

CICADA: Cumulative Effects Spatial Data

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2025

**Canadian Data Report of
Fisheries and Aquatic Sciences 1447**



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Canadian Data Report of Fisheries and Aquatic Sciences

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Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

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Cat. No. Fs97-13/1447E-PDF ISBN 978-0-660-78417-5 ISSN 1488-5395

Correct citation for this publication:

Chu, C., Dey, C.J., and Rudolph, C. 2025. CICADA: Cumulative Effects Spatial
Data. Can. Data Rep. Fish. Aquat. Sci. 1447: iii + 25 p.

ABSTRACT

Chu, C., Dey, C.J., and Rudolph, C. 2025. CICADA: Cumulative Effects Spatial Data. Can. Data Rep. Fish. Aquat. Sci. 1447: iii + 25 p.

Consideration of cumulative effects for inland regulatory habitat decision-making and planning at Fisheries and Oceans Canada (DFO) requires understanding of the distributions of fishes, their habitats, and human activities across the Canadian landscape. A national, inland geospatial database, CICADA (**C**umulative **e**ffe**C**ts **g**eosp**A**tial **D**Ata), was developed to address this need. This report describes the fish, habitat, stress/stressor, and other watershed data (and their sources) included in the CICADA database. These data are intended to improve our understanding of fish, habitats, and human activities on the landscape in order to inform decision-making related to fish habitat regulation and planning processes at DFO.

RÉSUMÉ

Chu, C., Dey, C.J., and Rudolph, C. 2025. CICADA: Cumulative Effects Spatial Data. Can. Data Rep. Fish. Aquat. Sci. 1447: iii + 25 p.

Pour tenir compte des effets cumulatifs dans la prise de décisions et la planification réglementaires sur l'habitat dans les régions intérieures à Pêches et Océans Canada (MPO), il est nécessaire d'avoir une compréhension de la répartition des poissons et de leurs habitats ainsi que des activités humaines dans tout le Canada. L'outil CICADA (**C**umulative **e**ffe**C**ts **g**eosp**A**tial **D**Ata), une base de données géospatiales sur les effets cumulatifs dans les régions intérieures et nationales, a été élaboré pour répondre à ce besoin. Ce rapport décrit les données sur les poissons, les habitats, les facteurs de stress et d'autres données sur le bassin hydrographique (ainsi que leurs sources) incluses dans la base de données CICADA. Ces données visent à améliorer notre compréhension des poissons, des habitats et des activités humaines au pays afin d'éclairer la prise de décisions liées aux processus de réglementation et de planification de l'habitat du poisson au MPO.

DESCRIPTION

Section 34.1 (1) (d) of the *Fisheries Act*, R.S.C. 1985, c. F-14 (as amended by S.C. 2019, c. 14), specifies the consideration of cumulative effects for regulatory fish habitat decision-making and planning. A recent survey of 75 practitioners and researchers across Canada identified that the most important freshwater fish habitat research questions are: “When do cumulative impacts on a system lead to tipping points (thresholds) in ecosystem health?” and “When, how, and over what scale, should management decisions consider cumulative effects?” (Dey et al. 2021). Answering these questions, and considering cumulative effects in fish habitat management decisions and planning, requires an understanding of fish species and habitat distributions as well as the current landscape of human activities in Canada (Hodgson et al. 2022). CICADA (**C**umulative **e**ffe**C**ts **s**p**A**tial **D**A**A**), a geospatial database for Canadian watersheds, was developed to address this need.

Three steps were taken to build CICADA. First, data related to fish species distributions, their habitats, and human activities were identified and acquired from online and open federal, provincial, territorial, and international data sources. Once the data were compiled, they were reviewed for quality assurance and quality control. This step included cleaning the data (e.g., removing obvious errors or missing data records), standardizing the measurements (e.g., measurements of total phosphorus in ug/L were standardized to mg/L across all datasets), and verifying georeferenced information (e.g., matching fish sampling locations to waterbodies). The verifications and standardizations were executed using scripts written in R (v. 4.2.2; R Core Team 2021) and ArcGIS Pro (Esri 2021). The final step involved the compilation of the data into one geospatial platform; in this case, an R Shiny (Chang et al. 2024) application that is accessible within Fisheries and Oceans Canada (DFO) through the DM Apps portal. Users of the application can query information on fish, habitat, stress/stressors, and other relevant information for a focal watershed surrounding a site of interest, such as a site proposed for works, undertakings, or activities.

This report describes the data and data sources that have been included in CICADA. The data were categorized into five broad categories: base spatial, fish, habitat, stress/stressor, and other watershed information (Table 1).

Table 1: Categories, brief descriptions, and resolutions of the data included in CICADA.

Data category	Description	Spatial resolution
Base spatial data	Locations and extent of land, waterbodies, and watercourses	Ranges from 1:1,000 to 1:72,000 (0.3–21.6 m)
	Topography	Ranges from 1:1,000 to 1:72,000 (0.3–21.6 m)

	Watershed boundaries	1:50,000 (15 m)
Fish data	Tertiary watershed fish species lists Site-level fish observations	N/A Point data
Habitat data	Land use/land cover Species at Risk critical habitat Protected areas Site-level water quality observations	1:9,000 (30 m but ~15% of data aggregated to 100 m in northern Canada for computational purposes) 1:5,000 (1.5 m) 1:50,000 (15 m) Point data
Stress and stressor data	Landscape modification index Barriers in aquatic systems Industrial activities	1:1,000,000 (300 m) Point data Point and polyline data
Other watershed information	Watershed area Freshwater ecoregion of the watershed of interest COSEWIC freshwater biogeographic zone of the watershed of interest Predominant land cover classes Five most common fish species based on site-level fish presence data	N/A N/A N/A N/A N/A

Base spatial data

Locations and extent of land, waterbodies, watercourses, and topography

The basemap included in CICADA is the Esri World Topographic Map vector tile (Esri 2023), which includes the land, waterbodies, watercourses, topography, and jurisdictional boundaries of Canada. The basemap is compiled from a variety of authoritative sources including Canadian federal government datasets. It has a resolution of 1:72,000 (21.6 m) to 1:4,000 (1.2 m) for most of Canada and higher resolutions of 1:1,000 or 1:2,000 (0.3 or 0.6 m, respectively) in some urban areas. However, very small features (e.g., narrow watercourses or waterbodies such as ponds) may not be included in the basemap.

Watershed boundaries

Two levels of watershed boundaries are included in CICADA: the [National Hydrographic Network](#) tertiary watershed layer (Figure 1), and smaller scale watersheds in British Columbia ([BC Freshwater Atlas](#) units), Alberta ([Hydrological Unit Code Level 8](#) units), and Ontario ([Ontario Watershed Boundaries Quaternary Watershed](#) units) (Figure 2). The provincial watershed layers have been included because they are consistent with the scale of some provincial spatial planning processes.

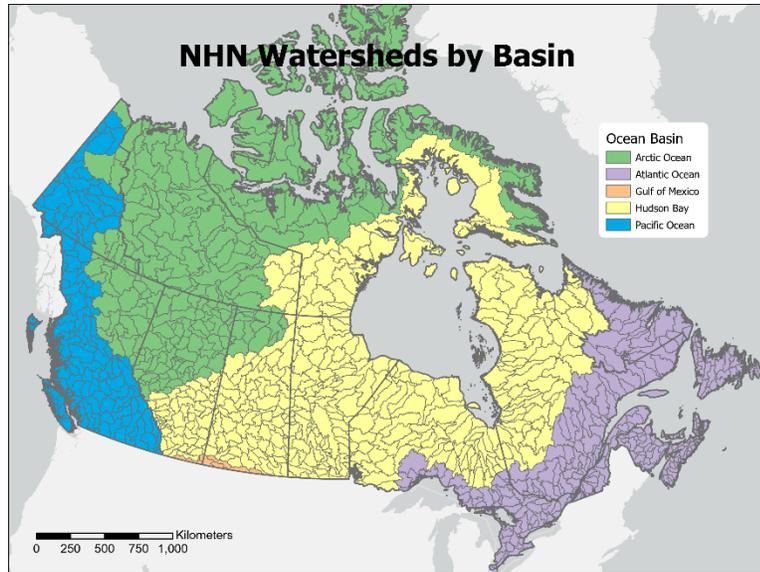


Figure 1. National hydrographic network (NHN) tertiary watersheds in Canada. Canada's major drainage basins are shown for interest and are not included in CICADA.

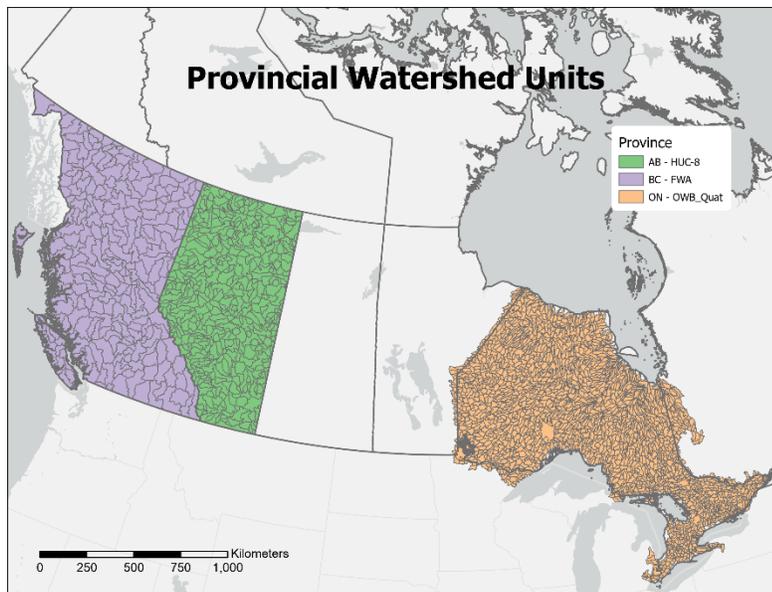


Figure 2. Provincial watershed layers in CICADA including British Columbia Freshwater Atlas watersheds, Alberta Hydrological Unit Code Level 8 watersheds, and Ontario Watershed Boundary Quaternary watersheds.

Fish data

Tertiary watershed fish species lists

Tertiary watershed fish species lists and site-specific fish species observations are included in CICADA. The tertiary species lists are consistent with Anas and Mandrak (2022) and contain:

- common name: the common name of fish species present in the watershed. Note that regionally specific common names were retained for some species, e.g., watersheds in British Columbia may have Sockeye and/or Kokanee Salmon;
- scientific name: the scientific name of fish species present in the watershed;
- species origin: categories of 'native', 'translocated', or 'foreign' describe whether the species is native to the focal watershed, is native to Canada but not to the focal watershed, or is not native to Canada, respectively.

Site-level fish observations

Site-specific fish capture data are included in CICADA for over 240,000 sites across Canada (Figure 3). These data were compiled by the CICADA project team from a variety of online, open provincial and regional datasets, which are detailed in Annex A. Fish are present at many other sites across Canada, but it was beyond the scope of this exercise to identify and incorporate site-level fish observations available through non-open data sources such as individual published scientific studies or the grey literature.

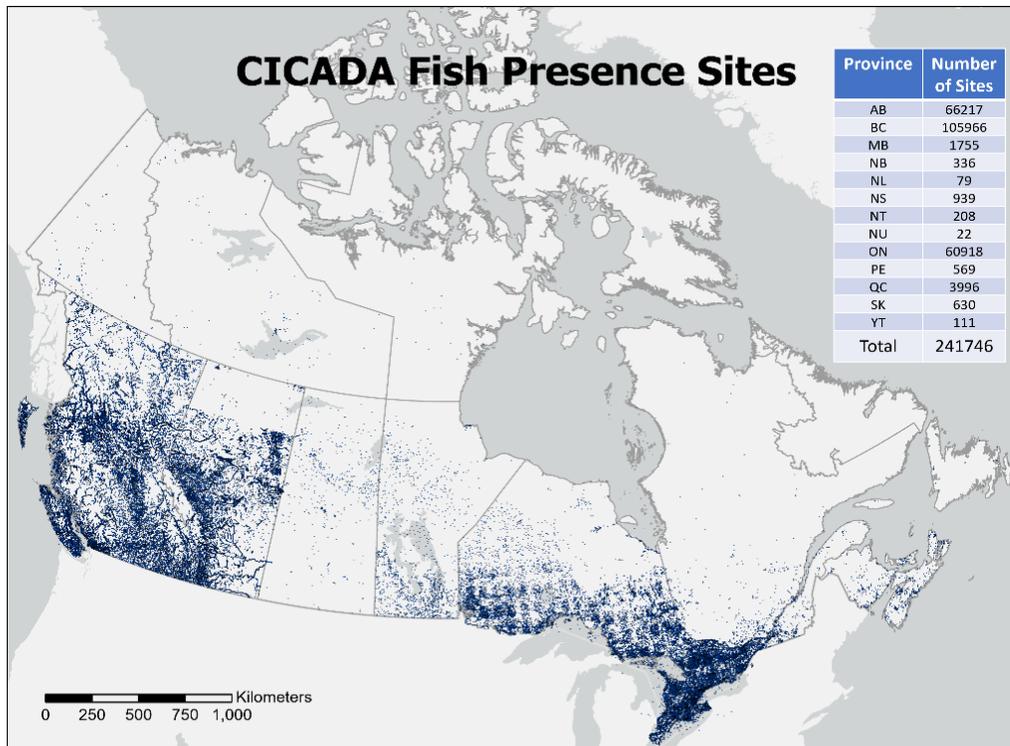


Figure 3. Sites with fish observation data within CICADA.

The site-level fish observation information contains:

- common name: the common name of the fish species;
- scientific name: the scientific name of the fish species;
- site ID: a unique site ID for each sampling site, to help reference the information provided in the interactive map;
- last caught: the date that the fish species was most recently caught at that sampling site;
- latitude: the latitude of the sampling site, in WGS 1984;
- longitude: the longitude of the sampling site, in WGS 1984;
- waterbody name: the name of the waterbody in which the sampling site is located, if available.

Habitat data

Land use/land cover

Land use and land cover data were derived from ESA Sentinel-2 satellite imagery with each pixel assigned to one of nine categories via a deep learning AI classification model trained on billions of human-labeled images (Karra et al. 2021; Figure 4). Possible classification values are:

- water: areas where water was predominantly present throughout the year; may not cover areas with sporadic or ephemeral water; contains little to no sparse vegetation, no rock outcrop, no built up features like docks; examples: rivers, ponds, lakes, oceans, flooded salt plains;
- trees: any significant clustering of tall (~15 feet or higher) dense vegetation, typically with a closed or dense canopy; examples: wooded vegetation, clusters of dense tall vegetation within savannas, plantations, swamps or mangroves (dense/tall vegetation with ephemeral water or canopy too thick to detect water underneath);
- flooded vegetation: areas of any type of vegetation with obvious intermixing of water throughout a majority of the year; seasonally flooded areas that are a mix of grass/shrub/tree/bare ground; examples: flooded mangroves, emergent vegetation, rice paddies and other heavily irrigated and inundated agriculture;
- crops: human planted/plotted cereals, grasses, and crops not at tree height; examples: corn, wheat, soy, fallow plots of structured land;
- built area: human made structures; major road and rail networks; large homogenous impervious surfaces including parking structures, office buildings, and residential housing; examples: houses, dense villages/towns/cities, paved roads, asphalt;
- bare ground: areas of rock or soil with very sparse to no vegetation for the entire year; large areas of sand and deserts with no to little vegetation; examples: exposed rock or soil, desert and sand dunes, dry salt flats/pans, dried lake beds, mines;
- snow/ice: large homogenous areas of permanent snow or ice, typically only in mountain areas or highest latitudes; examples: glaciers, permanent snowpack, snow fields;
- clouds: no land cover information due to persistent cloud cover;
- rangeland: open areas covered in homogenous grasses with little to no taller vegetation; wild cereals and grasses with no obvious human plotting (i.e., not a plotted field); mix of small clusters of plants or single plants dispersed on a landscape that shows exposed soil or rock; scrub-filled clearings within dense forests that are clearly not taller than trees; examples: natural meadows and fields with sparse to no tree cover, open savanna with few to no trees, parks/golf courses/lawns, pasture.

For most watersheds, the resolution of the land use/land cover data is 30 m x 30 m. A small number of northern watersheds are too large to map at such fine resolution, and were upscaled to 100 m x 100 m. Therefore, features that are

smaller than this size will not be well represented in the layer. Furthermore, some pixels may be misclassified through the automated classification methods, which had an 85% accuracy across a variety of exemplar datasets (Karra et al. 2021).

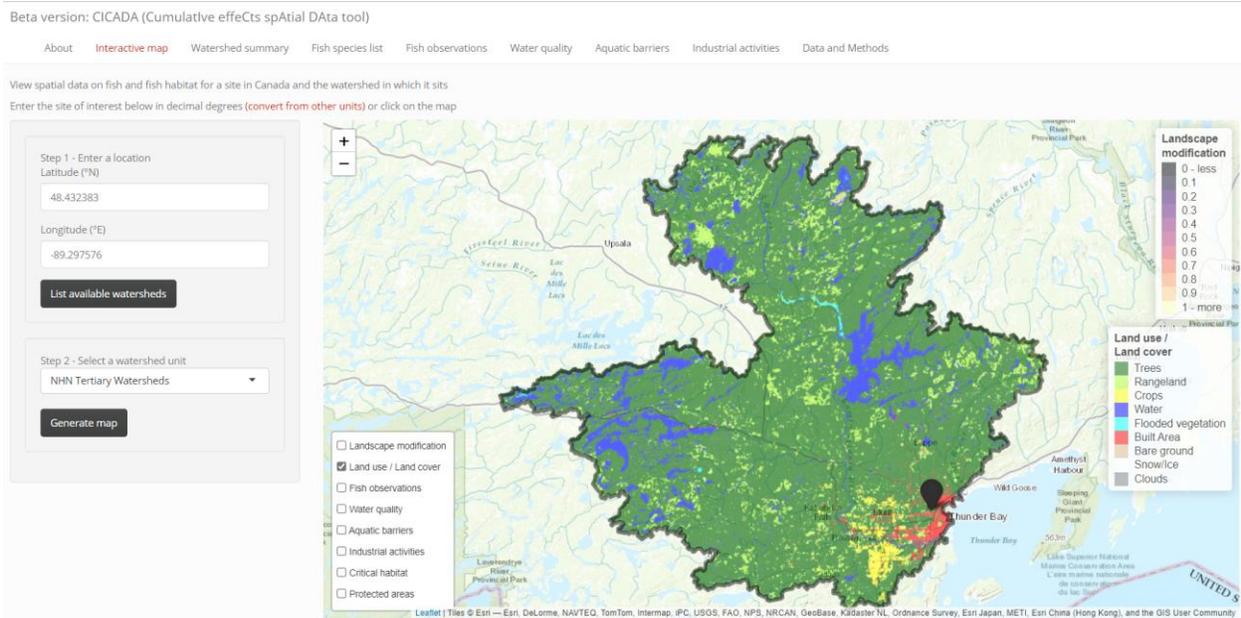


Figure 4. Example of land use/land cover information that is available in CICADA for a watershed near Thunder Bay, Ontario.

Species at Risk critical habitat

Areas designated as critical habitat for fish or mussels (up until May 2023) under the *Species at Risk Act*, S.C. 2002, c. 29, ss 56–61 are included in CICADA. The critical habitat spatial data were downloaded from the [Government of Canada Open Data Portal – Critical Habitat of Species at Risk](#), and filtered for freshwater and diadromous species (i.e., marine species were removed). Species names, designatable unit (if applicable) that corresponds to that habitat, as well as the *Species at Risk Act* S.C. 2002, c. 29 Schedule I status are also included in CICADA (Figure 5).

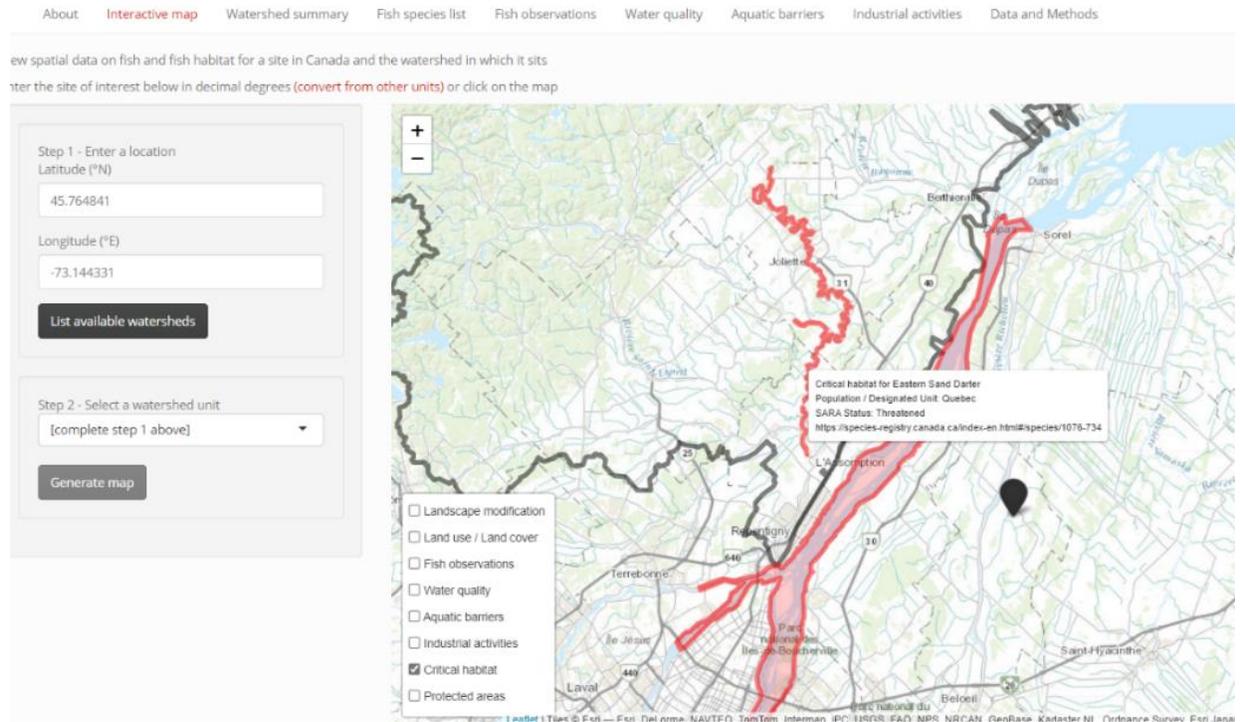


Figure 5. Example of the Species at Risk critical habitat polygons and polylines included in CICADA.

Protected areas

Protected areas data were downloaded from the [Canadian Protected and Conserved Areas Database's December 2022 release](#). These data include all areas considered as protected areas or other effective area-based conservation measures (OECMs) per the [CPCAD User Manual](#) and reported by the responsible national and subnational jurisdictions (Figure 6). In addition to the extent of the protected areas or OECMs, the information in CICADA includes the name, type, and owner of the protected area, and when those data were made available.

- turbidity (NTU): the measured turbidity, in nephelometric turbidity units;
- conductivity (uS/cm): the measured specific conductance, in microsiemens per centimeter;
- nitrates (mg NO₃-N/L): the measured nitrate concentration, in milligrams of nitrate–nitrogen per liter;
- total phosphorus (ug/L): the measured total phosphorus concentration, in micrograms per liter;
- selenium total (ug/L): the measured total selenium concentration, in micrograms per liter;
- selenium dissolved (ug/L): the measured dissolved selenium concentration, in micrograms per liter;
- total dissolved solids (mg/L): the measured total dissolved solids, in milligrams per liter.

Water quality index scores were also calculated for sites where appropriate data were available based on methods outlined in the [Canadian Council of Ministers of the Environment \(CCME\) Water Quality Index User’s Manual 2017 Update](#). This index gives a score between 0 (poor quality) and 100 (excellent quality) based on the frequency, scope, and amplitude by which water quality guidelines failed to be met (Table 2).

Table 2. Water quality index scores in CICADA based on CCME guidelines.

Water quality description	Water quality index value
Excellent	95–100
Good	80–94
Fair	65–79
Marginal	45–64
Poor	0–44

In order to calculate the water quality index (WQI), we focused on seven water quality parameters for which specific guidelines were available (Table 3; Environment and Climate Change Canada 2023). We included water quality measurements taken from January 1, 2000 onwards and only calculated a WQI at a site if: i) the site had been sampled for longer than 1 year; ii) the site had been sampled at least 4 times per year throughout the sampling period; and iii) at least 4 different water parameters from Table 3 had been measured and met criteria i) and ii).

Table 3. Parameters and guideline values used in the calculation of the water quality index (WQI) in CICADA.

Water chemistry parameter	Guideline used in CICADA WQI calculation	Source
Dissolved oxygen	> 6.5 mg/L	Canadian Council of Ministers of the Environment 1999
Dissolved chloride	< 120 mg/L	Canadian Council of Ministers of the Environment 2011
pH	6.5–9	Canadian Council of Ministers of the Environment 1987
Total phosphorus	< 30 ug/L	Environment and Climate Change Canada 2023
Nitrates	< 2.93 mg NO ₃ -N/L	Canadian Council of Ministers of the Environment 2012
Total selenium	< 2 ug/L	Government of Canada 2008
Turbidity	<10 NTU	Environment and Climate Change Canada 2023a

Stress and stressor data

Stresses are human activities (e.g., agriculture, urban development, forestry) whereas stressors are the result of human activities (e.g., the degradation in water quality due to human activities). Although water quality has been categorized as habitat information, sites with fair, marginal, or poor water quality (Table 2) may also be considered as a stressor on fishes and other aquatic life.

Landscape modification index

The extent and intensity of human modification to the landscape is represented in CICADA by an index that scales from 0 (no modification) to 1 (maximal modification). These values were calculated by Theobald et al. (2020) and are based on the footprint of a variety of stressors including built areas, agriculture, energy production, mining, transportation and service corridors, biological harvesting (e.g., forestry), human intrusions, natural system modifications, and pollution. The values are based on landscape modification as of 2017, and are presented at a 300 x 300 m resolution (Figure 7).

View spatial data on fish and fish habitat for a site in Canada and the watershed in which it sits

Enter the site of interest below in decimal degrees ([convert from other units](#)) or click on the map

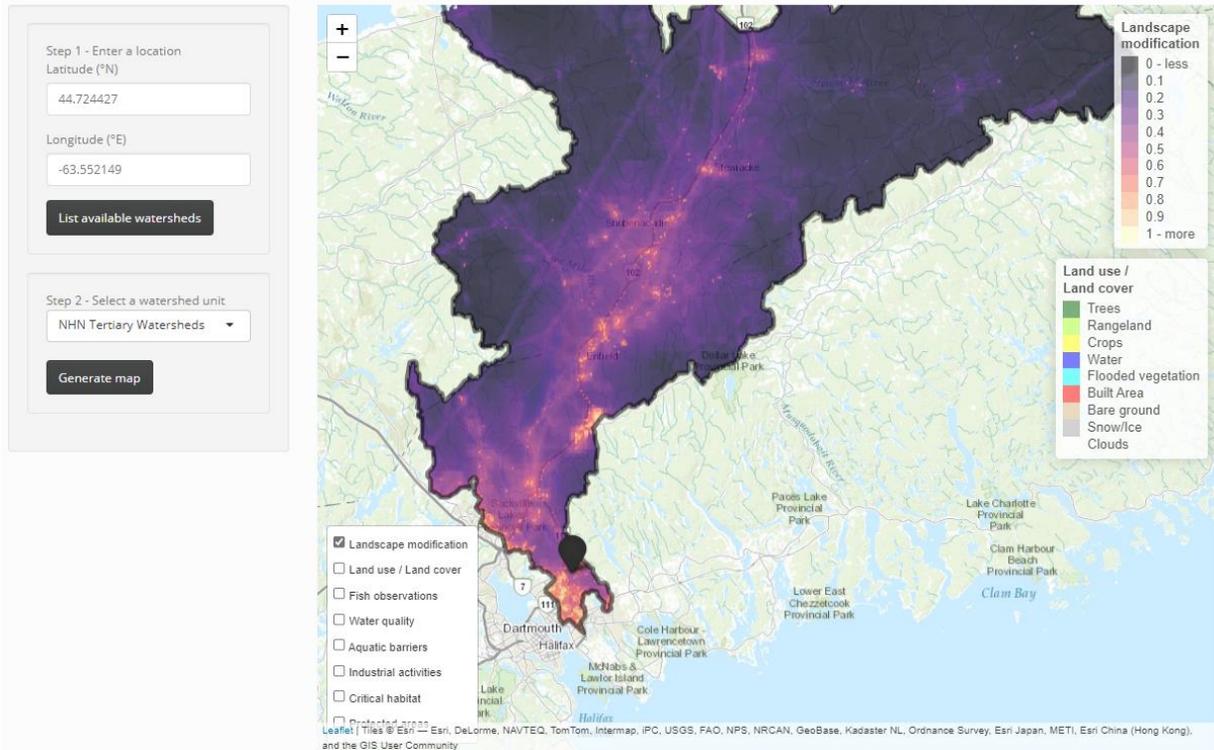


Figure 7. Example of the landscape modification index, shown on a scale of 0 (no modification) to 1 (maximum modification) for a watershed near Halifax, Nova Scotia.

Barriers in aquatic systems

Data on barriers in aquatic systems in CICADA are based on the Canadian Wildlife Federation’s [Canadian Aquatic Barrier Database](#), which has compiled over 100 datasets relating to aquatic barriers in Canada (Figure 8). While these data represent the most comprehensive data on barriers in aquatic systems in Canada, they are not complete. As such, the absence of aquatic barriers within CICADA is not necessarily indicative of a true absence of barriers. The barrier data include dams, waterfalls, and fishways, the unique ID number for the barrier, and information on height, use, and passability, where they are available.

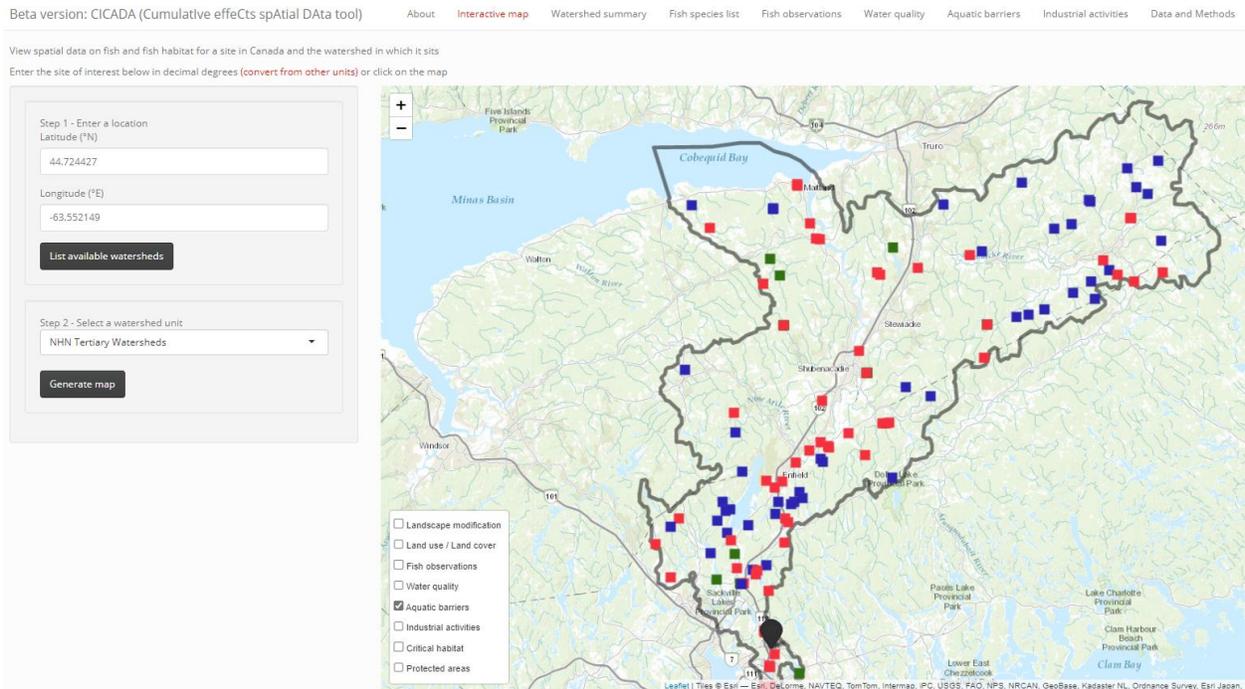


Figure 8. Example of the aquatic barriers data included in CICADA.

Industrial activities

Information on current, former, or planned industrial activities were compiled from several federal data sources and included in CICADA (Table 4; Figure 9).

Table 4. Industrial activities and data sources included in CICADA

Activity	Source
Producing mines	Natural Resources Canada 2023
Oil and gas sites	Natural Resources Canada 2023
Metalwork sites	Natural Resources Canada 2023
National Pollutant Release Inventory sites	Environment and Climate Change Canada 2023b
Wastewater Systems Effluent Regulations sites	Environment and Climate Change Canada 2022

Federal Contaminated Sites Inventory sites	Treasury Board of Canada Secretariat 2023
(Planned) Major Projects Inventory	Natural Resources Canada 2023

Industrial activity information included, when available, are:

- facility type: the type of industrial activity or facility;
- name: the name of the site;
- owner: the owner of the facility, or the responsible department in the case of federal contaminated sites;
- latitude: the latitude of the site, in WGS 1984;
- longitude: the longitude of the site, in WGS 1984;
- description: additional information on the facility, as provided through the data sources referenced in Table 4. This may include additional information on the facility’s operations or when pollutant release data was last provided to the National Pollutant Release Inventory database;
- known releases: a list of known pollutant releases, or the average daily effluent release in the case of wastewater facilities.

Beta version: CICADA (Cumulative effects spAtial DAta tool) About **Interactive map** Watershed summary Fish species list Fish observations Water quality Aquatic barriers Industrial activities Data and Meth

View spatial data on fish and fish habitat for a site in Canada and the watershed in which it sits
Enter the site of interest below in decimal degrees (convert from other units) or click on the map

Step 1 - Enter a location

Latitude (°N)

Longitude (°E)

Step 2 - Select a watershed unit:

Figure 9. Examples of current, former, and planned industrial activities for a watershed near Edmonton, Alberta. Note that all industrial activities are point locations, except planned major projects (purple symbols) which may include sites or lines (e.g., linear features such as planned pipelines).

Other watershed information

Other information for the watersheds relevant to fish and fish habitat that have been included in CICADA are:

- the freshwater ecoregion in which the focal watershed sits ([Freshwater Ecoregions of the World](#));
- the COSEWIC freshwater biogeographic zone in which the focal watershed sits, based on COSEWIC guidance for delineating designatable units ([COSEWIC 2020](#));
- the area (km²) of the focal watershed;
- the predominant land cover classes (top four, by percent coverage) in the watershed, based on land cover classification data (see land use/land cover data below for more information);
- a list of the five most common fish species captured across sites within the watershed, based on site-specific fish observation data (see site-level fish observations below for more information).

CONCLUSIONS

The assembly and provision of the data in CICADA are intended to inform decision-making related to development project reviews and planning related to projects such as habitat restoration or SAR recovery planning at DFO. CICADA allows for the independent verification of information that may be provided within proposed projects, e.g., permit applications. CICADA can be used to check the fish species present at a site or in an ecosystem, or the human activities that may be occurring around a proposed project site. While CICADA represents a snapshot of the current landscape, its information can be updated as the data sources are updated and other relevant spatial resources are developed.

ACKNOWLEDGEMENTS

The authors thank Colin Illes, Lianna Lopez, Kelly MacDonald, Ben Zdasiuk, Aaron Hall, Milly Corrigan, and Darren Smith for their assistance with the data compilation. The author team also thanks the project steering committee: Andrew Doolittle, Bev Ross, Leah Brown, Lisa Fowler, Susan Doka, Neil Mochnacz, and Emma Hodgson, as well as FFHPP and SARP participants of the Cumulative Effects Geodatabase Workshop who provided constructive feedback for the development of CICADA. Mohamed Anas and Nicholas Mandrak shared the

watershed-level fish data. CICADA was funded through DFO's Competitive Science Research Fund and Freshwater Habitat Initiative.

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ANNEX A

Data sources for site-level fish observations.

Name	Source	Coverage
Fisheries and Wildlife Management Information System	Alberta Environment and Parks	Alberta
iNaturalist	iNaturalist	National
Fish stocking report	Alberta Environment and Parks	Alberta
Contaminants in fish database	Fisheries and Oceans Canada	National
BOLD Systems Fish Species Location Data	BOLD Systems	National
Clean Air Regulatory Agenda Freshwater Inventory and Surveillance of Mercury	Environment and Climate Change Canada	National
Wild Fish Health, Oil Sands Region	Environment and Climate Change Canada	Alberta
Enhanced Monitoring of the Lower Athabasca River	Alberta Environment and Parks	Alberta
BC Historical Fish Distribution	Government of British Columbia	British Columbia
Known BC Fish Observations and BC Fish Distributions	Government of British Columbia	British Columbia
Aquatic Invasive Species of British Columbia	Government of British Columbia	British Columbia
BOLD Systems Lamprey Species Location Data	BOLD Systems	National
Fish community and fish habitat inventory of streams and constructed drains throughout agricultural areas of Manitoba	Fisheries and Oceans Canada	Manitoba
Pelagic Fish Trawl Survey of Lake Winnipeg	Fisheries and Oceans Canada	Manitoba
Trophic structure and mercury transfer in the subarctic fish community of Great Slave Lake, Northwest Territories, Canada	Academic	Northwest Territories
Fishery resources and habitats in a headwater lake of the Brock River, Northwest Territories	Fisheries and Oceans Canada	Northwest Territories
Commercial harvest of Arctic Char at the Halokvik River	Fisheries and Oceans Canada	Nunavut
Arctic Char biological data using a weir in Halokvik River, Nunavut	Fisheries and Oceans Canada	Nunavut
Ontario Fish Presence Absence data	Fisheries and Oceans Canada	Ontario

Fish Community Records	Toronto Regional Conservation Authority	Ontario
Fish Community - Prince Edward Island	Government of Prince Edward Island	Prince Edward Island
iNaturalist SK Community Conservation Data	iNaturalist	Saskatchewan
Piscivorous Fish Population and Structure - Prince Albert	Parks Canada	Saskatchewan
Dolly Varden Harvest Monitoring	Fisheries and Oceans Canada	Northwest Territories

ANNEX B

Data sources for water quality data.

Name	Source	Coverage
Long-term Water Quality Monitoring Program for Lakes	Alberta Environment and Parks	Alberta
LakeKeepers Water Quality Data	Alberta Lake Management Society	Alberta
Upper Athabasca Community Based Monitoring	Upper Athabasca Community Based Monitoring	Alberta
LakeWatch Water Quality Data	Alberta Lake Management Society	Alberta
Lesser Slave Watershed Council Tributary Monitoring Program	Lesser Slave Watershed Council	Alberta
Acid Sensitive Lakes, Oil Sands Region	Environment and Climate Change Canada	Alberta, Saskatchewan and Northwest Territories
RAMP Water Quality	Regional Aquatics Monitoring Program	Alberta
Long Term River Station Data	Alberta Environment and Parks	Alberta
Oil Sands Monitoring - Surface Water Quality Wetland 2017–2020	Alberta Environment and Parks	Alberta
Tributary Water Quality - Oil Sands Region	Environment and Climate Change Canada	Alberta
Athabasca Basin: Tailing Ponds and Impacts on Aquifers	Alberta Environment and Parks	Alberta
Mainstem Athabasca Benthic Invertebrates - Major Ions Physicals 2011–2017	Environment and Climate Change Canada	Alberta
Expanded Geographic Extent, Oil Sands Region Water Quality Monitoring	Environment and Climate Change Canada	Alberta
Acid Sensitive Lakes, Oil Sands Region	Environment and Climate Change Canada	Alberta
Deltaic Ecosystem Health, Benthic Invertebrate Major Ions	Environment and Climate Change Canada	Alberta
Peace–Athabasca River Basin Long-Term Water Quality Monitoring Data	Environment and Climate Change Canada	Alberta

Pine Lake Water Quality Monitoring Data	Wood Buffalo National Park	Alberta
Water Quality of Seven Persons Creek	South East Alberta Watershed Alliance	Alberta
CreekWatch Citizen Science	RiverWatch Institute of Alberta	Alberta
Surface Water Quality Data	City of Calgary	Alberta
Kananaskis River Environmental Science Program	University of Calgary	Alberta
Friends of Fish Creek Water Quality Monitoring Program	Friends of Fish Creek Provincial Park Society	Alberta
Bragg Creek Water Quality Monitoring	Bragg Creek Water Quality Monitoring Collective	Alberta
Bighill Creek Water Quality Data	Bighill Creek Preservation Society	Alberta
Ghost Watershed Water Quality Monitoring Program	Ghost Watershed Alliance Society	Alberta
North Saskatchewan River Tributary Monitoring Network Program	Alberta Environment and Parks	Alberta
North Saskatchewan River Basin Long Term River Network Program	Alberta Environment and Parks	Alberta
Vermilion River and Stretton Creek Water Quality at Low Flow	North Saskatchewan Watershed Alliance	Alberta
Carvel Pitted Delta Lakes Survey	Alberta Lake Management Society	Alberta
Sturgeon River Ecosystem Assessment Report	North Saskatchewan Watershed Alliance	Alberta
Lac La Biche County Lake Water Quality Monitoring Program	Lac La Biche County	Alberta
BC Environmental Monitoring System	Government of British Columbia	British Columbia
Peace River Regional District Water Quality Baseline	Municipality of Hudson's Hope	British Columbia
Fort Nelson First Nation Water Quality Monitoring	Fort Nelson First Nation	British Columbia
Wildsight Creston Valley Goat River Monitoring	Wildsight Creston Valley	British Columbia
Slocan Park CARE Society Water Quality Monitoring Program	Slocan Park CARE Society	British Columbia
Slocan River Water Quality Monitoring	Slocan River Streamkeepers Society	British Columbia

Wilson Creek Water Quality Monitoring	Slocan Lake Stewardship Society	British Columbia
Lake Windermere Ambassadors Water Quality Monitoring	Lake Windermere Ambassadors	British Columbia
NWT-wide Community-based Monitoring Program	Government of the Northwest Territories	Northwest Territories
Community Based Monitoring of Kakisa River watershed	K'agee Tu First Nation	Northwest Territories
Dehcho Region Water Quality	University of Waterloo	Northwest Territories
The impact of wildfire on diverse aquatic ecosystems of the NWT	Government of the Northwest Territories	Northwest Territories
The Impacts of Recent Wildfires on Northern Stream Ecosystems	Brock University	Northwest Territories
The influence of forest fires on metal deposition to lakes and peatlands in the North Slave Region, NWT	Environment and Climate Change Canada	Northwest Territories
Changes in dissolved organic carbon quality and quantity: Implications for aquatic ecosystems and drinking water quality for northern communities	University of Waterloo	Northwest Territories
Legacy arsenic pollution in Yellowknife Bay sediments	Government of the Northwest Territories	Northwest Territories
Changing hydrology in the Taiga Shield - Geochemical and resource management implications	Government of the Northwest Territories	Northwest Territories
Understanding changes in aquatic ecosystem health and water quality in the Fort Good Hope, Ramparts Area	Kirsty Gurney	Northwest Territories
Fort McPherson–Inuvik–Tuktoyaktuk Transportation Corridor Water Quality Monitoring	Wilfrid Laurier University	Northwest Territories
Development of a Biological Monitoring Program to Detect Change in Stream Health Along the Dempster–Inuvik–Tuktoyaktuk Corridor	Wilfrid Laurier University	Northwest Territories
Water Quality - Tukut	Parks Canada	Northwest Territories

Swift Current Creek Watershed Stewards Phosphorus Monitoring	Swift Current Creek Watershed Stewards	Saskatchewan
South Saskatchewan River Stewards Phosphorus Monitoring	South Saskatchewan River Watershed Stewards	Saskatchewan
Carrot River Watershed Association Monitoring Program	Carrot River Valley Watershed Association	Saskatchewan
NSRBC Water Quality Data	North Saskatchewan River Basin Council	Saskatchewan
Lower Saskatchewan - Nelson River Basin Long-term Water Quality Monitoring	Environment and Climate Change Canada	Saskatchewan
Yukon Basin WQ Field Measurements and Laboratory Analysis	U.S. Geological Survey	Yukon
Yukon River Basin Long-term Water Quality Monitoring Data	Environment and Climate Change Canada	Yukon
Ivvavik Park Water Quality Monitoring	Parks Canada	Yukon
Provincial Stream Water Quality Monitoring Network	Ontario Ministry of Natural Resources and Forestry	Ontario
Great Lakes DataStream	DataStream Initiative	Ontario
East Interlake Watershed District Quarterly Sampling	Government of Manitoba	Manitoba
FortWhyte Alive Watershed Project	FortWhyte Alive	Manitoba
Long Term Water Quality Monitoring Program	Government of Manitoba	Manitoba
Lake Winnipeg Chemistry	Fisheries and Oceans Canada	Manitoba
Manitoba Water Quality Monitoring	South Central Eco Institute	Manitoba
Lake Winnipeg Community-Based Monitoring Network	Lake Winnipeg Foundation	Manitoba
Fish Community and Fish Habitat Inventory of Streams and Constructed Drains Throughout Agricultural Areas of Manitoba	Fisheries and Oceans Canada	Manitoba
Environmental Nutrient Budget Kerr Lake	Little Saskatchewan River Conservation District	Manitoba
Environmental Water Quality Monitoring Program	Municipality of Yellowhead	Manitoba

PEI Surface Water Quality Monitoring Program data	Government of Prince Edward Island	Prince Edward Island
Water Quality in Canadian Rivers	Environment and Climate Change Canada	National