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Cover photo: Woodley Range Ecological Reserve, Vancouver Island. Photo credit: Laura Matthias, 2021

From the Chair and Executive Director

ISCAL 2021-22 was an exceptionally busy and productive year for NatureServe Canada, thanks to strong financial support from government and non-government member organizations and partners. This funding enabled the development and implementation of a broad suite of new and existing biodiversity science and conservation projects, as highlighted with examples in this report!

In addition to advancing our core business of developing, managing, and sharing subnational, national, and global species spatial and taxonomic data, we made impressive progress on our Ecosystem-based Automated Range (EBAR) mapping project, the Canada Key Biodiversity Areas initiative, the Canadian National Vegetation Classification, the Canadian Terrestrial Ecological Framework, species distribution modelling, databasing Canadian invertebrate collections, the Data Security Policy and Procedures initiative, and the Explorer Pro Open Data platform. These collaborative projects involved the pooling of resources, expertise, and capacity of dozens of agencies, organizations, and individual experts. And, their overarching goal is to advance biodiversity science in Canada to ensure that conservation decision-making in our country is informed by accurate, comprehensive, current, and publicly available (at no cost) biodiversity information.

Once again, a big "thank you" to our members, partners, and funders for your ongoing work and support towards our shared biodiversity science and conservation goals. We encourage "new partners" to reach out to discuss projects that are in line with our mission, and that could benefit from the expertise and capacity offered by NatureServe Canada and our membership.

Onwards with fiscal 2022-23!





Patrick Henry Executive Director

About Us

ANADA IS HOME to about 80,000 known species, with thousands more species to be scientifically identified or first discovered. These organisms belong to a vast organic tapestry – the diversity of life at genetic, species, and ecosystem levels, 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 where conservation of biodiversity and resource decision-making are guided by high quality scientific data and information. Our mission is 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) 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 60 government and non-government organizations in Canada and the United States.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. Canada's CDCs are located in British Columbia. Alberta, Saskatchewan, Manitoba, Ontario, Québec, Atlantic Canada, Yukon, Northwest

Territories, and Nunavut.

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



Surveying an endangered meadow ecosystem along the Yukon River. Photo credit: Caitlin Willier, Yukon Government.

a province or territory? Where precisely are species at risk and rare ecosystems found?

We presently maintain information on 64,051 species and 4094 ecological communities – an increase from 38,000 and 2200, respectively, in 2016. 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.

¹ See: https://www.natureserve.org/natureserve-network

EBAR Mapping Work Broadens in End-Use Application

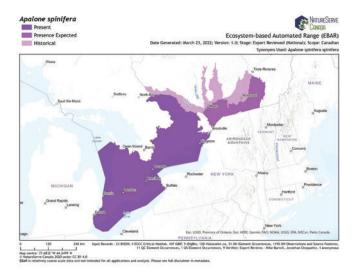
PECIES RANGE MAPS Support environmental impact assessments, species at risk status assessments, species management and recovery plans, and the identification of areas in need of inventory and/or protection. Since 2019, NatureServe Canada's (NSC) Ecosystem-based Automated Range (EBAR) mapping project has been producing data-driven, expert-validated ranges to support conservation initiatives in North America, such as the identification of Key Biodiversity Areas (KBAs).² This novel mapping process eliminates the need to manually draw or edit species range boundaries, and results in range maps that can be refined efficiently as new data or expert review become available.3

In 2021-22, the EBAR project was broadened to include the development of ranges supporting Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and federal *Species at Risk Act* (SARA) programs. As part of the work, NSC made significant improvements to data management protocols and added new functionality to the EBAR database infrastructure. This included developing and implementing a data model

to facilitate the mapping of wide-ranging (including migratory) species such as Caribou (*Rangifer tarandus*) and Grizzly Bear (*Ursus arctos*).

In the past year a total of 212 new species range maps were published, bringing the total number of published EBAR ranges to 451. The maps were developed using a database of about 9.5 million species occurrences, collected from over 170 data sources including NatureServe Network Conservation Data Centres (CDCs), with map refinement courtesy of hundreds of experts across Canada, the U.S., and beyond. EBAR maps are available online on multiple platforms, at no cost, and are available in PDF or geodatabase format to support various end uses.⁴

NatureServe Canada's EBAR team undertook work in 2021-22 to support the British Columbia Conservation Data Centre's (BCCDC) launch of a Species Habitat Model (SHM) pilot project. The first year of the project included scoping of data inputs and model algorithms, and the development of a modelling process and production of a test model. Along with producing SHMs, the BCCDC will document



The expert-reviewed EBAR map for Spiny Softshell (Apalone spinifera), listed as Endangered under Canada's Species at Risk Act.

data gaps encountered when modelling so that, when funding opportunities arise, these gaps can be more effectively addressed. The EBAR team engaged in both advisory and learning capacities, shared species data management lessons learned from EBAR work, and transferred knowledge from the SHM project to NSC. Future EBAR participation will include working with the BCCDC to learn how their SHM pilot could inform the development of an NSC-hosted, multi-organizational national SHM project. The BCCDC will continue developing the project in 2022-23, and is actively looking for funding for this important work.

² http://www.kbacanada.org/

³ Details on EBAR mapping, including its associated methods: https://www.natureserve.org/canada/ebar

⁴ To access EBAR maps: https://www.natureserve.org/canada/ebar#downloads or https://explorer.natureserve.org/ or https://livingatlas.arcgis.com/en/browse/#d=2&q=ebar or https://www.arcgis.com/apps/webappviewer/index.html?id=1027bc16ec2f48419c8029ffea5ee3b1

British Columbia: Documenting Range Extension for an Endangered Snake

HE BRITISH COLUMBIA Conservation Data Centre (BCCDC) partners with BC Parks on inventory projects in parks and protected areas, and incorporates observations from BC Parks' bioblitzes into its mapping products and status assessments. In May 2021, a bioblitz in the Woodley Range Ecological Reserve, in central-east Vancouver Island, led to an unexpected observation: BC Parks volunteers uncovered a Sharp-tailed Snake (Contia tenuis) — a species listed as Endangered under the federal Species at Risk Act.

An exciting discovery under any circumstance, this observation represented a range extension of 65 kilometres. For most at-risk species, this would hardly be noteworthy. However, for a small snake with a documented lifetime movement of 150 metres, every new location provides critical information about its distribution and habitat.

Usually around 20 centimeters long, the Sharp-tailed Snake (named because of the thorn-like scale at the tip of its tail) is a gentle, nonvenomous snake with a reddish-brown back and black and white bars on its underside. Requiring open, sunny landscapes for thermoregulation, it lives in

loose, woody debris or talus slopes where it mates, and spends almost its entire life underground.

The Sharp-tailed Snake is endemic to western North America, and is found along the west coast south to California. In Canada, its distribution is restricted and patchy: of the occurrences currently known, all are in southwestern BC, many in areas where they face increasing threats from habitat loss. Sharp-tailed snakes are found primarily in the imperilled Coastal Douglasfir Biogeoclimatic zone, which includes Garry Oak (Quercus garryana) ecosystems, of which less than five percent remains in

dispersed in BC among Vancouver Island, the Gulf Islands, and the mainland is a mystery. Locating these snakes is critical to conserving the species and the ecosystems where they occur. Since this discovery at Woodley Range, artificial cover objects (small asphalt shingles placed on the ground, which the snakes use to warm themselves under) have been deployed and monitored by

near natural condition. These ecosystems

supporting more than 100 at-risk species

a dedicated team. Three additional snakes

How the Sharp-tailed Snake has

found nowhere else in Canada.

rank high in conservation importance in BC,

have been discovered, and the site is now being used as part of a larger research project to determine the effectiveness of using environmental DNA to detect their presence.



A Sharp-tailed Snake (*Contia tenuis*), found at the Woodley Range Ecological Reserve on Vancouver Island. Photo credit: Laura Matthias, 2021.

Saskatchewan: First Provincial Record of an At-Risk Lichen

that an at-risk lichen species was found in Saskatchewan. Golden-eye Lichen (Teloschistes chrysophthalmus) was previously known from two populations in Canada: The Great Lakes population (Ontario) is listed under the federal Species at Risk Act (SARA) as Endangered, while the Prairie/Boreal population (Manitoba and Ontario) is listed as Special Concern. The Saskatchewan location is now the most westerly occurrence in Canada.

Golden-eye Lichen is a visually distinct species that is relatively easy to identify. This fruticose macrolichen is an epiphyte on twigs and branches, and occasionally on tree trunk bark; in the Prairie subpopulation it is most frequently found on White Spruce (*Picea glauca*).

It was this affinity that prompted Michael Rudy, a former interim Saskatchewan Conservation Data Centre (SKCDC) botanist, to investigate a stand of Blue Spruce (*Picea pungens*) during a stop in Saskatchewan's Moose Mountain Provincial Park, on his return trip from surveying for Golden-eye Lichen in Manitoba for the Canadian Wildlife

Service. There, in the core area of the park, Rudy discovered two thalli of the species – the first record for Saskatchewan.⁵

With a new management plan underway for Moose Mountain Provincial Park, determining the extent of Golden-eye Lichen within the boundary became a priority for the Province. Staff from the Ministry of Parks, Culture and Sport partnered with SKCDC botanist, Sarah Vinge-Mazer, to survey the known extent of White Spruce in the park. The park is dominated by hardwoods, however both White Spruce and Blue Spruce have been planted there, and White Spruce has naturalized in some of the more remote park areas.

As a result of these surveys, three more thalli were found outside the core area. This information has been incorporated into the park's management of White Spruce and Blue Spruce, to aid in the conservation of Golden-eye Lichen. As White Spruce is not the only host for Golden-eye Lichen, in coming years further surveys will



Golden-eye Lichen (*Teloschistes chrysophthalmus*) on a branch of White Spruce (*Picea glauca*) in Saskatchewan. Photo credit: Sarah Vinge-Mazer, SKCDC.

be conducted on alternate host species in the vicinity of known thalli, as well as in forested areas elsewhere near the Manitoba border.

⁵ Thalli are the vegetative tissues of some algae, fungi, lichens, and liverworts, which are not differentiated with stems and leaves, and which lack true roots and a vascular system.

Manitoba: Documenting Imperilled Grassland Species

Manitoba border, and around where the Qu'Appelle and Assiniboine rivers meet, are two of the largest tracts of contiguous, undeveloped mixed-grass prairie remaining in Canada. Indeed, at a little over 150 square kilometres of mixed-grass prairie each, the Ellice-Archie and Spy Hill-Ellice Community Pastures contain some of the last "seas of grass" in Manitoba.

Most of these pastures feature native mixed-grass prairie, with some of the land

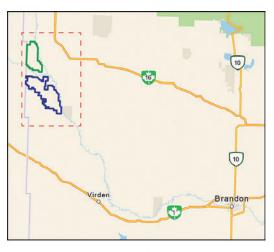


Although currently globally Secure (G5), the Redwhisker Clammyweed (Polanisia dodecandra) is Critically Imperilled (S1) in Manitoba. Photo credit: Lynnea Parker.

seeded with non-native grasses. Temperate deciduous forest, scrub oak and aspen habitats, and a number of streams add to the landscape.

The pastures support rich species diversity including over 35 rare plant species, many of which are imperilled, and at least 151 bird species, including over 15 at-risk ones such as Eastern Whip-poorwill (Antrostomus vociferus) and Baird's Sparrow (Ammodramus bairdii), listed under the federal Species at Risk Act (SARA) as Threatened and Special Concern, respectively. In 2019 the pastures were designated as an Important Bird and Biodiversity Area due to the presence of globally significant breeding concentrations of two grassland bird species: Chestnut-collared Longspur (Calcarius ornatus) and Sprague's Pipit (Anthus sparguei), both listed as Threatened under SARA.

The pastures are subject to multiple pressures including recreational use, cattle grazing, utility developments, and aggregate, petroleum, and potash extraction. Data provided by the Manitoba Conservation Data Center (MBCDC) is increasingly used to inform development proposals applicable to the pastures, and land use and conservation decisions



The Ellice-Archie (in green) and Spy Hill-Ellice (in blue) community pastures, in Manitoba.

concerning these invaluable habitats.

The MBCDC has been surveying and monitoring the pastures since 2002, and continues to make important biodiversity discoveries. In 2021, surveys successfully located 17 provincially rare plants, most of which had last been recorded on the pastures in 2002. An exemplary discovery, in the Spy Hill-Ellice Community Pasture, was that of the provincially *Critically Imperilled* (S1) Redwhisker Clammyweed (*Polanisia dodecandra*). The find represents a range extension of 150 km north of the plant's previously known distribution in Manitoba.

Great Lakes coastal dune habitat, with Slender Blazing Star (*Liatris cylindracea*) and wet sedge meadow at Long Point National Wildlife Area. Photo credit: Sam Brinker.



Missouri Speckled Shield Lichen (*Punctelia* missouriensis), new for Canada from Long Point National Wildlife Area. Photo credit: Sam Brinker.



Prionapteryx achatina, a crambid moth new for Canada from Long Point National Wildlife Area. Photo credit: Colin Jones.

Ontario: Discovering Species New to Canada

XTENDING 32 KILOMETRES into Lake Erie, the Long Point peninsula is the longest freshwater sandspit in the world, and one of the most intact wild areas remaining in southern Ontario. The peninsula consists of a series of alternating sand ridges separated by ponds and swales, with extensive Great Lakes coastal dunes along its south shore. Containing rare ecosystems as well as species found nowhere else in Canada, Long Point is designated as a World Biosphere Reserve, and is recognized as an Important Bird Area. Roughly half of the peninsula is under protection and management as a National Wildlife Area (NWA), by Environment and Climate Change Canada's Canadian Wildlife Service.

Over four days in July of 2021, biologists with Ontario's Natural Heritage Information Centre (NHIC) conducted biodiversity inventories within the NWA, at Gravelly Bay and Squires Ridge. While an emphasis was placed on gathering data on several priority species at risk, two species not before known to occur in Canada – Missouri Speckled Shield Lichen (*Punctelia missouriensis*), and *Prionapteryx achatina* (a crambid moth) – were discovered.

Missouri Speckled Shield Lichen, described rather recently from its type

locality in Crawford County, Missouri, has been determined to be more widespread than previously thought, with published records extending to New Jersey, Ohio, and Virginia. Tending to grow on exposed trunks or branches of old hardwoods, at Long Point this lichen was discovered in an interdunal swamp where it grew on the bark of Tamarack (*Larix laricina*). This first collection from Canada appears to represent the northernmost occurrence so far known for this species.

Prionapteryx achatina is a micromoth in the family Crambidae. On three separate nights and at two locations about 150 metres apart from each other, NHIC Biologists captured and photographed several individuals. Little is known about this species but based on its known range and closely related species, it appears to be associated with beach dune habitats and quite likely feeds on dune grasses. This, coupled with the fact that the moth had not previously been recorded in Canada, suggests it could be a naturally rare species throughout its range. Further surveys will be needed to confirm the extent of its presence at Long Point NWA, and whether it is found at other dune sites along the Great Lakes.

The Maritimes: Documenting Leafminers

EAFMINERS ARE AN INSECT GUILD characterized by larvae which, through their feeding, excavate cavities (i.e., mines) between the epidermal layers of leaves. The combination of mine characteristics and the host plant species often make it relatively easy to determine the insect involved. With the recent publication of Charley Eiseman's e-guide, *Leafminers of North America*, leafminer identification is now more accessible.6

Four insect orders – beetles (*Coleoptera*), wasps and sawflies (*Hymenoptera*), true flies (*Diptera*), and butterflies and moths (*Lepidoptera*) – have leafmining species. The distributions of many of these species in Canada are not well documented, making them ripe for discovering new provincial and territorial records.

Inspired by the Leafminers of Ontario iNaturalist project ⁷ created by Mike Burrell of the Ontario Natural Heritage Information Centre, the Atlantic Canada Conservation Data Centre (ACCDC) launched the *Leafminers of the Maritimes* iNaturalist project in 2021.⁸ As of mid-April, 2022, 37 people had recorded 199 leafminer species, from 1568 field observations. Among taxa treated in the 2020 edition of *Wild Species: The General Status of Species in Canada*, the project has documented at least 123 new records for New Brunswick, Nova Scotia, and/or Prince Edward Island, and three new national records.

Number of New Provincial Records by Insect Order

PROVINCE	COLEOPTERA	DIPTERA	HYMENOPTERA	LEPIDOPTERA
New Brunswick	1	4	3	28
Nova Scotia	2	2	0	13
Prince Edward Island	3	7	5	55

Two of the new national records are of moths. *Cameraria picturatella* (Lepidoptera: *Gracillariidae*) feeds on Northern Bayberry (*Morella pensylvanica*), and is common in all three Maritime provinces. *Fomoria hypericella* (Lepidoptera: *Nepticulidae*) feeds on St. Johns-worts (*Hypericum* spp.). It was documented in Nova Scotia, as well as in Québec, in 2021. The other new national record is of the metallic woodboring beetle *Brachys howdeni* (Coleoptera: *Buprestidae*), recorded in Nova Scotia and Prince Edward Island.



Mine of a moth, Cameraria picturatella, on Northern Bayberry (Myrica pensylvanica). Photo credit: David Mazerolle.



Mine of a fly, *Phytomyza aralivora*, on Wild Sarsaparilla (*Aralia nudicaulis*). Photo credit: David McCorquodale.

⁶ http://charleyeiseman.com/leafminers/

⁷ https://www.inaturalist.org/check_lists/2757875-Leafminers-of-Ontario

⁸ https://www.inaturalist.org/projects/leafminers-of-the-maritimes

Yukon: Identifying Species at Risk in South Beringia

Places for Species at Risk initiative, administered by Environment and Climate Change Canada (ECCC), supports several ambitious projects across Canada. Through a coordinated, multi-partner approach, these projects focus on opportunities to protect the habitat of and help recover multiple terrestrial species listed under the federal *Species at Risk Act*. 9

Among the projects is the South Beringia Priority Place (SBPP) initiative, coordinated by ECCC in partnership with area First Nations, the Government of Yukon, and non-governmental organizations. The goal is to develop an integrated conservation action plan to improve outcomes for at-risk species and other species of interest in South Beringia.

South Beringia occupies an area of approximately 120,000 square kilometres in west-central Yukon. This landscape of mountains, forests, grasslands, and rivers was never glaciated. As a result, its biodiversity is akin to some other places in Canada, for example Haida Gwaii in British Columbia,



and the Gaspé Peninsula in Québec, that also escaped glaciation. A large number of species are found here but nowhere else, and at least 80 species – most of them yet to be formally assessed by the Committee on the Status of Endangered Wildlife in Canada, and with little or no habitat protection – are at risk of extirpation from Canada, or of extinction.

The Woolly Mammoth (Mammuthus primigenius) roamed through South Beringia for millennia, as it did throughout the Mammoth Steppe grasslands once straddling much of northern North America, Europe, and Asia. Although the mammoth is long extinct, most of the species which shared the land with them are still present in places like South Beringia. However, in the Yukon these grasslands, targeted for agriculture, gravel extraction, road building, and housing, are largely

Mammoth Meadow with Siberian Sage (Artemisia laciniata), a species found in Alaska and, in Canada, only in the meadows of South Beringia. Photo credit: Bruce Bennett.

unprotected. Coupled with climate change and habitat shifts, the time to act for their conservation is narrow.

In 2021-22 the Yukon Conservation Data Centre (YTCDC) participated in the Mammoth Steppe Biodiversity project

and provided data to identify the taxa to focus summer fieldwork upon. This fieldwork aimed to improve understandings of the distribution and composition of dry meadow ecosystems and the rare and endemic species that inhabit them, and to create models and maps to better manage rare and at-risk species through land use planning and development assessment processes.

Associated with this project, a bioblitz undertaken by the YTCDC resulted in data gathered on 936 species. Preliminary results indicate the discovery of 20 new species for the Yukon, including 11 spiders, seven beetles, a centipede, and a stonewort. Three of the beetles are also new to Canada, one of the beetles is new to North America, and one of the spiders is wholly new to science (i.e., a newly discovered species). ■

⁹ https://www.canada.ca/en/environment-climate-change/services/nature-legacy/fund/community-nominated-places-species-risk.html#toc0

Northwest Territories: Inventorying LIFEPLAN Sites

HE NORTHWEST TERRITORIES
Conservation Data Centre (NTCDC)
works in a co-management setting
by which organizations with legislated
responsibilities for biodiversity in the
Northwest Territories (NWT) work together
towards a common goal. The 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'èezhii renewable resources
boards.

The NTCDC continued to monitor biodiversity throughout the pandemic year of 2021, as well as to investigate new ways of collecting information about species in the NWT. For example, the NTCDC joined an international initiative called LIFEPLAN. Based at the University of Helsinki, this "Planetary Inventory of Life" aims, through a worldwide sampling program, "to establish the current state of biodiversity across the globe" and to generate "accurate predictions of its future state under future scenarios." 10

The LIFEPLAN sites being monitored

year-round by the NTCDC, including through the harsh northern winter, are in and near Yellowknife. The sites include cameras, automated recording units, specialized equipment such as cyclone samplers for

documenting spores and pollen, and malaise traps for collecting insects such as flies and wasps. Equipment checks and sample collection is being done every week for six years, a schedule made possible with the help of many enthusiastic partners including North Slave Métis Alliance, Wek'èezhii Renewable Resources Board, and Environment and Climate Change Canada.

As another feature of the

NTCDC's work in 2021, the

Centre, including all of its

partners, took the lead to produce the report

NWT Species 2021-2025 – General Status Ranks

of Wild Species in the Northwest Territories. 11

Published every five years, this volume is

of Wild Species in the Northwest Territories. 11
Published every five years, this volume is issued as part of the Wild Species: The General Status of Species in Canada program. 12 The





At an air temperature of -40C, NTCDC personnel field-test equipment and LIFEPLAN sampling protocols. Photo credit: Robert Reid.

newest NWT report provides the subnational (territorial) status ranks for 8228 species, or 27% of the estimated number of species present in the NWT; this was an increase over the 5257 species ranked in the 2016-2020 General Status report. ■

¹⁰ https://www2.helsinki.fi/en/projects/lifeplan

¹¹ https://www.enr.gov.nt.ca/en/services/biodiversity/nwt-species-general-status-ranking

¹² https://www.wildspecies.ca/

Nunavut: Building Baseline Biodiversity Knowledge

HE NUNAVUT CONSERVATION DATA
CENTRE (NUCDC) was founded in
December 2015, thereby completing the
network of provincial and territorial CDCs in
Canada. Nonetheless, the NUCDC has a big
challenge – documenting the biodiversity of
a territory which, at nearly 2.1 million square
kilometres (larger than Mexico and nearly twothirds the size of India) is not yet well known
biologically.

The NUCDC's program in 2021-22 concentrated on enhancing species lists and conservation status ranks. The work was greatly aided by information arising from the Wild Species: The General Status of Species in Canada assessments, and from experts hired by General Status who improved the completeness of the NUCDC's lists.

In particular, the NUCDC was fortunate to obtain expert input on the lists for vascular plants, spiders, mayflies, grasshoppers, and springtails. Of special note, Gergin Blagoev of the University of Guelph's Centre for Biodiversity Genomics kindly provided unpublished data on the spiders of Nunavut, drawing on his DNA barcoding work. Staff from other CDCs, including Yukon, Northwest Territories, Québec, and Atlantic Canada, also contributed data and advice, once again

illustrating the value of the NatureServe Network.

In terms of further specific work, NUCDC conducted an extensive review of bird and terrestrial mammal information for Nunavut. Close to 90% of 317 bird Element Subnational Tracking records were updated with distribution information, taxonomy comments, synonyms, and common names – including names in Inuktitut, if available. This work was largely based on information presented in the Birds of Nunavut, published in 2019, and also from 58 other published references. Using such information, the territorial ranks of 44% of the birds of Nunavut were updated, while 51 element subnational ranking records were also created.

Similar updates were made to terrestrial mammal records, drawing on 122 references. Territorial rank changes were applied to 21 terrestrial mammals, and eight element subnational ranking records were created. Funding from Parks Canada Agency also supported development of a spatial layer for Muskox (*Ovibos moschatus*), with accompanying supporting data, for future upload into Biotics 5 (NatureServe's web-enabled biodiversity information management system).

The NUCDC aims to continue list



The Snowy Owl (*Bubo scandiacus*) is one of about 160 bird species native to Nunavut. Breeding across a wide range of the circumpolar region, it is considered by the NatureServe Network to be *Apparently Secure* in Nunavut (S4) and globally (G4). However, the numbers of this owl have dropped sharply in recent decades, with climate change believed to be a principal factor. Photo credit: Jongsun Lee CC BY 3.0.

development and ranking refinements for other high-priority taxonomic groups, including lichens, freshwater fishes, and marine mammals. NatureServe Canada is working with its membership, and the Government of Nunavut, to find ways for increasing the capacity and resourcing of the NUCDC, so that the scope of biodiversity knowledge for the largest subnational geographic jurisdiction in the Americas can be greatly expanded.

Enhancing Online Biodiversity Data Platforms

about the nation's biodiversity is the federal-provincial-territorial website, Wild Species: The General Status of Species in Canada, and the associated reports of the same title.¹³ The first report, published in 2001, contained information on 1670 species across eight taxonomic groups. The fifth report, anticipated for release in the fall of 2022, will address over 50,000 species in 46 taxonomic groups – reflecting steadily increasing knowledge about Canada's biodiversity.

The Wild Species report, coordinated by Environment and Climate Change Canada's Canadian Wildlife Service and prepared by representatives of federal, provincial, and territorial departments, NatureServe Canada (NSC), and Canada's Conservation Data Centres (CDCs), is published every five years. In addition to informing the public, the report helps identify species that should undergo a comprehensive assessment by the Committee on the Status of Endangered Wildlife in Canada.

In 2021, NatureServe Canada developed a

public-facing search tool on the *Wild Species* website. ¹⁴ This tool allows users, working in English or French, to access and compare species-specific data from all *Wild Species* reports, and to compare species conservation status at national and regional (provinces, territories, oceans) levels. Common and scientific names are provided, as well as indication whether species are native or exotic.

Another significant development in 2022, in public access to biodiversity data, was NatureServe's release of NatureServe Explorer Pro. An extension of NatureServe's free online platform, NatureServe Explorer, Explorer Pro provides no-cost access to location data for over one million mapped species occurrences, drawn from authoritative data maintained by the NatureServe Network, for at-risk species and ecosystems in North America. Via Explorer Pro, users can view the spatial distribution of species at risk, zoom in on documented occurrences mapped by provincial/territorial CDCs and state Natural Heritage Programs, download search results in spatial and tabular data formats, generate reports with details about species found in



their area of interest, and more. 15

NatureServe Canada's members will be providing their data on Explorer Pro platform at no cost to the public. A data license agreement and/or data use training will be required to access CDC precise data for species that are susceptible to harm (e.g., poaching). Live and recorded online training webinars introduce Explorer Pro users to the platform's impressive search, view, and download functionalities. NatureServe staff provide ongoing technical support for the one-year term of subscription holders to assist them in accessing and accurately interpreting the data.



¹³ https://www.wildspecies.ca/

¹⁴ https://search.wildspecies.ca/

¹⁵ https://explorer.natureserve.org/pro/Welcome

Customizing Biodiversity Information Access for National Parks Management

EVELOPED IN PARTNERSHIP with Microsoft and the renowned geographic information systems company, Esri, Biotics 5 is NatureServe's web-enabled, biodiversity information management system.

16 Used across the NatureServe Network, Biotics 5 helps maintain unified taxonomy, supports consistent application of shared data standards and methodology, and underpins map, data, and other products at provincial, state, national, and international scales.

Parks Canada Agency (PCA) has worked closely with the NatureServe Network since 2003, and has been a long-term Associate



Member of NatureServe Canada (NSC). Biotics 5 is one of the primary biodiversity information systems by which PCA strives to meet its commitment to maintain or restore the ecological integrity of Canada's 47 national parks and other protected natural heritage places.

In 2021-22, NatureServe, NSC, and PCA worked to customize and improve access of PCA personnel to information maintained within Biotics 5, in support of particular PCA tasks and data management requirements. More specifically, customized access to yield simplified user interfaces was developed for six roles (e.g., critical habitat specialist, species recovery specialist). Guidance materials were developed internally to support such Agency employees. Access to these interfaces and guidance materials are now being made available across the Agency.

In a similar vein, in 2021-22 work began among NatureServe, NSC, and PCA to provide PCA with access to NatureServe Network licensed data via NatureServe's Explorer Pro. As described in the previous story, Explorer Pro

Parks Canada employees examine the vegetation inside a quadrat at Sidney Spit Gulf Islands National Park Reserve. Photo credit: Fritz Mueller ©Parks Canada All rights reserved. enables access to enhanced species mapping tools, including the ability to view species locations at finer spatial scales and to generate reports on species found within given areas of interest.¹⁷

Parks Canada's Biotics 5 platform annually receives two data refreshes from NatureServe's Central Biotics database. This includes updates to species taxonomy and ranks and spatial data from NatureServe's member Conservation Data Centres (CDCs). The partners are examining how Explorer Pro could be implemented to provide this NatureServe Network data to PCA personnel in near real-time. Success will mean a streamlining of data access for PCA staff across Canada. thereby also reducing the number of data requests submitted by PCA to CDCs. Once implemented, this new data access approach will be of significant interest to other organizations for efficiently and conveniently accessing geo-located biodiversity information, while maintaining adherence to data sharing agreements and data access and management training requirements.



¹⁶ https://www.natureserve.org/products/biotics-5 17 https://explorer.natureserve.org/pro/Welcome

Summary Financial Data

The summary financial data on this page is drawn from NatureServe Canada's audited financial statements for 2021-22. To access the full statements, please visit www.natureserve.ca.

STATEMENT OF FINANCIAL POSITION				
Year ending March 31	2022	2021		
ASSETS				
Current				
Cash	777,742	264,563		
Accounts receivable	485,253	667,109		
Prepaid expense	1,020	668		
	1,264,015	932,340		
Capital Assets	1,067	_		
Total Assets	1,265,082	932,340		
LIABILITIES AND NET ASSETS				
Current Liabilities				
Accounts payable and accrued liabilities	949,440	755,382		
Deferred revenue	134,946	25,593		
	1,084,386	780,975		
Net Assets	180,696	151,365		
Total Liabilities and Net Assets	1,265,082	932,340		

STATEMENT OF OPERATIONS					
Year ending March 31	2022	2021			
REVENUE					
Charitable organization/foundation funding	207,872	344,169			
Dues	16,500	16,500			
Government funding	2,042,133	1,628,550			
Other	40,557	15,783			
Total Revenue	2,307,062	2,005,002			
EXPENDITURES					
Contracts	2,231,312	1,963,754			
Office costs	12,395	8,386			
Other	2,320	2,241			
Professional fees	17,421	16,926			
Sponsorship	10,000	_			
Travel, annual meeting, workshops	4,283	_			
Total Expenditures	2,277,731	1,991,307			
Excess (Deficiency) Revenue Over Expenditures	29,331	13,695			

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 (#862330529RR0001). 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, which manage data of conservation value, and/or are active in promoting science-based conservation action nationally or sub-nationally.

Online donations can be processed through our website (www.natureserve.ca) and inquiries can be directed to Patrick Henry, Executive Director, phenry@natureserve.ca; 613-986-1535.



James Churchill,
Conservation
Data Analyst and
Field Biologist,
Atlantic Canada
Conservation
Data Centre.
Photo credit:
Kier Gigeroff.

In Gratitude to Our Members in 2021–22

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















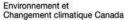








Climate Change Canada







Parks

Parcs









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