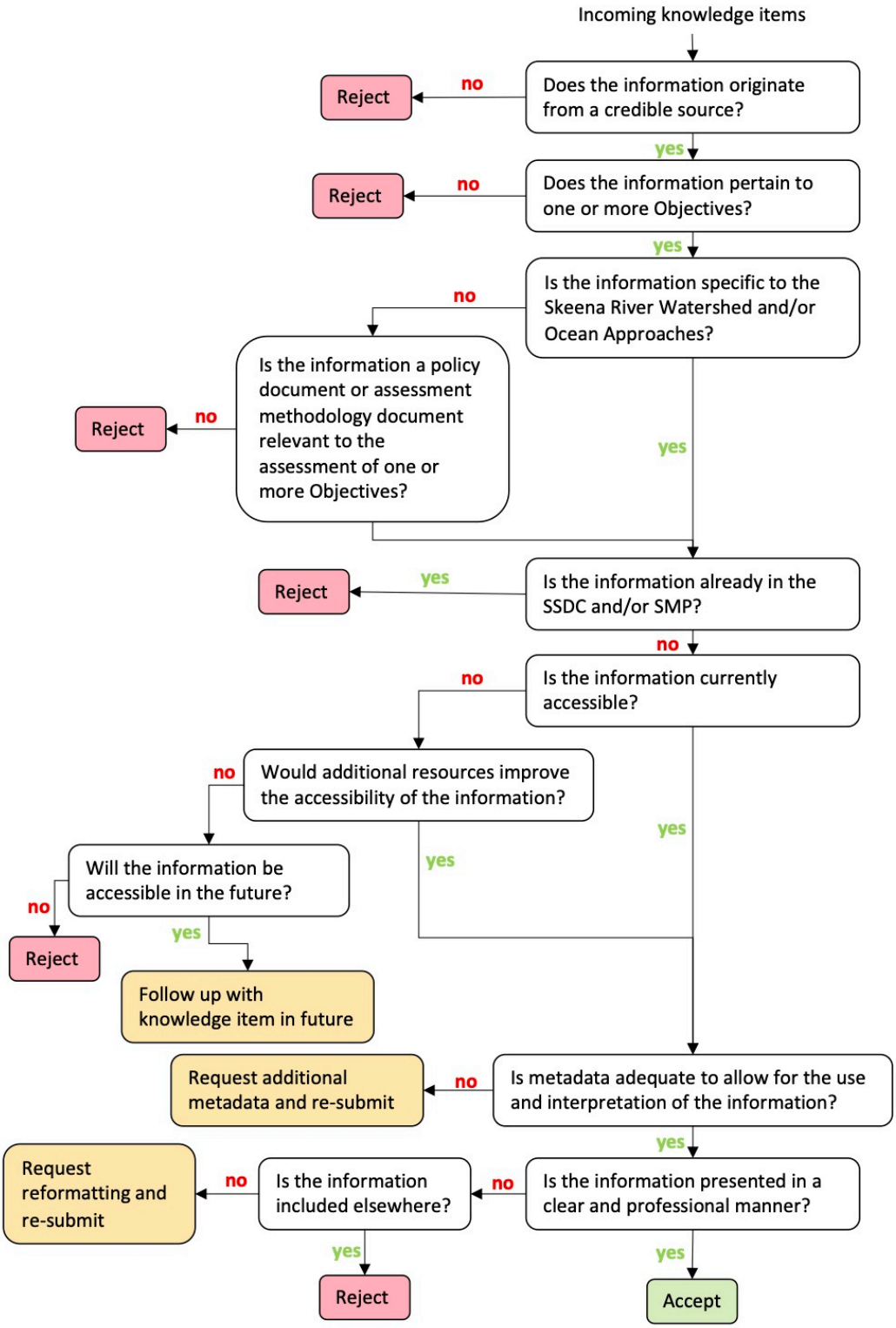

Figure 3: Diagram illustrating the information project prioritizing process

5.1.3 Information Project Priority List Compilation

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

1) Canvass existing information to select and rank information projects by the value of the information to assess the risk from a Pressure Indicator or Indicators to an Objective or Objectives (Existing Information Projects);
2) Identify and rank new candidate information projects by the value of newly-generated information to assess risk from a Pressure Indicator or Indicators to an Objective or Objectives (New Information Projects); and
3) Rank previously acquired information projects by the need to improve the accessibility and/or clarity of presentation (Communication Projects).

A flowchart showing the information project relative ranking process for existing information is included as Figure 4.

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.

To date, the SKT has focused on curating existing information and piloting communication projects.

5.1.4 Exceptions

In certain circumstances, exceptions may be made to include information which does not meet the criteria described by the Information Project Prioritising Process. Exceptions may be made in the following cases with the approval of the SKT Trustees:

1. Where the majority of an information project is situated within the Skeena River Watershed and Ocean Approaches, data from sites in adjacent watersheds may also be included in order to preserve the completeness of the project.
2. Where information is collected in support of land use planning within the Skeena River Watershed and Ocean Approaches but is only tangentially related to SKT Objectives or Pressure Indicators, the information may be curated by the SKT and stored on the SSDC and/or SMP if it is not housed elsewhere on a case-by-case basis.

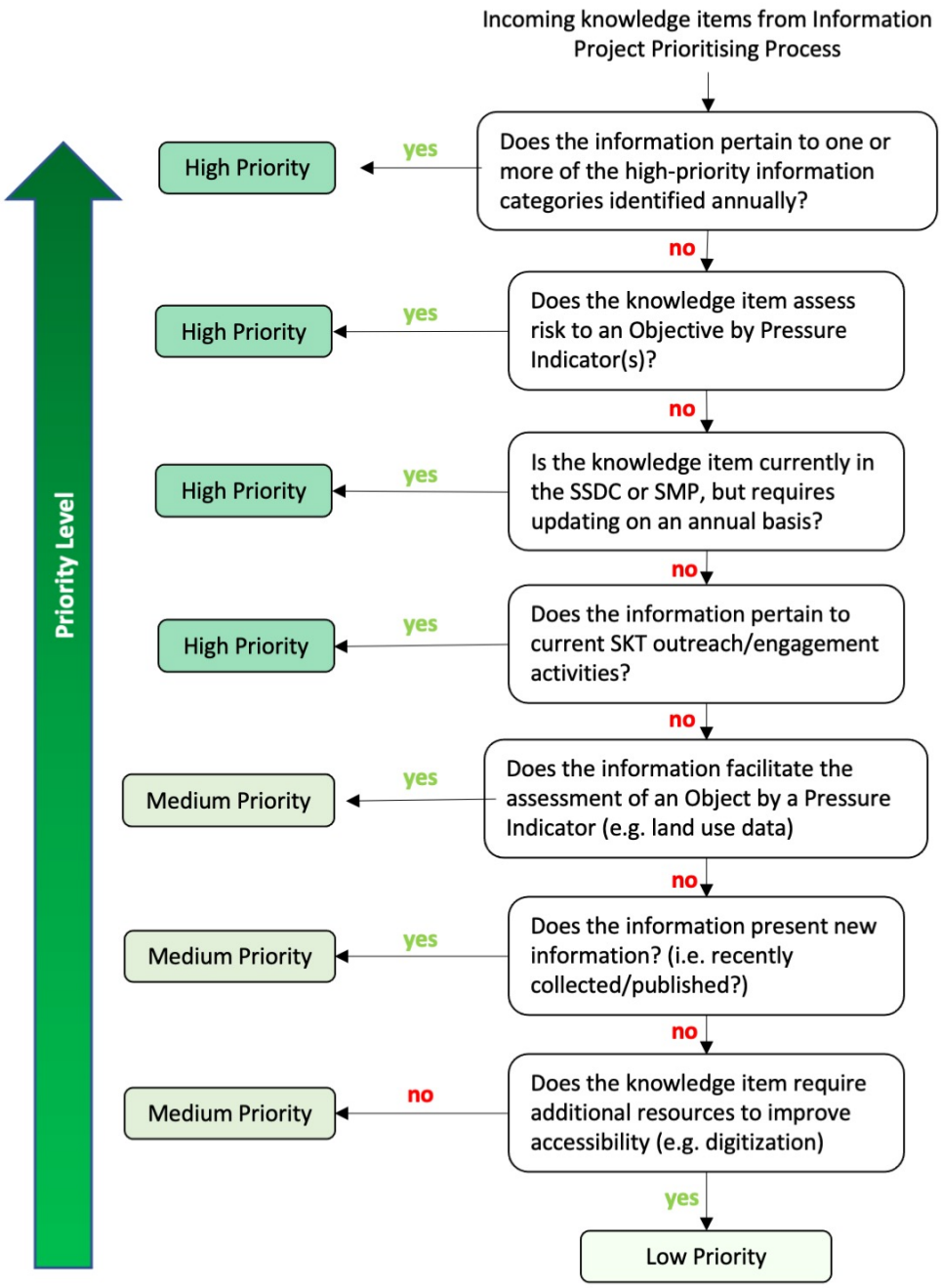

Figure 4: Information value ranking process diagram for existing information

5.2 Priority Area Identification for 2022

High-priority Objectives and Pressure Indicators for 2022 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 2021 AKP and current database contents, and public interest (estimated through SSDC visitor traffic). The following sections summarize the results of the scan.

5.2.1 Current and Proposed Activities

Current and ongoing activities relating to the IMF Objectives and Pressure Indicators identified for 2022 include salmon hatchery production in Alaska and BC; major project development including the Vopak Terminal in Prince Rupert, the Coastal Gaslink pipeline, and the PNG pipeline expansion near Terrace; forest harvesting activities; agricultural land development and water use in the Upper Bulkley; and rail transport and maintenance activities. In addition, the Wetzin'kwa Land Use Plan development process is ongoing for the Upper Bulkley and Morice sub-watersheds.

Proposed activities include increases to salmon hatchery production in Alaska and BC, major project development including the Telkwa Coal Mine in Telkwa, the Westcoast Gas Transmission Line, and the Northern Gateway pipeline, and expansion of the railway corridor.

5.2.2 Database Contents Summary and Gap Analysis

A high-level review of the content housed in the SSDC and SMP as of December 2021 was completed to assess whether priorities identified in the 2021 AKP were addressed and identify gaps for integration into the 2022 AKP. The objective classes defined by the IMF have been distilled into the following categories for the purposes of information management and data discovery:

- **Habitat** (objective c)
- **Populations** (objectives a, b and g)
- **Ecology/Vegetation** (objective d)
- **Water quality and quantity** (objectives e and f)
- **Climate change** (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)

5.2.2.1 SSDC Contents Summary

The SSDC housed a total of 1,024 datasets and 2,506 resources as of December 31, 2021 with 171 datasets and 312 resources added in 2021 (Figure 5). Results of the contents review indicate additional datasets were added to the SSDC over all categories in 2021, with gains made particularly in datasets pertaining to climate, GIS (spatial) data, salmon populations, habitat, land use, and water (Figure 6). Note datasets may be added to more than one category so the total number of datasets would be less than the sum of datasets in all categories.

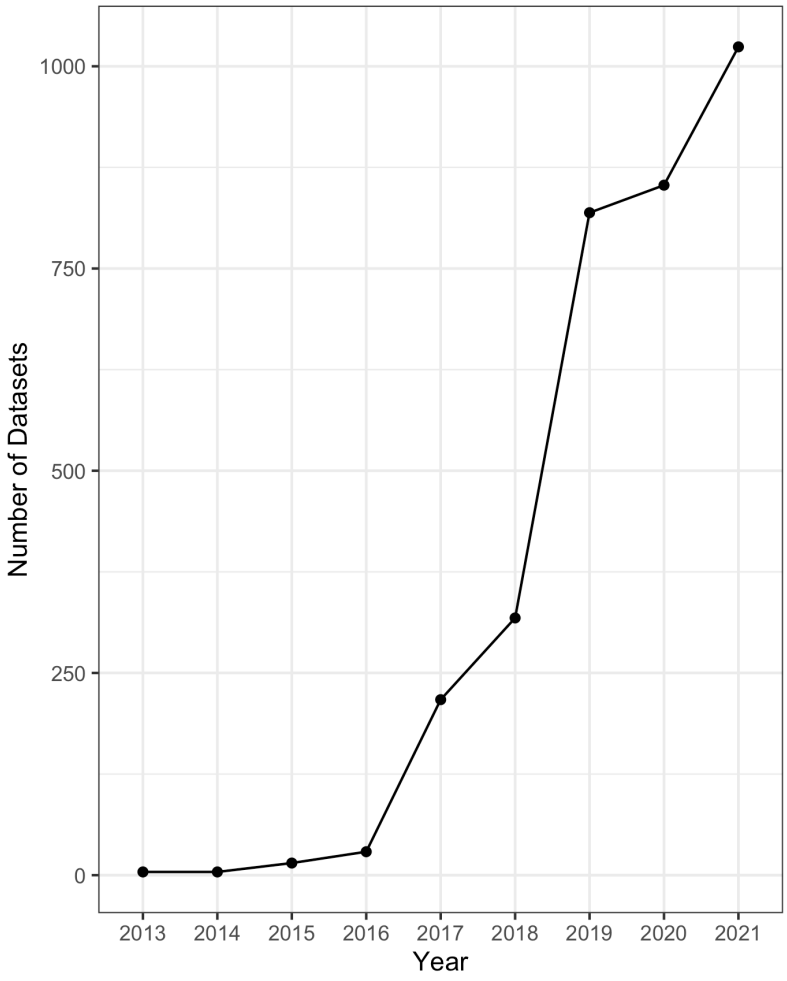

Figure 5: Total number of datasets housed in the SSDC over time

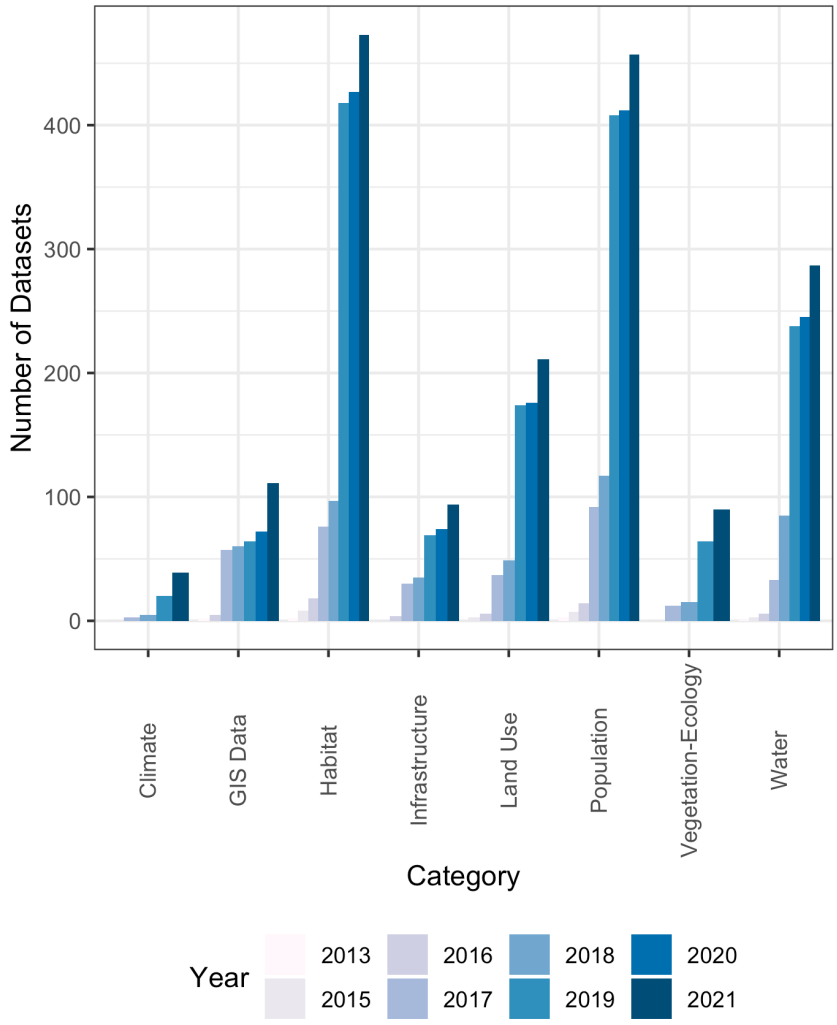

Figure 6: Cumulative datasets in the SSDC by category

Datasets in the SSDC were further characterized by geographic area using Skeena River major sub-basins and by publication date. Results of the scan show datasets are relatively well-distributed across the region, with the highest proportion of datasets associated with the Bulkley River and Lower, Middle and Upper Skeena watersheds and fewer datasets associated with the Skeena Estuary and Sustut and Zymoetz Watersheds (Figure 7).

Datasets published in the 1990s, 2000s, and 2010s continue to be the most numerous and reflect the availability of information (Figure 8). There are also a relatively high number of datasets published in the 2020s considering there have only been two years contributing to this decade bracket so far (Figure 8).

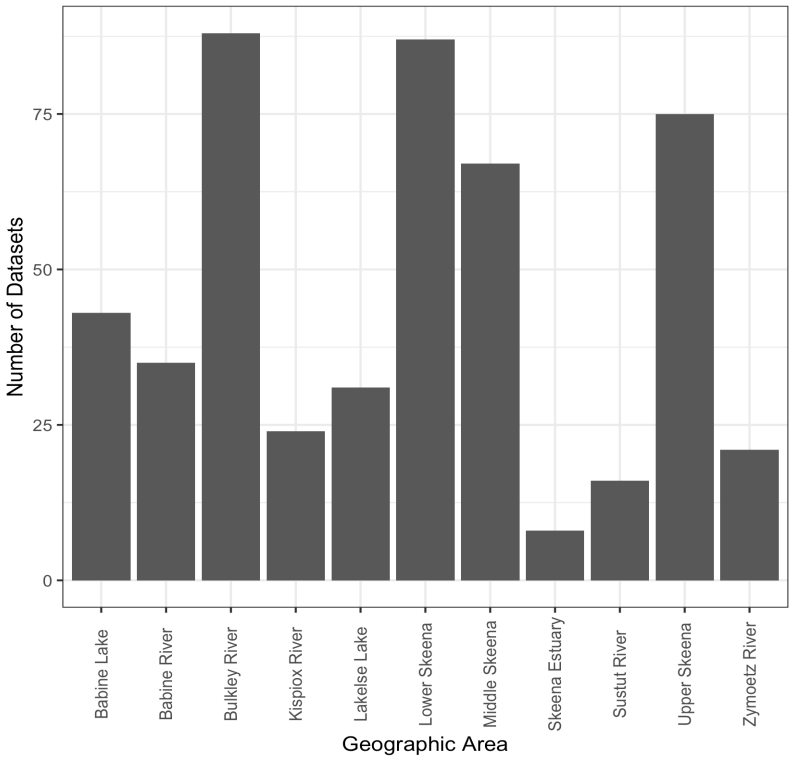

Figure 7: SSDC dataset distribution by Skeena River Major Sub-basin

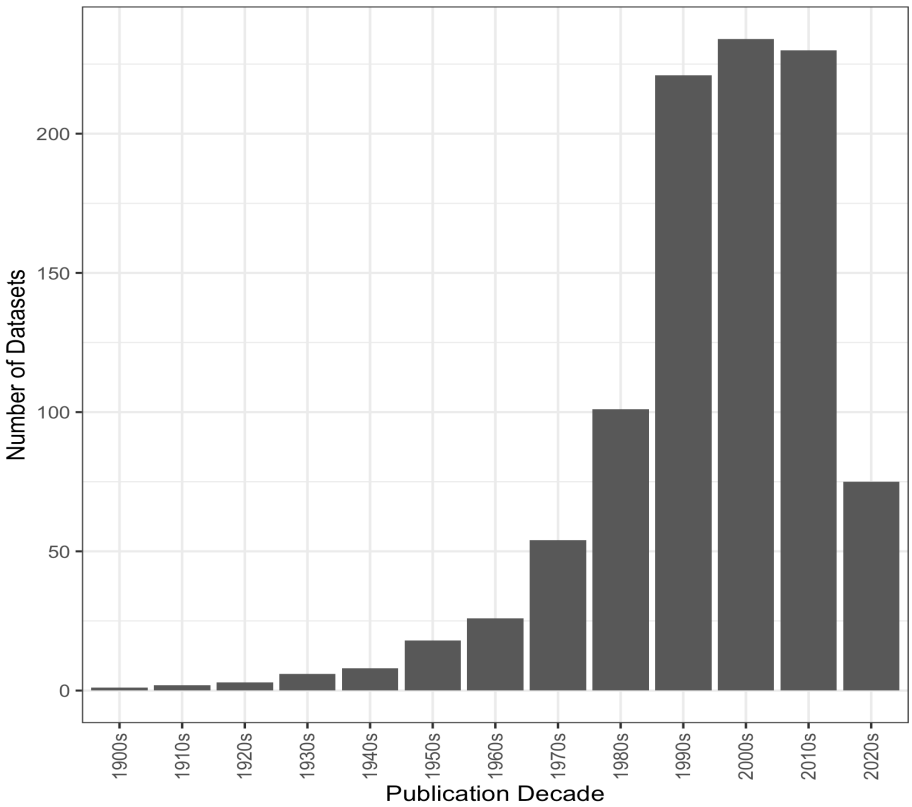

Figure 8: SSDC dataset distribution by publication date

5.2.2.2 SMP Contents Summary

The SMP housed a total of 212 mapping layers as of December 31, 2021, up from 152 the year before.

Additional categories specific to spatial data on the SMP include Boundaries, Imagery and Base Mapping, Hillshades and DEMs (Digital Elevation Models), and Placenames and Settlements. These categories house spatial layers that do not necessarily provide information directly relating to Objectives or Pressure Indicators, but allow for the analysis of spatial indicators (e.g. watershed boundaries) or provide context for mapping and information sharing. In addition, the infrastructure category is further classified into utilities, transportation, and buildings.

The majority of the spatial layers added to the SMP in 2021 comprised layers relating to fish habitat, ecology, and infrastructure (Figure 9).

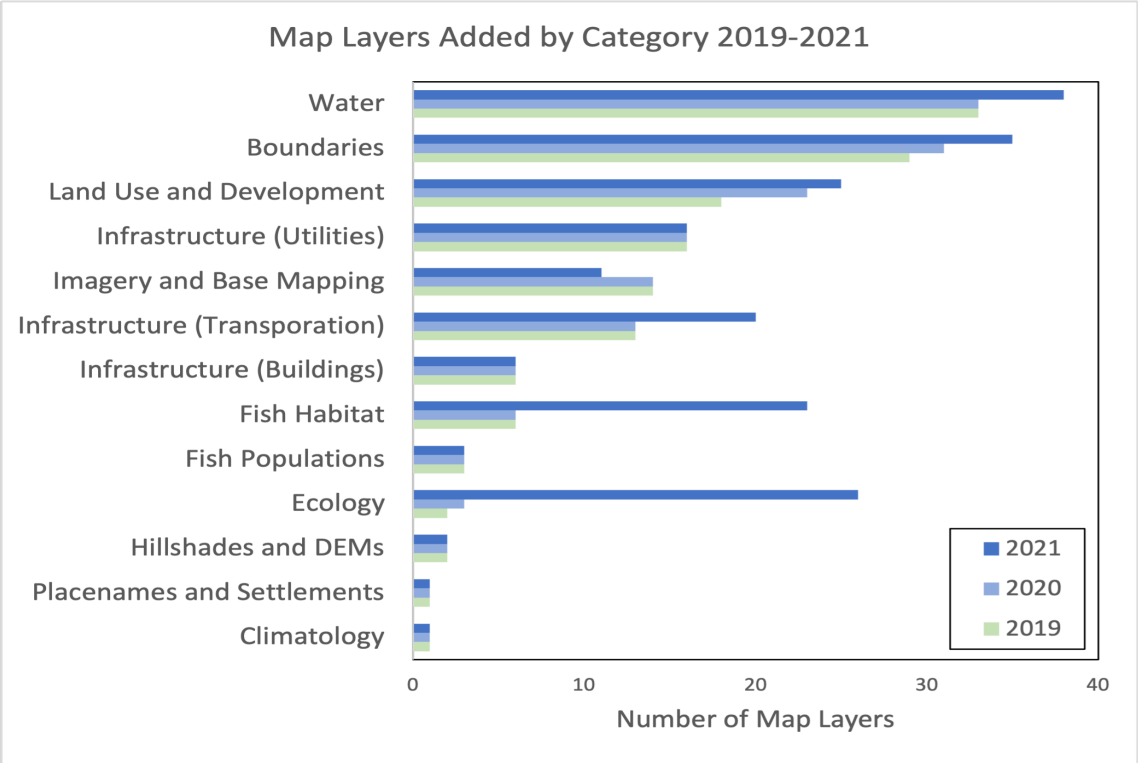

Figure 9: Data layers on the Skeena Maps Portal by category

5.2.2.3 Gap Analysis

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

Information pertaining to climatology continue to be underrepresented on both the SSDC and SMP. Datasets relating to GIS (spatial data), vegetation/ecology and infrastructure are also underrepresented on the SSDC, while fish population datasets are underrepresented on the SMP (Figures 6 and 9).

5.2.3 Database Traffic Report

Generalized information on visitor location and page views for the SSDC for 2021 was compiled to identify high-value datasets as determined by user interest. Findings indicated the majority of site visitors continue to be from Smithers and Vancouver, with smaller numbers of visitors from all over the world. Refer to Appendix B for a detailed breakdown of users by location.

Site visits in 2020 averaged around 430 unique user visits per month, which is a significant increase over the levels in previous years (Figure 10).

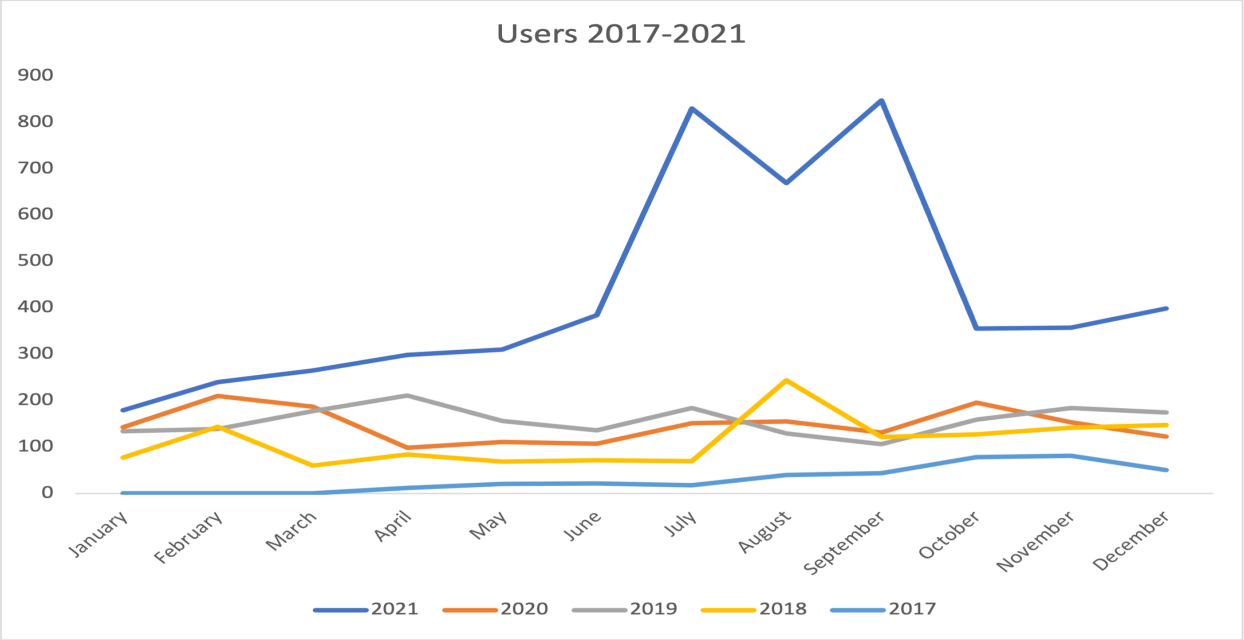

Figure 10: Number of SSDC visitors by month from 2017 to 2021

The most popular datasets included the Skeena Tyee Test Fishery Visualization, the 2021 Skeena Sockeye Forecast, Skeena Sustainability Assessment Forum (SSAF) state of the value reports, Upper Bulkley Water Temperature Data, Climate Change Adaptation Planning for Northwest Skeena Communities, BC Water Resources, Old Growth Deferral Areas, Wild Salmon Policy Indicator Analysis for the Kispiox TSA, among others. A detailed list of the top 202 most viewed datasets in 2021 is included in Appendix B.

Additional analysis prepared for the 2022 AKP includes a summary of how users are navigating to the SSDC. Results of the analysis indicated 92.1% of visitors to the SSDC in 2021 were new users and 7.9% were returning users. Slightly more than half of the users navigated to the SSDC using a bookmark or by typing the SSDC URL into a browser (direct search); 41% of users found the SSDC by entering search terms in a browser (organic search); 7.0% of users navigated to the SSDC by clicking on a provided link (referral); and the remainder of users were directed to the SSDC by following a link on social media (social).

Top search terms used in browser searches directing users to the SSDC focused around BC water resources, hydrometric data, and minerals.

Refer to Appendix B for a detailed listing of search terms and user acquisition figures.

5.3 Integration with United Nation Sustainable Development Goals

The United Nations' 2030 Agenda for Sustainable Development, which Canada committed to implementing, sets out 17 interlinked Sustainable Development Goals (SDGs) providing a blueprint for achieving an equitable and sustainable future[2]. Relevant SDGs include (6) clean water and sanitation, (13) climate action, (14) life below water, and (15) life on land. The International Union for Conservation of Nature (IUCN) champions the SDGs and is the leading provider of conservation data, assessments and analysis, and an implementing agency of conservation projects around the world. The IUCN also serves as an official agency monitoring progress towards biodiversity-related targets[3].

A joint effort by the 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 Open Standards for the Practice of Conservation (OSPC), illustrated by Figure 11.

[2] United Nations Department of Economic and Social Affairs Sustainable Development. 2021. The 17 Goals. https://sdgs.un.org/goals.

[3] Sustaining Development IUCN and the Sustainable Development Goals. 2017. International Union for Conservation of Nature and Natural Resources.

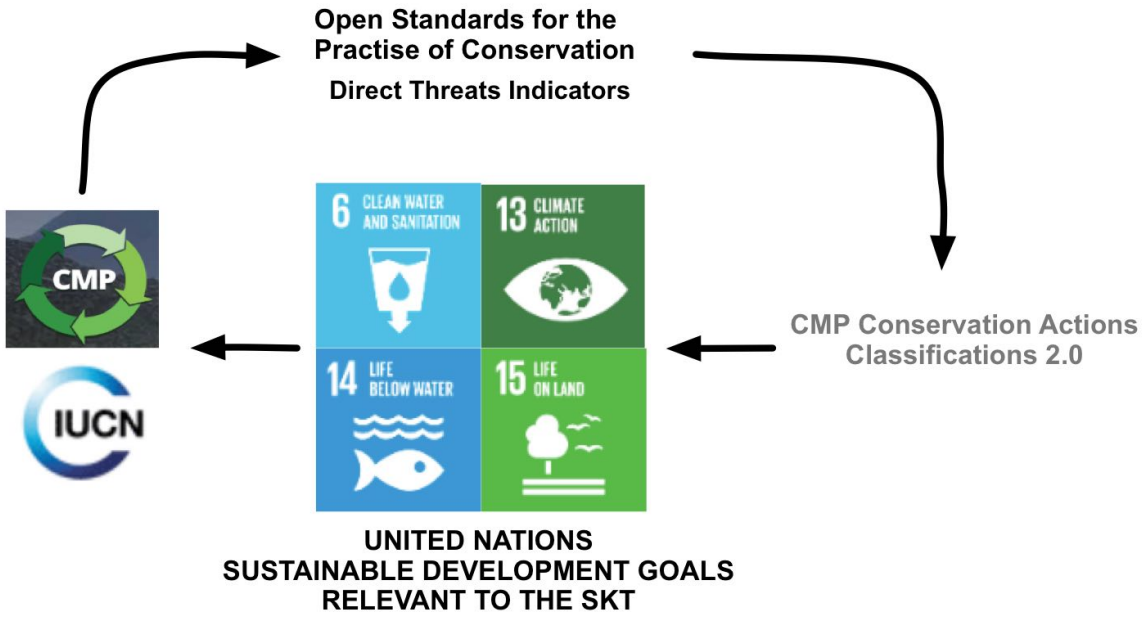

Figure 11: Linkages between the UN Sustainability Goals and CMP direct threat indicators

The SKT aims to incorporate the OSPC within the framework of the AKP by identifying linkages between the Direct Threats Classification Version 2.0 created as a key component of the Open Standards and the SKT's IMF, which incorporates Canada's Wild Salmon Policy as well as regional and sub-regional land use plans (Appendix A). Of the eleven threats identified through the OSPC, the SKT has identified eight of these threats as relevant to the Skeena watershed and estuary environment, presented with the relevant Objective Classes and Pressure Indicators in Table 1.

Table 1: Summary of IMF Pressure Indicators and Objective Classes as they relate to OPSC threats

OSPC Threat	Pressure Indicator	Objective Class
Residential and Commercial Development (Threat 1)	• Total land cover alterations • Riparian disturbance • Accessible stream length based on barriers	• Wild salmon habitat • Hydroriparian ecosystem integrity • Hydrology
Agriculture and Aquaculture (Threat 2)	• Hatchery fish production • Fish farming • Total land cover alterations (agriculture) • Riparian disturbance (agriculture)	• Wild salmon populations • Wild salmon genetic diversity • Wild salmon habitat • Hydroriparian ecosystem integrity • Salmon fisheries management
Energy Production and Mining (Threat 3)	• Total land cover alterations • Permitted waste management discharges	• Wild salmon habitat • Water quality • Hydrology

Transportation and Service Corridors (Threat 4)	• Watershed road development • Riparian disturbance • Accessible stream length based on barriers • Marine vessel traffic • Estuary habitat disturbance	• Wild salmon habitat • Hydroriparian ecosystem integrity • Hydrology
Biological Resource Use (Threat 5)	• Salmon harvesting • Total land cover alterations (forestry harvesting)	• Wild salmon populations • Wild salmon genetic diversity • Wild salmon habitat • Hydroriparian ecosystem integrity • Salmon fisheries management
Natural System Modifications (Threat 7)	• Water extraction • Stream discharge • Accessible stream length based on barriers	• Wild salmon populations • Wild salmon genetic diversity • Wild salmon habitat • Hydroriparian ecosystem integrity • Hydrology
Pollution (Threat 9)	• Permitted waste management discharges • Suspended sediment • Water Quality • Estuary chemistry and contaminants (e.g. Nitrogen (N), Phosphorus (P), N:P, Metals, Polycyclic Aromatic Hydrocarbons & PCBs) • Estuary dissolved oxygen	• Wild salmon populations • Wild salmon genetic diversity • Wild salmon habitat • Water quality
Climate Change (Threat 11)	• Water temperature: juvenile rearing – stream resident species • Water temperature: migration and spawning – all species • Stream discharge • Coldwater refuge zone	• Wild salmon populations • Wild salmon genetic diversity • Wild salmon habitat • Water quality • Hydrology

Further discussion on how each threat relates to salmon-related objectives and management pressures is included as Appendix C.

6.0 Results of the 2022 Annual Knowledge Plan Process

The top four high priority information categories identified for 2022 through the AKP development process were identified as (1) climate change, (2) salmon populations, (3) ecology/vegetation, and (4) land use and development. Specific knowledge items within the high priority categories are described below:

Climate Change

- Reports and/or datasets pertaining to monitoring, modelling, or mitigation of climate change impacts on salmon habitat within the Skeena Watershed and Ocean Approaches, including but not limited to:
    - Aquatic refugia;
    - Water temperature (streams/rivers and lakes);
    - Water quantity; and
    - Fisheries and Oceans Canada annual reviews.
- Reports and/or datasets pertaining to monitoring, modelling, or mitigation of climate change impacts on survival rates of Skeena salmon at all life stages including but not limited to:
    - Fisheries and Oceans Canada annual reviews.
- Reports and/or datasets pertaining to monitoring or modelling of climate change within the Skeena region and/or northern Pacific ocean including but not limited to:
    - Regional climate change reports;
    - Links to ocean and regional atmospheric data collection pages;
    - Snowpack information;
    - Changes in glacial ice mass;
    - Wildfire data and impacts; and
    - Terrain stability.

Population

- Reports and/or datasets pertaining to monitoring, modelling, or management of salmonid populations including but not limited to:
    - Genetic diversity;
    - Historical abundance;
    - Populations by conservations unit/system;
    - Commercial fishery interception; and
    - Food, Social, and Ceremonial needs.
- Reports and/or datasets pertaining to wild salmon health and annual growth.
- Reports and/or datasets pertaining to impacts on wild salmon populations and survival rates from increased competition from hatchery-raised fish.

Ecology/Vegetation

- Reports and/or data pertaining to vegetation and ecology in the Skeena including but not limited to:
    - Forest harvesting;
    - Riparian disturbance;
    - Land cover alteration;
    - Land cover change over time;
    - Wetlands; and
    - Estuary habitat.
- Spatial data layers pertaining to forest harvesting and land use change.

Land Use and Development

- Reports and/or data pertaining to major projects currently undergoing an Environmental Assessment or major permitting process as it pertains to salmon habitat including but not limited to:
    - Telkwa Coal Mine;
    - Vopak Terminal;
    - Coastal Gaslink Pipeline;
    - Westcoast Gas Transmission Line;
    - Northern Gateway;
    - PNG natural gas pipeline expansion; and
    - Railway expansion.
- Spatial data layers pertaining to land use planning particularly in the area covered by the Wetzin'kwa Land Use Plan.
- Assessments, reports and/or data pertaining to mines and mining infrastructure.

Additional knowledge items relating to water sustainability planning and objectives development were also identified as high priority for 2022. Incoming information relating to Objectives and/or Pressure Indicators not identified as high priority for the year will be prioritized as per the information value ranking process for existing information and uploaded as resources allow.

Table 2 describes the 2022 SKT information priorities organized by salmon-related objective classes as they relate to the OSPC direct threats classification and the AKP framework.

An exceptional case was approved in 2021 for knowledge items generated by the Skeena Environmental Stewardship Initiative (ESI) Skeena Sustainability Assessment Forum (SSAF) which do not meet criteria described by the Information Project Prioritising Process (EGIS, 2021). Skeena ESI SSAF knowledge items will continue to be curated as finalized products become available.

Table 2: High-priority information categories and related objectives, pressure indicators, and OSPC threats

Project Category	SKT AKP Objective Class	Related Pressure Indicator	OSPC Threat Class
Climate Change	• Wild salmon habitat • Wild salmon populations • Water quality • Hydrology	• Water temperature • Suspended sediment • Total land cover alterations (e.g. wildfires) • Stream discharge	• Threat 11
Populations	• Wild salmon populations • Wild salmon genetic diversity • Sustainable salmon fisheries management	• Hatchery production • Salmon harvesting • Total land cover alterations and riparian disturbance (forestry harvesting and agriculture)	• Threat 2 • Threat 5
Vegetation/Ecology	• Wild salmon habitat • Hydroriparian ecosystem integrity • Hydrology	• Total land cover alterations • Suspended sediment • Water temperature • Stream discharge	• Threat 1 • Threat 2 • Threat 5 • Threat 7
Land Use and Development	• Wild salmon habitat • Hydroriparian ecosystem integrity • Water quality • Hydrology	• Total land cover alterations • Riparian disturbance • Road development • Marine vessel traffic • Estuary habitat disturbance • Permitted waste management discharges • Estuary chemistry and contaminants • Accessible stream length	• Threat 1 • Threat 2 • Threat 3 • Threat 4 • Threat 7 • Threat 9

Individual datasets within the prioritized information projects will be evaluated for relevance to Skeena salmon, credibility, and clarity of presentation as they are acquired.

To date, data curation efforts have focussed on identifying and cataloguing existing datasets due to the large volume of relevant information currently available. New information projects may be initiated subject to specific requests or resourcing. Information needs and data gaps identified through the 2022 AKP process include:

- A comprehensive, map-based stream restoration project registry and database for the Skeena;
- Updated salmon habitat indicators with comparisons over time;
- Land cover alteration impact tracking; and
- Legal objective compliance tracking.

A stream restoration site mapping project using the Community Mapping Network (CMN) database as a starting point to build out a comprehensive dataset on the SMP is proposed for 2022 subject to funding approval. This project would involve connecting with organizations working on stream and habitat restoration projects in the Skeena River watershed.

Ongoing SKT communication projects include:

- The compilation, tabulation, and visualization of Tyee Test Fishery current and historical salmon run volume and timing data published by Fisheries and Oceans Canada;
- What's in my watershed? Information summaries for local watersheds; and
- A water temperature visualization dashboard for water temperature information collected in the Upper Bulkley River Watershed.

The continued development of the communication projects is expected to continue for 2022.

7.0 Skeena Knowledge Trust Proposed Activities for 2022

A budget was established by the Skeena Knowledge Trust trustees for 2022 in support of the following activities:

7.1 Governance

Trustee meetings held quarterly to approve the operating budget and AKP, oversee administration, and provide direction for activities and resource allocation. SKT activities, and legal, financial, and administration services will be carried out under contract.

7.2 Finance

Day-to-day bookkeeping services and budget tracking provided by the primary contractor, with financial reporting completed by an independent registered accountant. Grant writing and funding diversification will also be 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

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 2022 will be sharing the new features and enhancements of the updated SSCD and SMP, deepening relationships with existing watershed stewardship and conservation groups, extending awareness of the SKT within coastal

communities, and extending data collection and community science initiatives through the Water Rangers program.

In addition, the SKT is proposing to undertake development of a four-part webinar series highlighting projects that utilize the SSDC and/or the SMP with a focus on projects with Indigenous collaborations. Potential topics include climate change, community science, community engagement tools, and salmon habitat restoration and collaboration.

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 and feature case studies showcasing past projects and collaborations. 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 2022.

7.5 Content and Material Development

7.5.1 Visualizations

The development of What's in my Watershed data visualization and information summaries was initiated in 2020 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 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. What's in my Watershed data visualizations have been completed for three Smithers-areas lakes to-date with additional data visualizations to be completed by request and as resources allow.

A visualization of current and historical salmon runs was piloted in 2020 with the development of the Tyee Test Fishery Salmon and Steelhead Returns dashboard. The dashboard was updated with 2021 data on a weekly basis during the summer months and was a popular reference for users. The Tyee Test Fishery Salmon and Steelhead Returns dashboard will be updated with 2022 data as it is made available. A potential expansion to include other fish fence numbers (e.g. Babine Lake) will be pursued as resources allow.

A water temperature monitoring data dashboard was piloted in 2021 with available data for the Upper Bulkley River Watershed. This dashboard summarizes water temperature data in a variety of ways and includes regional climate and stream discharge information as well as provincial water quality guidelines. An expansion or replication of the dashboard is anticipated for similar data collected in the Kispiox, Babine, and Upper Skeena River Watersheds either in 2022 or 2023.

7.5.2 User self-help tools

User self-help tools include help pages and educational materials developed 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 additional short instructional videos was completed for the SSDC and the updated SMP.

7.6 Data Acquisition and Curation

High priority information identified in Section 6.0 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 and domain maintenance.

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. Major upgrades for both the SSDC and SMP were undertaken in 2021 and are expected to be completed in early 2022. Additional functionality and enhancements will continue to be added as resources allow.

8.0 Evaluation and Reporting

A summary of SKT activities, data acquisition, and curated information is completed annually as part of the SKT's Year in Review and subsequent year's Annual Knowledge Plan.

Financial reporting is completed on an on-going basis with quarterly updates and a final budget report provided to the trustees for review. Formal financial documentation and charity filing with the Canada Revenue Agency is completed annually by a registered professional accountant.

Project-specific reporting is completed throughout the year according to funder requirements.

9.0 References

Eclipse Geomatics Ltd. [EGIS]. 2021. 2021 Annual Knowledge Plan. Prepared for the Skeena Knowledge Trust. Available at https://data.skeenasalmon.info/dataset/skt-annual-knowledge-plans.

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.

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Sustaining Development IUCN and the Sustainable Development Goals. 2017. International Union for Conservation of Nature and Natural Resources.

United Nations Department of Economic and Social Affairs Sustainable Development. 2021. The 17 Goals. https://sdgs.un.org/goals.

APPENDIX A

Information Management Framework

Information Management Framework

The SKT AKP Information Management Framework (IMF) is outlined by the Skeena Knowledge Trust Agreement Schedule "C" (SKT, 2017) and consists of the following components: (1) 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 (the "Plans and Policies"), (2) a compilation of salmon-related objectives from the Plans and Policies by objective class (the "Objectives"), (3) a list of relevant pressure indicators of management activities that influence whether an Objective will be achieved (the "Pressure Indicators", and (4) relevant geographic areas. IMF components utilized for the 2021 SKT AKP development are included below. The IMF is reviewed and maintained on an annual basis.

1. Plans and Policies

a) the federal Wild Salmon Policy;
b) the Metlakatla Strategic Land Use Planning Agreement;
c) the Gitanyow Land Use Plan;
d) the Wet'suwet'en Land Use Plan;
e) the North Coast Land and Resource Management Plan;
f) the Kalum Land and Resource Management Plan;
g) the Morice Land and Resource Management Plan;
h) the Bulkley Land and Resource Management Plan;
i) the Kispiox Land and Resource Management Plan;
j) the Kalum Sustainable Resource Management Plan;
k) the Cranberry Sustainable Resource Management Plan;
l) the Bulkley Valley Sustainable Resource Management Plan;
m) the West Babine Sustainable Resource Management Plan;
n) the Marine Planning Partnership North Coast Plan (Draft);
o) the Pacific North Coast Integrated Management Plan;
p) provincial land-use legislation;
q) provincial fisheries legislation;
r) federal fisheries legislation

2A. 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.

The identified objective classes have been distilled into the following information categories 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)

2B. Compilation of Salmon-related Objectives from the Plans and Policies

Salmon-related objectives from the Plans and Policies compiled by Price and Pfalz (2015) are listed in Table 3 below:

Table 3: Compilation of Salmon-Related Objectives by Objective Class

Objective Class	Objectives
a. maintain wild salmon populations;	• Protect/conserve indigenous fish populations • Restore fish populations
b. maintain wild salmon genetic diversity;	
c. for all salmon life stages, maintain habitat in the ocean; the estuary; and freshwater;	• Maintain fish habitat • Minimize/manage the effects of development on fish habitat • Rehabilitate degraded fish habitat
d. maintain hydroriparian ecosystem integrity;	• Sustain ecological integrity of the full range of aquatic/riparian/hydroriparian ecosystems
e. maintain hydrology (water quantity);	• Maintain hydrological integrity/water quantity • Maintain needed low-flows • Minimize effects of water use on water quantity • Restore hydrological integrity • Manage cumulative effects to an acceptable level
f. maintain water quality, including: chemistry; sedimentation; and temperature;	• Maintain water quality • Restore/enhance water quality • Manage cumulative effects to an acceptable level • Sustain structural and functional integrity of stream channels • Maintain water temperature within critical limits for salmonids
g. manage salmon fisheries for sustainable benefits.	

3. Pressure Indicators

Indicators used by the SKT IMF comprise pressure indicators of management activities developed in support of Canada's Policy for Conservation of Wild Pacific Salmon (Fisheries and Oceans Canada, 2005) as well as selected state indicators and are presented in Table 4 below. The list of indicators is reviewed on an annual basis.

Table 4: Refined indicator list

Indicator Type	Indicator
Pressure	Total land cover alteration
	Riparian disturbance
	Estuary habitat disturbance
	Equivalent clearcut area
	Young second growth forest
	Road density
	Road density near streams
	Road density on steep slopes
	Point source pollution
	Water extraction
	Groundwater wells
	Dams and impoundment
	Marine vessel traffic
	Fisheries harvesting rates
	Hatchery fish production
State	Water quality
	Suspended sediment
	Water temperature: juvenile rearing - stream resident species
	Water temperature: migration and spawning - all species
	Stream discharge
	Accessible stream length, based on barriers
	Key spawning areas (length)
	Low flow sensitivity
	Coldwater refuge zone
	Lake productive capacity
	Lakes and wetlands
	Lake shore spawning area (length)
	Salmon escapement
	Benthic invertebrate health
	Hydrocarbons & PCBs)
	Estuary dissolved oxygen
	Estuarine habitat area
	Ocean temperatures at depth
	Ocean acidification
	Sea surface temperatures

Geographical Area

The geographic extent relevant to the SKT consists of the Skeena Watershed and Ocean Approaches as defined by the SKT Trust Agreement and shown in Figure 1 and Figure 12. A more detailed map of the area is available at https://data.skeenasalmon.info/dataset/skt-trust-agreement-documents.

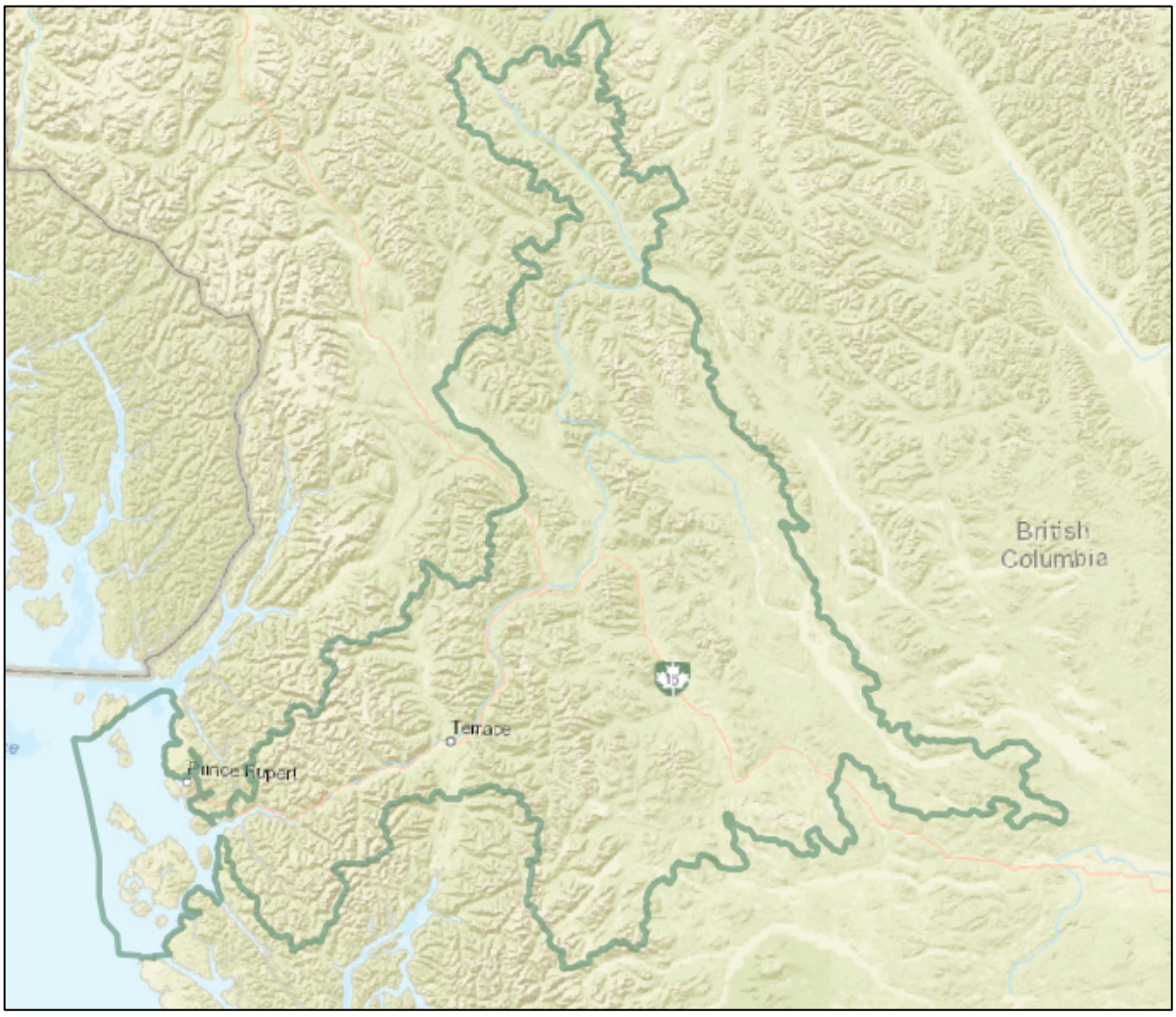


Figure 12: Detail view of the Skeena Watershed and Ocean Approaches outlined in green.

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.

Price and Pfalz. 2015. Skeena Knowledge Trust Information Management Framework: Discussion Paper. Prepared for the SKT Governance Establishment Group and Bulkley Valley Research Centre. Available from https://data.skeenasalmon.info/dataset/skeena-knowledge-trust-information-management-framework-discussion-paper.

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

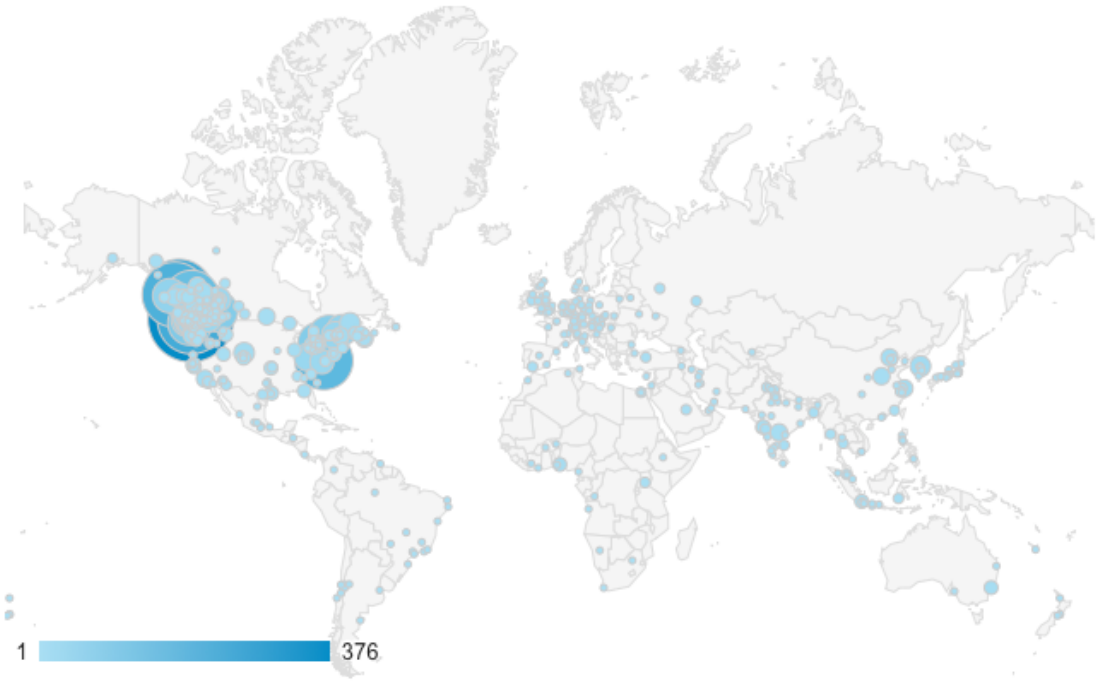
Stalberg, H. C., Lauzier, R. B., MacIsaac, E. A., Porter, M. and C. Murray. 2009. Canada's Policy for Conservation of Wild Pacific Salmon: Stream, Lake, and Estuarine Habitat Indicators. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2859: 135pp Retrieved from: http://publications.gc.ca/collections/collection_2014/mpo-dfo/Fs97-4-2859-eng.pdf.

APPENDIX B

Skeena Salmon Data Centre Traffic Report

2021 Skeena Salmon Data Centre Traffic Report

Geographical distribution of Skeena Salmon Data Centre (SSDC) visitors in 2021 by city:



Total yearly users in 2021: 6,117

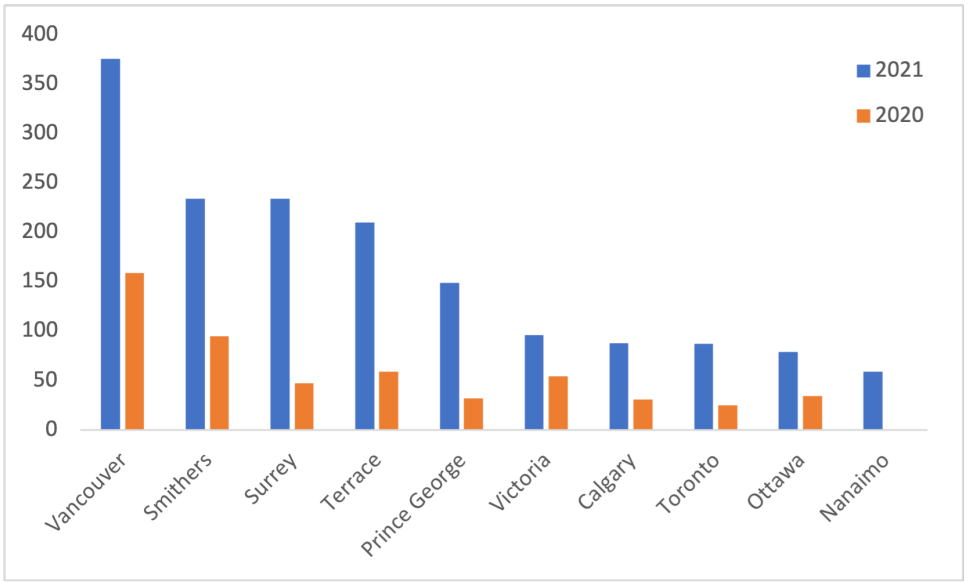


Figure 13: Top ten cities by number of SSDC visitors in 2020 and 2021

Table 5: Top 20 most viewed SSDC datasets in 2021

Ranking	Dataset Title	URL	Page Views
1	Skeena Tyee Test Fishery Visualization	https://data.skeenasalmon.info/dataset/skeena-tyee-test-fishery-data	1667
2	2021 Skeena Sockeye Forecast	https://data.skeenasalmon.info/dataset/2021-skeena-sockeye-forecast	342
3	SSAF State of the Value Report for Fish and Fish Habitat 2020 - Data	https://data.skeenasalmon.info/dataset/ssaf-state-of-the-values-report-for-fish-and-fish-habitat-2020-data	200
4	Upper Bulkley Water Temperature Monitoring Data	https://data.skeenasalmon.info/dataset/upper-bulkley-water-temperature-monitoring-data	191
5	SSAF State of the Values Report for Wetlands 2020 - Data	https://data.skeenasalmon.info/dataset/ssaf-state-of-the-values-report-for-wetlands-2020-data	134
6	SSAF State of Value Report for Grizzly Bear 2020 - Data	https://data.skeenasalmon.info/dataset/ssaf-state-of-value-report-for-grizzly-bear-2020-data	134
7	SSAF State of the Values Report for Wetlands 2020	https://data.skeenasalmon.info/dataset/ssaf-state-of-the-values-report-for-wetlands	114
8	Climate Change Adaptation Planning for Northwest Skeena Communities	https://data.skeenasalmon.info/dataset/climate-change-adaptation-planning-for-northwest-skeena-communities1	113
9	BC Water Resources Atlas	https://data.skeenasalmon.info/dataset/bc-water-resources-atlas	95
10	Old Growth Deferral Areas	https://data.skeenasalmon.info/dataset/old-growth-deferral-areas	81
11	Wild Salmon Policy Indicator Analysis for the Kispiox TSA	https://data.skeenasalmon.info/dataset/wild-salmon-policy-indicator-analysis-for-the-kispiox-tsa	79
12	Water Survey of Canada Hydrometric Station Data	https://data.skeenasalmon.info/dataset/water-survey-of-canada-hydrometric-stations	78
13	SSAF State of the Value Report for Fish and Fish Habitat 2020	https://data.skeenasalmon.info/dataset/ssaf-state-of-the-values-report-for-fish-and-fish-habitat-2020	74
14	Coastal Watershed Assessment Procedure Guidebook (CWAP) Interior Watershed Assessment Procedure Guidebook (IWAP)	https://data.skeenasalmon.info/dataset/interior-watershed-assessment-procedure-guidebook-iwap	59
15	Skeena Knowledge Trust Meeting Minutes	https://data.skeenasalmon.info/dataset/skt-meeting-minutes	47

16	Lakelse 1937 Historical Air Photo Archive (1 of 3 Datasets)	https://data.skeenasalmon.info/dataset/lakelse-1937-historical-air-photo-archive	43
17	Skeena Knowledge Trust Agreement	https://data.skeenasalmon.info/dataset/skt-trust-agreement-documents	41
18	SSAF State of Value Report for Grizzly Bear 2020	https://data.skeenasalmon.info/dataset/ssaf-state-of-value-report-for-grizzly-bear-2020	40
19	Lower Skeena River Floodplain Mapping	https://data.skeenasalmon.info/dataset/lower-skeena-river-floodplain-mapping	38
20	Lakelse River Steelhead: Summary of Current Data and Status Review, 1997	https://data.skeenasalmon.info/dataset/lakelse-river-steelhead-summary-of-current-data-and-status-review-1997	38

User acquisition analysis was completed for the first time in 2021. Figures 14 and 15 show user acquisition by new or returning users and by search type respectively.

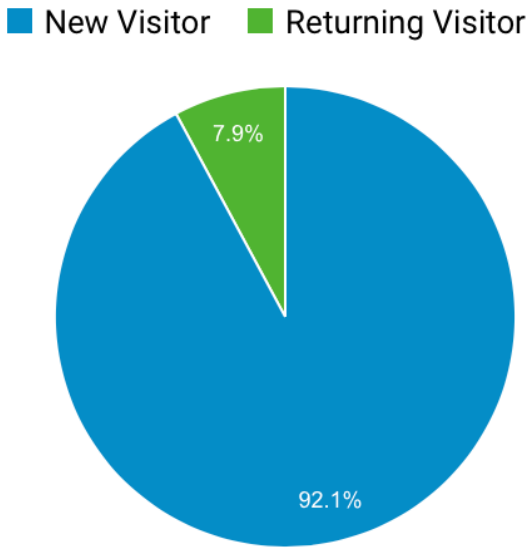


Figure 14: SSDC new and returning visitor comparison

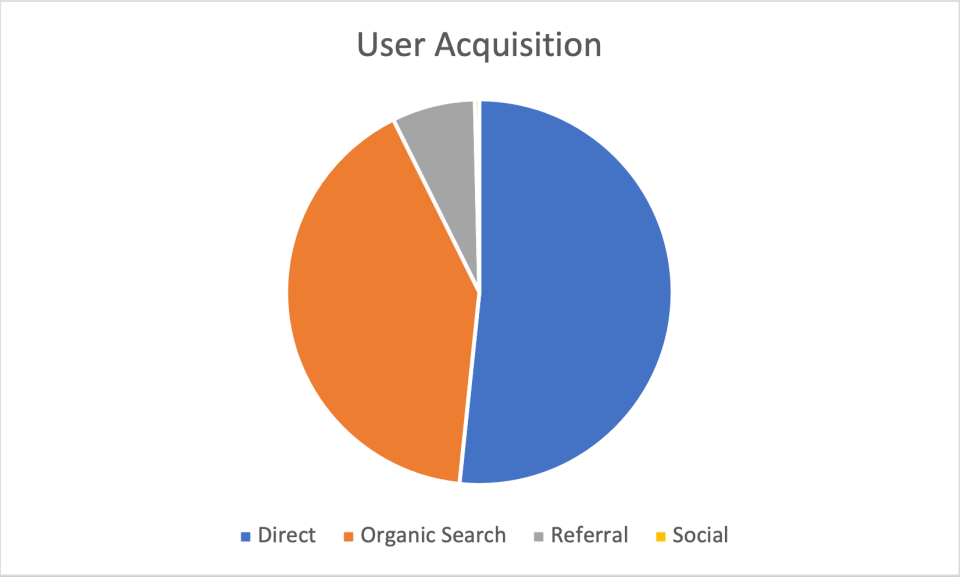


Figure 15: User acquisition by search type.

Search types show in Figure 15 include:

- Direct search – when a user uses a bookmark or types our URL into a browser;
- Referral – when a user clicks a link;
- Organic search – when a user finds our site by entering search terms into a browser; and
- Social – when users follow a link from social media.

The top 20 search terms used in browsers searches leading to SSDC pages are listed in Table 6.

Table 6: Top browser search terms used to direct users to SSDC datasets

Ranking	Top Search Queries
1	bc water atlas
2	bc water resources atlas
3	bc water resource atlas
4	minfile
5	water science series
6	water resource atlas
7	skeena tyee test fishery
8	pacific booker minerals
9	real time hydrometric data
10	streams east
11	steelhead office
12	real time hydrometric data map
13	site specific water quality objectives
14	water quality objectives
15	water survey of canada real time
16	hydrometric data
17	fidq
18	skeena river fishing
19	lidarbc
20	habitat compensation

SSDC Traffic Report Data Notes

- All data are from Google Analytics except search terms, which are from Google Search Console.
- Site traffic/user numbers are unedited except for removal of a large set of users from Indonesia in December. These were not considered to be real users as there was a large number from one city in a few days with a very high bounce rate.
- For the top dataset summary, all results that are not datasets (home page, resources, help pages, etc.) were removed from the results. For datasets that were included multiple times (i.e. appearing in different languages), the datasets were included only once with the total number of pageviews added together.

APPENDIX C

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 eight of these threats as relevant to the Skeena watershed and estuary environment for 2020.

The eight 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 and competition from/interbreeding with hatchery-raised salmon from large production hatcheries.

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. However, hatchery-raised salmon from large production hatcheries in BC and Alaska can reduce the survival of wild salmon by increasing competition for food in the ocean, masking population trends resulting in unsustainable harvest levels, and reducing the quality of wild salmon stock and genetics by interbreeding with weaker individuals.

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.

Skeena Sustainability Assessment Forum (SSAF). 2021. Skeena Sustainability Assessment Forum's State of the Value Report for Fish & Fish Habitat. Retrieved from https://data.skeenasalmon.info/dataset/ssaf-state-of-the-values-report-for-fish-and-fish habitat-2020