



A Network Connecting Science with Conservation
Un Réseau pour la Science et la Conservation

ANNUAL REPORT 2019–20

OUR MISSION

TO BE THE AUTHORITATIVE, PRIMARY SOURCE OF ACCESSIBLE, CURRENT, AND RELIABLE INFORMATION ON THE DISTRIBUTION AND ABUNDANCE OF CANADA'S NATURAL DIVERSITY— ESPECIALLY SPECIES AND ECOSYSTEMS OF CONSERVATION CONCERN.

TABLE OF CONTENTS

- 2 From the Chair and Executive Director
- 3 About Us
- HIGHLIGHTS FROM THE NATURESERVE CANADA NETWORK
- 4 Ecosystem-based Automated Range (EBAR) Species Mapping
- 5 Mapping Places Vital for Preventing Extinctions
- 6 New Discoveries in Atlantic Canada
- 7 iNaturalist Data for Conservation Decisions Support
- 8 Monitoring the Status of Manitoba's Only Lizard
- 9 New Plant Discoveries in Saskatchewan
- 10 Biodiversity Inventory of Dàadzàii Vàn Territorial Park
- 11 Biodiversity Knowledge Sharing in Northwest Territories
- 12 Building the Nunavut Conservation Data Centre
- 13 Documenting Canada's Nationally Endemic Species
- 14 A Tribute to Jim Mackenzie and Leah Ramsay
- 15 Summary Financial Data
- 16 In Gratitude to Our Members in 2019-20

Cover photo: White Cottongrass (*Eriophorum scheuchzeri*) near Summit Lake, Dàadzàii Vàn Territorial Park, Yukon
Photo credit: Yukon Government

From the Chair and Executive Director

FISCAL 2019-20 PROVED to be NatureServe Canada's biggest year to date, with a wide-range of projects that leveraged the biodiversity and information technology expertise of our membership. Thanks to new project funding from the federal government, we made major advancements on numerous priority projects including our Secure and Open Data project (policies and procedures to enable the sharing of ecologically sensitive biodiversity information); NatureServe Explorer 2.0 (the NatureServe Network's public-facing biodiversity information platform); and our Ecosystem-based Automated Range (EBAR) mapping project (see page 4).

Underlying these "flagship" projects is our Network's ongoing work to continuously expand, refine, and distribute our information on species and ecological communities, at subnational, national, and global levels. In 2019-20 and on behalf of the General Status of Wildlife in Canada program, information on over 16,000 species in Canada, primarily fungi, lichens, and invertebrates, was added to the Network to enable assessment and reporting of the status of more wild species.

Expanding the body of knowledge of Canada's species and ecological communities, and making this information available to support science-based decisions concerning them, is the purpose of the NatureServe Canada Network. Our growing body of data and expertise is integrated into projects, such as those mentioned above, and made publicly available through data requests and the public-facing data platforms of our members. A big "thank you" to our members, partners, and funders for your ongoing work and support towards these shared goals.



Bruce Bennett
Chair



Patrick Henry
Executive Director

About Us

CANADA IS HOME to an estimated 140,000 species, only about half of which have been scientifically identified. These plants, animals, lichens, and fungi belong to a vast organic tapestry—the diversity of life at genetic, species, and ecosystem levels, and vital for environmental, economic, and social health.

At NatureServe Canada, our vision is for the natural heritage of Canada to be thoroughly documented, for that information to be readily available to the public, and for conservation of biodiversity and for resource decision-making to be guided by high quality scientific data and information. Our mission: to be the authoritative, primary source of accessible, current, and reliable information on the distribution and abundance of Canada's natural diversity—especially species and ecosystems of conservation concern.

NatureServe Canada and its network of provincial and territorial Conservation Data Centres (CDCs)—organizations with responsibility for biodiversity knowledge for the jurisdictions they serve—work together and with other government and non-government organizations to develop, manage, and distribute authoritative knowledge regarding Canada's plants, animals, and ecosystems. NatureServe Canada and the Canadian CDCs are members of the international NatureServe Network, spanning over 80 CDCs

in the Americas.¹ NatureServe Canada is the Canadian affiliate of NatureServe, based in Arlington, Virginia that provides scientific and technical support to the international network. NatureServe Canada is based in Ottawa, Ontario and is governed by a Board of Directors comprised of representatives of its member provincial and territorial CDCs.

Each CDC adheres to NatureServe's rigorous scientific methods and standards developed since the 1970s. Together, NatureServe Canada and the Canadian CDCs strive to answer questions such as what species and ecosystems exist in each province or territory; what is the condition and conservation status of their populations; which species or ecosystems are at risk of extinction (global) or extirpation (from Canada or a province or territory); and where precisely are species at risk and rare ecosystems found?

We presently maintain information on over 55,000 species and 3,600 ecological communities. Our Network steadily adds new knowledge about biodiversity—including about species newly documented for Canada or species newly described to science. The Network also helps document the most important places for biodiversity in Canada, to aid in management decisions concerning them.



Claire Singer, NWT Species at Risk Act Implementation Supervisor, with a blue vane trap to test the effects of land use and honey bee presence on bee species native to the NWT. Photo credit: ©NWT Environment & Natural Resources 2019.

¹ Canada's CDCs are located in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Québec, Atlantic Canada, Yukon, Northwest Territories, and Nunavut.

Ecosystem-based Automated Range (EBAR) Species Mapping

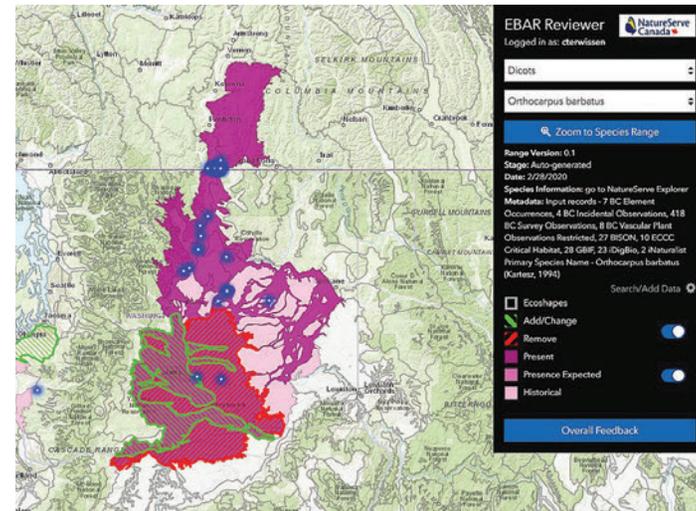
BIODIVERSITY EXPERTS ACROSS CANADA have long identified the need for high-quality range maps to inform species conservation decision-making. With inputs from experts across Canada and beyond, NatureServe Canada is developing publicly accessible range maps for thousands of species of conservation concern.

Ecosystem-based Automated Range (EBAR) maps use jurisdiction-provided ecoshapes (polygons of ecoregions, ecodistricts, or other representations of ecosystems) that eliminate the need to manually draw or edit species range boundaries. The maps combine biodiversity information with expert knowledge to populate ecoshapes with species occurrence data. Each ecoshape in a species range is associated with references to the underlying occurrence data without displaying the precise species locations. This novel work is resulting in species range maps that can be refined efficiently as new data or expert review become available.

EBAR maps incorporate the best available species occurrence information from sources including NatureServe Network Conservation Data Centres, federal, provincial, and territorial governments, online citizen science platforms (e.g. iNaturalist), digital biodiversity data

resources (e.g., Global Biodiversity Information Facility), academics, natural resource companies, and traditional/local ecological knowledge holders. Data is stored and archived in a secure, cloud-based Microsoft Azure server. An ArcGIS Enterprise Server is used to manage the EBAR geodatabase and provide the foundation for the EBAR Reviewer online tool. This tool allows species experts to efficiently contribute their knowledge toward reviewing and providing feedback on EBAR maps, thus contributing to map improvements on an ongoing basis. This review is critical for filling data gaps in the “automated” EBAR maps, particularly for lesser known and rare species.

NatureServe Canada is presently developing EBAR maps for the Environment and Climate Change Canada funded Canada Key Biodiversity Areas (KBA) project.² We are working to secure funding to expand our work to cover species of priority to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), particularly for upcoming status assessments or reassessments. To date, we have approximately



Screenshot of expert review work on the EBAR map for Grand Coulee Owl's Clover (*Orthocarpus barbatus*).

3.7 million species occurrences in our database, 90 experts who have agreed to review ranges, and 101 ranges sent for review by these experts. NatureServe Canada will make EBAR maps publicly available online at no cost. The map file formats will facilitate integration into Geographic Information System (GIS) software and so facilitate uptake and customization by a wide variety of end-users including industrial environmental impact assessments, federal, provincial and territorial species at risk programs, and government bodies responsible for land use planning.

² <https://www.natureserve.org/natureserve-network/canada/ebar-canada-kbas>

Mapping Places Vital for Preventing Extinctions

PREVENTING EXTINCTIONS REQUIRES precise information on where imperiled species occur. The NatureServe Network was founded to provide that information, and draws on ever-more sophisticated technology for improving upon the breadth, depth, quality, and relevance of information provided. In February 2020, NatureServe programs in the United States released the Map of Biodiversity Importance, a synthesis of decades of natural heritage data and expertise, completed in collaboration with Esri, The Nature Conservancy, and Microsoft's AI for Earth Program. By applying machine learning methods to over 40 years of biological inventory data, NatureServe created habitat suitability models for 2,216 imperiled species and analyzed those models to produce species-specific measures of range-size and degree of protection. Taken together, that information was used to produce a series of maps—15 products in all—that identify areas most critical for species conservation in the contiguous United States.

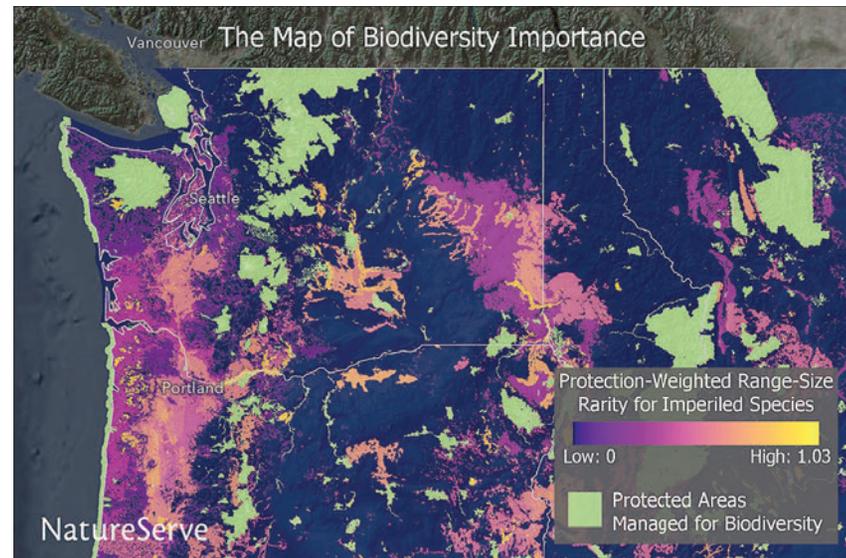
The Map of Biodiversity Importance is unique in that it includes a taxonomically diverse set of species: plants, pollinators, freshwater invertebrates, and vertebrates. This diversity, and the fine resolution of the inputs, bring to light

specific new areas that harbor globally significant biodiversity. These data, and the methods used to generate them, will improve the efficiency and effectiveness of conservation practitioners including federal resource managers, local governments, land trusts, farmers, foresters, and private citizens.

The flagship product of the Map of Biodiversity Importance project is a map identifying areas of highest biodiversity conservation using a metric called Protection-Weighted Range-Size Rarity. While the Map of Biodiversity Importance currently covers only the United States, the methodological and technological underpinnings of the effort are ready to be applied to Canada. Already, NatureServe Canada is benefitting by adapting online map review tools developed for the project to support the Ecosystem-based Automated Range (EBAR) mapping

project (see previous page).

The map on this page displays richness of at-risk species in Washington State, outside of existing protected areas, using modeled distributions for the most imperiled plants and animals in the United States which occur in the state. Brighter colors indicate where land and water protection will most benefit the least protected yet most threatened species. To view a 25-minute presentation by NatureServe in early 2020 that unveiled the Map of Biodiversity Importance, go to: https://www.youtube.com/watch?v=_VU4AoqtomA&feature=youtu.be



New Discoveries in Atlantic Canada



Above: The holotype (single physical example of an organism used when a species is formally described) of the flower fly *Psilota klymko*, named in honour of ACCDC zoologist John Klymko who discovered the species. Photo credit: John Klymko, ACCDC.

Below: A healthy colony of Eastern Waterfan (*Peltigera hydrothyria*) in moss just above water level in a cool, deeply shaded ravine in Fundy National Park. Photo credit: Colin Chapman, ACCDC.



THE ATLANTIC CANADA CONSERVATION DATA CENTRE (ACCDC) conducts extensive fieldwork annually to further understand the biodiversity of the Atlantic Canadian provinces. The year 2019 marked a first for the ACCDC, when a new species of flower fly (family Syrphidae) was named in honour of ACCDC Zoologist John Klymko. In 2013 he and Community Ecologist Sarah Robinson collected flower flies (aka syrphid flies or hoverflies, so named as they often hover over flowers that they land on to obtain nectar) during the New Brunswick Museum-led bioblitz of the Caledonia Gorge Protected Natural Area near Fundy National Park. They found one specimen of *Psilota*, a genus not previously reported from Canada, and that did not match any known species. John suspected it represented something new to science. Flower fly researchers at Agriculture and Agrifoods Canada in Ottawa confirmed this and in September 2019 published the description of *Psilota klymko*, using John's specimen as the holotype. To date, this newly described species has only been collected at four sites: one each in New Brunswick and Québec, and two in Pennsylvania. It is unclear if this hard to detect and potentially very rare species is at risk in Canada or globally.

The year 2019 was also big for the ACCDC's botany program. Centre botanists collaborated with Parks Canada on targeted surveys for Eastern Waterfan (*Peltigera hydrothyria*) within Fundy National Park. The species is a rare aquatic lichen endemic to eastern North America, from Georgia north to Atlantic Canada. Many occurrences have been lost in New England where it is now potentially extirpated from three states. In Canada it is restricted to New Brunswick, Nova Scotia, and Québec. The species is listed as "Threatened" under the federal *Species at Risk Act* because of habitat loss, air pollution, climate change, and changes in water quality and quantity associated with upstream development. The ACCDC and Parks Canada staff found over 800 new locations for Eastern Waterfan in 20 additional watercourses, making Fundy National Park home to over 50% of Canada's known population. The surprising local abundance in the park has sparked renewed investigation into its regional distribution. In 2020 the ACCDC will try to find new populations further afield.

iNaturalist Data for Conservation Decisions Support

THE iNATURALIST IS AN ONLINE citizen science biodiversity information platform (and social network of naturalists, citizen scientists, and biologists) built on the concept of sharing data and promoting conservation of wildlife around Earth. The Natural Heritage Information Centre (NHIC) in Ontario was among the first Conservation Data Centres (CDCs) to harness the platform for gathering observations of species of conservation concern. After a short test period, in April 2017 the CDC established the NHIC Rare Species of Ontario project.³ Since then, participation in the iNaturalist project has continued to grow and now contains over 40,000 observations of almost 1,300 species, with observations contributed by over 500 members.

Species observations recorded in the NHIC Rare Species of Ontario project are regularly incorporated into the NHIC database, alongside other citizen science data (e.g., eBird⁴). While having more data is generally good, such increase brings new challenges for data processing and quality checking.

The first step in integrating citizen science data into a CDC's data holdings is determining which observations to include based on

minimum data standards and species-specific criteria. At the NHIC this work is done using the "auk library" for R and Safe Software's data integration platform Feature Manipulation Engine. These two products allow the NHIC to automatically filter Ontario's over 40,000 iNaturalist records and over 18 million eBird records to a more manageable number of the most useful observations. The filter criteria are often species-specific, and this process allows the NHIC to build in the criteria and automate a large portion of the work.

The other important step in using iNaturalist data is a manual review by species experts. This review happens at various stages throughout



the data integration process, with a final review to ensure the quality of the observations before being included into the NHIC's main database.

The iNaturalist and eBird citizen science platforms are quickly becoming the NHIC's largest contributors of data. The NHIC has worked hard to ensure this data can be quickly and easily incorporated into the database at regular intervals, while maintaining a high level of data quality so that it may have the greatest possible impact for species conservation.



Blanding's Turtle (*Emydoidea blandingii*) and Acadian Flycatcher (*Empidonax vireescens*) are among at-risk species in Ontario for which locational data recorded by citizen scientists is invaluable. Photo credits: Mike Burrell, NHIC.

³ See <https://inaturalist.ca/projects/nhic-rare-species-of-ontario>

⁴ See <https://ebird.org/canada/home>

Monitoring the Status of Manitoba's Only Lizard

THE NORTHERN PRAIRIE SKINK (*Plestiodon septentrionalis septentrionalis*) is a small, slender lizard, olive-brown or greyish in colour, with alternating light and dark stripes running the length of its body. Adults can grow to a length of about 20 centimetres, with half of this consisting of a skink's tail. Juvenile skinks can be distinguished from adults by their bright blue tails. During breeding season, adult males develop orange colourization on their heads and throats.

The Canadian range of Northern Prairie Skink is limited to southwestern Manitoba, and represents less than five percent of the global range of the species which is otherwise found in a band of 11 southern, central, and northern U.S. states, from Louisiana and Texas to Wisconsin, Minnesota, and North Dakota. The maximum radius of a skink's home range rarely exceeds 1,000m², and they spend more than seven months of the year in underground hibernation.

Skink habitat in Manitoba is limited to areas of sand prairie. Bunch grasses provide skinks with shelter, and sandy soils allow them to construct nests and burrows. Skinks feed on insects and other small invertebrates, and in turn they are prey for a variety of snakes, birds, and mammals. A skink's main defence is to stay hidden, but it also has an ability to detach and regrow its tail: a detached tail will continue to

thrash for several minutes, distracting a predator and allowing a skink to escape. Human threats to skinks include habitat fragmentation due to cultivation, habitat degradation due to invasive species such as Leafy Spurge (*Euphorbia virgata*), and encroachment of Quaking Aspen (*Populus tremuloides*) into prairie habitat.

The Northern Prairie Skink is listed as "Endangered" under Manitoba's Endangered Species and Ecosystem Act, and as "Special Concern" (2017) under the federal *Species at Risk Act*. The Manitoba Conservation Data Centre



Northern Prairie Skink (*Plestiodon septentrionalis septentrionalis*). Photo credit: Carla Church, MBCDC.

(MBCDC) works with the Canadian Wildlife Service, the Wildlife and Fisheries Branch of Manitoba's Department of Agriculture and Resource Development, and the University of Brandon to monitor known skink locations, update historical records, and improve understanding of the species' range. The MBCDC uses a common skink monitoring protocol of laying out plywood boards (which provide regulation of temperatures for thermoregulation, egg gestation, and incubation, as well as cover from predators), and surveying these sites throughout the monitoring season. They check hundreds of boards each year in southern Manitoba, and use the findings to inform status assessments, recovery actions, threat abatements, and environmental impact assessments.

A significant increase in survey efforts over the past 15 years has led to documentation of new skink sites within the Brandon and Lauder sandhills. In 2019, the MBCDC checked boards at 57 survey sites and observed 18 skinks, thus adding further data to the record of Manitoba's only lizard. Recovery activities for Northern Prairie Skink include raising public participation in long-term population monitoring, reducing habitat loss, and reducing intentional or unintentional killing.

New Plant Discoveries in Saskatchewan

MOST PLANT SPECIES observations in Saskatchewan are made in relatively easily accessed southerly sites, and those in the north of the province tend to follow linear features such as roads, pipelines, rivers, and streams. Additionally, understanding of the diversity and distribution of Saskatchewan's non-vascular plant species (lichens, hornworts, liverworts, and mosses) lags considerably behind understanding of the province's vascular flora (conifers, ferns, and flowering plants).

To help counter these data gaps, Michael Rudy, Saskatchewan Conservation Data Centre (SKCDC) Botanist, performed preliminary surveys of the Creighton Crevices in October 2019. This geologically unique site for Saskatchewan, approximately 30 kilometres southwest of Flin Flon, MB, features exposed, jagged limestone fissures (5-10 metres deep) and boulders, in a province where limestone bedrock underlies only about 1.2% of its area.

Prior to Michael's surveys, the SKCDC had almost no plant records from the crevices. His investigation, assisted by Dr. Richard Caners of the Royal Alberta Museum, has so far revealed two rare to uncommon mosses (*Seligeria tristichoides* and *Seligeria donniana*) as fascinating finds for Saskatchewan.

The population of *S. tristichoides* is the first record for Saskatchewan, and is located



Seligeria tristichoides. The capsule opening of this moss is rimmed with a peristome (small teeth), one of the main identifying characteristics of this species. Photo credit: Michael Rudy, SKCDC.

almost 1,000 kilometers away from the closest known sites, in the Alberta Rockies. The finding of *S. donniana* is also significant because the only prior Saskatchewan record was collected over 30 years ago, and it was overlooked by every botanical authority (e.g., Flora of North America). The findings represent the rediscovery and confirmation of the moss family *Seligeriaceae* in Saskatchewan, and underline the botanical uniqueness of the Creighton Crevices and other similar features like them, of which several are thought to exist in the province.

In addition to the *Seligeria* species, 17 other rare plant species have been confirmed from

the crevices and the surrounding area, including three other species (*Anthina flammea*, *Collema glebulentum*, and *Gymnostomum aeruginosum*) that are new additions to Saskatchewan's flora record, and seven species which had been thought to have been present in Saskatchewan but for which the SKCDC had no records. Michael's work confirms that the Creighton Crevices, and similar limestone habitats, represent unique and high-diversity species reservoirs for Saskatchewan.

Biodiversity Inventory of Dàadzàii Vàn Territorial Park

DÀADZÀII VÀN IS A REMOTE 1,525 km² proposed park in the Richardson Mountains of northeastern Yukon, and which would protect land and freshwater between the Whitefish wetlands and the Rat River Gwich'in Conservation Zone. The nearest community, Fort McPherson, lies 75 kilometres to the southeast. Dàadzàii Vàn ("Loon Lake" in Gwich'in) is the traditional name of what is commonly known as Summit Lake. The area is important to the Vuntut Gwitchin and the Tetlit Gwich'in First Nations.

The Dàadzàii Vàn is well known for healthy populations of Caribou, Grizzly Bear, Dall Sheep, and Moose, but little is known about other biodiversity of the region. Collecting baseline information is an important first step in establishing a long-term monitoring plan for the park, and monitoring and managing its ecosystems



are increasingly important in this era of climate change.

In 2019 and backed by Polar Continental Shelf funding, Bruce Bennett

of the Yukon Conservation Data Centre, and Piia Kukka of Yukon Environment, led an expedition of species experts to survey the biodiversity of Dàadzàii Vàn. The team surveyed over 50 sites, with focus on lesser-known wild plants, insects, birds, and mammals. Many of these were detected for the first time in the park. They included rare species of plants such as Eurasian Junegrass (*Koeleria asiatica*) and Arctic Larkspur (*Delphinium brachycentrum*), and insects such as four leafhopper species (*Cicadellidae*) that were new discoveries for Yukon (and one was new to Canada), and the Kits' Dance Fly (*Philetus kitsi*),



Summit Lake area in the proposed Dàadzàii Vàn Territorial Park. Photo credit: Yukon Government.

also studied the distribution of Collared Pika (*Ochotona collaris*), a species listed as "Special Concern" under the federal *Species at Risk Act*, and which is found from Alaska to Northwest Territories and in extreme northeastern British Columbia. Dàadzàii Vàn is at the very northern part of the pika's known range. It was hypothesized that as climate warmed in the region, more Collared Pika—an indicator species of climate change—would migrate there. In 2019, the survey team found that the pika already occupied most of its suitable habitat in the area.

also new to science. Two additional undescribed insect species were found, and the team also identified *Eiseniella tetraedra*, a squaretail worm previously thought to be exotic to North America.

Among mammals identified were Singing Vole (*Microtus miurus*) and Northern Bog Lemming (*Synaptomys borealis*). The team

Biodiversity Knowledge Sharing in Northwest Territories

THE NORTHWEST TERRITORIES CONSERVATION DATA CENTRE (NTCDC) works in a co-management setting, where all organizations with legislated responsibilities for biodiversity in the NWT work together towards a common goal. These organizations include territorial and federal departments and wildlife co-management boards set up under land claim settlement agreements, such as the Wildlife Management Advisory Council (WMAC-NWT) and the Gwich'in, Sahtu, and Wek'eezhii renewable resources boards.

The vast majority of NWT's lands and waters is rarely surveyed as most fieldwork is extremely expensive. In 2019, the NTCDC increased the promotion of the iNaturalist.ca citizen science platform to advance documentation of any rare,

new, or unusual species in the NWT. The CDC is also investing in new technology to document species using automated and continuous devices such as cameras, bird recorders, and bat detectors, and in passive collection methods such as bee traps. The uptake by communities for installing these devices has been quick and enthusiastic!

The NTCDC is launching a new NWT Species and Habitat map viewer to allow their clients to investigate the interactions between threats to Caribou and other species at risk, land use decisions, recovery decisions, and new development projects. The same viewer will also allow making area-specific biodiversity lists easier. These lists will initially include mammals, birds, and amphibians, with plans to add more species

groups in the near future. The biodiversity part of the viewer is a direct application of NatureServe Canada's innovative EBAR mapping approach to depicting species ranges (see story on page four).

In 2020, the NTCDC is also planning to re-visit surveyed sites and hopefully find new sites on Cape Bathurst (the northernmost point of land in mainland NWT) of one of the territory's rarest vascular plants, Hairy Braya (*Braya pilosa*). This species, a relict of the last glaciation, occurs only at Cape Bathurst and nearby Baillie Islands, in the Beaufort Sea, and is listed as "Endangered" under the federal *Species at Risk Act*. A lack of sea ice and rising sea levels are eroding the plant's coastal habitat at about 10 metres per year.



Left: Hairy Braya (Braya pilosa), one of Canada's rarest and most imperiled endemic plants, known only from a few locations in the Northwest Territories. Photo credit: James G. Harris, CC BY-SA 4.0. Right: A Polar Bear (Ursus maritimus) at the edge of an ice floe. Photo credit: Bruce Raby.

Building the Nunavut Conservation Data Centre



A pod of belugas near Churchill, Manitoba. Photo credit: Ansgar Walk CC BY-2.5.

THE NUNAVUT CDC (NUCDC) was founded in December 2015, thereby completing the network of provincial and territorial CDCs in Canada. As a small, northern program in its early years, the NUCDC has been setting its foundations: identifying priority species for conservation status tracking; verifying species presence in a jurisdiction that, at nearly 2.1 million square kilometres (larger than Mexico and nearly two-thirds the size of India), is not well known biologically; and starting to map element occurrences of some of the most at-risk species. Assistance from knowledgeable staff at other CDCs, including Northwest Territories, Yukon, and Ontario, has been instrumental in helping

focused its efforts on mapping the locations of all known colonies in Nunavut, including those on Prince Charles Island and a series of small islands in Penny Strait and Queens Channel. This species, likely never numerous and today totaling perhaps less than 100,000 individuals across its global range, breeds primarily in northeastern Siberia but has a few scattered colonies in Greenland, the Svalbard archipelago of Norway, Alaska, and Arctic and subarctic Canada. The species appears to favour breeding sites near polynyas (areas of open seawater surrounded by sea ice). Where they migrate to in winter is unknown, though some are believed to inhabit open waters of the Arctic. Threats to

the NUCDC take such steps in becoming a fully-functioning CDC.

One of the species of concern to the NUCDC is the small, tern-like Ross's Gull (*Rhodostethia rosea*), known in Canada only from a handful of breeding colonies in Nunavut and Manitoba (Churchill area). In 2019-20 the NUCDC

the Ross's Gull include habitat disturbance in some breeding areas, and changes in ice and snow patterns due to climate change. The species is listed as "Threatened" under the federal *Species at Risk Act*.

Another species the NUCDC has been focusing on is the Beluga Whale (*Delphinapterus leucas*). Occurring in over 20 populations worldwide, primarily in Arctic waters but some sub-Arctic ones including the St. Lawrence Estuary, the Beluga is believed to number between 150,000-200,000 animals. Six of the populations occur within seawater off the coast of Nunavut. Five of those six populations are considered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to be at some level of risk, ranging from "Special Concern" to "Endangered," though only one of these populations is listed under the federal *Species at Risk Act* (the Cumberland Sound population, listed as "Threatened"). In preparation for an upcoming COSEWIC re-assessment, the NUCDC is identifying and mapping critical estuaries used by the various populations.



Ross's Gull. Photo credit: Bruce Mactavish.

Documenting Canada's Nationally Endemic Species

NATIONALLY ENDEMIC SPECIES are those that are restricted to a single country. They often have small ranges and population sizes which increases their vulnerability to extinction. Endemic species are therefore often targeted in conservation planning to identify priority areas for protecting biodiversity. Despite the need to protect these species and their habitats, comprehensive documentation on endemic species in Canada has been lacking.

To help rectify this problem, NatureServe Canada and the Nature Conservancy of Canada (NCC) have developed the first comprehensive list of Canadian endemic species. Using several biodiversity databases, including NatureServe's Biotics 5, and in consultation with experts from across the country, we identified over

300 nationally endemic species, subspecies, and plant varieties across Canada. Some examples are Lori's Water-lily (*Nymphaea loriana*), Banff Springs Snail (*Physella johnsoni*), Maritime Ringlet (*Coenonympha nipisiquit*), Whooping Crane (*Grus Americana*; breeding), and Vancouver Island Marmot (*Marmota vancouverensis*).

British Columbia has both the highest number of endemics and the most endemics that occur only within one province or territory's borders. Alberta, Québec, and Yukon also have relatively high numbers of endemics, including those that only occur within their respective borders. Areas in Canada with relatively high concentrations of endemic species have also been mapped and show that many of these hotspots

are associated with glacial refugia or unique habitats, such as alvars, sand dunes, hot springs, and alpine meadows.

The NatureServe global conservation status ranks for all Canadian endemic species indicate that only 10% of them are Globally Secure (G5), meaning that 90% of the endemics are of conservation concern. As they are found only in Canada, Canada has primary responsibility for the future of these species. The new comprehensive endemic species list will support the prioritization of action to protect these species and to support ongoing efforts to identify Key Biodiversity Areas in Canada. NatureServe Canada and the NCC will release a report on this work in early fiscal 2020-21.⁵



The Banff Springs Snail (*Physella johnsoni*), left, and the Maritime Ringlet (*Coenonympha nipisiquit*), are among Canada's 300+ endemic species. Photo credits: Paul M.K. Gordon, A.W. Thomas.

⁵ The report is available on NatureServe Canada's website: <https://www.natureserve.org/natureserve-network/canada/publications/scientific-reports>

A Tribute to Jim Mackenzie —Thank You Jim!

JIM MACKENZIE retired in August 2019 after serving as Co-ordinator of Ontario's Natural Heritage Information Centre (NHIC) for 18 years. Jim tirelessly championed the NHIC within the Ontario Ministry of Natural Resources and Forestry and beyond, and under Jim's leadership the NHIC grew and prospered. Jim was also a Board member of NatureServe Canada for 17 years, including serving as Chair and Vice Chair. Jim's strong leadership will be missed, but he leaves the NHIC well positioned to continue to effectively influence biodiversity conservation in the province.



A Tribute to Leah Ramsay —Thank You Leah!

LEAH RAMSAY recently retired as Zoologist with the BCCDC after more than 25 years of service—the longest serving employee of the Centre and a key mentor to others. Leah was a strong proponent of standardizing the NatureServe methodology for subnational ranking of animal species, and implementing workflows to facilitate the consistent application of the methodology. She also worked to include lesser known taxonomic groups among the animal groups monitored, mapped, and assessed by the BCCDC, thereby expanding the CDC's conservation impact.

Large-flower Purple False Foxglove (*Agalinus purpurea* var. *purpurea*) is provincially listed by the Ontario NHIC as a “Critically Imperiled” (S1) plant variety. Photo credit: Wasyl Bakowsky, NHIC.



Summary Financial Data

The summary financial data on this page is drawn from NatureServe Canada’s audited financial statements for 2019-20.

To access the full statements, please visit www.natureserve.ca.

STATEMENT OF FINANCIAL POSITION		
Year ending March 31	2020	2019
ASSETS		
Current		
Cash	563,168	500,309
Accounts receivable	318,340	377,814
Prepaid expense	669	672
Capital Assets		
	–	–
Total Assets	882,177	878,795
LIABILITIES AND NET ASSETS		
Current Liabilities		
Accounts payable and accrued liabilities	682,607	707,535
Deferred revenue	61,900	55,400
Net Assets	137,670	115,860
Total Liabilities and Net Assets	882,177	878,795

STATEMENT OF OPERATIONS		
Year ending March 31	2020	2019
REVENUE		
Charitable organization/foundation funding	433,772	172,959
Dues	16,500	16,500
Government funding	1,569,655	1,456,394
Other	7,254	4,005
Total Revenue	2,027,181	1,649,858
EXPENDITURES		
Contracts	1,957,507	1,602,953
Office costs	5,572	4,950
Other	2,163	2,102
Professional fees	16,926	16,839
Sponsorship	10,000	–
Travel, annual meeting, workshops	13,203	8,368
Total Expenditures	2,005,371	1,635,212
Excess (Deficiency) Revenue Over Expenditures	21,810	14,646

Flowering Dogwood (*Cornus florida*) is known in Canada only from Ontario, and is listed as “Endangered” under the federal *Species at Risk Act*. Photo credit: Sam Brinker, NHIC).



An Invitation to Contribute to Conservation Science

A financial investment in conservation science is an investment in knowledge about nature, upon which depends the health of the environment, the economy, and our society. NatureServe Canada is a registered Canadian charity (#862330529RRO001). We welcome financial gifts in support of our business—conservation science. As well, membership in NatureServe Canada is available to organizations that support our mission, manage data of conservation value, and/or are active in promoting science-based conservation action nationally or sub-nationally.

In Gratitude to Our Members in 2019–20

NatureServe Canada is deeply grateful for the contribution and collaboration of our Constituent and Associate members—Thank You!

CONSTITUENT MEMBERS

Alberta Conservation Information Management System
 Atlantic Canada Conservation Data Centre
 British Columbia Conservation Data Centre
 Manitoba Conservation Data Centre
 Northwest Territories Conservation Data Centre

Nunavut Conservation Data Centre
 Ontario Natural Heritage Information Centre
 Saskatchewan Conservation Data Centre
 Yukon Conservation Data Centre

ASSOCIATE MEMBERS

Environment and Climate Change Canada—
 Canadian Wildlife Service
 Fisheries and Oceans Canada
 Nature Conservancy of Canada

NatureServe
 Parks Canada Agency



Environment and Climate Change Canada

Environnement et Changement climatique Canada



Fisheries and Oceans Canada

Pêches et Océans Canada



A Network Connecting Science with Conservation
 Un Réseau pour la Science et la Conservation

NatureServe Canada

39 McArthur Ave, Level 1-1, Ottawa, ON K1L 8L7 CANADA

(613) 986-1535 info@natureserve.ca www.natureserve.ca