September 2022

nawmp.wetlandnetwork.ca

HabitatMatters

2022 Canadian NAWMP Report

"Nordic Light – White-fronted Goose" from the
2022 Canadian Wildlife Habitat Conservation Stamp series.

Artist: Pierre Girard

North American Waterfowl Management Plan

Plan nord-américain de gestion de la sauvagine

Plan de Manejo de Aves Acuáticas Norteamérica

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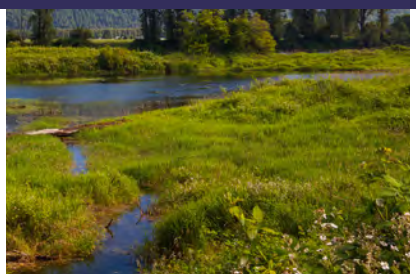
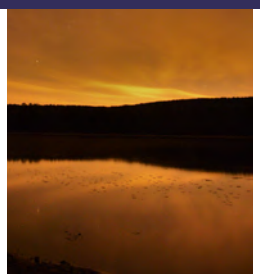
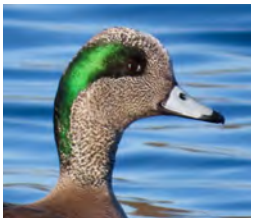







We would like to acknowledge that the lands on which the North American Waterfowl Management Plan is implemented in Canada are the traditional, treaty and unceded territories of First Nations, Inuit and the Métis Nation. The act of acknowledging the land, and the signed treaties where applicable, is an expression of respect and gratitude for the land. This action is to remind us that our places of work, where we live and where we gather are on the lands of First Nations, Inuit and the Métis Nation and is a recognition that we are all accountable to these relationships on a daily basis.

About the NAWMP

Wood Duck.

Jean-Maxime Pelletier

The North American Waterfowl Management Plan (NAWMP) is an international partnership to restore, conserve and protect waterfowl populations and associated habitats through management decisions based on strong biological foundations. The ultimate goal is to achieve abundant and resilient waterfowl populations and sustainable landscapes. The NAWMP engages the community of users and supporters committed to conserving and valuing waterfowl and wetlands.

In 1986, the Canadian and U.S. governments signed this partnership agreement, laying the foundation for international co-operation in the recovery of declining waterfowl populations.

Terminology used in this report

Securement
The protection of wetland and/or upland habitat through land title transfer or binding long-term (minimum 10-year) legal agreements with a landowner.

Influence
Direct actions taken by landowners, land managers or conservation agencies that protect or enhance wetland or associated upland habitats without legal or binding agreements. These direct actions result in applied land-use changes.

Enhancement
Actions carried out on wetland and/or upland habitats to increase their carrying capacity for wetland-associated migratory birds and other wildlife.

Management
Activities conducted on secured wetland and/or upland habitats to manage and maintain their carrying capacity for wetland-associated migratory birds and other wildlife.

Mexico became a signatory to the NAWMP with its update in 1994. As a result, the NAWMP partnership extends across North America, working at international, national and regional levels on a variety of waterfowl, habitat management and people issues.

Since its creation, the NAWMP's partners have worked to conserve and restore wetlands, associated uplands and other key habitats for waterfowl across Canada, the United States and Mexico. The partners have had wide-ranging influence: shaping land-use, agricultural and public policies; integrating science and monitoring systems into planning; and delivering habitat programs. The results of these efforts are notable. Many waterfowl populations have increased substantially since 1986, and NAWMP partners continue to collaborate with other bird conservation initiatives.

In Canada, NAWMP partner activities are directed by public–private Joint Venture partnerships, which focus on areas or species of concern identified in the NAWMP. Each Joint Venture includes a range of partners, from federal, provincial and local governments to conservation organizations. Strategic and Implementation Plans, developed based on the NAWMP's goals as well as on pressures specific to the Joint Ventures, form the basis of each Joint Venture's programs and individual projects.

Green-winged Teal.
Jean-Maxime Pelletier

National Overview

Accomplishments by Habitat Joint Ventures (1986–2022)

23.4

Million acres of habitat secured

(9.5 Million hectares)

Involves the protection of habitat through land title transfer or binding legal agreements with landowners (10-year minimum).

213.6

Million acres of habitat influenced

(86.4 Million hectares)

Involves direct actions that protect or enhance habitat without legal or binding agreements. These actions result in applied land-use change.

4.1

Million acres of habitat enhanced

(1.7 Million hectares)

Involves actions that increase habitat carrying capacity for waterfowl and other wildlife.

Accomplishments by Habitat Joint Ventures (2021–2022)

330.9

Thousand acres of habitat secured

(133.9 Thousand hectares)

33.4

Thousand acres of habitat influenced

(13.5 Thousand hectares)

362.9

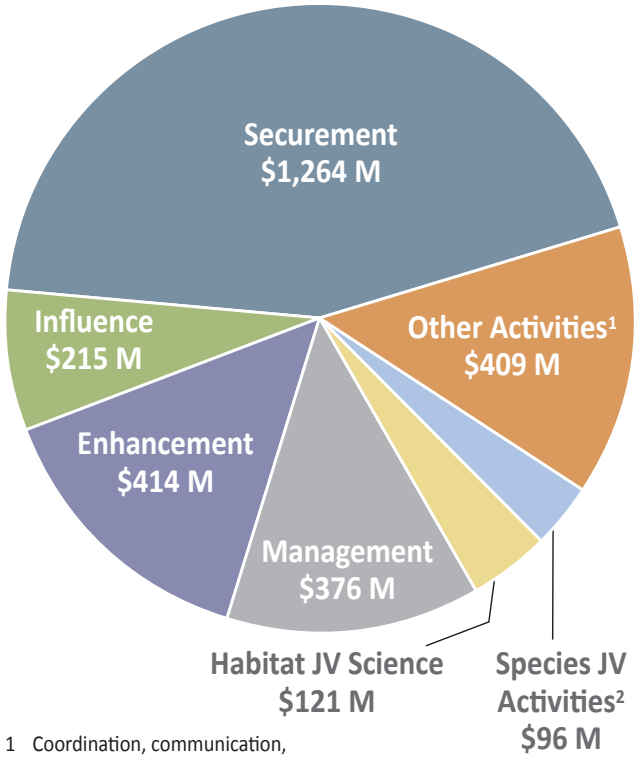
Thousand acres of habitat enhanced

(146.9 Thousand hectares)

Note: Managed acres are no longer reported in *Habitat Matters* to avoid redundant data, as all managed acres occur on secured land.

Expenditures

By activity 1986 to 2022
($2,895 M CAD)



1 Coordination, communication, policy, crop damage and compensatory mitigation
2 Banding, surveys, research, observation and management

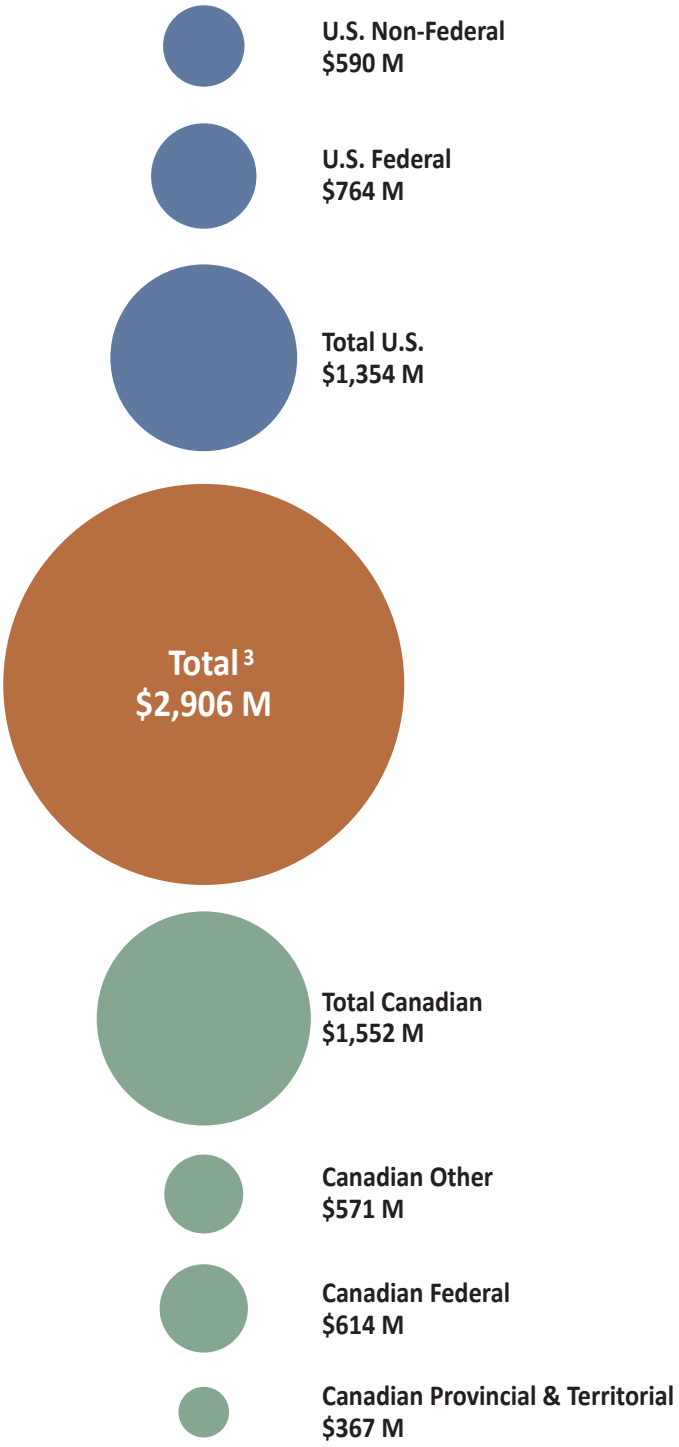
The successful implementation of Canada's NAWMP program has been enabled by the continuous support of partners in both Canada and the United States, including federal, provincial/territorial and state governments, non-governmental organizations and individuals. In particular, funding received under the United States' *North American Wetlands Conservation Act* has been integral to the success and longevity of the Canadian program.

1986–2022 consists of the January 1, 1986, to March 31, 2022, time frame.

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

Contributions

In support of the NAWMP in Canada 1986 to 2022
($2,906 M CAD)



3 Includes $0.31 M in international contributions

Thinking Bigger as the New Habitat Joint Venture Implementation Plans Take Flight

Black Scoter.
Jaden Barney

"In planning for the future of waterfowl, we must reflect upon the past, consider the present, and recognize and appreciate the tremendous efforts that have been made … on behalf of ducks, geese and swans by thousands of individuals, numerous private conservation organizations, and the state, provincial, territorial and federal governments of Canada, the United States and Mexico." This opening statement in the original North American Waterfowl Management Plan (NAWMP) is as true today as it was when written in 1986. However, our present and future look quite different in 2022, and our planning must reflect this.

> The Habitat Joint Ventures, along with the associated Species Joint Ventures, have evolved as the principal vehicles for implementing projects to meet the NAWMP goals.

We have long recognized that waterfowl and wetlands provide social, cultural and economic benefits to millions of North Americans, and that healthy wetlands and associated uplands are some of the most biologically diverse and productive environments. No one knows this better than those involved in the Habitat Joint Ventures (HJVs).

The HJVs, along with the associated Species Joint Ventures (SJVs), have evolved as the principal vehicles for implementing projects to meet the NAWMP goals. Originally beginning with 8 HJVs and 2 SJVs in 1986, and expanding incrementally to the present 21 HJVs (four in Canada) and 3 SJVs, these partnerships reach across Canada, the United States and Mexico.

The implementation of the NAWMP has always relied on tracking wetland and upland habitat conservation, monitoring waterfowl populations and analyzing the relation between the two. In 2012, the NAWMP goals were re-examined and a third goal was added: "Human Dimensions," which examines how to integrate people into waterfowl and wetland conservation.

Fast forward to 2022, and the four Canadian HJVs have released their new Implementation Plans (IPs). The IPs are still based on a strong science foundation, but now, as we consider the future of waterfowl and wetland conservation in the next decade, the HJVs are thinking bigger in response to greater societal and environmental changes.

The IPs include new habitat and population objectives, as well as a broader list of priority waterfowl species. They have also expanded to encompass priority non-waterfowl species and incorporate increased scientific methods. Expanded human dimensions sections include goals to connect more people with nature and enhance engagement with Indigenous Peoples and industry, while expanded outreach and public awareness goals are included in the communication sections.

This year's *Habitat Matters* highlights projects across the country:

- In the Prairie Habitat JV, Ducks Unlimited Canada is working with the Cowessess First Nation of Saskatchewan, the Manitoba Heritage Habitat Corporation, and farmers and ranchers in Alberta and Manitoba in separate projects to enhance wetlands, grasslands and forests. The projects preserve waterfowl habitat with the added benefit of improving the sustainability of farmland while also capturing and storing carbon.
- In the Eastern Habitat JV, the Nature Conservancy of Canada (NCC) is collaborating with the Kenauk Institute to protect the extensive Kenauk property in southwestern Quebec. This will enhance waterfowl habitat while providing a nature experience for the populations of Ottawa–Gatineau and Montreal, and research opportunities for students and scientists from around the world.
- In the Pacific Birds Habitat JV, the NCC, in partnership with the Nuxalk Nation, is formulating a management plan to guide long-term stewardship of Iclhicwani, a 301-acre (122-hectare) riverfront conservation area in the coastal temperate rainforest of the Bella Coola Valley that is important to priority waterfowl and non-waterfowl species.
- The Canadian Intermountain JV made progress in achieving objectives for securing and restoring habitat in the ecologically important Hoodoos–Columbia Wetlands and Deer Creek Complex near Williams Lake, as well as creating new wetlands in the Creston Valley. These projects are of benefit to waterfowl and also non-waterfowl like the endangered Northern Leopard Frog and at-risk species like the Western Painted Turtle, American Badger, Long-billed Curlew, Bank Swallow and Vivid Dancer.

Tori Mezebish, one of three students who received a fellowship grant offered by the Sea Duck Joint Venture in collaboration with Ducks Unlimited Inc. Tori is holding a Common Goldeneye, the species she is studying.

Tori Mezebish

As these examples demonstrate, thinking bigger is what will ensure that the NAWMP's success is maintained for future generations. And activities promoting the NAWMP goals will continue to be supported by such programs as the Canadian Wildlife Habitat Conservation Stamp (CWHC).

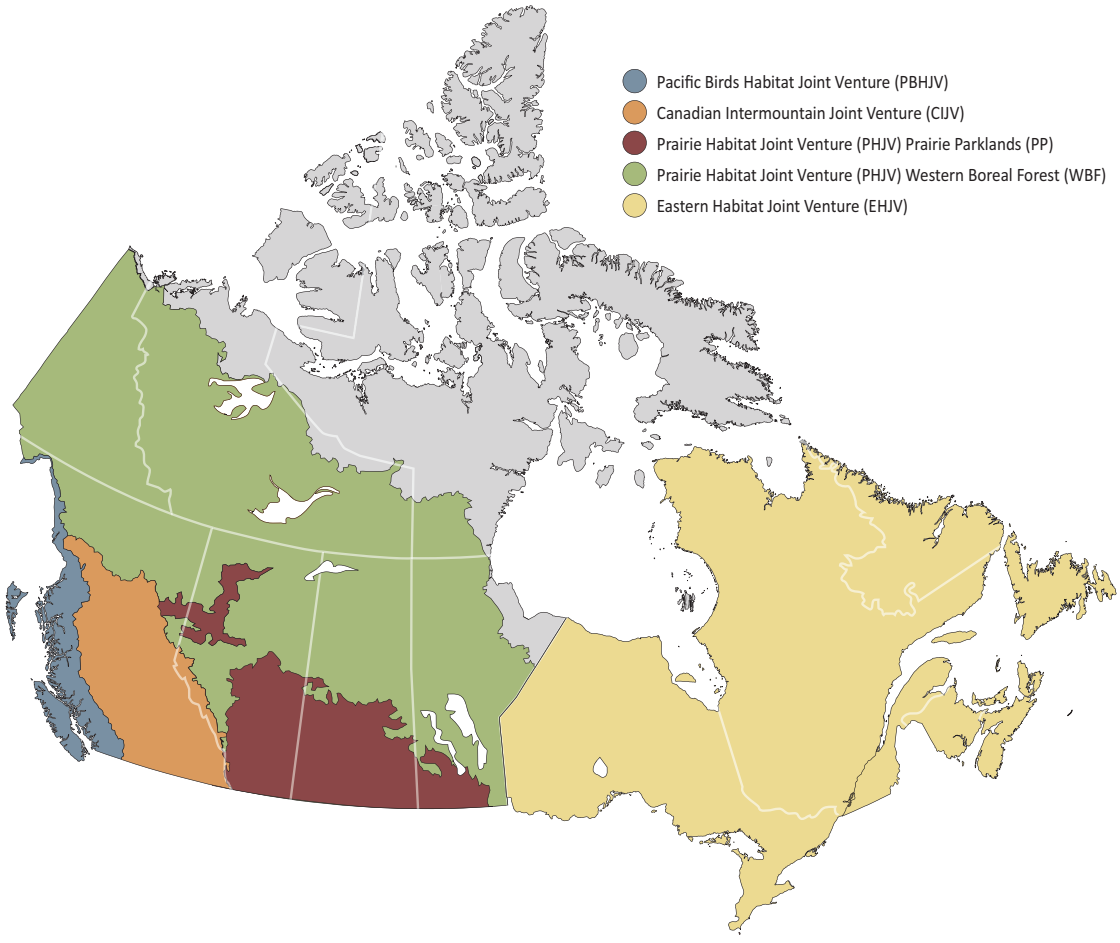
A program of Wildlife Habitat Canada (WHC), the Stamp is purchased by hunters to validate their migratory gamebird hunting permit, as well as by collectors and other conservationists. Each year's design presents original work by a Canadian artist featuring a different species of waterfowl or migratory gamebird in its habitat. To date, funds from sales of the Stamp have provided over CA$62 million for habitat conservation, conservation networking and research projects. In the 2022–2023 grant year, WHC plans to expand its conservation contribution by delivering grants from the Stamp to another 28 projects across Canada. WHC will continue to support the NAWMP, the Habitat Joint Ventures and their new Implementation Plans in their goal of "Thinking Bigger" about conservation.

To learn more about Wildlife Habitat Canada, the CWHC Stamp or WHC grant programs, please visit *www.whc.org*.

Habitat Joint Ventures

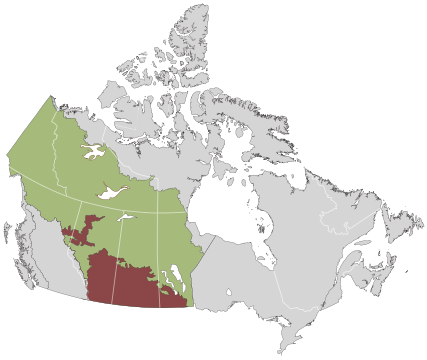
Nicomen Slough, British Columbia.
Graham Osborne

The Canadian Habitat Joint Ventures integrate planning, science, governance, partnerships and management to achieve the NAWMP goals in Canada through a programmatic approach. A science-based Implementation Plan is created to address local, regional and continental goals. Joint Venture partners actively research, monitor and evaluate waterfowl populations and deliver habitat conservation programs at a regional level.



Prairie Habitat Joint Venture

Lake Ranch, Manitoba.
Thomas Fricke



www.phjv.ca

The Prairie Habitat Joint Venture (PHJV) delivery area covers two distinct biomes in western Canada: the Prairie Parklands and the Western Boreal Forest (WBF). Together, this region supports approximately 50% of North American breeding waterfowl. One of the continent's first priority landscapes under the North American Waterfowl Management Plan, the Prairie Parklands encompasses 158.4 million acres (64.1 million hectares) of prairie and aspen parklands in Alberta, Saskatchewan, Manitoba and the Peace Parkland Region of British Columbia. The WBF, which covers parts of British Columbia, Alberta, Saskatchewan, Manitoba, Yukon and Northwest Territories, has been acknowledged under the NAWMP as second only to the Prairie Pothole Region as an important waterfowl breeding area.

The PHJV contains a range of wetland types from small potholes to marshes and bog systems. Together, the Prairie Parklands and WBF regions of Canada provide habitat for most North American duck species. They also provide habitat for hundreds of priority species identified in the Bird Conservation Region plans. Linkages among habitats and species are highlighted in the Prairie Parklands and WBF Implementation Plans.

Conservation in the PHJV is at the same time more positive and more challenging than ever before. The PHJV is in a tremendous place now, with significant increases in government support for habitat and species conservation. However, facing the challenges of species and habitat declines, as well as the impacts of climate change, is daunting. The new PHJV Implementation Plans (IPs) for the Prairie Parklands and Western Boreal Forest build on what has been a successful approach to waterfowl habitat conservation to meet these growing challenges. Fostering expanded relationships built on trust and respect with diverse partners who share a common vision, as well as a sustained commitment to conservation, will help the PHJV collectively achieve its objectives.

Nolan Johnson, DUC Conservation Land Negotiator, and Loretta Delorme, Cowessess First Nation Lands and Resources Manager.

Ducks Unlimited Canada

Prairie Parklands

Saskatchewan: Managing land for seven generations: Cowessess First Nation's conservation ethic supports PHJV programs

The traditional lands of the Cowessess First Nation (CFN) are situated along the scenic Qu'Appelle Valley in southeast Saskatchewan. Since the signing of the Saskatchewan Treaty Land Entitlement Framework Agreement in 1992, CFN has acquired and transferred to its reserve nearly 190,000 additional acres (76,890 hectares).

Ducks Unlimited Canada (DUC) began partnering with CFN in the early 2000s to protect habitat in the PHJV Pheasant Hills target landscape, an area of prairie parkland known to support waterfowl densities of up to 50 pairs per square mile (2.5 square km). Several forage program agreements have been signed over the years, and together DUC and CFN have worked to establish forage crops on over 1,000 acres (405 hectares) across eight quarter-sections of land, all of which remains in valuable perennial cover today.

DUC more recently entered into a series of long-term lease agreements with CFN. The total impact of these agreements is substantial: an additional 2,000 acres (810 hectares) of habitat conserved, including 470 acres (190 hectares) of wetlands. New funding from Environment and Climate Change Canada's (ECCC) Nature Smart Climate Solutions Fund will allow DUC's partnerships with CFN to grow.

While providing safe and secure nesting habitat for waterfowl, these efforts also promise to deliver a suite of environmental co-benefits, as well as reducing nutrient runoff and improving water quality (see sidebar). The secured perennial cover, mixed natural lands and wetlands will collectively store considerable amounts of carbon and will contribute to ongoing efforts to mitigate and address the impacts of climate change.

The secured perennial cover, mixed natural lands and wetlands will collectively store considerable amounts of carbon and will contribute to ongoing efforts to mitigate and address the impacts of climate change.

Wetland restorations contribute to the health of a stressed prairie lake

The Lake Winnipeg Basin Initiative (LWBI) aims to restore the ecological health of Lake Winnipeg by reducing pollution from agricultural, industrial and municipal sources. Conserving and restoring wetlands and their nutrient abatement function in this drainage basin is key. As part of LWBI efforts, and delivered via the Assiniboine River Basin Initiative, CFN is working with DUC and local watershed groups to restore an additional 82 acres (33 hectares) of wetlands, incorporating both Indigenous knowledge and science in the project.

The partnership with CFN aligns with the PHJV's habitat conservation goals of protecting and restoring habitat for waterfowl and other migratory birds. It also aligns with the Joint Venture's people goals. In the development of its new IP, the PHJV has set significant targets focused on collaborating and creating valued relationships based on trust.

For CFN, the partnership with DUC supports its sustainability goals and belief that the health of First Nation lands is of utmost importance. "Our lands suffer when we take a solely economic route to success. When we also consider the land's health, we pass on sustainability to the next seven generations," said CFN Council member Richard Aisaican. "By restoring wetlands and grasslands, we bring life back to these areas and ultimately bring habitat for wildlife back to our lands."

Alberta: The Importance of Cattle Grazing for Wetland Conservation in the PHJV

Cattle producers are critically important to meeting NAWMP/PHJV objectives. In sustainable grazing systems, good management by beef producers ensures that perennial plants provide a protective blanket over the landscape. This plant cover provides forage for livestock, stores carbon in the soil, provides important habitat for migratory birds and other wildlife, maintains biodiversity and protects watershed health.

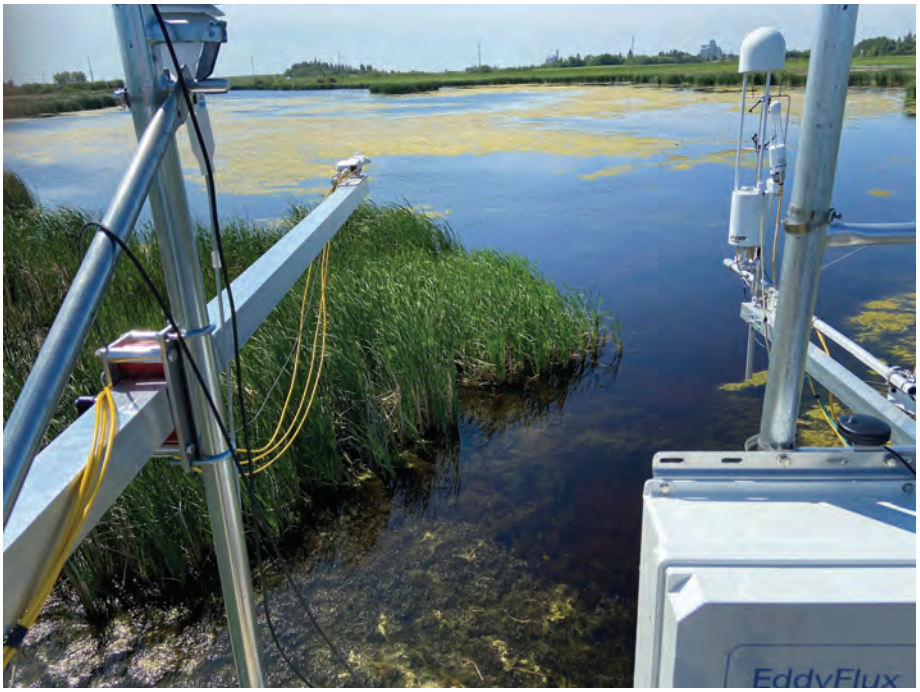
An added bonus to this impressive set of natural benefits is that grazing landscapes favour wetland conservation. Furthermore, wetlands in grazing landscapes actually amplify the ecosystem services generated by these landscapes.

By filling this important information gap, we hope to increase understanding of the ecosystem services that sustainable grazing landscapes provide to society as a whole.

But how much do wetlands amplify ecosystem services? A research project is working to answer that question.

"By filling this important information gap, we hope to increase understanding of the ecosystem services that sustainable grazing landscapes provide to society as a whole," said Dr. Pascal Badiou, a research scientist with DUC who is leading the project.

"Communicating our research results to consumers could bolster confidence in the environmental sustainability of the Canadian beef industry. And that could help toward ensuring that the remarkable array of ecosystem services provided by grazing landscapes and their wetlands are conserved for the long term."



Badiou's project is the first time these advanced greenhouse gas–monitoring technologies called flux towers have been used in smaller, freshwater, mineral soil wetlands.

Pascal Badiou/Ducks Unlimited Canada

Badiou noted that a tremendous number of Prairie wetlands have been drained over the past century, mainly to increase land available for annual crop production. "Where a lot of wetlands remain intact seems to overlay with intact pasture, grassland and forest landscapes. That makes sense because you need access to water for livestock production."

The project is taking place in three agricultural watersheds and overlaps with PHJV waterfowl priority areas in the Prairie Parklands: Camrose Creek in Alberta, Smith Creek in Saskatchewan and Broughton's Creek in Manitoba. The project team includes researchers with diverse expertise from many agencies, including DUC, Agriculture and Agri-Food Canada, University of Manitoba, University of British Columbia, University of Lethbridge and ECCC.

The project's primary focus is on measuring the carbon storage and greenhouse gas emissions of wetlands within grazing landscapes.

> PHJV habitat conservation programs in the Prairie Parklands provide benefits to all birds, with a focus on waterfowl, as well as on 22 shorebird, 13 waterbird and 28 landbird species.

The team is also assessing water quality, water quantity and biodiversity benefits from wetlands in grazing versus cropping landscapes.

"The beef industry is facing increased scrutiny in terms of the carbon footprint of beef consumption, with some people advising consumers to switch from beef to chicken or vegetarian options as a way to reduce greenhouse gas emissions associated with food production. The flip side of that is the need to help society understand the key role of beef producers in sustainably managing Canada's grassland, pastureland and rangeland landscapes," said Badiou.

"Sharing our research results could help consumers become aware of the environmental value of sustainable management of pasture and rangeland landscapes and the incredible importance of such landscapes to society. Our results could also be used in developing incentive programs or environmental markets, such as carbon markets, to encourage protection of grasslands and their wetlands."

Manitoba: Benefit for All Birds

PHJV habitat conservation programs in the Prairie Parklands provide benefits to all birds, with a focus on waterfowl, as well as on 22 shorebird, 13 waterbird and 28 landbird species. Benefits extend even further, providing improved ecosystem function and increased resilience to the impacts of climate change. For the first time the PHJV IP includes grassland bird habitat objectives and provides opportunities for new capacity and new partnerships that will deliver habitat conservation outside traditional waterfowl habitats.

Wolfe Creek

The Wolfe Creek property is in the heart of the Prairie Parkland region, one of Manitoba's most productive waterfowl breeding areas. Recently secured by the Manitoba Habitat Heritage Corporation (MHHC), about half of the 640-acre (260-hectare) property consists of native wetlands, grasslands and forests. The other half of this property provides a great opportunity to restore or enhance the 38 cropped wetland basins and adjoining cultivated acres to perennial grassland, increasing climate change resilience and available bird habitat.

Wolfe Creek, Manitoba.
Manitoba Habitat Heritage Corporation

The conversion of cropland to perennial grass cover aligns well with the PHJV Prairie Parklands IP. The wetlands, grasslands and forests on this property will provide habitat for a number of PHJV priority waterfowl, shorebird, waterbird and landbird species.

Community has long been recognized as one of MHHC's core values, and the conservation organization works closely with farmers and landowners to sustainably manage lands for the benefit of the community and the environment. In the case of Wolfe Creek, the property will be managed by MHHC's local Habitat

Conservation Specialist based out of Shoal Lake, just a few miles away.

The plan is to have livestock grazing as the primary use of the property. This is an effective way to manage the lands for increased biodiversity and at the same time maintain local access for agriculture. Key objectives are to increase soil carbon levels and provide exceptional wildlife habitat. These complementary objectives can be achieved through the restoration of cultivated areas and the implementation of an ecological grazing system. In addition to livestock use, the lands will be open to the public, and both big-game and waterfowl hunting will be permitted.

Lake Ranch

Located in one block along the eastern shoreline of East Shoal Lake, the Lake Ranch property is significant not only for its size (at 6,662 acres [2,696 hectares] it is one of the largest projects ever secured by the Nature Conservancy of Canada [NCC] in Manitoba) but also for its remarkable habitat diversity. The area's ridge and swale topography and dynamic water table have created a complex and ever-changing habitat mosaic that supports thousands of acres of wetland, tall-grass prairie and forest. This diversity and intactness in turn support an incredible array of species. Recent surveys, for example, recorded significant grassland birds (including Sprague's Pipit), 30 species of shorebird and over 150 Western Grebe.

The project is located within the North, West, and East Shoal Lakes Important Bird Area (IBA), an important site for migratory birds in the prairie provinces, which provides significant habitat for enormous congregations of migrating waterfowl, while also being a stopover site and breeding habitat for shorebirds. The IBA was identified as a wetland site of significant importance to wetland-associated birds (colonial nesters, shorebirds, waterfowl) in the PHJV Prairie Parklands IP.

Under NCC's protection, management of this working ranch will include grazing and woody encroachment control to maintain open wetlands and grasslands and the species that depend on them. This project will also provide opportunities to connect with the public to highlight the benefits of wetlands and waterfowl habitat, and to demonstrate their role within the broader Prairie Parklands habitat mosaic.

Western Boreal Forest

Nature-Based Solutions to Climate Change

The 26th United Nations Climate Change Conference of the Parties (COP26) took place in November 2021, bringing together leaders and top experts from around the globe,

Killdeer on Lake Ranch, Manitoba.

Thomas Fricke

and resulted in the Glasgow Climate Pact. Here in Canada, conservation partners are using the Government of Canada's new Nature Smart Climate Solutions Fund to build on already well-established programs. One of these is the PHJV's Western Boreal Forest (WBF) program, which focuses on key carbon-rich landscapes, delivering the kind of nature-based solutions called for in the pact.

Section Four of the pact emphasizes the importance of "protecting, conserving and restoring nature and ecosystems, including forests and other terrestrial and marine ecosystems ... acting as sinks and reservoirs of greenhouse gases and protecting biodiversity while ensuring social and environmental safeguards."

Kevin Smith, DUC's national manager of boreal programs, a major delivery partner of the PHJV in the WBF, spoke to COP26 delegates and the public. He shared research showing how the carbon-rich wetland ecosystems scattered throughout the boreal region are a nature-based solution to climate change and deserve enhanced protection.

"Given that Canada's boreal region holds 200 million acres of North America's surface freshwater and provides breeding grounds for 11 million waterfowl, this opportunity to combine the need for legacy carbon storage with the need to secure waterfowl breeding grounds provides DUC with an opportunity to leverage the benefits and align the interests of the NAWMP and COP26," Smith said.

The PHJV is already making significant progress in the boreal region, influencing a total of 108 million acres (43.7 million hectares) of protected lands and 12 million acres (4.8 million hectares) of Sustainable Land Use areas (partnerships with land users to increase and maintain habitat suitability on the landscape). DUC, along with other partners in the PHJV, has a goal to accomplish an additional 75 million stewarded acres

Western boreal wetlands.
Ducks Unlimited Canada

The PHJV's conservation efforts will continue to be critical in Canada's commitment to the global community and its role in the current climate and migratory bird crises. They are also critical to elevating the importance of Canada's boreal region, a national treasure that should be guarded with great care.

(30 million hectares) over the next five years. The creation of Ts'udé Niljné Tuyeta, a 3,860-square-mile (10,000 square km) Indigenous Protected Area near Fort Good Hope, Northwest Territories, is an example of the boreal program's role in uniting Indigenous communities, government and other land users to support collaborative management and protection of these ecologically indispensable regions.

However, according to Smith, protection is only part of the puzzle. Sustainable land management and knowledge sharing are also key pieces needed to reach Canada's—and the world's—climate action goals.

"Sustainable land management can happen in a number of ways," said Smith. "This includes influencing higher certification standards for industries operating in boreal peatlands and forests, establishing direct industry conservation partnerships and influencing the adoption of codes of practice, policies and regulation that help to maintain wetland function."

DUC steps up in these areas as well, offering services to land managers and owners, and equipping them with the knowledge they need to make informed decisions on land use. Practitioner guides such as the *Guiding Principles for Wetland Stewardship and Forest Management* and *Wetland Best Management Practices for Forest Management Planning and Operations* were created by DUC's boreal program as the result of collaborative knowledge sharing and cumulative research on these sensitive areas, which Smith hopes will help with understanding the importance and value of these areas.

"Conducting and leveraging science is critical for the development of nature-based climate solutions, as is raising awareness of the importance and role of peatlands in mitigating climate change," said Smith.

For more information, please contact Deanna Dixon, Prairie Habitat Joint Venture Coordinator, deanna.dixon@ec.gc.ca.

Prairie Habitat Joint Venture – Prairie Parklands

Contributions (CAD)

	2021–2022	*Total (1986–2022)*
Total	63,079,717	1,520,278,914

Accomplishments (Acres)

	2021–2022	*Total (1986–2022)*
Secured	81,851	8,452,277
Enhanced	353,773	2,986,785
Influenced	125,893	7,780,346

Secured and enhanced acres are not additive.

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

1986–2022 consists of the January 1, 1986, to March 31, 2022, time frame.

Prairie Habitat Joint Venture – Western Boreal Forest

Contributions (CAD)

	2021–2022	*Total (1986–2022)*
Total	13,495,385	173,517,479

Accomplishments (Acres)

	2021–2022	*Total (1986–2022)*
Secured		12,091,184
Enhanced		107
Influenced	32,974,625	121,105,108

Secured and enhanced acres are not additive.

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

1986–2022 consists of the January 1, 1986, to March 31, 2022, time frame.

Eastern Habitat Joint Venture

Kenauk Nature Reserve, Quebec.
Juliana Balluffi-Fry

www.ehjv.ca
www.ehjv.ca/fr

The Eastern Habitat Joint Venture (EHJV) contains 780 million acres (315 million hectares) spanning the provinces of Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador. The EHJV supports 30% of Canada's wetlands, including more than 120 million acres (48 million hectares) of freshwater and tidal wetlands. Important habitats include coastal bays and salt marshes, lakeshore marshes, floodplain wetlands and boreal forest wetlands. The EHJV has six priority waterfowl species: American Black Duck, Mallard, Wood Duck, Common Goldeneye, Barrow's Goldeneye and Common Eider (subspecies *dresseri*), as well as 16 non-waterfowl priority species including waterbirds, shorebirds and landbirds. The habitat within the EHJV supports 95% of the continental population of American Black Duck and 80% of the Common Eider subspecies *dresseri*.

Because it encompasses one-third of Canada's land mass and two-thirds of its population, the EHJV has always thought big, investing in projects to conserve and restore wetlands and associated uplands for the benefit of waterfowl and all other bird species. For the objectives in its new Implementation Plan (IP), the EHJV is thinking even bigger, identifying six waterfowl and 16 non-waterfowl species, present throughout most of the EHJV region, as focal species. Over the next decade the EHJV will focus not only on waterfowl, but also on specific conservation, management and research actions that will benefit the non-waterfowl priority species. Additionally, the new IP highlights research that will connect people and wildlife through expanded human dimensions activities. This year's report highlights large-scale projects that benefit all birds, including waterfowl, under the new EHJV objectives.

Some of the lakes and wetlands in the historic Kenauk property in southern Quebec.

Kenauk Nature Reserve

Conserving Kenauk

The Nature Conservancy of Canada (NCC), in partnership with the Kenauk Institute, has been working since 2013 to conserve the historic Kenauk property in southern Quebec. NCC now protects more than 17,300 acres (7,000 hectares) of the 65,000-acre (26,300-hectare) property, known for its pristine lakes and exceptional old-growth forests that are home to a diversity of species. Wetlands, lakes and ponds cover approximately 22% of the entire Kenauk property, and this conserved land will benefit NAWMP priority species including American Black Duck, Wood Duck and many other migratory bird species.

This protected area is a key piece within a natural corridor that extends nearly 62 miles (100 km) at the northern limit of the temperate forest range, spanning three different bio-climatic zones and linking Plaisance National Park on the Ottawa River and Mont-Tremblant National Park at the edge of the boreal region. NCC is pursuing the protection of this corridor, made up of a mosaic of public and private timberlands that provide an important passageway for wildlife to move between habitats. With climate change, animals are steadily migrating north, making these types of wildlife corridors all the more crucial for their survival.

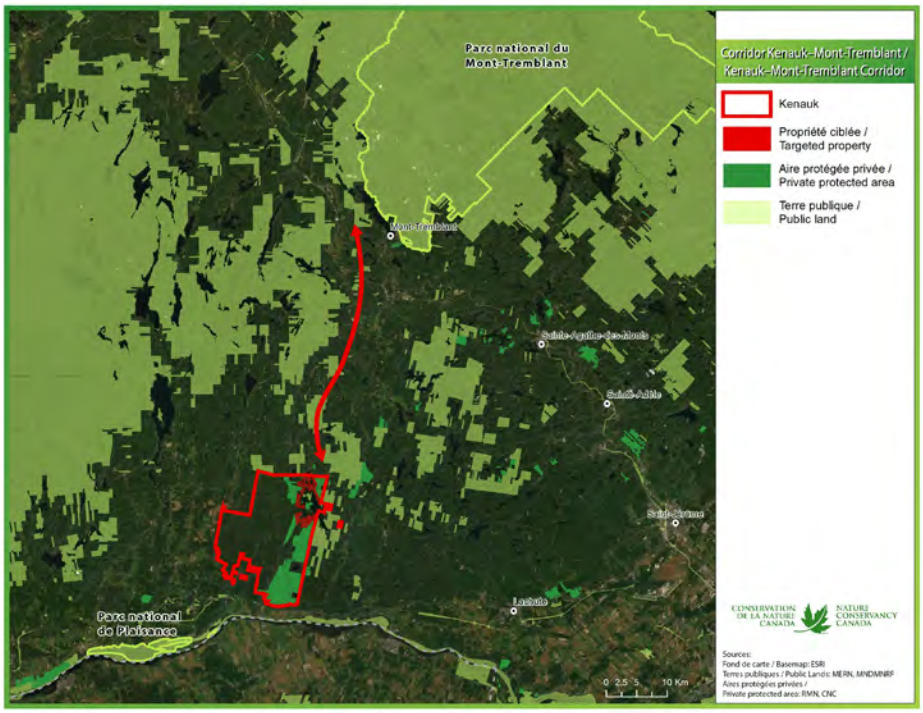
> Old-growth forests, species not previously identified in Quebec and species that were thought to be extirpated have been discovered in Kenauk, along with more than 75 at-risk species.

Scientific research is already being carried out on the property, and an internship program is offered to students, providing opportunities for biologists and students to conduct research and learn about this important area (*www.kenaukinstitute.org*). Through this work, old-growth forests, species not previously identified in Quebec and species that were thought to be extirpated have been discovered in Kenauk, along with more than 75 at-risk species. Additionally, the property is open to the public for recreational activities, such as hiking, as a way to connect wildlife, waterfowl and people (*www.kenauk.com*).

The NCC-protected land will continue to be accessible to the Kenauk Institute for youth education programs, as well as for research on the effects of climate change on old-growth forests, wildlife and different types of ecosystems to provide insight into how best to adapt conservation efforts to slow biodiversity loss.

Kenauk's close proximity to two major Canadian urban areas, Ottawa–Gatineau and Montreal, means development pressures threaten the area's natural spaces, making protecting the entire 65,000 acres (26,300 hectares) a priority. The area could not

Kenauk property and surrounding areas.
Map by Nature Conservancy of Canada



sustain its unparalleled biodiversity if it became isolated from other habitats in the region.

NCC and the Kenauk Institute are thinking big, with plans to create the world's largest open-air research laboratory. With the help of funders, including the U.S. Fish and Wildlife Service (through the *North American Wetlands Conservation Act*, or NAWCA), the Government of Quebec (through the Projet de partenariat pour les milieux naturels of the Ministry of the Environment and the Fight against Climate Change) and the Government of Canada (through the Natural Heritage Conservation Program), they will continue working to protect this massive area, which provides important habitat for waterfowl as well as co-benefits to a variety of other wildlife.

Rebuilding wetlands in Atlantic Canada's National Wildlife Areas

Ducks Unlimited Canada (DUC) began restoring wetlands in National Wildlife Areas (NWAs) across the EHJV as early as 1965, including seven projects in Atlantic Canada, with most of the work occurring in the early 1970s. These restored wetlands were high in waterfowl productivity and became DUC's flagship projects in Atlantic Canada. The organization continues to maintain the restored wetlands to this day, in a long-standing partnership with the Canadian Wildlife Service.

Over several decades, the organic-based material used to create dikes in the NWAs has started to erode, and these dikes are now in need of restoration. With recent financial investments from Environment and Climate Change Canada (ECCC), NAWCA, Ducks Unlimited Inc., DUC and others, work has begun to rebuild the dikes and replace failing water control structures within the Chignecto NWA, Shepody NWA, Wallace Bay NWA and Tintamarre NWA. Once completed, approximately 3,200 acres (1,295 hectares) of wetland habitat will be restored for the benefit of waterfowl, wildlife and people.

> These Nova Scotia properties contain nesting habitat for Common Eider, Arctic Tern, Leach's Storm Petrel and other coastal waterbird species.

Over the past year, ECCC has acquired an additional 1,058 acres (428 hectares) of wetland and coastal forest habitats in New Brunswick and Nova Scotia. Two properties totalling 525 acres (213 hectares) were acquired adjacent to the Portobello Creek NWA in southern New Brunswick. These properties contain valuable floodplain forest habitat and will eventually be included within the boundaries of the existing NWA. An additional 530 acres (215 hectares) were acquired via transfers of administration from other federal departments along the Atlantic coast of Nova Scotia and on Cape Breton Island. These Nova Scotia properties contain nesting

Wetlands in Portobello Creek National Wildlife Area, New Brunswick.

Andrew Kennedy, Environment and Climate Change Canada

habitat for Common Eider, Arctic Tern, Leach's Storm Petrel and other coastal waterbird species. They also serve as important stopover sites for dozens of passerine species during spring and fall migration. Acquisition of these properties directly benefits EHJV priority waterfowl and contributes to NAWMP objectives as well as the Government of Canada's goal of conserving 25% of Canada's lands and oceans by 2025, and 30% by 2030.

Creating temporary habitat for migrating shorebirds

In Canada, 40% of all shorebird species are showing signs of decline. And according to the North American Bird Conservation Initiative's 2019 State of Canada's Birds report, 52% of long-distance migrating shorebirds are in decline. In addition to the extensive work restoring and conserving waterfowl habitats in the EHJV, partners are undertaking important work to address shorebird declines. There are several ways to improve the availability and quality of shorebird habitat according to their needs throughout their annual cycle, and coastal environments that represent high-potential shorebird habitat have received a lot of attention and protection efforts. However, farmland could provide another option to increase migration habitat for shorebirds seeking open, shallow-water areas that are relatively free of vegetation. This would also benefit waterfowl by providing feeding and resting habitat for NAWMP priority species.

In an agricultural setting, the goal is to create temporary habitat for migrating shorebirds by flooding fields for a few weeks outside the growing season, before the arrival of migrating or wintering birds. The water level is then gradually decreased during the migration period to provide shallow water habitats with lots of food available so birds can replenish the energy they spent migrating. The plots are drained after migration, allowing for crops to be planted or other agricultural activities to be carried out.

> The creation of temporary shorebird habitat appears to generate benefits for waterfowl and agriculture as well.

DUC-Quebec is proposing to flood lands such as agricultural fields in the fall using temporary dams (e.g., inflatable dams). Fall is the target period, since this is when shorebirds are present in Quebec in greater numbers and for a longer period of time. The landscape is also naturally drier in the fall, so the availability of shorebird habitat is limited. DUC will implement a pilot project to evaluate the feasibility and the methods required to flood fields and evaluate shorebird use of the created habitat. The pilot will inform future project implementation, including additional research on the benefits to shorebirds and the agricultural habitat.

The potential benefit for the birds is clear, but the creation of temporary shorebird habitat appears to generate indirect benefits for agriculture as well. In Mississippi, researchers observed a reduction in soil erosion and nitrogen runoff into natural streams, and a slight increase in soybean harvest from temporarily flooded fields. DUC will be working to identify and build relationships with farmers interested in the project. These relationships are key to establishing partnerships for collaborative conservation efforts linking habitat restoration and agriculture.

Mallard ducklings.

Jean-Maxime Pelletier

Bigger and Better in Ontario

This year saw several conservation milestones in Ontario.

NCC launched a bold new project in the heart of the boreal forest. Known as the Boreal Wildlands, this will be the largest private conservation project in Canada's history at over 358,000 acres (144,877 hectares) of forests and wetlands, including peatlands and swamps.

DUC surpassed one million acres (404,685 hectares) of waterfowl habitat conserved in the province since 1974, including the enhancement and management of nearly 3,800 acres (1,538 hectares) of wetlands and over 5,000 acres (2,023 hectares) of associated uplands in 2022 alone.

Data from the Marsh Monitoring Program (MMP) and other citizen science programs delivered by Birds Canada show that these conservation projects greatly benefit a diverse suite of water and land birds. But to "go big" and quantify the benefits even better, DUC and Birds Canada are designing an "Enhanced MMP." This provisional Wetland Restoration Monitoring Protocol combines the strengths of the MMP with five other wildlife monitoring protocols to better detect all species using conserved wetlands and surrounding uplands. A field pilot of the new protocol at a small selection of conservation projects is already revealing more species of spring-staging waterfowl and at-risk grassland birds in adjacent uplands than the MMP alone identified.

The hard work in Ontario is evolving to help deliver the EHJV's ambitious and strategic objectives for both waterfowl and non-waterfowl species thanks to Ontario EHJV partners and key funders (Birds Canada; DUC; ECCC; NCC; Ontario Ministry of Agriculture, Food and Rural Affairs; Ontario Ministry of Natural Resources and Forestry; and NAWCA), landowners and others.

For more information, please contact Kristina Hick, Eastern Habitat Joint Venture Coordinator, (778) 903-5084, kristina.hick@ec.gc.ca.

Eastern Habitat Joint Venture

Contributions (CAD)

	2021–2022	*Total (1986–2022)**
Total	68,535,956	734,652,513

Accomplishments (Acres)

	2021–2022	*Total (1986–2022)**
Secured	246,925	2,401,195
Enhanced	8,063	706,234
Influenced	270,331	78,000,526

Secured and enhanced acres are not additive.

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

1986–2022 consists of the January 1, 1986, to March 31, 2022, time frame.

* Includes first-step projects completed from 1986 to 1988, before the formal recognition of the EHJV in 1989.

Wood Duck.
Jean-Maxime Pelletier

Pacific Birds Habitat Joint Venture

The Iclhicwani conservation area, British Columbia.
Harvey Thommasen

www.pacificbirds.org

The Pacific Birds Habitat Joint Venture (PBHJV) is an international Joint Venture that includes portions of British Columbia (B.C.), Alaska, Washington, Oregon, California and Hawaii. The B.C. coastline has over 440 estuaries, which are a focus of many PBHJV programs due to their food-rich tidal wetlands and adjacent floodplains. Near urbanized areas, floodplains have often been highly modified and converted to intensive non-forage agricultural crops, resulting in the loss of considerable natural habitat and food supply for wildlife. Throughout the PBHJV, 40 species of ducks, swans and geese occur regularly at various stages of their life cycles, and an estimated one million waterfowl winter along the B.C. coast. The Fraser River Delta in southern British Columbia is the only Canadian Important Bird and Biodiversity Area designated as "in danger" by BirdLife International. This delta supports the highest density of wintering waterfowl in Canada. Key species in the B.C. portion of the Joint Venture include the Wrangel Island Snow Goose (nearly half the population), the Pacific Coast's Trumpeter Swan (half the population), American Wigeon, Cackling Goose and Western High Arctic Brant.

In 2021–2022, the PBHJV made great strides toward achieving several of the key objectives identified in its new Implementation Plan:

- Permanently securing an additional 2,340 acres (947 hectares) of habitat by 2024.
- Managing 35,341 acres (14,302 hectares) of habitat by 2024.
- Restoring 3,252 acres (1,316 hectares) of wetlands by 2024.

Projects supporting these goals included a study of created tidal marshes in the Fraser River Estuary and the acquisition of land in Iclhicwani (Snowshoe Creek) and Nicomen Slough. The Fraser River Estuary study has identified potential factors that may affect the success of created tidal marshes, and the acquisitions represent ecologically significant land that is of particular importance for conservation of

habitat important to NAWMP priority species. Iclhicwani is home to a globally rare ecology and is also on the traditional, unceded lands of the Nuxalk Nation, which provided an opportunity for partnership with the First Nation. Nicomen Slough is in the heart of the Fraser Valley, a critical waterfowl habitat area on British Columbia's west coast.

Collectively, these projects support two of the PBHJV's five priority habitat types—estuaries and freshwater wetlands—as well as several priority species, including Trumpeter Swan, Canada Goose, Northern Goshawk, Western Grebe and Great Blue Heron.

Over the last 40 years, a plethora of tidal marshes have been built up along the Fraser River Estuary to address the impacts of development, agriculture, pollution and climate change.

Learning from created tidal marshes in the Fraser River Estuary

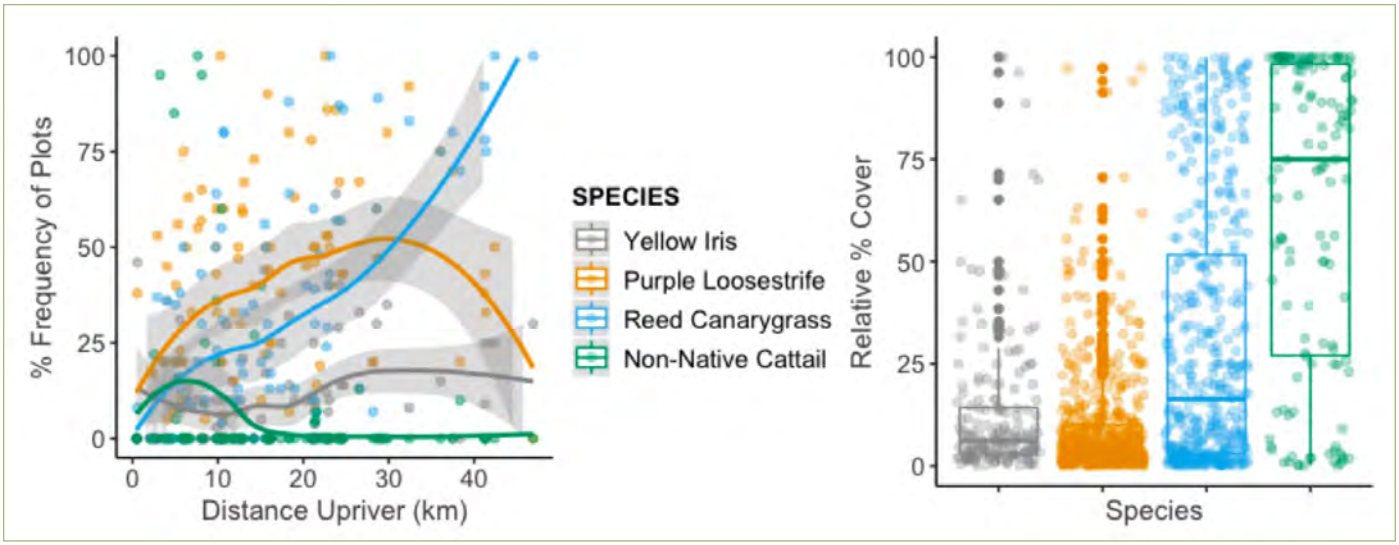
The Fraser River Estuary is the largest estuary in British Columbia and a critical piece of ecological infrastructure that enhances habitat for both plants and wildlife, particularly NAWMP priority waterfowl. It comprises a patchwork of tidal marshes, channels, mudflats, sand flats and eelgrass meadows and is the main artery that feeds biodiversity on British Columbia's west coast. The estuary is Canada's most important wintering area for waterfowl, providing feeding and roosting sites for more than 250,000 migrating and wintering waterfowl and one million shorebirds. It is an internationally critical migratory stopover area for the Western Sandpiper, one of the most common shorebirds in the western hemisphere.

Over the last 40 years, a plethora of tidal marshes have been built up along the Fraser River Estuary to address the impacts of development, agriculture, pollution and climate change, which threaten the capacity of the estuary to support the species that depend on it. The design and requirements of these marshes are diverse, and they have had varying levels of success. In the spring of 2021, the B.C. Wildlife Federation's Wetland Workforce project funded a study by Ducks Unlimited Canada (DUC) to assess shoreline recession of the constructed marshes, dominance of native plant species and vegetation diversity.

Field crews surveying a created tidal marsh in the Fraser River Estuary, British Columbia.

Ducks Unlimited Canada

DUC identified marsh recession in 40 of the 78 projects surveyed (51%). In total, the recessed area measured 5.82 acres (2.36 hectares), representing 9.3% of the overall area surveyed. Marshes that were lower in mean elevation, farther upriver or located on the North Arm of the Fraser River were more likely to have receded. The DUC surveyors recommended further investigation but suggested that boat wake and plant consumption by non-migrating Canada Geese could be significant contributors to the recession. The team also found that upriver and high-elevation marshes tended to have more native and non-native vegetation present, but were less dominated by native species.



This scatterplot shows the frequency of plots of four known invasive species in the Fraser River Estuary, with increasing distance upriver (left) and the relative percent cover of those species, when present (right). Data were collected from created and reference marshes in the Fraser River Estuary, described in papers by Megan Lievesley et al. (available from the Community Mapping Network, *cmnbc.ca*) and by Daniel Stewart et al. (available from Ducks Unlimited, *www.ducks.ca/our-work/fraser-river-estuary/*). Loess regression lines display non-parametric trends in the scatterplot data.

Ducks Unlimited Canada

The findings offer insight into the challenges presented by stressors and environmental change within the estuary and the role of site design and location in the success of marsh creation projects.

Field crews surveying a created tidal marsh in the Fraser River Estuary.

Ducks Unlimited Canada

Stewardship of donated lands in the Bella Coola Valley

Iclhicwani (formerly Snowshoe Creek) is a 301-acre (122-hectare) riverfront conservation area in the Bella Coola Valley. Bella Coola residents Harvey and Carol Thommasen donated the land to the Nature Conservancy of Canada (NCC) with the desire to protect the area as a bird sanctuary.

The land is located in the traditional, unceded territory of the Nuxalk Nation, which is committed to protecting the ecosystems within its territory and is supportive of NCC's work at Iclhicwani. This is the second project NCC has undertaken in the territory of the Nuxalk Nation, representing an important milestone in achieving the PBHJV's goals of further partnerships and engagement with First Nations groups to increase conservation.

Iclhicwani is in a coastal temperate rainforest, a rare ecosystem found only in British Columbia and Alaska. It is home to a thriving rainforest, floodplain and riverside habitat that supports an abundance of wildlife and plant diversity. The abundant fish

Great Blue Heron.

The Nature Trust of British Columbia

population attracts NAWMP priority waterfowl such as the Western Grebe and the Great Blue Heron, and other bird species, including the Western Tanager, the Black-headed Grosbeak and the American Redstart, rely on Iclhicwani and neighbouring lands as a transition zone and nesting habitat. Also found are Warbling Vireo, Evening Grosbeak, American Redstart, Bonaparte's Gull and Common Merganser. Beaver ponds create valuable pools and channels that support young salmon and Cutthroat Trout, while Grizzly Bears actively forage along the riverfront. At least 15 federally at-risk species have been observed, including Northern Goshawk, Western Toad and wolverine.

In addition to its intrinsic ecological value, the conservation area also benefits neighbouring conservancies by increasing the interconnections between nearby protected lands, including Burnt Bridge Creek Conservancy and Tweedsmuir Provincial Park. This in turn protects the waterfowl, plants and other wildlife that rely on the connectivity of the Bella Coola River to thrive. This land donation was enabled by the Government of Canada's Ecological Gifts Program, which provides enhanced tax incentives for individuals or corporations who donate ecologically significant land. The project was further supported by several generous donors, whose contributions will provide for the ongoing management of the conservation area.

> The slough is of continental significance to waterfowl, which stop in the area during migration and for wintering.

The next steps for Iclhicwani include conducting a baseline inventory of the land and formulating a management plan to guide long-term stewardship.

Expanding protected areas at Nicomen Slough

The Nature Trust of British Columbia (NTBC) created the Nicomen Slough Conservation Area in 2019. In 2021, NTBC secured an additional 18 acres (7.3 hectares) of ecologically important land, increasing the size of its holdings on the slough by more than 50%.

Nicomen Slough, British Columbia.
Graham Osborne

Nicomen Slough is in the heart of the Fraser River Valley, the stretch of the Fraser River between Mission, B.C., and Hope, B.C., that profoundly affects the productivity of the river and the greater watershed. The slough is of continental significance to priority waterfowl, which stop in the area during migration and for wintering. More than 100 Trumpeter Swans spend the winter foraging in the area, alongside owls, ducks and Great Blue Herons, an at-risk species (special concern) under Canada's Species at Risk Act. The area is also home to non-waterfowl species, including River Otters, muskrats, beavers and a variety of fish, amphibians and plants. It provides crucial spawning habitat for salmon and White Sturgeon and is a nursery or migration corridor for tens of millions of juvenile salmon each year.

In recent years, pressure from industry, agriculture, forestry and development has been taking a toll on the Nicomen Slough, resulting in a decline in the quality and quantity of habitat and a drop in fish populations. There is great potential for effective wetland and riparian habitat restoration on the newly acquired land, with benefits for a wide range of species. "As the Nature Trust conserves more land at Nicomen Slough, we have the unique opportunity to enhance habitat for waterfowl and other wildlife through our restoration work," said Jasper Lament, NTBC Chief Executive Officer.

The U.S. Fish and Wildlife Service provided financial support for the conservation of this property under the NAWCA, with additional support from many other donors.

For more information, please contact Andrew Huang, Pacific Birds Habitat Joint Venture Coordinator, (604) 350-1913, andrew.huang@ec.gc.ca.

Pacific Birds Habitat Joint Venture

Contributions (CAD)

	2021–2022	*Total (1991–2022)*
Total	17,992,212	257,147,866

Accomplishments (Acres)

	2021–2022	*Total (1991–2022)*
Secured	1,323	141,227
Enhanced	419	200,038
Influenced	18,974	6,662,785

Secured and enhanced acres are not additive.

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

1991–2022 consists of the January 1, 1991, to March 31, 2022, time frame.

Horned Grebe.
Glenn Bartley

Canadian Intermountain Joint Venture

148 Mile Marshes, British Columbia.
Ducks Unlimited Canada

www.cijv.ca

With an area of 123.5 million acres (50 million hectares), the Canadian Intermountain Joint Venture (CIJV) covers portions of British Columbia (B.C.) and Alberta. The CIJV encompasses a diverse landscape of grasslands, dry and moist coniferous forests, riparian areas and wetlands, alpine tundra and even pocket desert, with 24 breeding waterfowl species. The Joint Venture's estimated 1.45 million birds represent 70% of British Columbia's and roughly 4% of Canada's breeding waterfowl population. The CIJV supports roughly one-quarter of the world's breeding population of Barrow's Goldeneye, along with significant breeding populations of Mallard, Hooded Merganser and Ruddy Duck.

In 2021–2022, the CIJV made progress in achieving two of the key objectives identified in its Implementation Plan (IP):

- Permanently securing 112,517 acres (45,534 hectares) of habitat by 2024.
- Restoring 3,025 acres (1,224 hectares) of wetlands by 2024.

Projects supporting these goals included a hydrological restoration of the Deer Creek Complex using engineered water controls and the creation of two new wetland areas, Frog Bear and Hoodoos–Columbia Wetlands. New water control structures at the Deer Creek Complex will facilitate waterfowl breeding and nesting, while the Frog Bear and Hoodoos–Columbia Wetlands provide important new habitat areas.

Collectively, these projects support three of the CIJV's four priority habitat types—freshwater wetlands, wetland-associated uplands and grasslands—as well as several NAWMP priority species, including the Trumpeter Swan, American Wigeon, Bufflehead, Green-winged Teal, Greater and Lesser Scaup, Mallard and Horned Grebe. Reflecting the expanded priorities of the new IP, the projects also support non-waterfowl species like the Northern Leopard Frog, Western Painted Turtle, American Badger, Long-billed Curlew, Bank Swallow and Vivid Dancer (damselfly).

Wetlands at Wolf Marsh, British Columbia.
Ducks Unlimited Canada

Deer Creek Complex hydrological restoration

Deer Creek Complex consists of two wetland basins, Gay Lake and Wolf Marsh, west of Williams Lake in British Columbia's central interior. Gay Lake has mostly forested uplands with a narrows of emergent vegetation between two open lake sections. Wolf Marsh is a long and narrow wetland; its uplands are in an intersection of grassland and forest.

> The project has allowed the Deer Creek Complex to maintain a more consistent water level conducive to waterfowl breeding and nesting.

Several species of waterfowl breed in the wetlands, including multiple CIJV and NAWMP priority species. Broods of scaup and all three species of teal have been seen at Wolf Marsh, and Gay Lake is one of the few wetlands in the region where breeding Wood Ducks have been observed.

The Deer Creek wetlands were co-operatively developed by Ducks Unlimited Canada (DUC) and the Fish and Wildlife Branch of the B.C. Ministry of Forests, Lands and Natural Resource Operations for wetland conservation and waterfowl habitat. In 1988, DUC identified the Gay Lake and Wolf Marsh wetlands for further development. Both areas were noted as being fairly productive with good development potential, but with a lack of emergent cover for overwater nesting and a lack of brood cover and loafing areas. Upland nest cover and cavity nest sites were also limited, but to a lesser degree. Due to high demand for irrigation water from Deer Creek, DUC proposed a series of water control structures to allow available water within the creek to be stored and managed wisely for wildlife and downstream needs.

A moose at Gay Lake, British Columbia.
Ducks Unlimited Canada

In the fall of 2021, a new sheet pile weir was constructed at Gay Lake, and the primary water control structure at Wolf Marsh was converted to a rock chute. A trail was constructed to transport equipment into the project area without damaging forest resources, and environmental monitoring was conducted throughout the project. Any disturbed construction areas were blended with existing slopes and revegetated.

By implementing water control structures using a hydrological restoration approach, the project has allowed the Deer Creek Complex to maintain a more consistent water level conducive to waterfowl breeding and nesting.

Frog Bear wetland creation and habitat restoration

The Creston Valley is widely recognized for its importance as migratory habitat for waterfowl and many other bird species. The Nature Conservancy of Canada (NCC) has managed lands here for more than a decade. In 2021 NCC broke ground on a project to reconstruct three new wetlands and associated riparian habitat in a former farm field. At least a dozen CIJV priority species will benefit from the new feeding and nesting habitat, including Mallard, Ring-necked Duck and Black-crowned Night Heron.

This project will also restore critical habitat for the endangered Northern Leopard Frog in one of its only known breeding sites in B.C. The new wetlands allow Northern Leopard Frogs to safely lay their eggs and raise their young. Newly planted upland riparian area will provide spring habitat for waterfowl, while also benefiting Grizzly Bears as they traverse the valley. Beyond this, the new wetlands will support dozens of migratory bird species and many other at-risk species.

> The new wetlands allow Northern Leopard Frogs to safely lay their eggs and raise their young.

The land where the new wetlands were constructed was previously used to grow timothy crops but experienced drainage issues due to the floodplain elevation. Work began with the excavation of three dugouts designed as ephemeral wetlands that would fill with water from surface runoff. Next, the arable excavated soil was moved to neighbouring areas with higher elevation. To reduce the potential for invasive plants to establish themselves, shrubs and other riparian vegetation were planted at the edge of the habitat to form a gradual transition into the neighbouring farmland. Additional trees and shrubs were planted within the wetlands to provide cover for wildlife, including Grizzly Bears moving between the Purcell and Selkirk Mountains.

The new wetlands in the Frog Bear Conservation Corridor, British Columbia.
Nature Conservancy of Canada

The wetlands were created in fall 2021, with plantings installed in April 2022. Students from the Recreation, Fish and Wildlife program at Selkirk College assisted with the plantings. This project was undertaken with the financial support of Environment and Climate Change Canada, the Creston Valley Wildlife Management Authority and the U.S. Fish and Wildlife Service.

Hoodoos–Columbia Wetlands acquisition and wetland creation

In 2021, the Nature Trust of British Columbia (NTBC) purchased 143 acres (58 hectares) of ecologically important land known as the Hoodoos–Columbia Wetlands from Fairmont Hot Springs Resort to protect the area from development and conserve the natural wetlands. The wetlands are part of the Columbia Wetlands, a designated Ramsar Site and an area of continental significance to waterfowl under the NAWMP. They are adjacent to NTBC's Hoodoos Conservation Complex and a portion of the Columbia Wetlands Wildlife Management Area, forming a continuous area of over 11,000 acres (4,450 hectares) of relatively undisturbed wetland, riparian and grassland habitat.

> The expansive riparian floodplain and wetlands of the property stretch out in front of you and are filled with the sound of songbirds and waterfowl.

Numerous species of migratory waterfowl and waterbirds are known to use the Hoodoos–Columbia Wetlands, including the Great Blue Heron, Tundra Swan and Horned Grebe, along with the American Wigeon, Blue-winged Teal, Green-winged Teal, Cinnamon Teal, Bufflehead, Common Goldeneye, Mallard, Northern Pintail and Trumpeter Swan. Chris Bosman, NTBC Kootenay Conservation Land Manager, described the view: "As you stand along the west bank of the mighty Columbia River

The Hoodoos–Columbia Wetlands, British Columbia.

The Nature Trust of British Columbia

Bufflehead.

Jaden Barney

looking downstream . . . the expansive riparian floodplain and wetlands of the property stretch out in front of you and are filled with the sound of songbirds and waterfowl."

The rare wetlands and grasslands also provide a home to many provincially and federally at-risk and endangered species across British Columbia, including the American Badger, Long-billed Curlew, Bank Swallow and Vivid Dancer. Each of these species plays a role in ensuring the persistence of biodiversity and a healthy planet. Large protected areas are the best way to allow biodiversity to flourish undisturbed in perpetuity.

Open and native grassland covers less than 1% of British Columbia's land base and provides habitat for more than 30% of the province's at-risk species. Grasslands support more threatened and endangered species than any other habitat type in British Columbia. With native grasslands being irreversibly lost to urbanization and agriculture, it is crucial to protect the undisturbed grasslands that remain.

Financial support for the conservation of this property has been provided by the Government of Canada's Nature Smart Climate Solutions Fund, the U.S. Fish and Wildlife Service under NAWCA, the Fish and Wildlife Compensation Program, the East Kootenay Wildlife Association, and many other donors.

For more information, please contact Andrew Huang, Canadian Intermountain Joint Venture Coordinator, (604) 350-1913, andrew.huang@ec.gc.ca.

Canadian Intermountain Joint Venture

Contributions (CAD)

	2021–2022	*Total (2003–2022)*
Total	6,138,042	101,865,644

Accomplishments (Acres)

	2021–2022	*Total (2003–2022)*
Secured	766	363,052
Enhanced	639	205,680
Influenced		50,898

Secured and enhanced acres are not additive.

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

2003–2022 consists of the January 1, 2003, to March 31, 2022, time frame.

Species Joint Ventures

Common Eider.
Jaden Barney

Species Joint Ventures are international in scope, spanning North America and including circumpolar countries. These Joint Ventures focus on critical science needs to inform the management of over 20 species (50+ populations) and their related habitats. Additionally, research directed through the Species Joint Ventures addresses questions for other bird species that share the habitats.

Sea Duck Joint Venture

Common Goldeneye.
Jean-Maxime Pelletier

www.seaduckjv.org

The Sea Duck Joint Venture (SDJV) encompasses all of Canada and the United States and focuses on coastal waters for migrating and wintering ducks and on boreal forest and tundra for nesting ducks. The Joint Venture includes all 22 recognized populations among the 15 sea duck species (tribe Mergini): Common Eider, King Eider, Spectacled Eider, Steller's Eider, Black Scoter, White-winged Scoter, Surf Scoter, Barrow's Goldeneye, Common Goldeneye, Bufflehead, Long-tailed Duck, Harlequin Duck, Common Merganser, Red-breasted Merganser and Hooded Merganser. As a group and depending on the season, sea ducks use all four flyways.

A key initiative of the SDJV in 2021–2022 was the launch of a graduate student fellowship program, which is being coordinated in partnership with Ducks Unlimited, Inc. (DU). The fellowship is open to any student at a U.S. or Canadian university pursuing a master's or doctoral degree with a research focus on biology or conservation of North American sea ducks.

The SDJV has recognized the need to encourage early career professionals to pursue sea duck research and conservation, which will ensure the availability of a skilled workforce to continue meeting the NAWMP's conservation goals. Maintaining and expanding education and training was identified as a critical need in the NAWMP 2018 Update, which led to the development of the North American Waterfowl Professional Education Plan (NAWPEP) in 2020. The NAWPEP calls for organizations to work with educational institutions to provide opportunities for students focused on waterfowl research and management. The SDJV is in a unique position to support this call due to its focus on filling scientific information gaps and its wide network of partners and stakeholders. The goal of the SDJV's fellowship program is to contribute to the development of the next generation of sea duck biologists, one of the ways the SDJV is thinking bigger.

Reyd Smith holding a male King Eider.

Reyd Smith

Anastasia Miliguine doing benthic sampling as part of her work on sea ducks.

Anastasia Maliguine

Program applications are reviewed by an ad hoc award committee comprising both Canadian and U.S. members of the SDJV Continental Technical Team and Management Board as well as outside professionals involved in sea duck research and management in North America. The award committee evaluates applications based on the strength of both the research proposal and the applicant, and then makes a recommendation to the SDJV Management Board for approval. Three to five awards of US$10,000 each will be made each year, with master's students eligible for one year of funding, and doctoral students eligible for up to two years of funding, depending on progress made in the first year. All awards are dependent on the availability of funding.

In the first year of the program, the SDJV awarded fellowship grants for three proposed projects:

- **Polycyclic aromatic compound (PAC) contamination and health implications in Common Eider Ducks at a diesel spill site and a reference site in Nunatsiavut, Canada (Reyd Smith, Carleton University).** The objectives of this project are to determine whether proximity to a spill influences PAC levels in eggs and birds, to explore the relationship between foraging ecology and PAC levels through isotopic analyses and to use genetic and metabolomic analyses to evaluate sub-lethal effects of PAC exposure on eiders.
- **Steller's Eider foraging habitat in Izembek Lagoon, Alaska (Anastasia Maliguine, University of Alaska Fairbanks).** This project aims to evaluate the role of changing benthic prey composition and biomass in observed declines in Steller's Eiders in Izembek Lagoon, Alaska, a critical moulting and wintering site.
- **Environmental and anthropogenic variables affecting Common Goldeneye wintering in southern New England (Tori Mezebish, University of Rhode Island).** This project seeks to identify important areas used by Common Goldeneye in southern New England, to quantify the environmental and anthropogenic variables influencing selection of those areas across the winter period, and to characterize the movement ecology of Common Goldeneye that winter in southern New England in relation to environmental variables across the annual cycle.

Application and program details are available online (*seaduckjv.org/funding-opportunities/student-fellowship-program*).

For more information, please contact Margaret Campbell, Sea Duck Joint Venture Coordinator, (867) 334-5379, margaret.campbell@ec.gc.ca.

Sea Duck Joint Venture

Expenditures (CAD)

	2021–2022	*Total (1998–2022)*
Banding		695,345
Research	929,876	13,129,687
Surveys		3,630,006
Conservation Planning		1,040,515
Communication and Education	$464	103,432
Total	**$930,340**	**$18,598,985**

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

1998–2022 consists of the January 1, 1998, to March 31, 2022, time frame.

Arctic Goose Joint Venture

Greater Snow Geese.
Jean-Maxime Pelletier

The Arctic Goose Joint Venture (AGJV) covers 924 million acres (374 million hectares) spanning North America and circumpolar countries on other continents. It focuses on 24 populations among seven species: Greater White-fronted, Emperor, Snow, Ross's, Brant, Cackling and Canada Geese. Arctic geese use all four North American flyways and the Western Atlantic Flyway of Europe. Since inception, the scope of the AGJV has aligned with the NAWMP Waterfowl Habitat Areas of Geographic Concern, and the AGJV supports work in all the important arctic and subarctic areas identified for the NAWMP.

www.agjv.ca
www.pcoa.ca
www.gansodelartico.com

The AGJV continually strives to improve monitoring methods and fill priority monitoring gaps for northern-nesting geese. The COVID-19 pandemic caused unprecedented disruptions to monitoring programs and prompted the need to evaluate how missing data will affect population estimates and harvest regulation decisions.

Obtaining accurate estimates of population abundance and demographic rates is a priority for all goose populations, and this information forms the foundation for sound management decisions. For many goose populations, banding and harvest data are used to estimate demographic rates and population size. The same data is used to evaluate the sustainability of hunting regulations through assessment of harvest and survival rates.

Integrated population models (IPMs) were developed about 20 years ago but are just now gaining traction in ecology and conservation. They provide an exciting opportunity to better leverage survival, reproductive success and population survey data acquired by AGJV partners through public and private funding. Studies of population dynamics were commonly based on two-step approaches, where estimated survival and reproductive success parameters were entered in a matrix model to estimate population growth rate. Both of these steps now occur in the IPM, which makes it superior for holistic evaluation of the contributions to population growth rate. IPMs are particularly useful for estimating demographic rates for parameters that are difficult to observe directly (e.g., immigration), because they allow estimation of parameters through information-sharing among data sets (e.g., both dead-recovery data and population survey information contribute to survival estimation).

There are several recent examples of IPMs built to better inform Arctic-nesting goose conservation and management. In a 2021 article in *Journal of Wildlife Management*, Anthony Roberts et al. describe an IPM for Atlantic Brant to guide harvest management of the species using AGJV-funded banding data. Abundance and demographic estimates from their IPM supported more stable hunting regulations than would have been possible from piecemeal analyses conducted outside an IPM. And in a 2022 article in *Oikos*, Mitch Weegman et al. demonstrated an IPM for Lesser Snow Geese and Ross's Geese nesting in the central Canadian Arctic. They showed that declines in productivity, juvenile survival and juvenile fidelity all helped to explain the population decline of these species at Karrak Lake in the last 10 years. These IPMs provide opportunities for researchers to test their hypotheses about environmental drivers of demography and to scenario-play to forecast population change in the face of increasing climate and land-use change. The AGJV hopes these examples, and the publicly available code for these models, will encourage other practitioners to customize IPMs for their specific research questions and hypotheses.

The AGJV 2022 Request for Proposals gives researchers an opportunity to evaluate and improve goose monitoring data using frameworks such as IPMs. This will help goose biologists and managers address the broad need to answer population-level questions to better inform conservation and management of Arctic-nesting geese.

For more information, please contact Deanna Dixon, Arctic Goose Joint Venture Coordinator, deanna.dixon@ec.gc.ca.

Canada Goose.

Jaden Barney

Arctic Goose Joint Venture
Expenditures (CAD)

	2021–2022	*Total (1986–2022)*
Banding	861,480	19,471,107
Research	1,101,117	25,053,504
Surveys	131,624	11,626,018
Collar Observations		1,324,185
Management		272,992
Conservation Planning	36,997	841,485
Communication and Education		51,882
Total	**$2,131,218**	**$58,641,173**

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

1986–2022 consists of the January 1, 1986, to March 31, 2022, time frame.

Black Duck Joint Venture

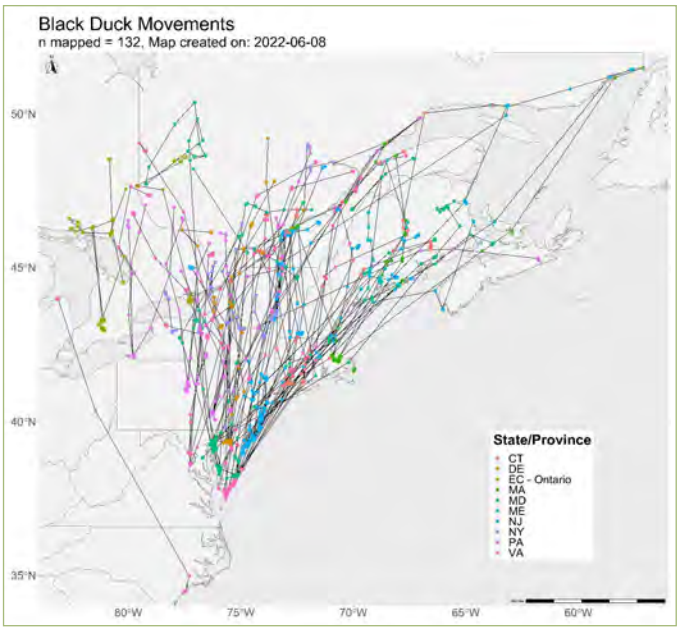
American Black Duck.
Jean-Maxime Pelletier

The Black Duck Joint Venture (BDJV) includes the provinces of Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador and 14 eastern U.S. states. The American Black Duck can be found in saltwater marshes, brackish and freshwater impoundments, riverine and estuarine marshes, swamps, shallow lakes and wetlands throughout the boreal landscape. Black ducks are mostly found in the Mississippi and Atlantic Flyways.

The American Black Duck (*Anas rubripes*; hereafter black duck) is an eastern North American species highly valued by hunters, and a flagship species for Atlantic marshes. Populations declined by 50% between the 1950s and 1980s, and although populations have since stabilized in the Atlantic Flyway, they have yet to recover to historic levels. Population size is determined by the number of deaths (i.e., survival) and births (i.e., productivity), as well as by emigration and immigration (moving out of or into a population). Recent research on black ducks suggests that productivity may be limiting population growth, so understanding the factors affecting reproductive success is critical to determine what management strategies would be most effective for increasing black duck productivity.

More than 50% of the population breeds in the boreal forest, a vast area spanning three provinces in eastern Canada (Ontario, Quebec and Newfoundland and Labrador; see map). Traditionally, research on the breeding ecology of ducks is done through on-the-ground fieldwork to locate nests and monitor hatching and brood success. However, breeding densities are not high in the boreal region, and this, in addition to the area's size and inaccessibility, has restricted this type of research in the region, limiting knowledge of the breeding ecology of black ducks.

To address this knowledge gap, the BDJV funded a large-scale research project to quantify the influence of black duck behaviour and movement on productivity using state-of-the-art tracking devices. These devices collect location data (every hour) and acceleration data (every 10 minutes), which are transmitted via cell towers to computers. Without being physically in the field, we know where the birds go, what



This map shows spring migratory movements of black ducks with tracking devices attached between January and March 2022. Different colours indicate where (state or province) the duck was captured and the device was deployed.

habitats they use (by overlaying remotely sensed map layers) and how they are behaving (resting, feeding or flying, as well as breeding behaviours).

Over the course of the four-year project, the BDJV will deploy 500 devices on black ducks and will assess three measures of reproductive success: namely, whether a hen 1) attempts to nest, 2) fully incubates her eggs and 3) raises a brood. Researchers can then examine how wetland/habitat use, behaviour, energy expenditure and migration characteristics explain reproductive success. By using a full annual cycle approach, they will be able to determine if conditions on the wintering grounds, during migration or on the breeding grounds are ultimately limiting productivity. In other words, researchers will learn when and where bottlenecks for black duck productivity are occurring, information that will inform conservation and management efforts.

In the winter of 2021, 49 devices were deployed as part of a pilot project by eight participating state agencies. Four of these devices are still transmitting. From January to March 2022, devices were deployed on 196 black ducks by nine state agencies (see the Atlantic Flyway Waterfowl Tracking website for a list of partners: *atlantic-flyway-waterfowl-gps.weebly.com*) and by Canadian Wildlife Service (CWS) staff in Ontario. Currently, 132 birds are alive, and many birds have migrated north. For the next two years (2023 and 2024), 150 devices will be deployed per year by the same partners as in 2022, as well as by CWS staff in Quebec and the Atlantic Provinces (New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador). For the list of project partners and for weekly updates on the birds' movements, check out the project's website: *atlantic-flyway-waterfowl-gps.weebly.com/black-ducks.html*.

For more information, please contact Kristina Hick, Black Duck Joint Venture Coordinator, (778) 903-5084, kristina.hick@ec.gc.ca.

Eastern Habitat Joint Venture priority areas.

From 2015–2020 Implementation Plan

Black Duck Joint Venture Expenditures (CAD)

	2021–2022	*Total (1986–2022)*
Banding	177,766	9,348,832
Research	151,430	1,966,034
Surveys		9,522,560
Conservation Planning	45,225	458,252
Communication and Education		80,428
Total	**$374,421**	**$21,376,106**

2021–2022 consists of the April 1, 2021, to March 31, 2022, time frame.

1986–2022 consists of the January 1, 1986, to March 31, 2022, time frame.

Partners

American Wigeon.
Jaden Barney

Thank you to all of our partners who contributed financially in 2021–2022:

Canadian Agencies

Alberta Birds of Prey Foundation
Alberta Conservation Association
Alberta Environment and Parks
Alberta Sport, Recreation, Parks & Wildlife Foundation
Alberta Treasury Board and Finance
Alberta-Pacific Forest Industries Inc.
ArcticNet Inc.
ATB Financial
AV Group
BC Hydro
BC Wildlife Federation
British Columbia Ministry of Environment and Climate Change Strategy
British Columbia Ministry of Transportation and Infrastructure
Cabela's Canada
Canada First Research Excellence Fund
Canadian National Railway
Canadian Pacific
Carthy Foundation
Charitable Gift Funds Canada Foundation
Columbia Basin Trust
Dairy Farmers of Canada
Dalhousie University
Ducks Unlimited Canada
Earth Rangers
East Kootenay (Regional District of)
Echo Foundation
Environment and Climate Change Canada
Fisheries and Oceans Canada
Fondation de la faune du Québec
Fondation Huguette et Jean-Louis Fontaine
Galiano Conservancy Association
Gestion J.I.C.A. Inc.
Habitat Conservation Trust Foundation
Hopewell Development Corporation
Irving Oil Ltd.
K+S Potash Canada
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Louise Gendron
Manitoba Finance
Manitoba Forage Council
Manitoba Habitat Heritage Corporation
Manitoba Hydro
Manitoba Natural Resources and Northern Development
MapleCross
McDonald's Restaurants of Canada Limited
Ministère de l'Énergie et des Ressources naturelles
Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec
Moncton (City of)
Mosaic Company
Natural Resources Canada
Natural Resources Canada – Polar Continental Shelf Project
Natural Sciences and Engineering Research Council of Canada
Nature Conservancy of Canada
New Brunswick Department of Natural Resources and Energy Development
New Brunswick Department of Transportation and Infrastructure
New Brunswick Environmental Trust Fund
New Brunswick Wildlife Trust Fund
Newfoundland-Labrador Department of Fisheries and Land Resources
Niskamoon Corporation
Nova Scotia Crown Share Land Legacy Trust
Nova Scotia Department of Lands and Forestry
Nova Scotia Environment
Nova Scotia Habitat Conservation Fund
Nutrien Ag Solutions
Ontario Ministry of the Environment, Conservation and Parks
Ontario Ministry of Natural Resources and Forestry
Ontario Ministry of Transportation
Ontario Power Generation
Polar Knowledge Canada
Prairie Mines and Royalty Ltd.

Long-tailed Duck.
Jaden Barney

Snowshoe Creek river drift, British Columbia.

Harvey Thommasen

Prince Edward Island Department of Agriculture and Land
Prince Edward Island Wildlife Conservation Fund
Project Learning Tree
Qualico Developments
Ravenswood Developments Inc.
RBC Royal Bank
Richardson Foundation Inc.
Saskatchewan Ministry of Environment
Saskatchewan Water Security Agency
Saskatchewan Wildlife Federation
SaskEnergy Incorporated
SaskPower
SaskWater
Scotiabank
Sitka Foundation
South Saskatchewan Community Foundation
Takla Foundation
TC Energy
TD Canada Trust
TD Friends of the Environment Foundation
TD Private Giving Foundation
Telus Corporation
The British Columbia Waterfowl Society
The Calgary Foundation
The Harold Crabtree Foundation
The Nature Trust of British Columbia
Thompson-Nicola Regional District
Université Laval
University of Alberta
University of Manitoba
Vermilion Energy Trust
Ville de Québec
Weston Family Foundation
Wildlife Habitat Canada
Wilson 5 Foundation

U.S. Agencies

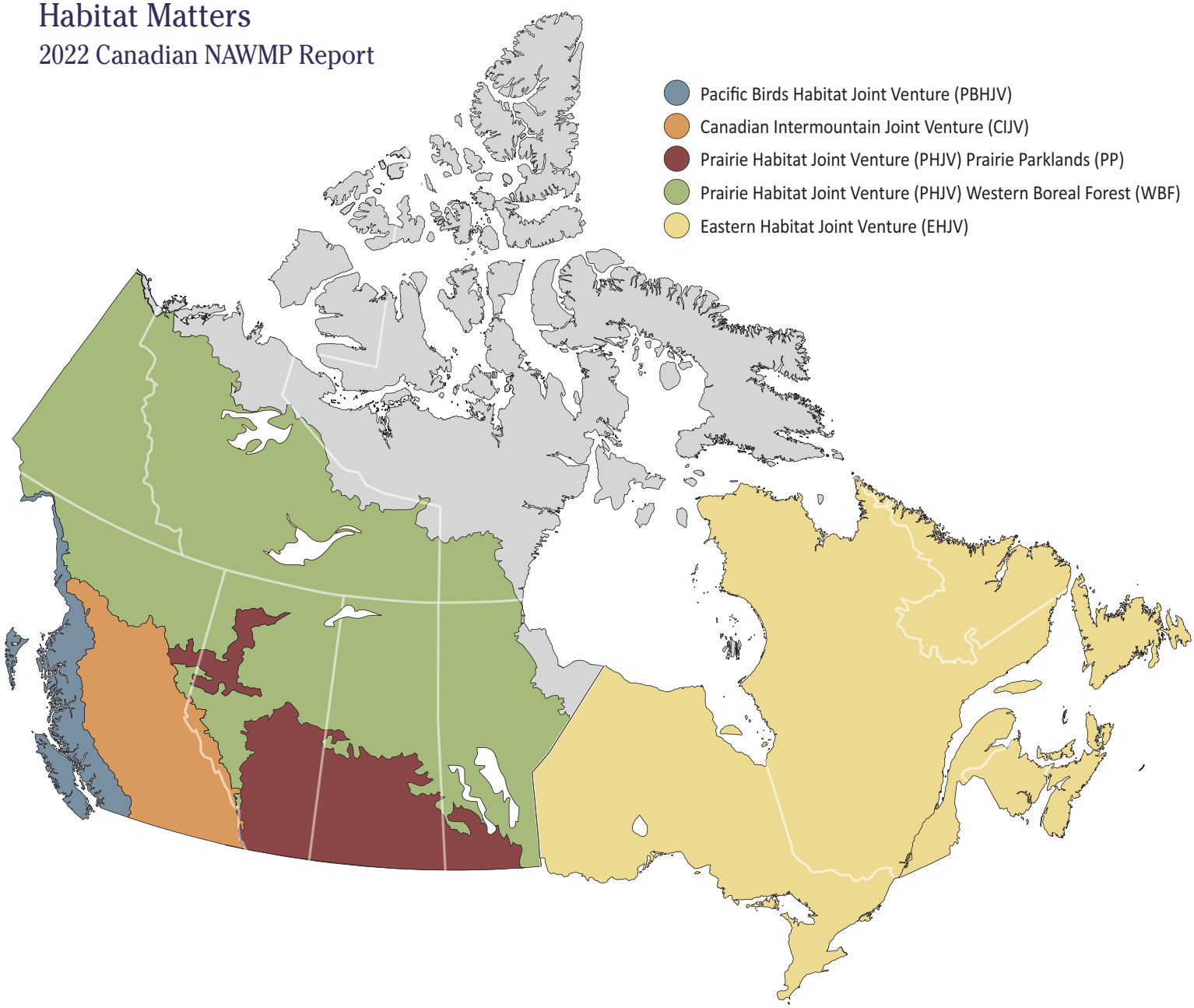
Alabama Department of Conservation & Natural Resources
Alaska Department of Fish and Game
American Friends of Canadian Nature
Arizona Game & Fish Department
Arkansas Game & Fish Commission
Atlantic Flyway Council
California Department of Fish & Wildlife
Central Flyway Council
Colorado Parks & Wildlife
Colorado State University
Delaware Division of Fish & Wildlife
Ducks Unlimited Inc.
Florida Fish & Wildlife Conservation Commission
Georgia Department of Natural Resources
Idaho Department of Fish & Game
Illinois Department of Natural Resources
Indiana Department of Natural Resources
Kansas Department of Wildlife and Parks
Kentucky Department of Fish & Wildlife Resources
Louisiana Department of Wildlife and Fisheries
Maine Department of Inland Fisheries & Wildlife
Maryland Department of Natural Resources
Massachusetts Division of Fisheries & Wildlife
Michigan Department of Natural Resources
Minnesota Department of Natural Resources
Mississippi Department of Wildlife, Fisheries & Parks
Missouri Department of Conservation
Montana Fish, Wildlife & Parks
Nebraska Games & Parks Commission
Nevada Department of Wildlife
New Hampshire Fish & Game
New Jersey Division of Fish & Wildlife
New Mexico Department of Game & Fish
New York State Department of Environmental Conservation
North Carolina Wildlife Resources Commission
North Dakota Game & Fish Department
Ohio Division of Wildlife
Oklahoma Department of Wildlife Conservation
Oregon Department of Fish and Wildlife
Pennsylvania Game Commission
Rhode Island Department of Environmental Management
South Carolina Department of Natural Resources
South Dakota Game, Fish & Parks
State University of New York College of Environmental Science and Forestry
Sustainable Forestry Initiative
Tennessee Wildlife Resources Agency
Texas Parks & Wildlife Department
Trust For Mutual Understanding
U.S. Bureau of Land Management
U.S. Bureau of Reclamation
U.S. Department of Agriculture – Animal & Plant Health Inspection Service
U.S. Fish & Wildlife Service
U.S. Geological Survey – Biological Resources Division
University of Alaska
University of Missouri
Vermont Agency of Natural Resources
Virginia Department of Wildlife Resources
Washington Department of Fish and Wildlife
West Virginia Division of Natural Resources
Wildlife Conservation Society
Wisconsin Department of Natural Resources
Wyoming Game & Fish Department
Wyss Foundation

Other Agencies

Chinese Academy of Sciences

Habitat Matters

2022 Canadian NAWMP Report



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nawmp.wetlandnetwork.ca

North American Wetlands Conservation Act Funding in Canada
https://fws.gov/service/north-american-wetlands-conservation-act-nawca-grants-canada

North American Bird Conservation Initiative
nabci.net

Map of Bird Conservation Regions
nabci-us.org/resources/bird-conservation-regions/