State of Wildlife **Report**

Forests, Fish and Wildlife Division

Prince Edward Island
CANADA

ACKNOWLEDGMENTS

PEI Forests, Fish and Wildlife would like to thank the following groups and individuals for their contributions towards the completion of the 2020 State of Wildlife Report:

PEI Invasive Species Council, Island Nature Trust, Nature Conservancy of Canada, Atlantic Conservation Data Centre, Ducks Unlimited Canada, Canadian Wildlife Health Cooperative, Rosemary Curley, Bob Harding and the Cornell Lab of Ornithology (range maps used with permission[17]).

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About This Report

Since 1997, the Prince Edward Island Forests, Fish and Wildlife Division (FFW) has been mandated to produce a State of Wildlife Report every decade. The first report was delivered in 2012[1] and reported on trends and statuses between 1997 and 2007. This reporting cycle focuses on the period between 2007 and 2020. It includes information on the status of wildlife species in PEI, with particular focus on species at risk or of management or conservation concern; land use trends and status of wildlife habitat; FFW and partner wildlife monitoring initiatives; and FFW programs like license and fees, permitting and public outreach.

This report summarizes PEI-specific results from the General Status of Wild Species in Canada reports from 2010[2] and 2020[3] and information provided by the Atlantic Canada Conservation Data Centre (ACCDC)[4]. Species ranks are based on those used by the Canadian Endangered Species Conservation Council (CESCC) and the ranks are defined in detail in ***Appendix 1***. Over 5,000 wild species were assessed in the 2020 wild species report, a significant increase from previous reports. Of the species assessed, more than two-thirds were ranked "SU" or "SNA" for PEI due to a lack of information on presence and distribution or the species' ranges not significantly overlapping with PEI. Of the roughly 1,750 species remaining, or that reside or use PEI at certain times of the year, approximately 60% are considered "S4/S5", while approximately 40% are considered "S1", "S2", or "S3".

Within this report, some species, or species taxonomic or guild groups, are provided a brief review. Due to the extensive list of wild species on PEI, particularly the number of plant species, only a small percentage can be included in any depth in this report. The full list of species ranks can be accessed here: **Wild Species Conservation Ranks for PEI 2020.**

Species or species groups reviewed include federally listed species at risk, provincial species of conservation concern, game and furbearers, and selected non-game species of interest. Where data are available, the reviews detail population trends, harvest statistics, wildlife disease information and monitoring results from FFW and partner organizations.

Wildlife habitat and land use trends are also considered in this report using information provided from the 2010[5] and 2020[6] Corporate Land Use Inventories (CLUI). The 2020 CLUI reports that forest area decreased by >4,000 ha. Due to technological advancements in wetland identification and delineation, an increase in wetland area of about 1900 ha was also reported. Agricultural land use decreased by about 1000 ha, and the amount of lands being developed increased by almost 3,500 ha.

This report also includes reviews and statistics from a variety of FFW surveys and programs as well as key collaborative efforts through partner organizations. The report concludes with key takeaways from the summarized statuses, conservation and monitoring initiatives, and land use trends since the 2007 SOW Report, as well as key commitments FFW will adhere to looking forward.

State of Wildlife 2020 Report

1.0 - Introduction

1.1 - Background Information

1.1.1 Legislative and Policy Mandate

Provincial regulatory (*Wildlife Conservation Act*)[7] and policy (*A Wildlife Policy for PEI*)[8] documents provide a mandate to inventory, monitor and report on PEI wildlife and wildlife habitat. Within this framework, the State of Wildlife Report (SOW Report) is meant to be produced once every decade. This is the second such report and covers the years 2007 – 2020; it follows, and expands on, the benchmark 2007 SOW Report.

This report includes information on land use trends, quantity and quality of wildlife habitat, status of wildlife populations, summary of monitoring and inventory initiatives, and recommendations on how to conserve these resources in the long term. The information was gathered from hunter and trapper surveys, wildlife population studies, land use inventories and reference material produced through an assortment of provincial and federal government agencies, local experts, universities, volunteers, and other conservation groups.

1.1.2 The 2007 Report

This report builds upon and aims to illustrate changes and trends since the 2007 SOW Report[1]. Major developments since then have occurred including in wind and biomass technology, rapid population growth, updated land use inventory, habitat conservation, and wildlife inventory and monitoring, and a variety of citizen science initiatives providing insights into presence and distribution of wildlife on PEI. Since 2007, several PEI species have been added to the list of endangered, threatened, or special concern. As with the 2007 SOW Report, the term wildlife refers to both animals and plants.

2.0 - State of PEI Wildlife Resources

2.1 - General Status of PEI Wild Species

2.1.1 Overview and Listing Process

Great strides have been made in our understanding of wildlife species occurrence and population statuses on PEI since the 2007 SOW report. This is driven primarily by an increased focus on poorly understood taxa including invertebrates, lichens, and fungi. Citizen science has also played a crucial role in documenting new species in the province, with platforms like eBird and iNaturalist growing increasingly popular. National wild species status reports are formulated every five years, as mandated in the federal *Species At Risk Act* (SARA).

National wild species status reports issue conservation ranks for species found throughout Canada. Ranks are determined through a network of conservation organizations and scientists with a goal of determining which species are at most risk of extirpation. Rankings are set nationally and provincially, however, this report pays particular focus on provincial status rankings. The terms and definitions of ranks can change slightly among reporting periods (***see Appendix 1a and 1b***). In PEI, conservation status rankings are maintained by the Atlantic Canada Conservation Data Centre (ACCDC). Due to its small size and high human population density, PEI had higher proportions of species listed in more severe conservation ranks for both 2010 and 2020.

2.1.2 Wild Species 2020 Report

The 2020 General Status of Species in Canada report[3] assessed a total of 5,641 species from 35 taxonomic groups for PEI, compared to 2,318 species from 19 taxonomic groups in 2010 (***Appendix 2***); this accounts for an increase of 140% from 2010. Of the species assessed for PEI, nearly 50% are considered "SU"(***Figure 2-1***), meaning knowledge is currently lacking to assess their status in the province (the majority of these are from the invertebrate taxonomic group) and 19% are ranked as "SNA", meaning that their natural ranges do not overlap with PEI, or they occur but are considered non-native or exotic species (again, the majority being from the invertebrate taxonomic group). Of the remaining species occurring on PEI - which will be the focus of the following sections - roughly 40% are ranked "S1", "S2", or "S3", and 60% are ranked "S4", or "S5" (***Figure 2-2***) Twenty-three species are listed as possibly or presumed extirpated ("SX" or "SH") on PEI (10 plants, 3 insects, 5 birds and 5 mammals). As unfortunate as this is, little if anything can be done to rectify their status; this is especially true for mammals, like lynx and woodland caribou.

Figure 2-1.
Number of PEI Species Listed by Rank 2020 (N=5641).

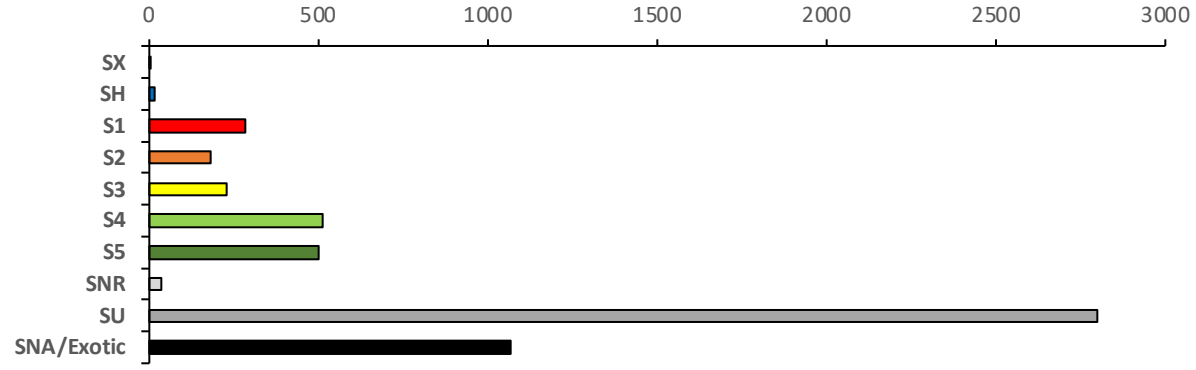
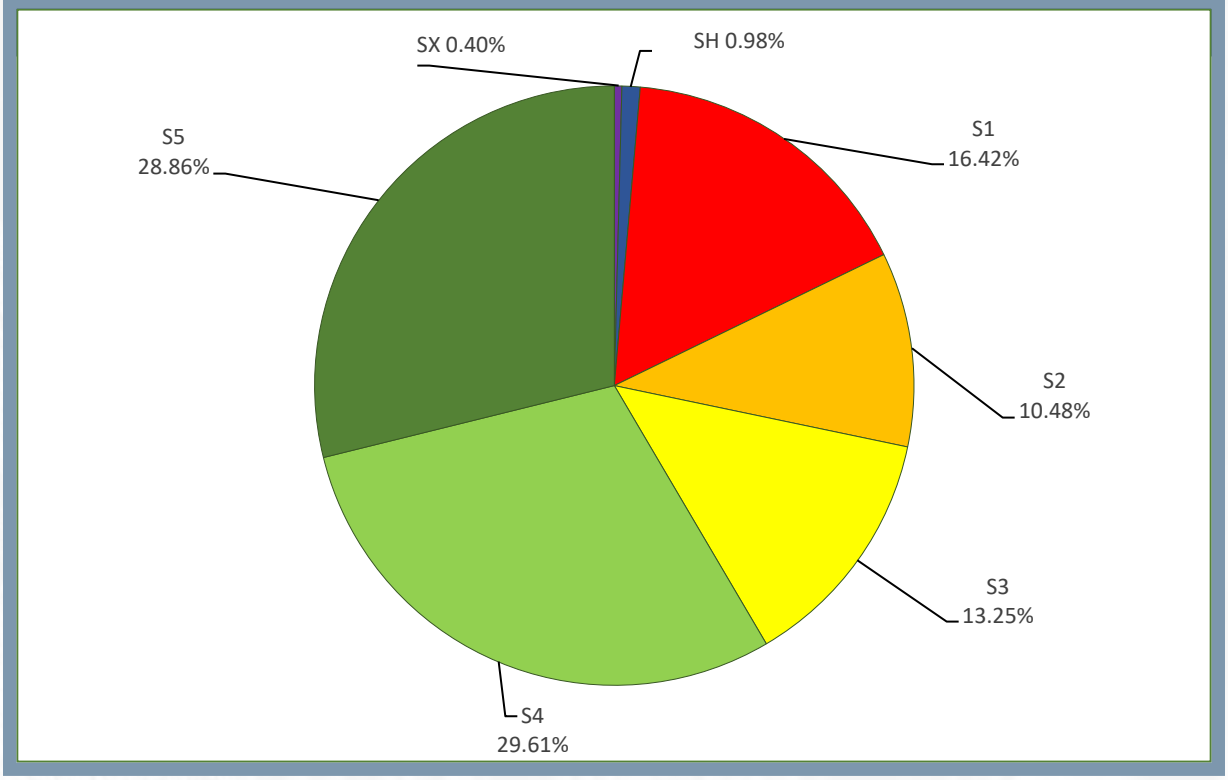


Figure 2-2.
Percent Distribution of 2020 PEI Species Ranks for Species Not Listed as SNR, SU or SNA.



(I) S1, S2 and S3 Species – 2020 vs 2010

Comparing rankings between reporting periods can be a challenge due to the restructuring of terms and ranks, and the reordering of old taxonomic groups or the inclusion of new ones. However, reviewing the changes in species' ranks through time can be useful for management planning as they serve not only as broad indicators of the structure and health of biodiversity and ecosystems of PEI, but also suggest species that require attention.

The number of species ranked as "S1", "S2", and "S3" (species of higher conservation concern) between reporting periods increased by almost 68%. In 2020, 285 species were ranked "S1", compared to 7 in 2010 (***Figures 2-3a and b***), a significant portion of them being bryophytes, lichens, vascular plants, and insects. The increase can be attributed to a variety of factors: enhancements in science and technology; increased efforts by taxonomists, researchers and citizen scientists to expand the knowledge base for species that are rare or that can be difficult to locate and identify; and, ecological factors such as habitat loss or degradation on wintering, breeding and staging grounds. The following subsections highlight some of the taxonomic groups that either experienced significant changes in status or that were chosen as specific survey targets on PEI.

Figure 2-3a
Species Ranked S1, S2, and S3 in 2020.

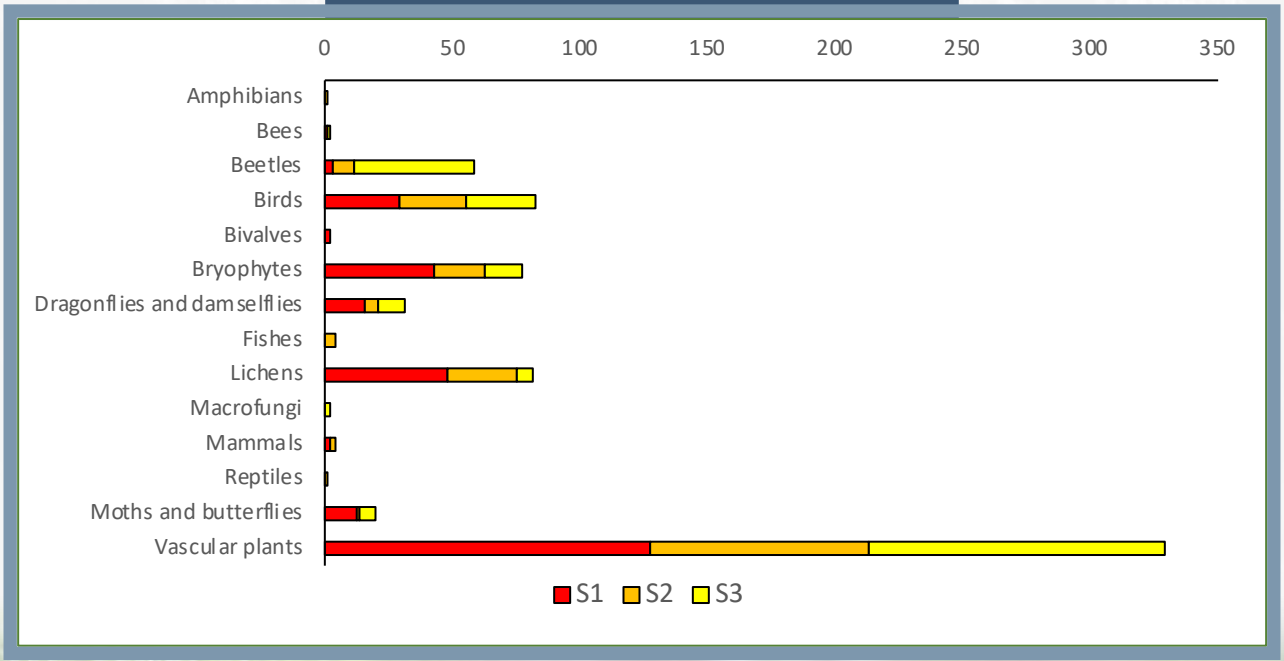
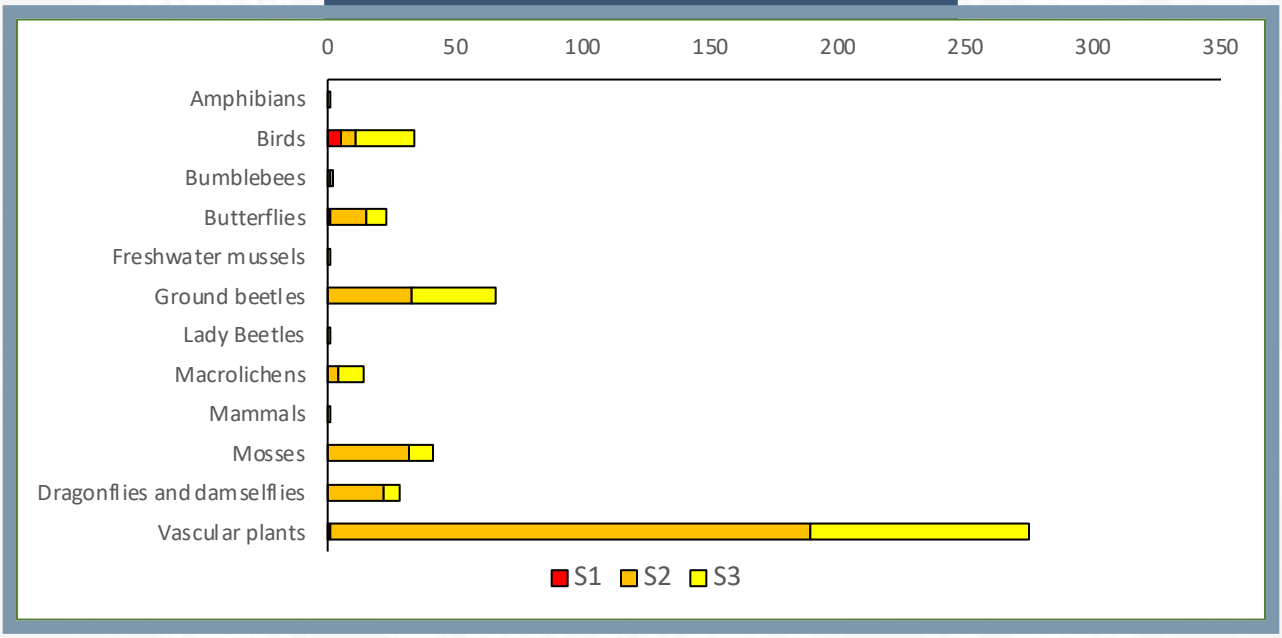


Figure 2-3b
Species Ranked S1, S2, S3 in 2010.

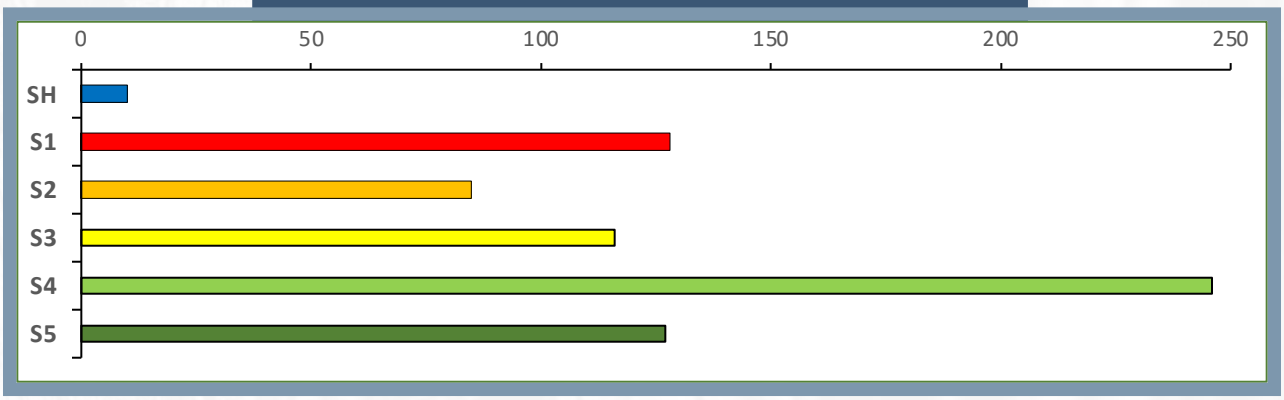


(II) Vascular Plants

About 29% of vascular plants ranked are either "S1" or "S2" (***Figure 2-4***). A large proportion of these imperiled species have restricted distributions and/or narrow habitat requirements. Examples include nodding ladies'-tresses and large purple fringed orchid; species such as these are at increased risk of extirpation from the province.

For scientific names refer to conservation ranks here: Wild Species Conservation Ranks for PEI 2020
PrinceEdwardIsland.ca/en/information/environment-energy-and-climate-action/species-at-risk-pei

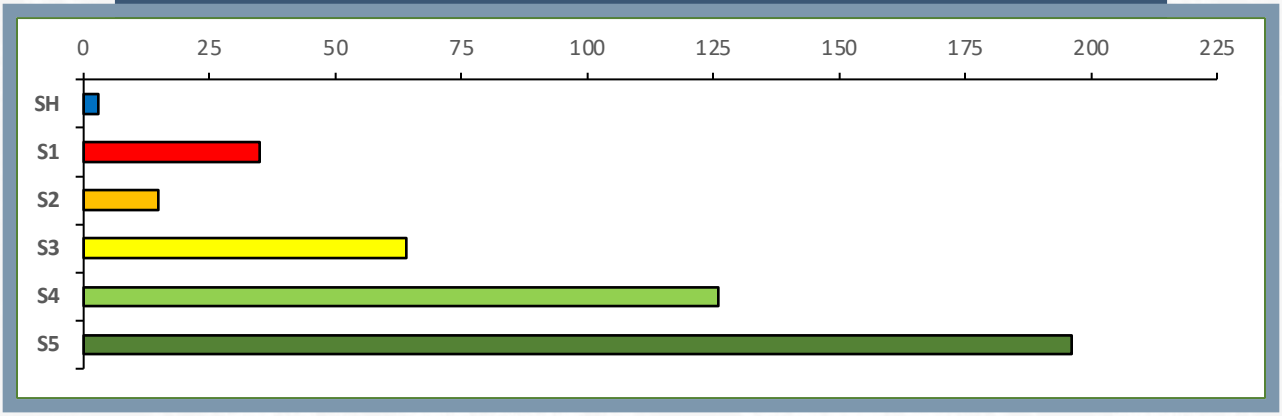
Figure 2-4
Number of PEI Vascular Plants Listed by Rank 2020.



(III) Invertebrates

Ongoing work by field experts has enabled a steady rise in invertebrate inventory on PEI since the last decade. In the Wild Species 2010 report, 527 invertebrate species were ranked for PEI; in 2020, that number increased to 3371 (***from 24 taxonomic groups; see Appendix 2***). Data collection has been aided by citizen scientists using smartphone app technology (e.g., iNaturalist), which has made reporting observations easier and has led to a better understanding of the statuses of the PEI insect community. Of the 3371 species assessed, 87% are "SNA", "SU" or "SNR"; the rank distribution of the remaining 438 species are provided in ***Figure 2-5***.

Figure 2-5
Number of PEI Invertebrate Species by Listed Conservation Rank 2020.



Of invertebrates with applicable rankings, 25% are ranked "S1", "S2", or "S3". Systematic inventory methods have been used on PEI over the past decade for moths and butterflies, dragonflies and damselflies, and spiders and are highlighted below.

a. Dragonflies and Damselflies (Odonates)

Odonates inhabit freshwater ecosites across PEI. As of 2010, 142 odonate species were known to occur in the Atlantic Maritime Ecozone (Maritime provinces, the Gaspe and Ile de la Madeleines), with 70 species of known occurrence on PEI. As of 2020, the species count has increased to 72 species[10,11]. Out of 71 species assessed, 34 were ranked as "S3", "S4", while 31 were ranked "S1", "S2", or "S3" (***see Figure 2-3a***).

b. Moths and Butterflies

Moths and butterflies can be observed in many different forms and on many landscapes across PEI. Until recent years, the moths of PEI had been relatively under-surveyed. This limited baseline data resulted in challenges in assessing species diversity and abundance across the province.

In 2010, 101 moth species were reported to occur on PEI. As of 2020, the number of moth species recorded from the province has grown to 803. Many of these species are currently unrankable based on limited information. Of species ranked, 40% are exotics, 45% "S4" or "S3", 14% "S1", "S2", or "S3" (***see Figure 2-3a***), and one species (*Erora laeta*) is "Possibly Extirpated".

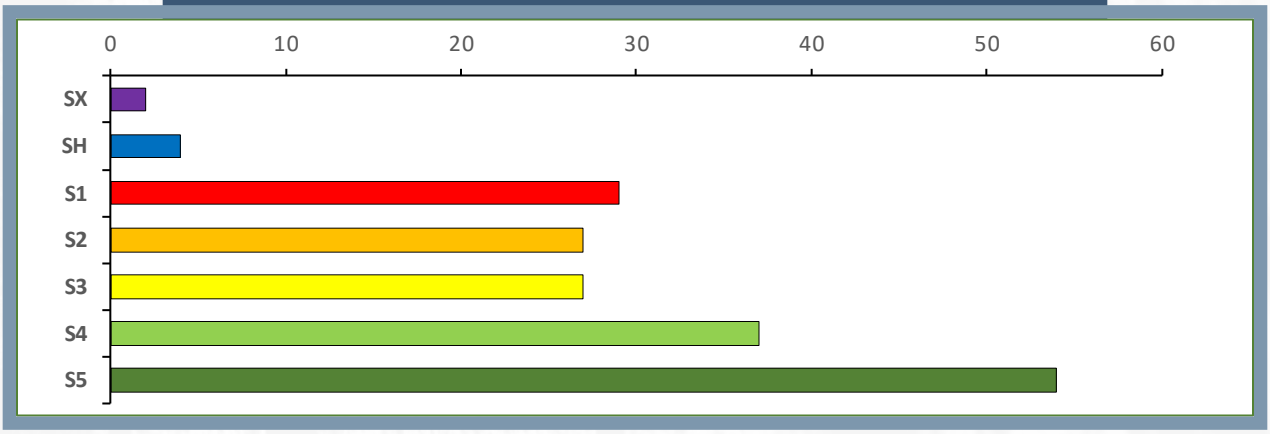
c. Spiders

Baseline information for PEI spiders was limited in 2010 when only 38 species were recorded from Prince Edward Island in the report "Wild Species 2010"[2] .Recent studies and surveys on PEI have increased that number to 198 with 20 spider families represented[14,15]. No spider species were ranked "S1", "S2", or "S3" in 2020.

(IV) Birds

Among the most well understood taxonomic groups are the birds and analyzing trends in bird status can provide insights into local biodiversity and habitat effectiveness. As indicated in ***Figure 2-6***, almost 50% of PEI's birds are listed as "S1", "S2", or "S3", with a notable increase in species ranked as "S1" (***refer to Figures 2-3a, and b***).

Figure 2-6
Number of PEI Bird Species by Listed Conservation Rank in 2020.



While the species ranking methodology has changed between the two reports (namely adopting a more quantitative approach), the results suggest that the status of some populations of bird species is becoming increasingly precarious on PEI. For example, Canada Jay, a species that inhabits extensive, mature softwood stands, was downgraded from "S4" in 2010 to "S2" in 2020, and the number of species listed as S1 increased from 5 in 2010 to 29 in 2020. This trend is also supported by data presented for many species groups in Canada through the North American Bird Conservation Initiative Canada's (NABCIC) latest State of Birds Report[16].

Taken at face value this is a troubling statistic; however, it must be noted that many of the bird species listed as "S1" include ones that either exist at the periphery of their ranges (i.e., American three-toed woodpecker), are naturally rare or sporadic (i.e., red crossbill), were likely not historically present on PEI before European settlement (i.e. horned lark, bobolink), or simply never naturally occurred on PEI (i.e., ruddy duck). For these reasons, they are not realistic targets for management or conservation measures. These species face population declines range-wide and it is important to monitor presence when possible, but focused management efforts are often not warranted on PEI. Similar scenarios are observed for the "S2" and "S3" ranks.

The full list of "S1" ranked species is presented using a categorization scheme developed by FFW (***Table 2-1***); species in the "A", "B", and "C" categories are considered species where practical management options may be possible to address the nature of their status ranks. Given this information, FFW proposes management and conservation measures linked directly to habitat or landscapes found on PEI, such as forests, wetlands and shorelines. This type of strategy targets the species at risk dwelling on PEI where realistic conservation gains may be obtainable.

Riparia riparia

Table 2-1. *Management Prioritization for PEI Species of Concern.*

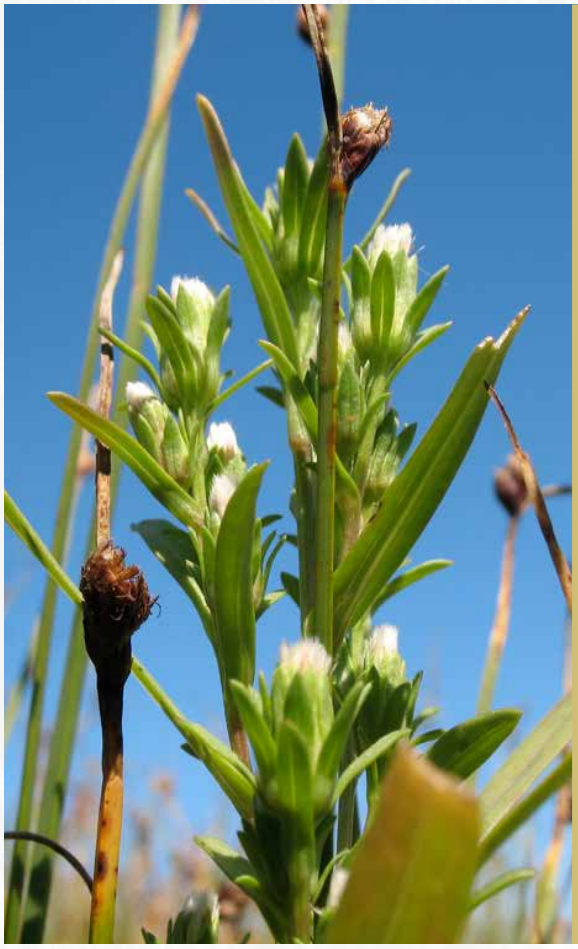
Management Priority Code	Conservation Category	Species Common Name
A	*Possible habitat loss on PEI; provincial and/or range-wide decreases in abundance*	**Great cormorant** **Piping plover** **Common tern**
B	*Naturally rare or sporadic on PEI due to specialized food and/or habitat requirements*	**Hooded merganser** **Common loon** **Common nighthawk** **Black-backed woodpecker** **Bay-breasted warbler** **Red crossbill**
C	*Exists on extreme periphery of range/ Regionally uncommon*	**Arctic tern** **Broad-winged hawk** **American three-toed woodpecker** **Short-eared owl** **Philadelphia vireo** **White-breasted nuthatch** **Baltimore oriole** **Rusty blackbird**
D	*Outside of natural breeding range, specialized for untraditional PEI landscape types (e.g., grasslands).*	**Brown-headed cowbird** **Northern pintail** **Harlequin duck** **Ruddy duck** **American coot** **Upland sandpiper** **Long-eared owl** **Horned lark** **Northern mockingbird** **Eastern bluebird** **Vesper sparrow**
E	*Other (e.g., not a priority species for management)*	**Ring-billed gull**

2.2 - Species at Risk and Species of Management or Conservation Concern

2.2.1 Federally Listed Species At Risk on PEI

The *Species At Risk Act* (SARA) provides protection on federal lands for species listed as "Threatened" or "Endangered" under the *Act*. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommends reviews of imperiled or vulnerable species. Through this process, species are recommended for or against status under SARA. Fourteen terrestrial species have been listed for PEI; of these, one is ranked as "presumed extirpated" (Eskimo curlew) and another (eastern whip-poor-will) is ranked "Not Applicable". The following subsections provide basic information on the remaining 12 terrestrial species protected under SARA whose ranges (e.g., breeding, staging or wintering) overlap with PEI. For most bird species, range maps are provided to provide context on geographical distribution relative to PEI.

Species listed as "Special Concern" under the SARA are managed to prevent them from becoming "Threatened" or "Endangered" in the future. Several of these species can be observed on PEI or have ranges that overlap with it (***see Section 2.2.2***).



(1) Gulf of St. Lawrence Aster

Habitat:
Coastal, including lagoons, salt marshes and dune slacks. Endemic to the Gulf of St. Lawrence region.

SARA status: Threatened

Provincial status: S1

Trend: Unknown

Other protections:
Habitat (i.e., wetlands, sand dunes) is protected under provincial legislation (*Environmental Protection Act* [EPA]).

Provincial monitoring initiatives:
Habitat management projects have been implemented within PEI National Park by Parks Canada

(Photo: Jason Hollinger)

(11) Wrinkled Shingle Lichen

Habitat:
Found in mature forests in moist areas on the edges of wetlands (e.g. treed swamps, riparian floodplains) with moderately-open forest canopy.

SARA status: Threatened

Provincial status: S1

Trend:
Increasing detections due to monitoring efforts

Recent Conservation Initiatives:
In 2019, ACCDC developed a habitat suitability index model for Wrinkled Shingle Lichen and have been conducting targeted surveys for this species.

(Photo: iStock)

(111) Gypsy Cuckoo Bumble Bee

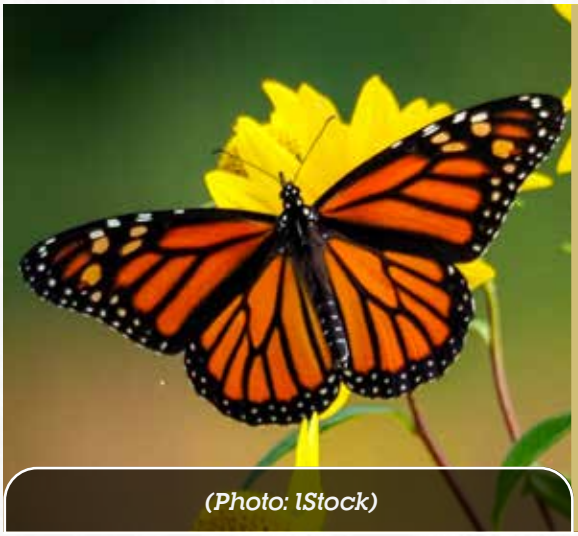
Habitat:
Diverse landscapes including rural and urban settings, meadows, and forests.

SARA status: Endangered

Provincial status: S1

Trend: Declining.

Other protections: None currently.



(Photo: iStock)

(IV) Monarch Butterfly

Habitat:
Diverse landscapes including fields, meadows, and forests.

SARA status: Endangered

Provincial status: S1

Trend: Declining.

Recent Conservation Inititatives:
Maritimes Butterfly Atlas was initiated in 2010 to assess the status of Maritime butterflies.

(Photo: Jason Hollinger)

(V) Northern Myotis and Little Brown Myotis

Habitat:
Both species use forests and wetlands across PEI for foraging, drinking, and roosting. They use large-diameter trees and snags, and trees with flaking bark, large crevices, cracks, or cavities for roosting. Little brown myotis is more likely to use human-made roosts. Northern Myotis are found in hardwood dominated stands in forest patches that are at least 10 hectares, with large trees in mid/advanced stages of decay. Will use hand-dug wells as hibernation sites.

SARA status: Endangered

Provincial status: S1

Trend:
Severe declines since spread of white nose syndrome in the 2000s.

Other protections:
Provincial Wildlife Conservation Act (WCA) (individuals).

Conservation/Monitoring: In 2020, FFW partnered with the PEI Watershed Alliance (PEIWA) and the Canadian Wildlife Health Cooperative (CWHC) to implement a province-wide bat monitoring program using acoustic detectors. The program's purpose is to establish long-term population indices and sample the distribution of these species on PEI. Fifty-nine stationary acoustic detector sites in suitable habitat were monitored between June and July 2020, and Myotis species were detected at 98.4%. Relative abundance of detections among sites is shown in the map (inset). FFW also plans to continue automated recording surveys of potentially suitable foraging habitat (***see Section 4.1.2***), preliminary results indicate bats persist across the province.

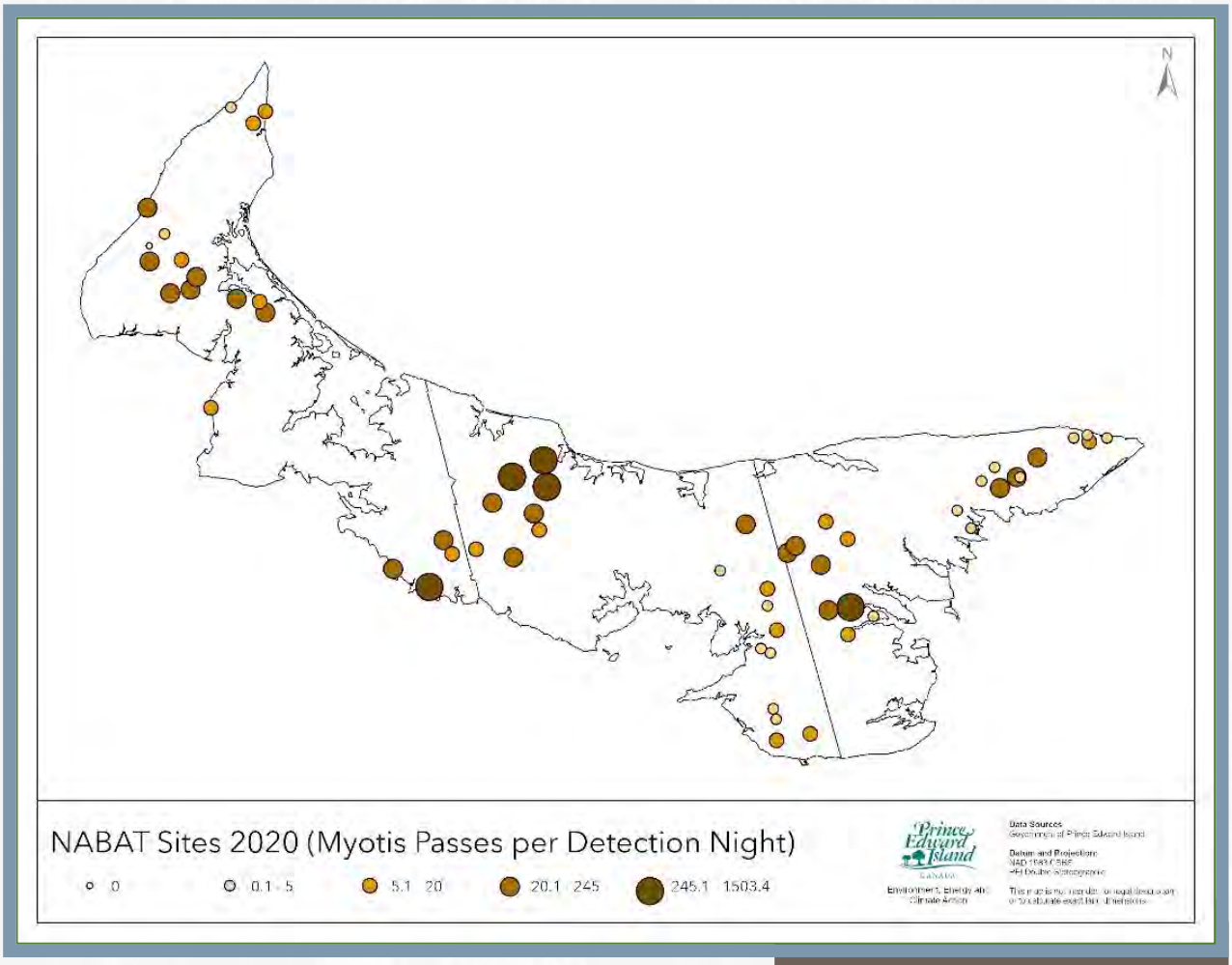


Photo: Wikimedia Commons

(V1) Piping Plover

(V1) Piping Plover

Habitat:
Coastal, nests on wide, ocean-facing beaches and spits with sand, gravel, pebble, or cobble substrates.

SARA status: Endangered

Provincial status: S1

Trend:
eBird: 11% decline (95% CI: 2% to 23%) on PEI since 2012[17]

MBBA: 3.6 % increase in detection probability between atlases (1992-2010)[18]

Other protections:
Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat – sand dunes and shorelines).

Provincial monitoring initiatives: The Island Nature Trust (INT), with logistical and financial support from FFW, monitors piping plover nesting activity and success annually. From 2007 to 2020, PEI's breeding piping plover population fluctuated widely (***Figure 2-7; INT 2020***). During this period, an average of 67 individual piping plovers were recorded per year, which is well below the long-term population objective of 60 pairs (120 individuals), a metric set by Environment and Climate Change Canada (ECCC 2012). Long-term population objectives are based on the maximum number of pairs documented in PEI between 1991 and 2016. ***Figure 2-8*** shows the general locations of piping plover nesting beaches and nesting attempts per beach between 2012 and 2019. Most nesting attempts occur on north shore beaches.

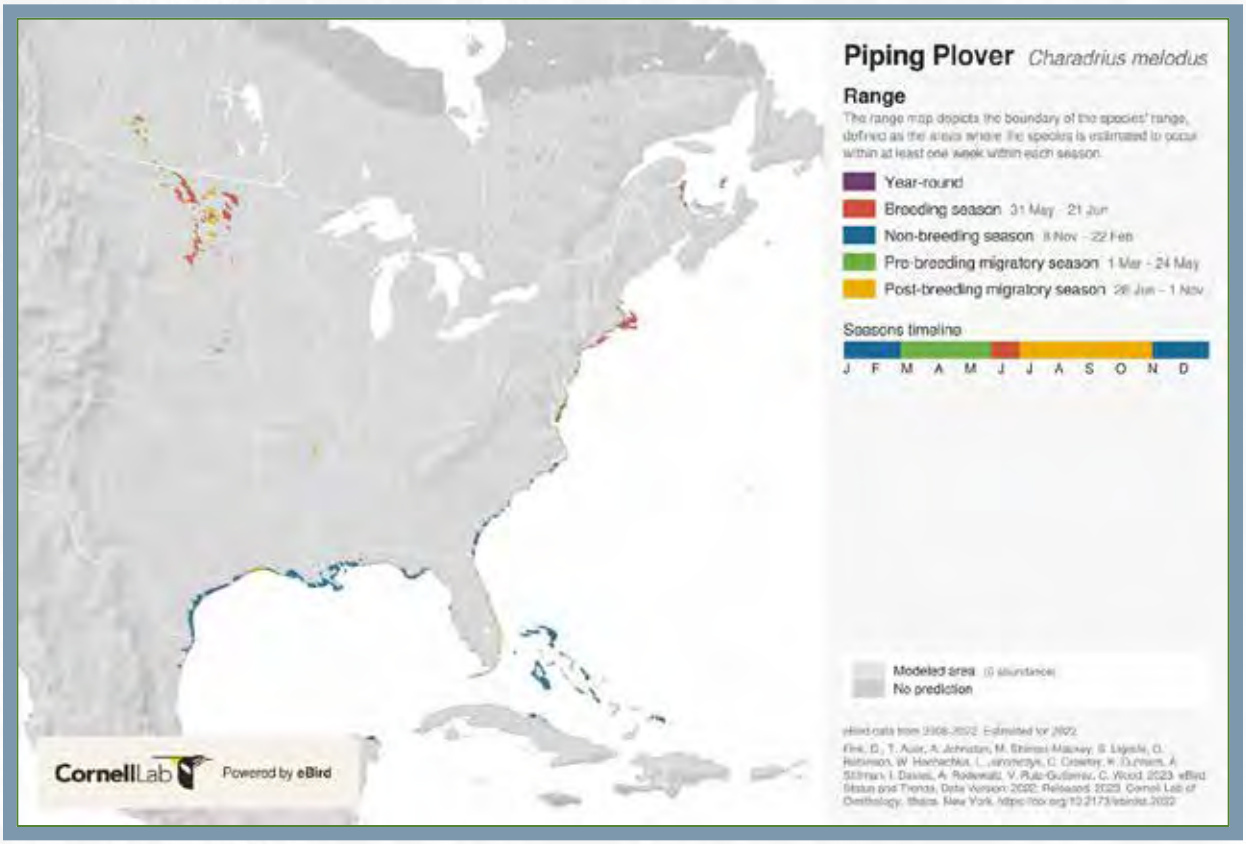


Figure 2-7
Results of the Annual Piping Plover Index Counts Conducted by Island Nature Trust Staff and Volunteers, 2007-2020. (INT 2020)

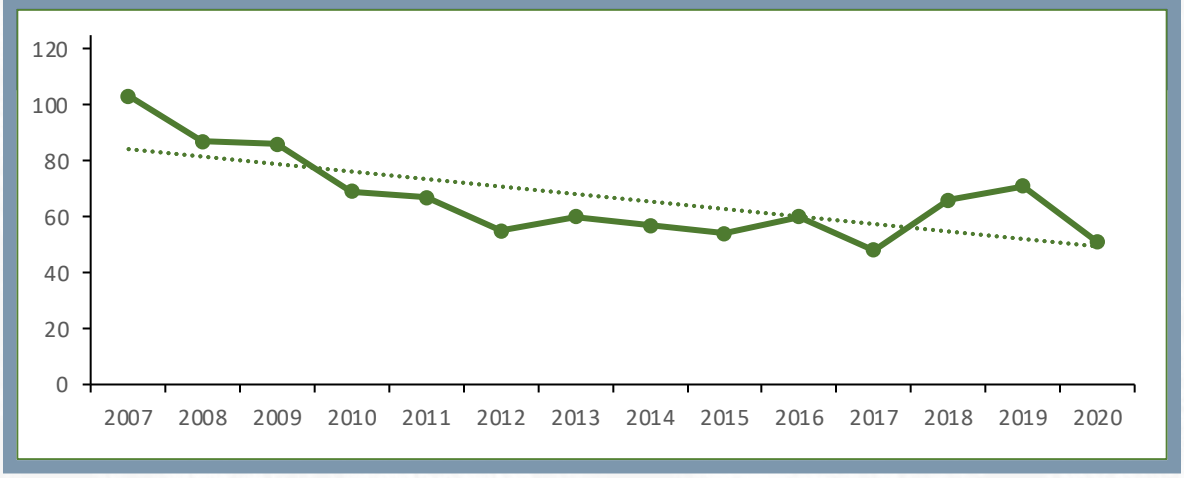
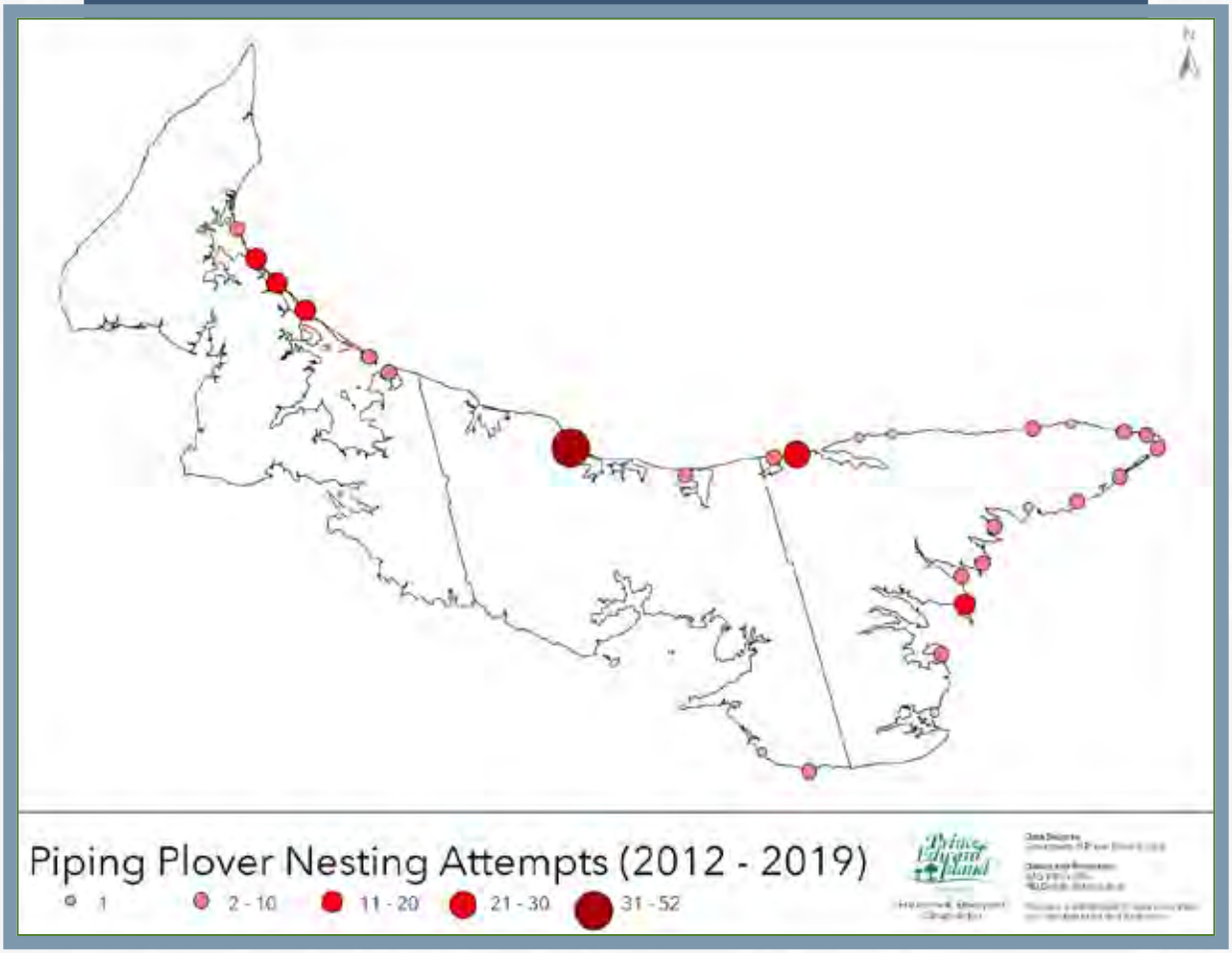


Figure 2-8
Piping Plover Resting Beaches and Nesting Attempts Between 2012-2019.



(VII) Red Knot (rufa subspecies)

(VII) Red Knot (rufa subspecies)

Habitat:
Shorelines, tundra. Holarctic breeding range; stages on PEI during migration; overwinters in South America.

SARA status: Endangered

Provincial status: S2

Trend:
eBird: 41% decline (95% CI: -7% to -25%) range-wide since 2012[17].

Other protections:
Federal *Migratory Birds Convention Act* (individuals), provincial *Wildlife Conservation Act* (individuals), provincial *Environmental Protection Act* (habitat – sand dunes and shorelines).

Provincial monitoring initiatives: FFW takes part in the annual Atlantic Canada Shorebird Survey coordinated by the Canadian Wildlife Service; red knot has been observed on PEI shorelines during this survey.

(VIII) Bank Swallow

(VIII) Bank Swallow

Habitat:
Coastal cliffs for nesting colonies, open fields, shorelines and wetlands for foraging.

SARA status: Threatened

Provincial status: S2

Trend:
BBS: 6.7% annual decline (97.5% CI: -9.1% to -3.7%) between 2007 and 2020[21] *

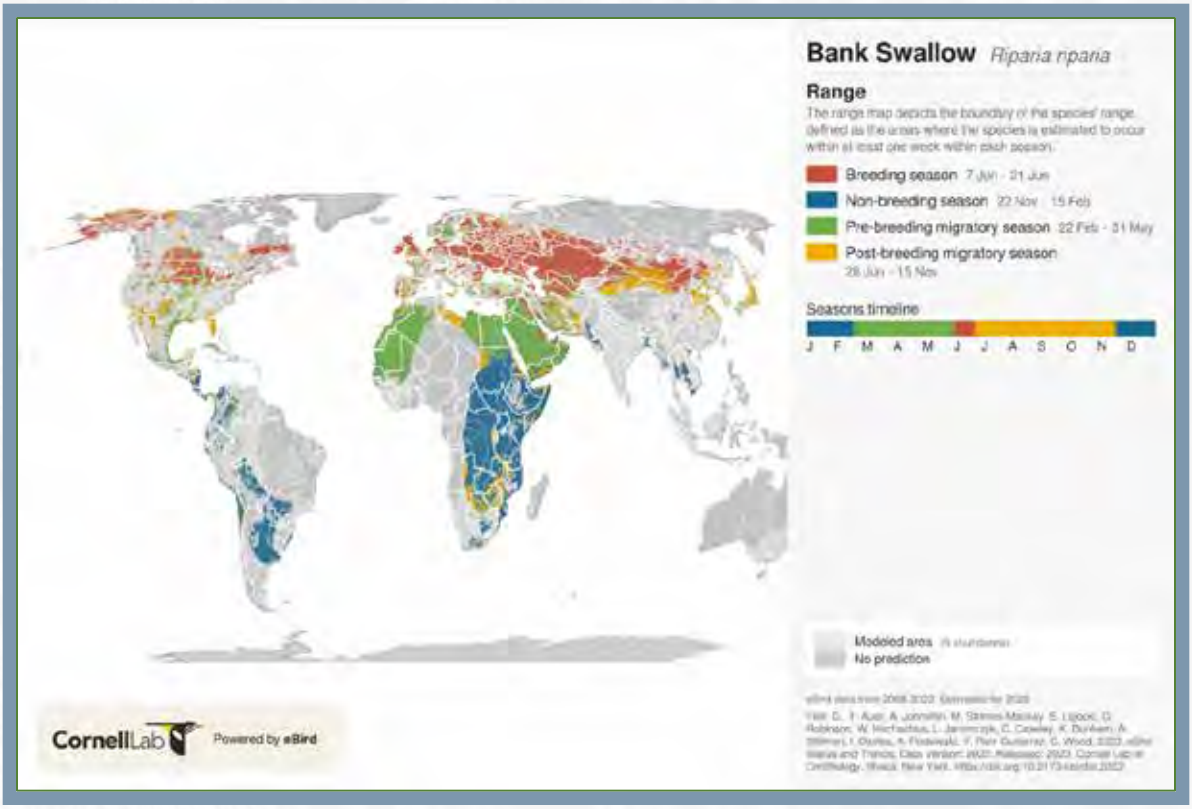
**Bird Conservation Region* (BCR) 14 (Atlantic Northern Forest)

eBird: 21% decline (95% CI: -29% to -9%) on PEI since 2012[17]

MBBA: 2.5% decline in detection probability between atlases (1992-2010)[18].

Other protections:
Federal Migratory Birds Convention Act (nests, individuals), provincial Wildlife Conservation Act (nests, individuals), provincial Environmental Protection Act (habitat – shorelines and wetlands).

Provincial conservation/monitoring initiatives: Targeted survey work led by INT in 2020 confirmed at least 26 active bank swallow colonies across PEI, with the largest located in southeast PEI containing approximately 170 active nest cavities. Banding and tagging efforts led by the Canadian Wildlife Service (CWS) to track movement are ongoing. FFW-installed tracking equipment (MOTUS) throughout the province will be used to assist these efforts.



(IX) Barn Swallow

(IX) Barn Swallow

Habitat:
Nest in human-made structures including barns, sheds, under eaves, and bridges; previously in crevices in coastal cliffs. Forage over open areas, including wetlands, agricultural lands, shorelines, and open forest areas.

SARA status: Threatened

Provincial status: S2

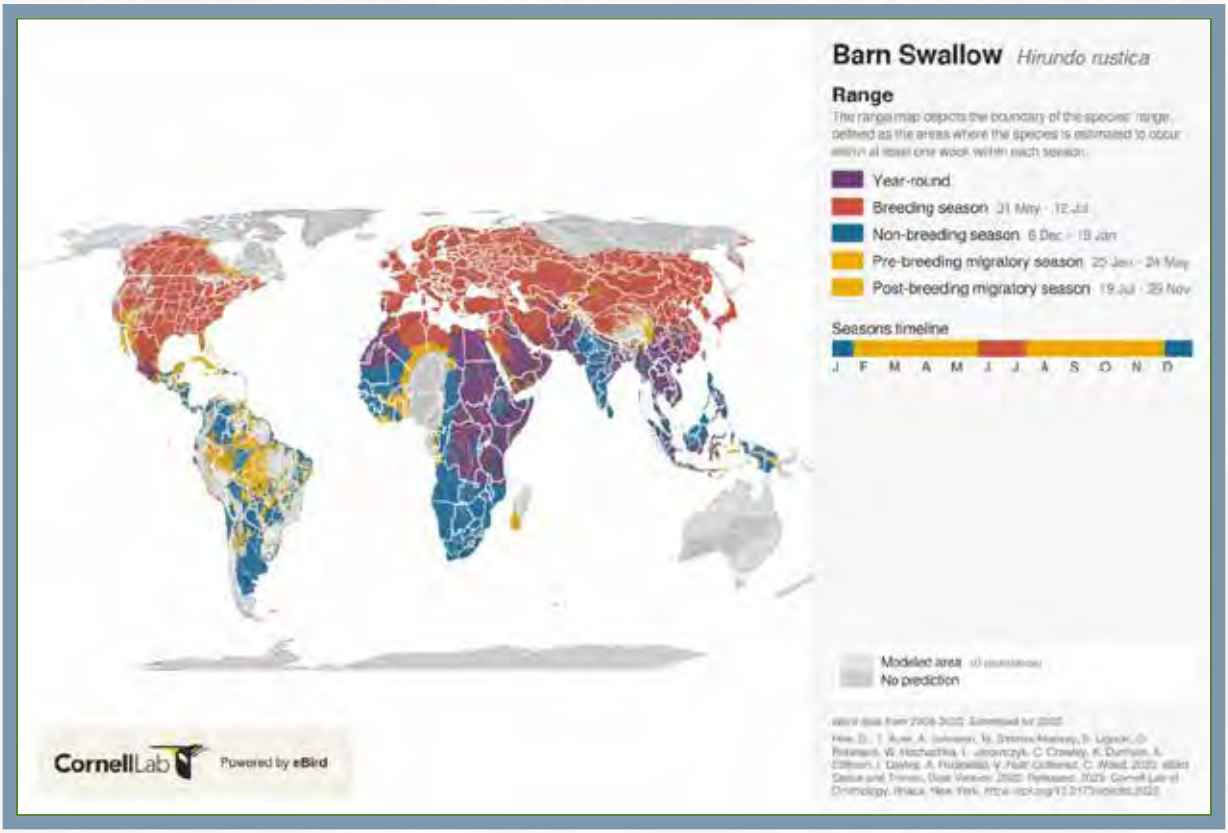
Trend:
BBS: 4% annual decline (97.5% CI: -4.4% to -3.6%)[21]
**Bird Conservation Region* (BCR) 14 (*Atlantic Northern Forest*)

eBird: 18% decline (80% CI: -26% to -13%)
(PEI 2012 to present)[17]

MBBA: 5.5% decline in detection probability
(PEI 1992-2020)[18]

Other protections:
Federal Migratory Birds Convention Act (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals).

Provincial conservation/monitoring initiatives: No population monitoring work for barn swallow has been done in PEI, however, INT established a program in 2014 to assist landowners with implementing best management practices for barn swallows.



(X) Canada Warbler

(X) Canada Warbler

Habitat:

Breeds in wet forests with dense shrub understories, partially closed canopy, and dead standing trees; such as alder thickets, and red maple, black spruce, and cedar swamps in western PEI.

SARA status: Threatened

Provincial status: S2

Trend:

BBS: 2.9% annual decline (97.5% CI: -3.7% to -2.3%)[21]
**Bird Conservation Region (BCR) 14 (Atlantic Northern Forest)*

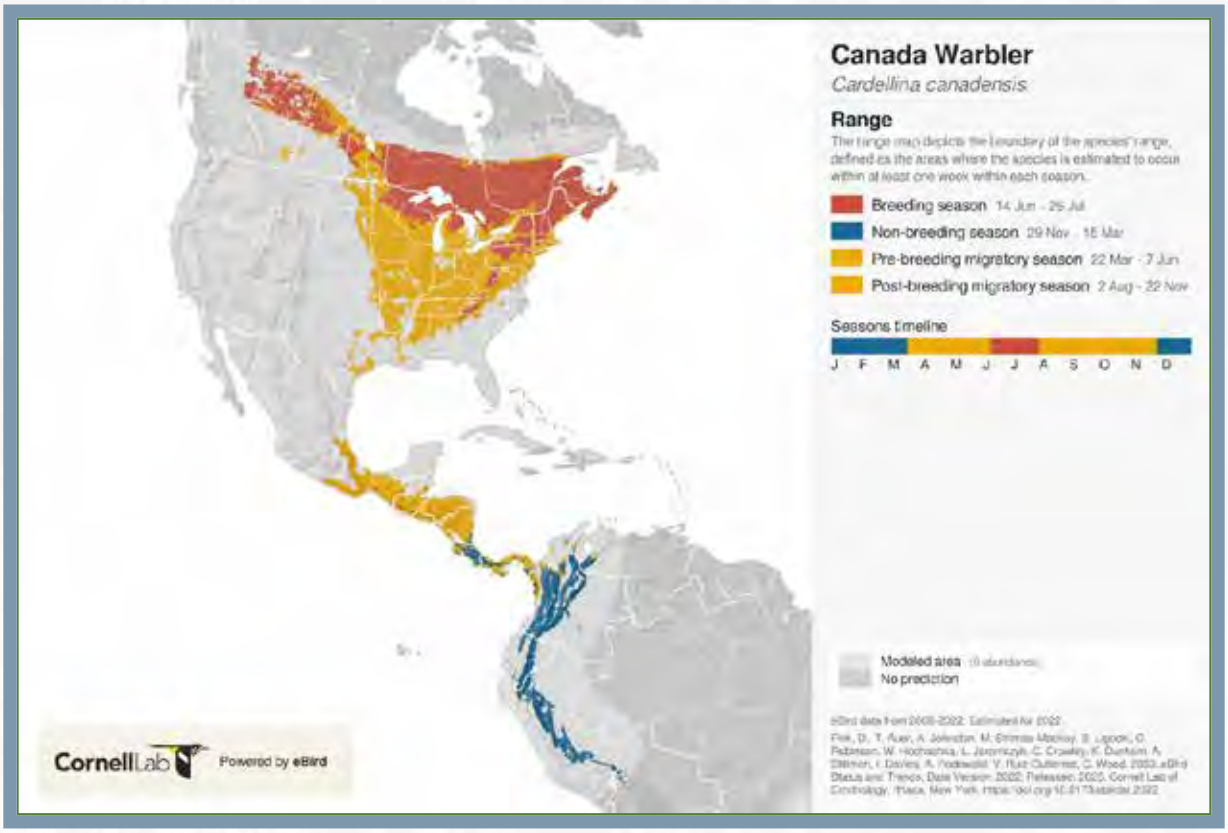
eBird: 12% decline (80% CI: -19% to -5%) (PEI 2012 to present)[17]

MBBA: 3% decline in detection probability (Maritimes 1992-2020)[18]

Other protections:

Federal Migratory Birds Convention Act (nests, individuals), provincial Wildlife Conservation Act (nests, individuals), provincial Environmental Protection Act (habitat -forested wetlands).

Provincial conservation/monitoring initiatives: Land securement (***see Section 3.2***) and targeted surveys (***see Section 4.1.2***) are ongoing. Dozens of observations have been recorded. The surveys are planned to continue to monitor breeding songbird communities in PEI forests; more information will be available for the 2030 SOW Report.



(XI) Bobolink

(XI) Bobolink

Habitat:
On PEI, nest and forage in agricultural settings like hayfields and pastureland.

SARA status: Threatened

Provincial status: S2

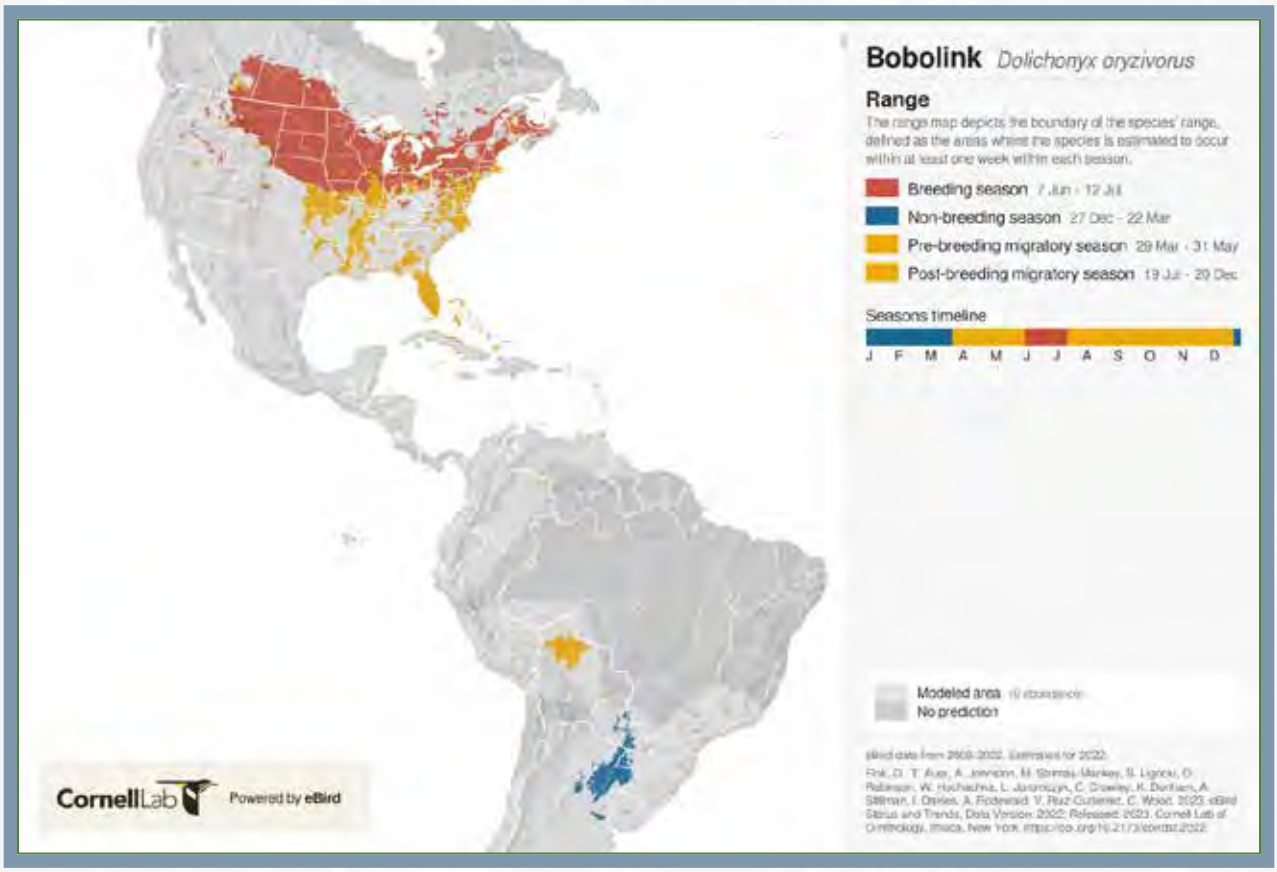
Trend:
BBS: 2.7% annual decline (97.5% CI: -3.4% to -2.1%)21
**Bird Conservation Region* (BCR) 14 (*Atlantic Northern Forest*)

eBird: 32% decline (80% CI: -36% to -23%)
(PEI 2012 to present)[17]

MBBA: 4% decline in detection probability (PEI 1992 – 2010)[18]

Other protections:
Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals).

Provincial conservation/monitoring initiatives: Since 2018, a partnership between FFW, INT, and the Alternative Land Use Services (ALUS program) has delivered a conservation incentive for delayed hay cutting to conserve grassland birds, thereby increasing the number of bobolink fledged[22].



2.2.2 Federally Listed Species of Special Concern on PEI

(I) Barrow's Goldeneye

(I) Barrow's Goldeneye

Habitat:
Small eastern population breeds in freshwater lakes in Quebec. In PEI, overwinters along coastlines, bays, estuaries and inlets where it forages mainly on salt water molluscs.

SARA status: Special Concern

Provincial status: S1

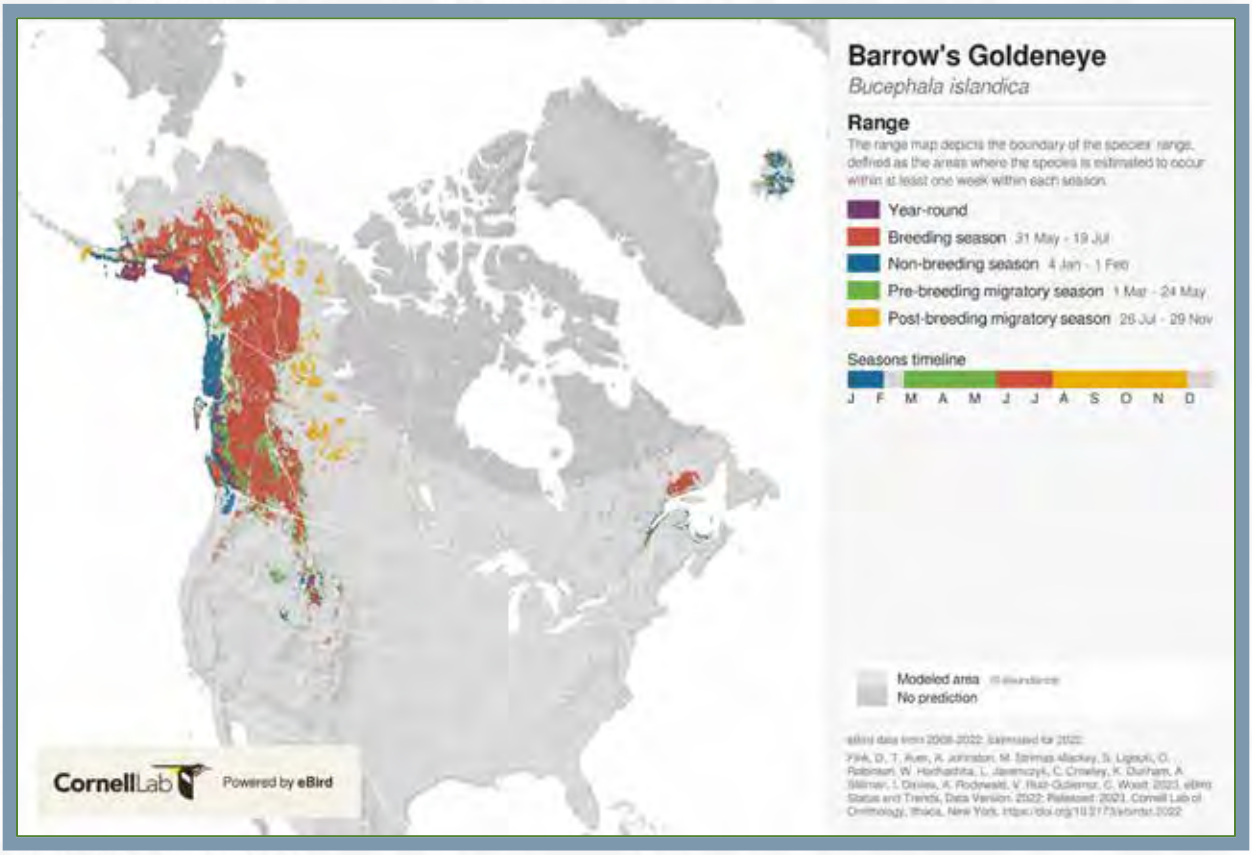
Trend:
Pop. Est.* (2007-2019): 742,000 – 505,000 (Barrow's and common goldeneyes)[23]

*USFWS-CWS waterfowl breeding and habitat survey; in thousands; eastern survey area

eBird: 22% increase (80% CI: 7% to 41%) (PEI 2012 to present)[17]

Protections:
Federal Migratory Birds Convention Act (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals).

Conservation/Monitoring: Between 1988 and 2008 Barrow's goldeneye were routinely observed at specific sites during winter waterfowl surveys (***Section 4.1.2***). In 2019, those same sites continued to have Barrow's goldeneye. These results indicate PEI may be an important wintering site for eastern populations.



(I) Olive-sided Flycatcher

(II) Olive-sided Flycatcher

Habitat:

Olive-sided Flycatcher breeds in open-canopy softwood stands in or near wetlands and is associated with forest openings and edges.

SARA status: Special Concern

Provincial status: S2

Trend:

BBS: 1.7% annual decline (97.5% CI: -2.2% to -1.3%)[21]
**Bird Conservation Region* (BCR) 14 (*Atlantic Northern Forest*)

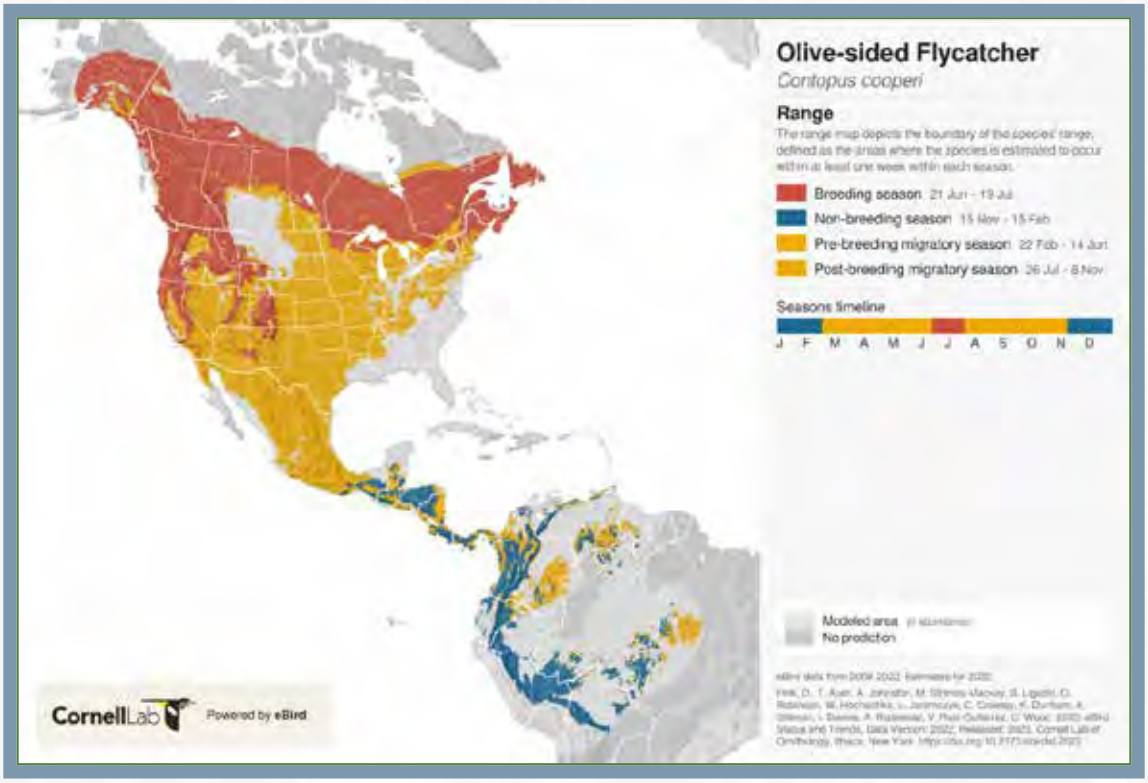
eBird: 10% decline (80% CI: -15% to -0.7%)
(PEI, 2012 to present)[17]

MBBA: 0.7% decline in detection probability
(Maritimes, 1992 – 2010)[18]

Protections:

Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat - wetlands)

Conservation/Monitoring: Land securement (***see Section 3.2***) and targeted surveys (***see Section 4.1.2***) are ongoing. Targeted point count surveys in 2017– 2018 yielded three observations on PEI. FFW surveys (point counts, automated recordings) are ongoing with some detections. The surveys are planned to continue to monitor breeding songbird communities in PEI forests; more information will be available for the 2030 SOW Report.



(II) Eastern Wood-pewee

(III) Eastern Wood-pewee

Habitat:
Eastern Wood-pewee breeds in mature or old hardwood and mixed wood stands with relatively open understories.

SARA status: Special Concern

Provincial status: S3

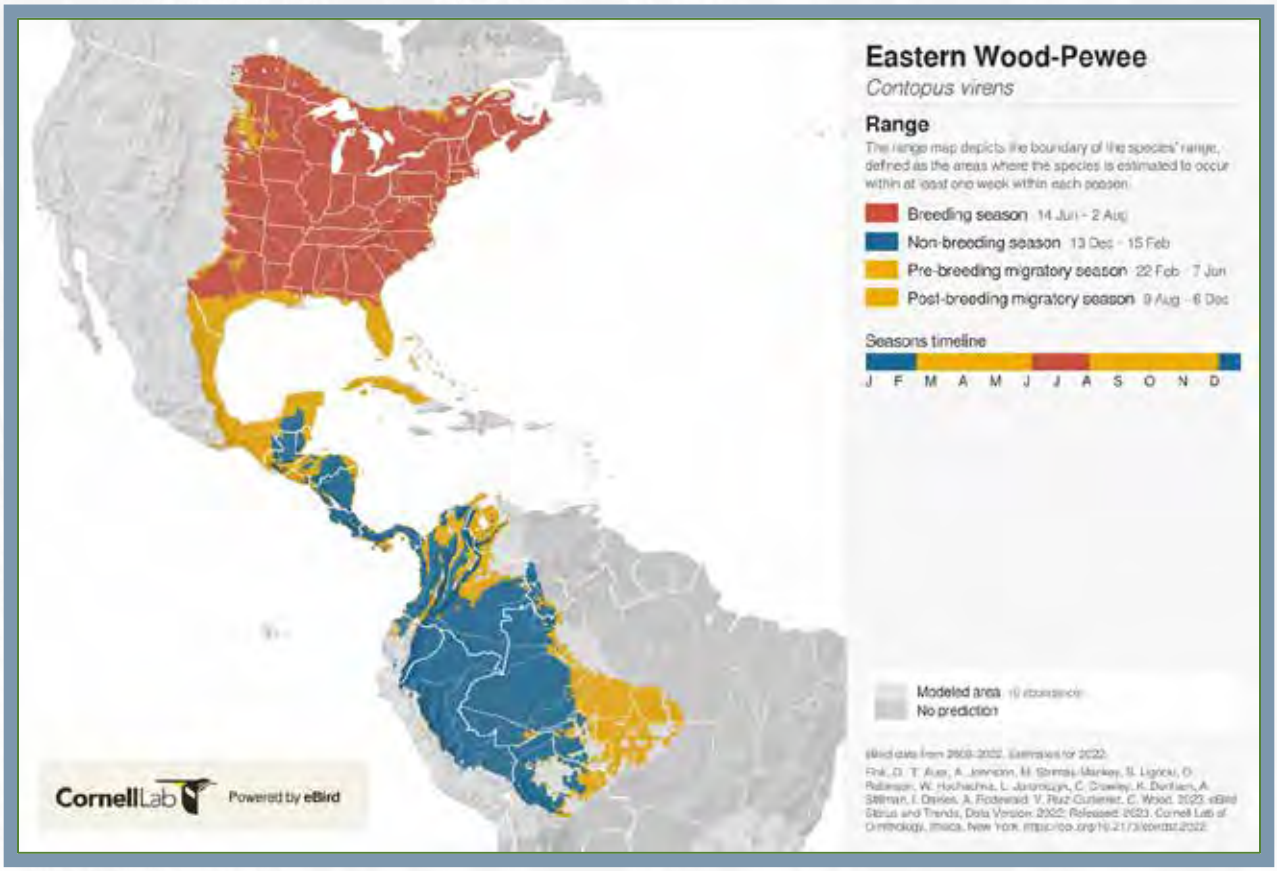
Trend:
BBS: 1.7% annual decline (97.5% CI: -2.2 % to -1.3%)[21]
**Bird Conservation Region* (BCR) 14 (*Atlantic Northern Forest*)

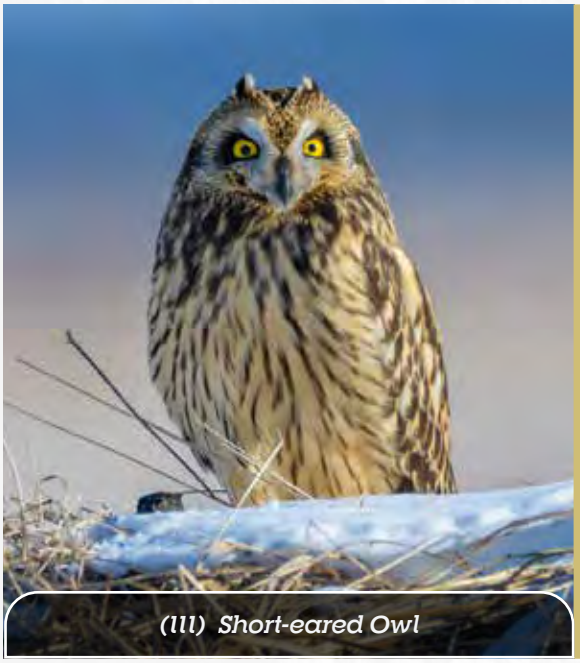
eBird: 11% increase (80% CI: -5% to 25%)[17]

MBBA: 1% decline in detection probability (Maritimes, 1992-2010)[18]

Protections:
Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals).

Conservation/Monitoring: Land securement (***see Section 3.2***) and targeted surveys (***see Section 4.1.2***) are ongoing. Out of 70 point-count surveys already conducted, eastern wood-pewee has been identified 11 times. The surveys are planned to continue to monitor breeding songbird communities in PEI forests; more information will be available for the 2030 SOW Report.





(III) Short-eared Owl

(IV) Short-eared Owl

Habitat:
Open habitats, including grasslands, dunes, and wetlands.

SARA status: Special Concern

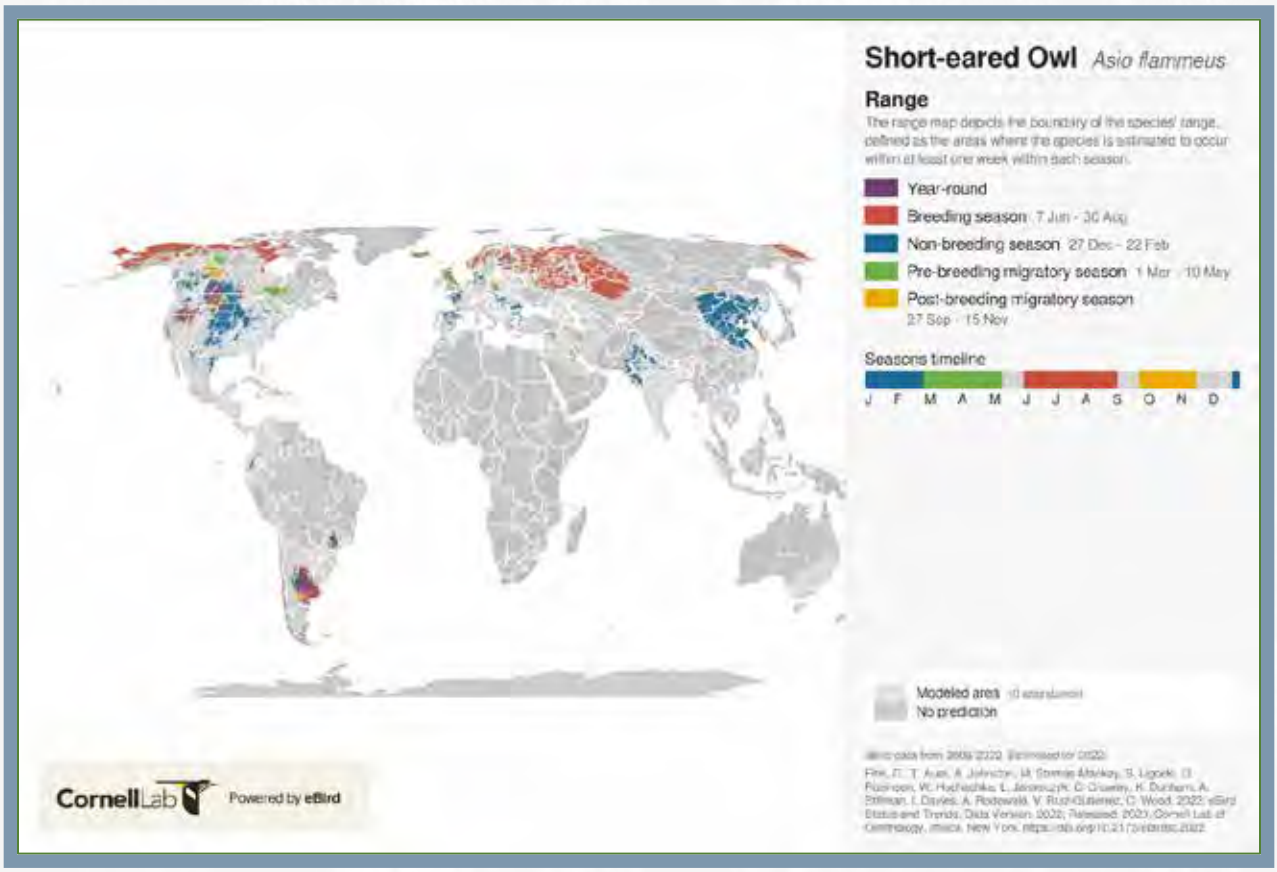
Provincial status: S1

Trend: undetermined

Conservation/Monitoring:
Land securement in potentially suitable habitat is ongoing.

Trend: data deficient for region.

Protections:
Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat - wetlands)



(IV) Common Nighthawk

(V) Common Nighthawk

Habitat:
Open, vegetation-free habitats, including recently harvested forests, peat bogs, and riverbanks. This species also inhabits mixed and coniferous forests.

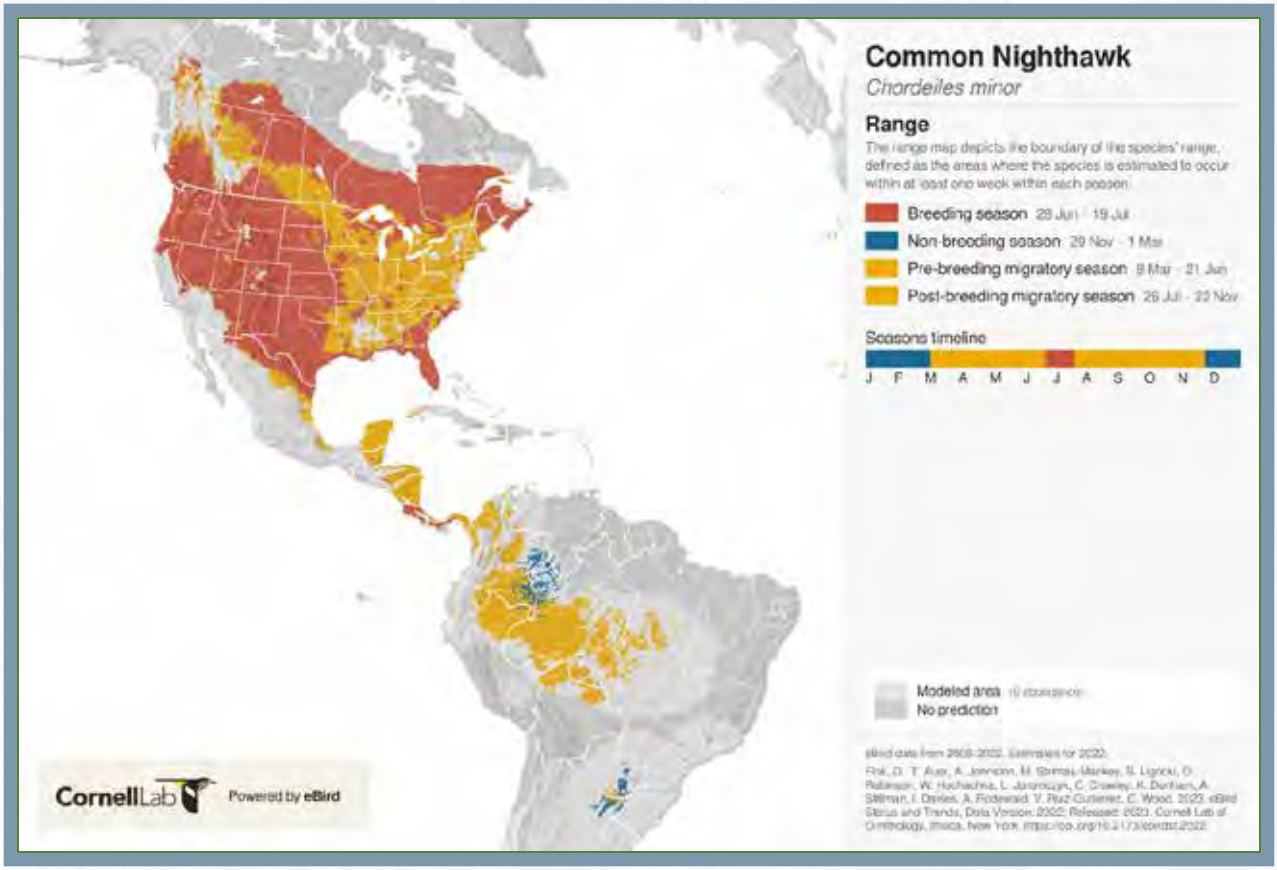
SARA status: Special Concern

Provincial status: S1

Trend:
BBS: 1.8% annual decrease (97.5% CI: -3% to -0.5%)[21]
**Bird Conservation Region* (BCR) 14 (*Atlantic Northern Forest*)

MBBA: 5.6% decline in detection probability (PEI, 1992-2010)[18]

Protections:
Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals).



(V) Rusty Blackbird

(VI) Rusty Blackbird

Habitat:
Coniferous and mixed wood forests near wetlands, forested wetlands.

SARA status: Special Concern

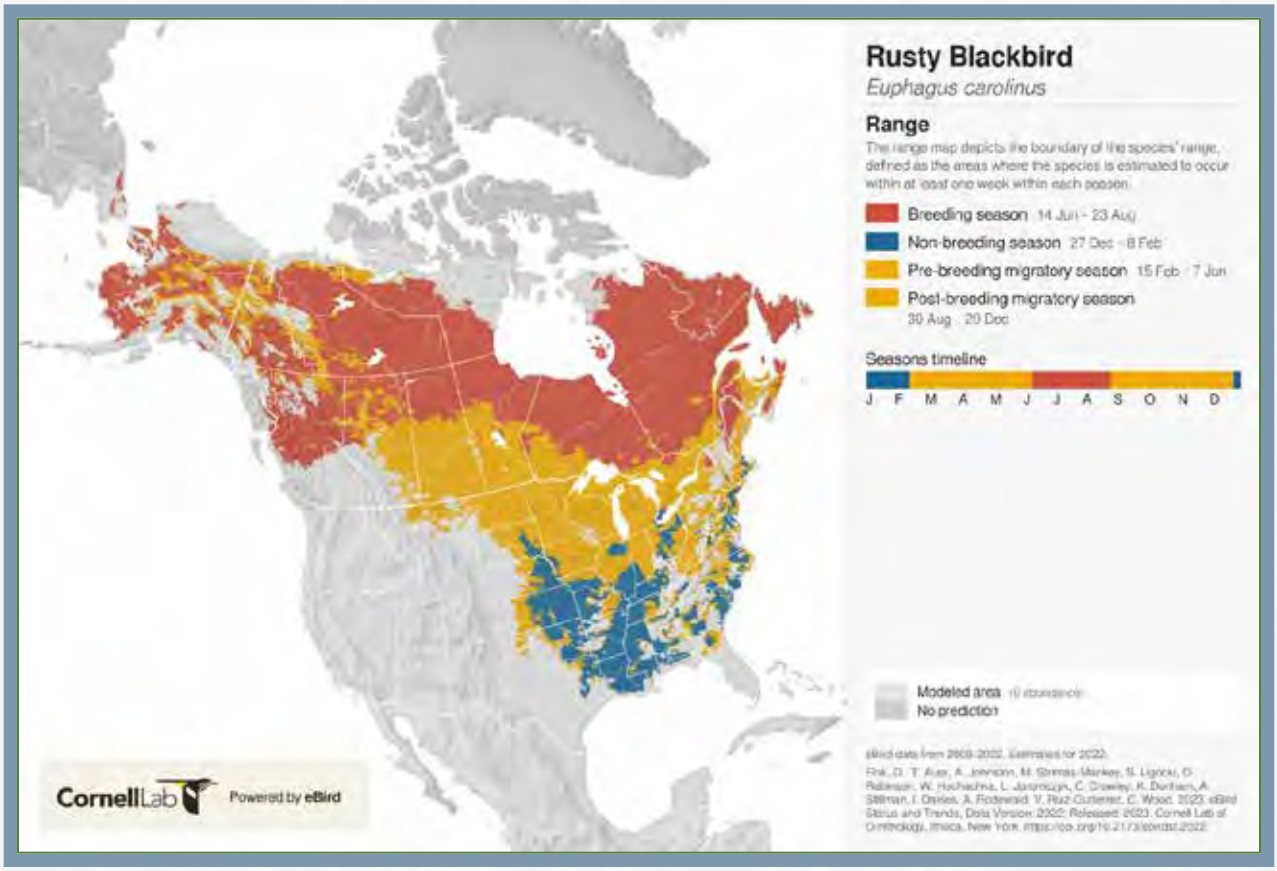
Provincial status: S1

Trend:
BBS: 3.9% annual decline (97.5% CI: -5.2% to -2.5%)[21]
**Bird Conservation Region* (BCR) 14 (*Atlantic Northern Forest*)

MBBA: 5.6% decline in detection probability (PEI, 1992-2010)[18]

Protections:
Provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat - wetlands)

Conservation/Monitoring: Automated recording in presumably suitable habitat (***beaver meadows; see Section 4.1.2***) is planned to assess biodiversity with rusty blackbird being a potential target species. More information will be available in the 2030 SOW report.



(VI) Evening Grosbeak

(VII) Evening Grosbeak

Habitat: Mature coniferous dominated (especially fir and spruce) and mixed wood forests.

SARA status: Special Concern

Provincial status: S2

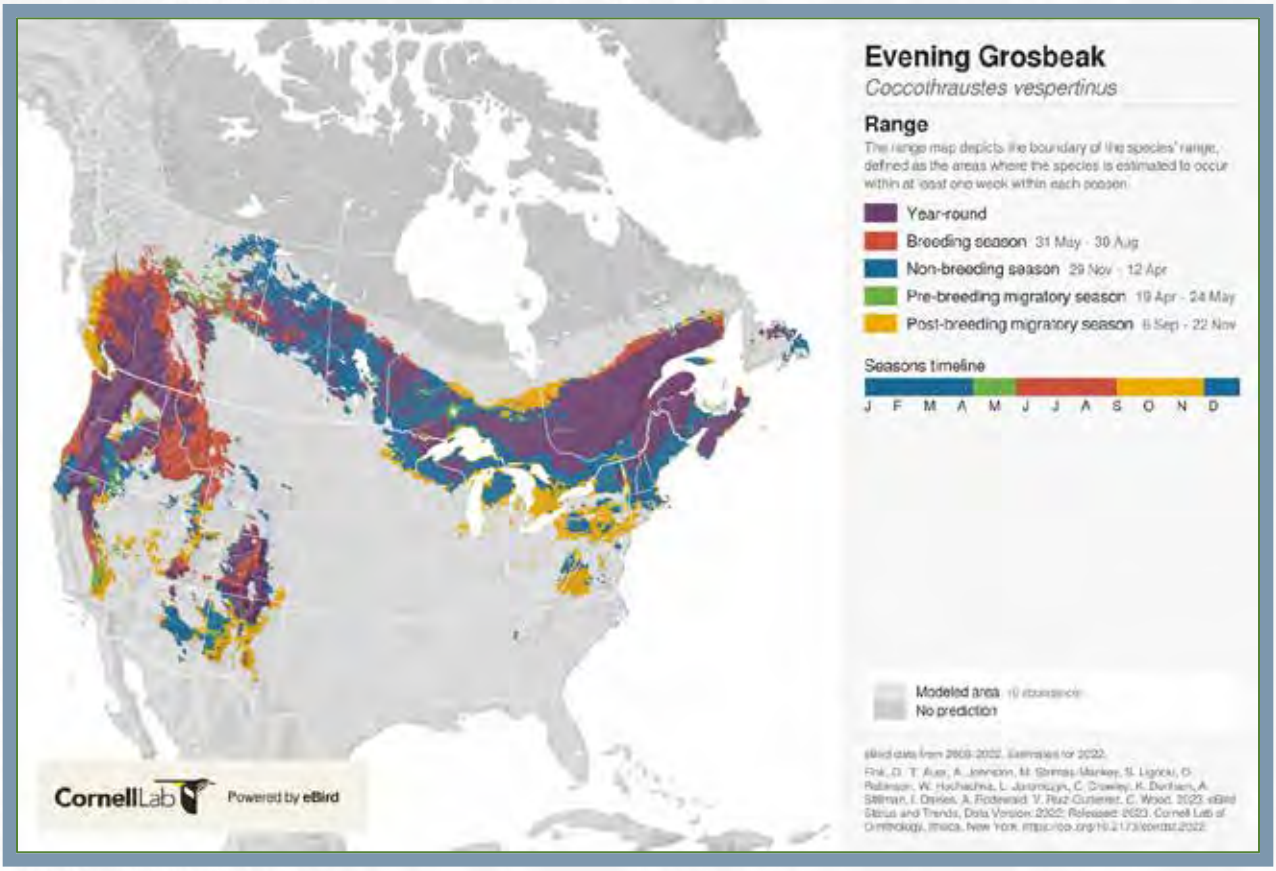
Trend: BBS: 3.6% annual decline (97.5% CI: -5.8% to -1.5%)[21]

**Bird Conservation Region* (BCR) 14 (*Atlantic Northern Forest*)

MBBA: 5.7% decline in detection probability (PEI, 1992-2010)[18]

Protections: Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals).

Conservation/Monitoring: Land securement (***see Section 3.2***) and targeted surveys (***see Section 4.1.2***) are ongoing; no observations of evening grosbeak have been recorded.



2.2.3 Provincial Species (or Species Groups) of Conservation or Management Concern

(I) Canada Jay

(I) Canada Jay

Habitat: Coniferous dominated forests. On PEI, restricted almost entirely to the larger forest patches of eastern Queens and Kings County on PEI.

Provincial status: S2

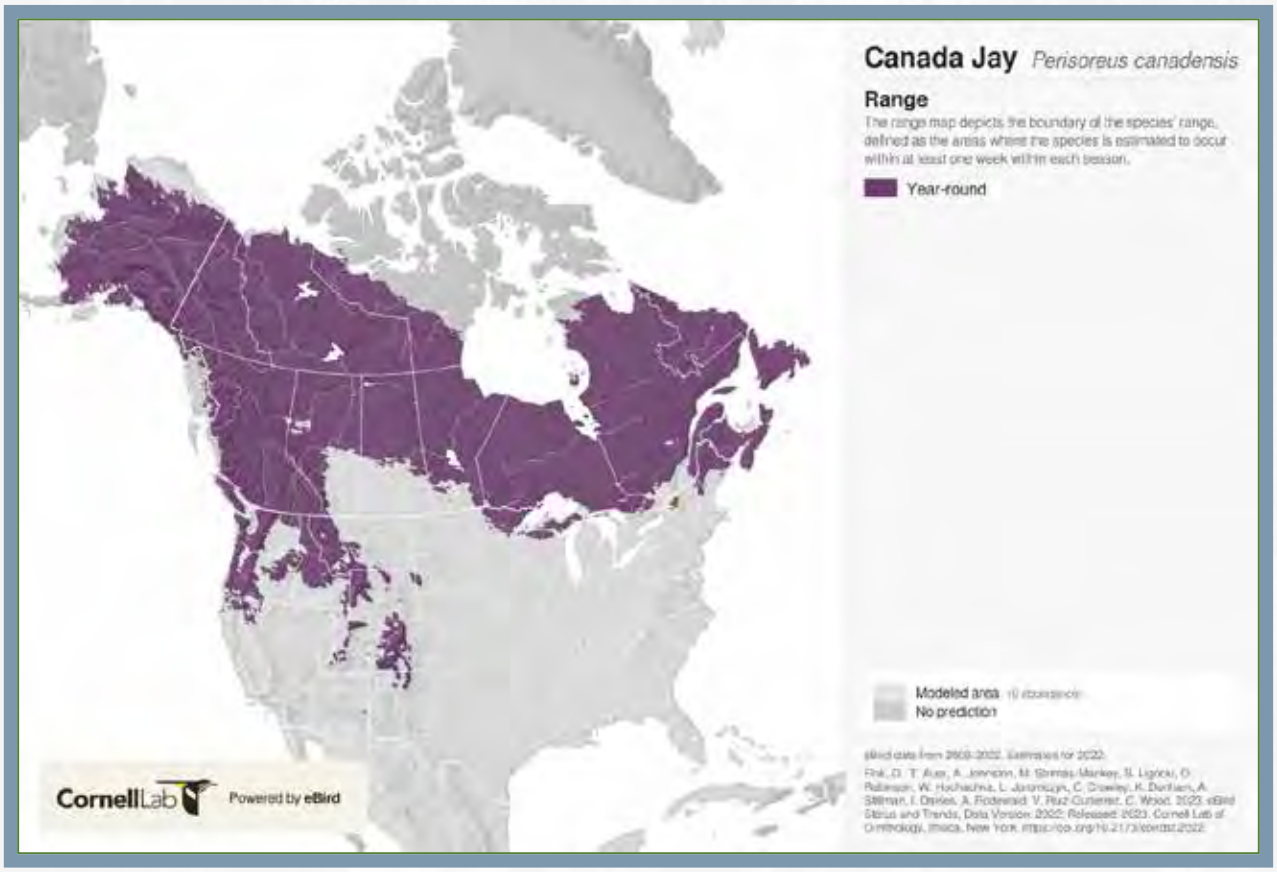
Trend: BBS: 0.7% annual decline (97.5% CI: -1.5% to - 0.1%[21]

**Bird Conservation Region (BCR) 14 (Atlantic Northern Forest)*

MBBA: No significant change[18].

Protections: Provincial *Wildlife Conservation Act* (nests, individuals).

Conservation/Monitoring: FFW-led breeding bird surveys (***see Section 4.1.2***) starting in 2020 failed to detect this species, despite sampling in apparently suitable habitat known to occur on PEI.



(II) Pickerel Frog

(II) Pickerel Frog

Scientific Name: Lithobates palustris

Habitat: Shores of ponds and streams.

Provincial status: S2

Trend: The status of this species on PEI remains precarious due to limited extent and apparently low abundance relative to PEI's other native frog species.

Protections: Provincial *Environmental Protection Act* (habitat - wetlands)

Conservation/Monitoring: not known to occur on PEI prior to 2000 and have been documented only sporadically since. The distribution of this species appears limited to the interior of Queens and western Kings Counties, except for a lone occurrence on the north shore near Tracadie Bay. This species resembles the much more common northern leopard frog, so it is certainly possible that other occurrences have been overlooked due to misidentification. Monitoring using remote audio recording units is ongoing. Healthy watersheds are likely linked to population status.

(III) Smooth Green Snake

(III) Smooth Green Snake

Habitat: Grassy areas on moist soils

Provincial status: S2

Trend: unknown

Protections: Provincial *Wildlife Conservation Act* (individuals), provincial *Environmental Protection Act* (habitat - wetlands).

Conservation/Monitoring: Factors suppressing population growth are unknown at this time, but it's possible that a targeted monitoring program would reveal a wider distribution. FFW intends to devote focused survey attention to this species in the coming years to better understand its status.

(IV) North American River Otter

(IV) North American River Otter

Habitat: Watercourses, wetlands

Provincial status: SU

Trend: Stable range-wide, apparently increasing but vulnerable on PEI

Protections:
Provincial *Wildlife Conservation Act* (individuals), provincial *Environmental Protection Act* (habitat - wetlands and riparian buffer zones).

Conservation/Monitoring: Considered extirpated from PEI in the early 20th century, river otters have made a tentative return to the province. Since 2016, seven river otters have been captured incidentally in legally set beaver traps, and a juvenile was found dead on the north shore by FFW staff. Prompted by these initial occurrences, dedicated camera monitoring has yielded multiple additional detections, the most promising of which included an adult with multiple young of the year. The combined evidence means it is likely that a very small, resident population of river otters has re-established. Management responses to protect the vulnerable population have included the establishment of a closed beaver trapping zone in the Kensington area, development of voluntary best management practices for beaver trappers, and establishment of a province-wide monitoring program through partnerships between FFW and the Watershed Alliance.

Lesser Yellowlegs

(V) Arctic and Sub-arctic Breeding Migratory Shorebirds

Each year hundreds of thousands of arctic and sub-arctic breeding shorebirds make their way south through Atlantic Canada towards wintering grounds in the southern United States, and central and South America. During this long voyage, shorebirds use stopover sites to feed and regain strength to continue their journey. These sites typically consist of coastlines, intertidal sandflats, and mudflats. On PEI, 16 shorebird species, one SARA-listed, can be reliably observed at certain locations during fall migration (***Table 2-2***).

As of 2020, numbers of long-distance migratory shorebirds have dropped by 52% since 2012[16]. Possible causes of the declines are due to climate effects (e.g., late or early thaws) in the breeding grounds, and habitat deterioration in staging and wintering sites. Conservation measures on PEI include the protection and restoration of migratory staging habitat and ensuring pets do not disturb them while they are roosting or feeding.

Table 2-2. *Statuses of Shorebirds That Use PEI Shorelines During Fall Migration.*

Common Name	Provincial Status	SARA
Killdeer	S2	-
Hudsonian Godwit	S2	-
Whimbrel	S2	-
Red Knot	S2	Endangered
Black-bellied Plover	S3	Endangered
Ruddy Turnstone	S3	-
Sanderling	S3	-
Semipalmated Sandpiper	S3	-
Short-billed Dowitcher	S3	-
Lesser Yellowlegs	S3	-
Willet	S3	-
Semipalmated Plover	S4	-
Dunlin	S4	-
White-rumped Sandpiper	S4	-
Least Sandpiper	S4	-
Greater Yellowlegs	S4	-


Least Flycatcher

(VI) Aerial Insectivores

Aerial insectivores are bird species that consume insects while in flight and as a group they are rapidly in decline (-59% since 1970)[16]. In PEI, 5 of 10 species from this group (***Table 2-3***) are SARA-listed (and are included in the above sections). Possible reasons for decline include agricultural intensification and reduced numbers of insect prey. For these reasons it is important to emphasize the need for proper watershed management and continued improvements in pesticide management to help reverse or slow down the decline.

Table 2-3. *Statuses of PEI Aerial Insectivores*

Common Name	Provincial Status	SARA
Common nighthawk	S1	Special Concern
Bank swallow	S2	Threatened
Barn swallow	S2	Threatened
Olive-sided flycatcher	S2	Special Concern
Eastern kingbird	S3	-
Tree swallow	S3	-
Eastern wood-pewee	S3	Special Concern
Yellow-bellied flycatcher	S3	Special Concern
Least flycatcher	S4	-
Alder flycatcher	S5	-

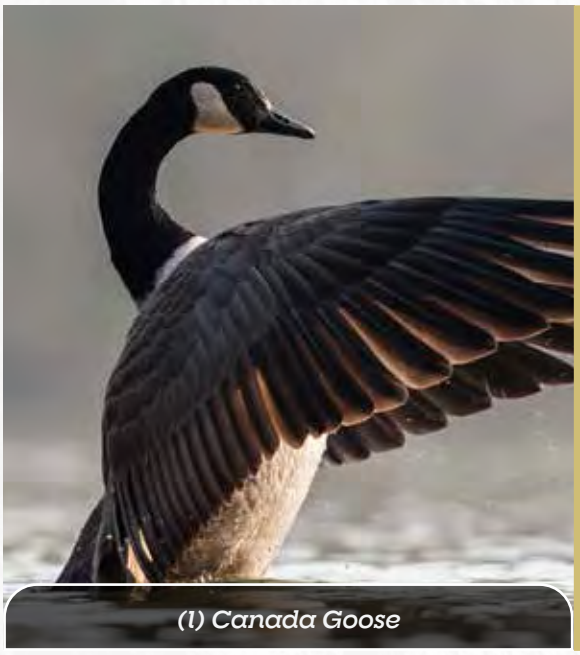
2.3 - Game and Furbearers

2.3.1 Waterfowl

PEI waterfowl (ducks and geese) are the most important game for many Island hunters. In the 1930s waterfowl populations were at historically low levels continent-wide, potentially as low as 50% of today's levels. Due to a combination of regulations, policies (PEI's Wetland Policy is an example), treaties, permit and stamp sales, a new and growing conservation ethic, habitat conservation, and adaptive harvest management, waterfowl populations have rebounded. Hunters have provided large contributions to these efforts in the form of permit and stamp fees, portions of which go directly to habitat programs. It is realistic to consider this achievement as one of the most successful conservation initiatives in modern times.

Monitoring of waterfowl populations and habitat conditions has been ongoing for decades. Since 2004, surveys conducted by the United States Fish and Wildlife Service (USFWS) and the Canadian Wildlife Service (CWS) have been integrated to determine the status of North American waterfowl populations. Each year, both organizations produce annual or biennial population status reports that characterize the condition of breeding waterfowl habitat and provide estimates of population numbers. Between 2007-2019 habitat conditions for waterfowl in eastern North America ranged predominantly from "good" to "excellent", with a few years experiencing "fair" conditions during seasons of drought[23,25-29,31-38].

The following sections provide an overview of the statuses of the four most common waterfowl species found on PEI: Canada goose, American black duck, mallard, and American green-winged teal.



(I) Canada Goose

(I) Canada Goose

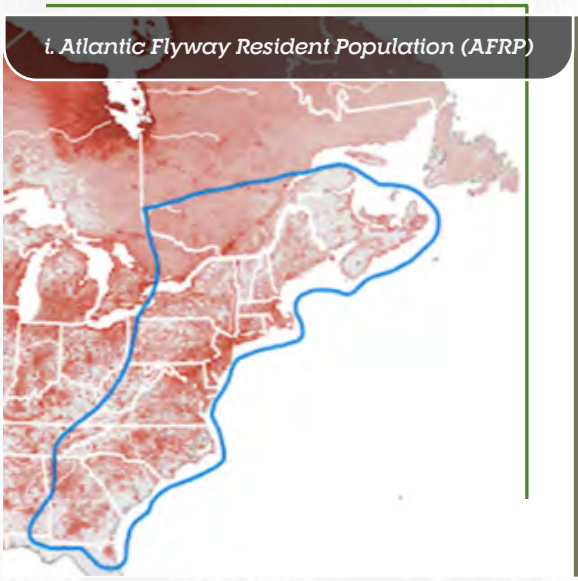
Habitat: Permanent waterbodies during nesting and brooding; during migration on PEI uses croplands, eelgrass beds, and freshwater habitats.

Provincial status: S5

Protections: Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat - wetlands).

Annual Average Harvest[53] : (2 007-2018): 370,000 birds Canada-wide, and 13,700 (range: 9500-16600) in PEI.

Sub-populations on PEI: Atlantic Flyway Resident (AFR) (breeding, migration); North Atlantic (NA), who stage on PEI during migration (see below).



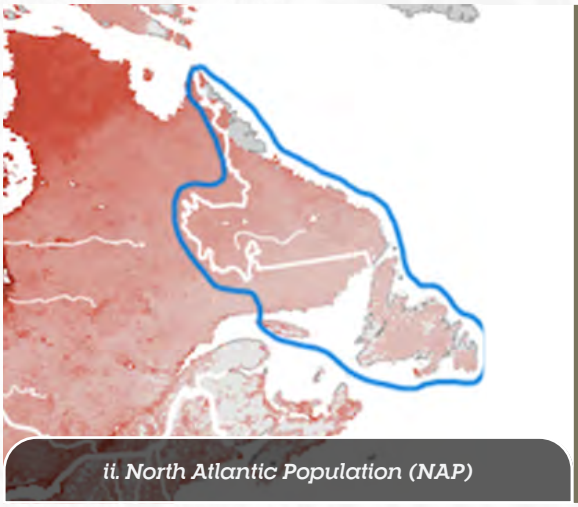
i. Atlantic Flyway Resident Population (AFRP)

i. Atlantic Flyway Resident Population (AFRP)

Population estimate[23]: 2007: 1.03 million,
2019: 1.04 million

Conservation/Monitoring Initiatives: CWS has initiated an AFRP goose banding program on PEI to better understand movement, site fidelity, and stock status. To date, 3,339 AFRP geese have been banded on PEI, with 1,619 recaptures. An early, two-week hunting season in September is now in place with the goal of targeting resident geese before migratory geese arrive.

*(**Map source:** Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022)*



ii. North Atlantic Population (NAP)

ii. North Atlantic Population (NAP)

Population estimate[23]: 2007: 48,000 breeding pairs
2019: 53,000 breeding pairs

Conservation/Monitoring Initiatives: CWS has ongoing goose banding and radio/GPS tagging operations for NAP geese in recent years to understand movement, survival and geographic overlap with AFRP geese during the waterfowl hunting season.

*(**Map source:** Fink, D., T. Auer, A. Johnston, M. Strimas-Mackey, S. Ligocki, O. Robinson, W. Hochachka, L. Jaromczyk, C. Crowley, K. Dunham, A. Stillman, I. Davies, A. Rodewald, V. Ruiz-Gutierrez, C. Wood. 2023. eBird Status and Trends, Data Version: 2022; Released: 2023. Cornell Lab of Ornithology, Ithaca, New York. https://doi.org/10.2173/ebirdst.2022)*

(II) American Black Duck

(II) American Black Duck

Habitat: Coastal marshes, and inland freshwater wetlands (e.g., beaver ponds, boreal lakes and meadows, etc.).

Provincial status: S5 (breeding), S4 (non-breeding)

Protections: Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat - wetlands).

Population Estimate (eastern NA)[23]:
2007: 942, 000 (90% CI: 815,000 to 1.07 million). (eastern North America)

2019: 729,000 (90% CI: 626,000 to 832,000) (eastern North America)

Average Annual Harvest (2007-2018)[53]: 83,000 Canada-wide, 6,200 (range: 2080-12800) in PEI.

Conservation/Monitoring Initiatives: Due to wetland habitat programs and science-based adaptive harvest management, numbers have been brought back to 1990 levels. The Black Duck Joint Venture (BDJV) helps facilitate research and habitat protection programs. Ongoing banding and tagging efforts by CWS on PEI help elucidate local and regional movement patterns, as well as fine-scale breeding activity.

(III) Mallard

(III) Mallard

Habitat: Wide variety of wetland and associated upland landscape-cover types.

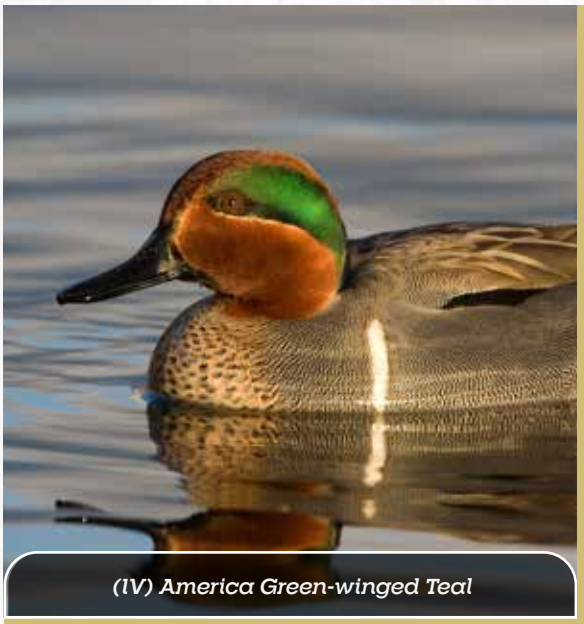
Provincial status: S5

Protections: Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat - wetlands).

Population Estimate (eastern NA)[23]: Decrease
2007:1.27 million (90% CI: 1.09 to 1.05 million)
2019: 1.05 million (90% CI: 895,000 to 1.2 million

Average Annual Harvest (2007-2018)[53]: 500,000 Canada-wide, 1548 (range: 650-2143) in PEI.

Conservation/Monitoring Initiatives: Mallard benefit from the many wetland habitat conservation and research programs currently ongoing for black duck. CWS also conducts banding and tagging operations to track movement and collect information of fine-scale breeding activity.



(IV) America Green-winged Teal

(IV) American Green-winged Teal

Habitat: Forested wetlands.

SARA Status: None

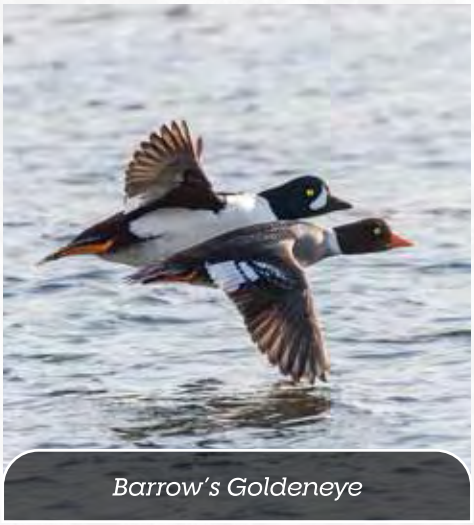
Provincial status: S5

Protections: Federal *Migratory Birds Convention Act* (nests, individuals), provincial *Wildlife Conservation Act* (nests, individuals), provincial *Environmental Protection Act* (habitat - wetlands).

Population Estimate (eastern NA)[23]:
2007: 440,000 (90% CI: 300,000 to 640,000)
2019: 302,000 (90% CI: 215,000 to 401,000)

Estimated Annual PEI Harvest[53]: 68,000 Canada-wide, 1350 (range: <250 to 3400) in PEI.

Conservation/Monitoring Initiatives: American green-winged teal benefit from the many wetland habitat conservation and research programs currently ongoing for black duck.



Barrow's Goldeneye

(V) Sea Ducks

PEI's north shore coastlines, bays and inlets provide staging sites for many sea ducks including scoters, eiders, long-tailed duck, goldeneyes and mergansers[30]. Population data for these groups are scarce, but trends indicate many of these species are in decline[40].

For some species, however, reliable population data do exist and indicate that goldeneyes (common and Barrow's) and mergansers (common, red-breasted, and hooded), are increasing.

Both goldeneye species and common merganser are observed frequently during FFW's winter waterfowl surveys. Statuses for sea duck species commonly observed at some point of the year in PEI waters, most often during migratory stopover, are listed in ***Table 2-4***. Harlequin ducks can sometimes be seen during spring or fall migration, but do not breed on PEI.

Mallards

Table 2-4. *Statuses of Sea Ducks of PEI.*

Common Name	Provincial Status	SARA
Harlequin Duck	S1	Special Concern
Barrow's Goldeneye	S2	Special Concern
Long-tailed Duck	S4	-
White-winged Scoter	S4	-
Black Scoter	S4	-
Surf Scoter	S4	-
Common Goldeneye	S4	-
Common Merganser	S5	-
Red-breasted Merganser	S5	-

2.3.2 Upland Game

Upland game refers to species that are hunted and that primarily use non-wetland areas for their basic habitat requirements. This group consists of snowshoe hare and birds including ruffed grouse, Hungarian partridge, and American woodcock.

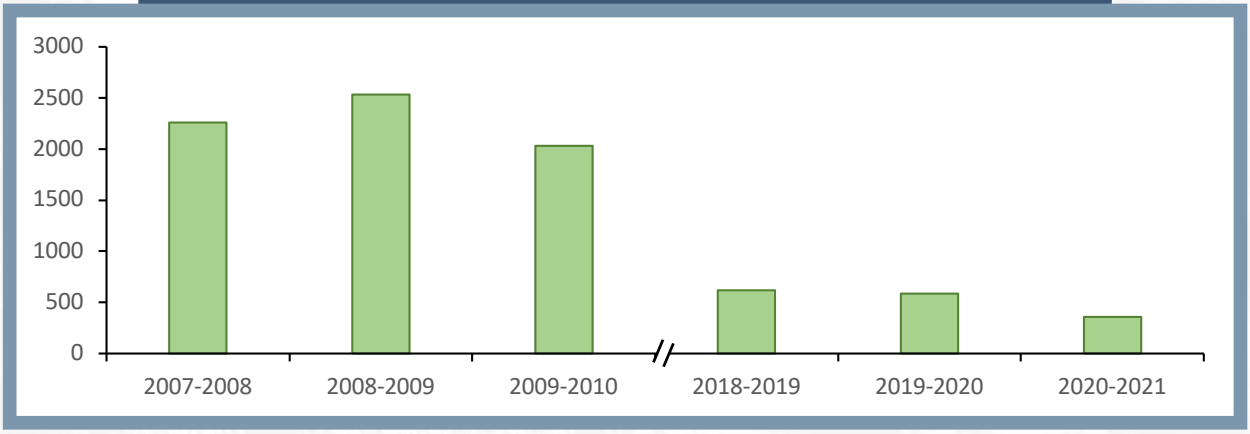
(VI) Snowshoe Hare

Snowshoe hare are listed as "S5" and are common and plentiful throughout PEI. Hare densities are linked to increasing density of coniferous canopy cover and understory vegetation. Hare are an important food source for many wildlife species, including coyotes, foxes, weasels, and forest raptors (i.e., barred owl, great-horned owl, and northern goshawk).

Although hare have historically been an important game species to many Islanders, hare harvest has declined over the years from an estimated average high of approximately 50,000 in 1978 to <1,000 since 2009 (***Figure 2-9***).

This decreasing trend in PEI hare harvest is likely at least partially explained by reduced hunter participation as indicated by license sale trends (***see Section 4.3***). Based on land use data between 2010 and 2020, availability of suitable habitat is not likely a factor, as a large proportion of PEI's forests are in the young to regenerating development stages preferred by hares (***see Section 3.0***).

Figure 2-9
Snowshoe Hare Hunting Harvest Between 2007-2010 and 2018-2021.



(VII) Ruffed Grouse

Ruffed grouse is a popular gamebird throughout Canada and is listed as "S5" in PEI. The species has a widespread distribution throughout mixed coniferous and deciduous forest across Canada. Ruffed grouse require mixed early-successional forests for brood rearing and winter cover[41,42,] and these birds are more common in areas that include poplar[43]. On PEI, the species is common in mixed-age forests; however, the species has experienced significant declines in many parts of their range, particularly in the United States[44].

Based on hunter harvest surveys between 2007-2010 and 2018-2020, ruffed grouse harvest ranged from approximately 1,000 birds to 5,000 birds (***Figure 2-10***) with an annual average of about 2,700.

Results from FFW spring drum counts show detections can change year to year (***Figure 2-11***) and that grouse are distributed throughout the province, with certain areas like southern Kings county and the Portage area tending to have higher relative counts of drumming males.

Figure 2-10
Ruffed Grouse Harvest Between 2007 and 2020. Note: No Survey Conducted 2013 to 2017.

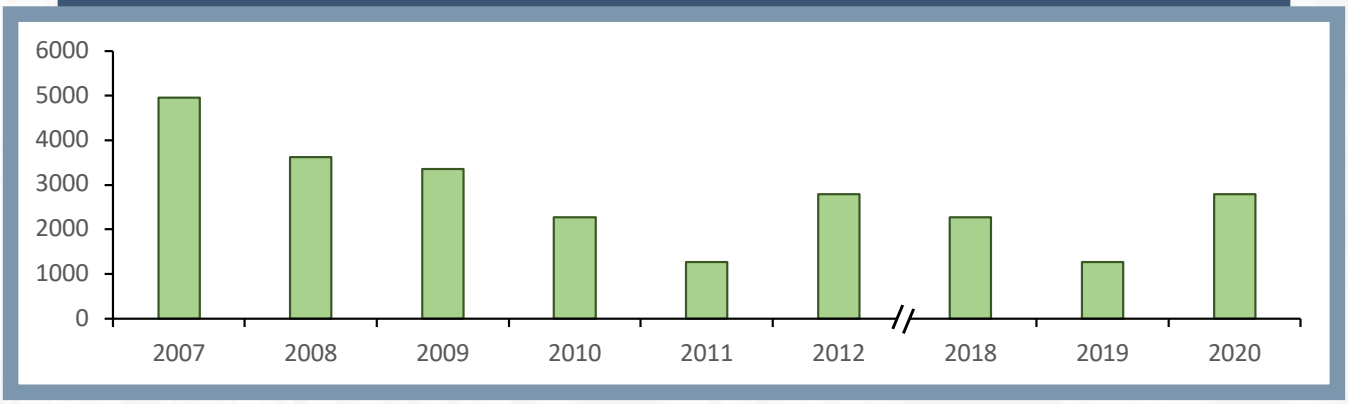
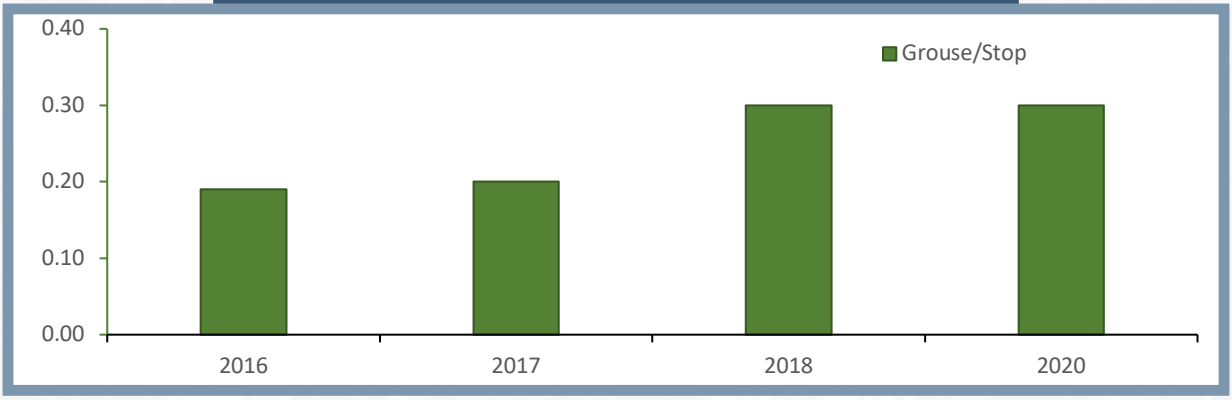


Figure 2-11
Ruffed Grouse Drums Per Stop Between 2016 and 2020.
Note: No Survey Conducted in 2019.



(VIII) American Woodcock and Wilson's Snipe

American woodcock (S5) and Wilson's snipe (S3) are shorebirds that use a variety of wet and dry upland landscapes where they can forage in soft rich soils for invertebrate prey during breeding and migration. American woodcock is monitored extensively by the USFWS's Singing Ground Surveys, which, on PEI, is coordinated through FFW (***see Section 4.1.2***).

American woodcock has been experiencing negative population trends both range wide, and in PEI at both long-term and short-term scales[44].

Woodcock and snipe are hunted on PEI, however, historically both species have had low harvests. Harvests peaked in the mid- to late-70s (~ 700 and 1,400, respectively), and estimated harvest of both species has been below 100 for each species since 2008 (FFW 2020).

2.3.2.1 Exotic Game Birds - Hungarian (Gray) Partridge, Ring-necked Pheasant and Sharp-tailed Grouse

Three species of exotic (introduced) game birds reside on PEI – Hungarian partridge, ring-necked pheasant, and sharp-tailed grouse. These birds were introduced to the Maritimes at various times since the late -1800s with the hopes of establishing harvestable populations. Currently, only Hungarian partridge has an open hunting season.

(I) Hungarian Partridge

Introduced early to mid-20th century, Hungarian partridge used to be an abundant and popular game bird for hunters. Introductions of this species ended decades ago, and numbers have declined since. An annual open hunting season of approximately one month (mid-October to mid-November) still exists in certain parts of PEI, however, participation by hunters is low.

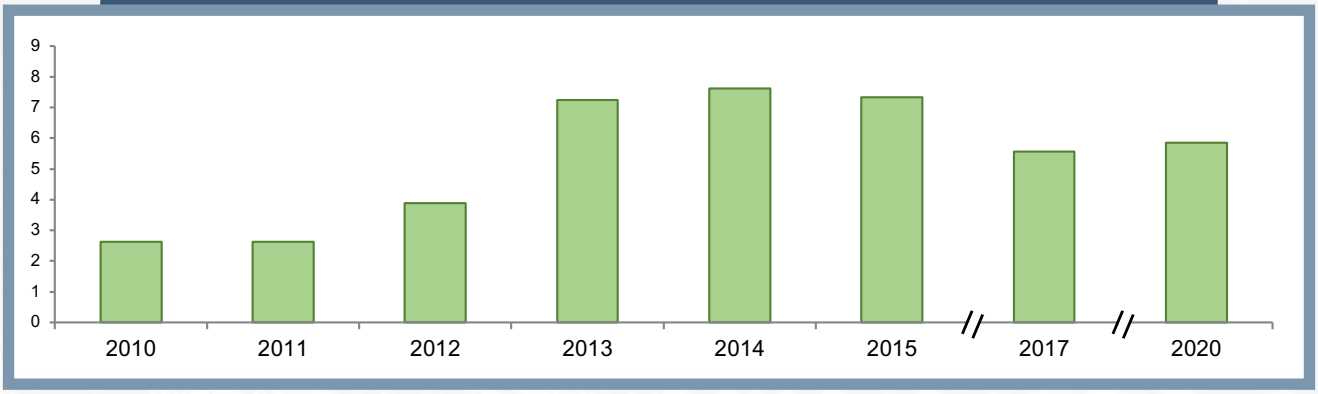
(II) Ring-necked Pheasant and Sharp-tailed Grouse

In 2007, PEI began a ring-necked pheasant stocking program, using birds translocated from New Brunswick and Nova Scotia. Between 2007 and 2018, 461 ring-necked pheasants were released on PEI. In 2010, annual ring-neck pheasant counts of crowing cocks (male pheasants) were established. The number of males heard per stop peaked in 2014 (***Figure 2-12***). There is currently no open hunting season for ring-necked pheasants on PEI, although opportunities for hunting them do exist on permitted preserves designed for that purpose. Sharp-tailed grouse resides on PEI in small numbers, and little is known about its status.

Figure 2-12

Total Adult Male Ring-Necked Pheasants per Survey Route from 2010 to 2020.

Note: Surveys not Conducted between 2017 and 2020.



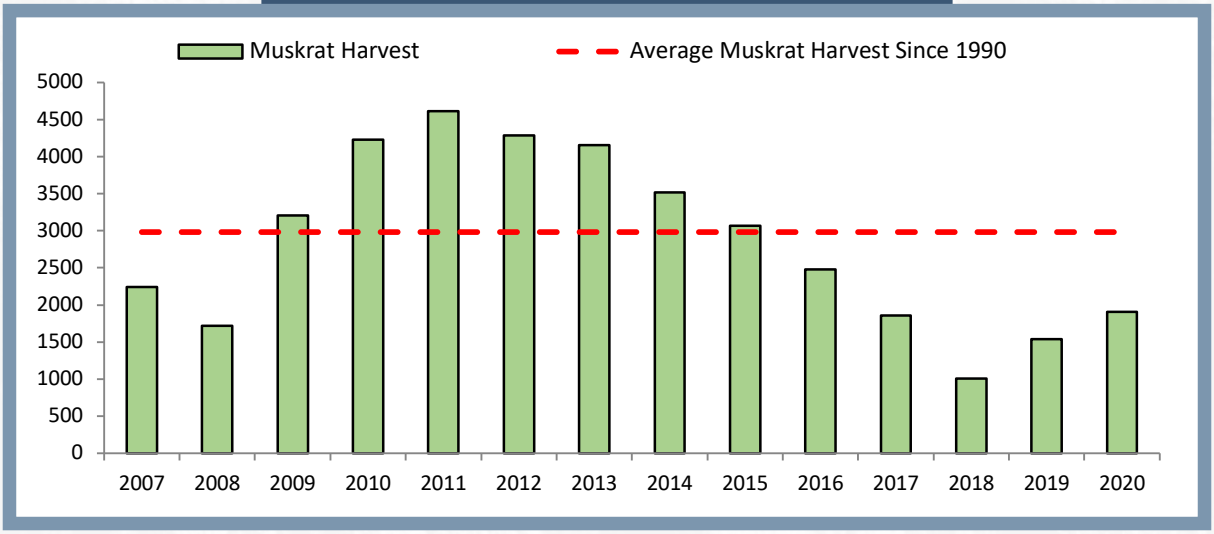
2.3.3 Furbearers

On PEI, all furbearer species aside from river otter (***see Section 2.2.3***) can be legally harvested through regulated hunting and/or trapping for their pelts. Harvest pressure is typically correlated with economic factors, especially the average pelt price.

(I) Muskrat

Muskrats, listed as S5, remain the most harvested furbearer on PEI, although the harvest in recent years has remained significantly below the long-term average (***Figure 2-13***). Muskrat harvest on PEI appears to be cyclical, with peaks and valleys that follow downturns and rebounds in the overall fur market. FFW has resumed an annual muskrat pelt sampling program to track trends in harvest demographics and key population metrics over time. In the 2019 and 2020 trapping seasons, 2666 individuals were sampled, accounting for 77% of the overall harvest. In those two seasons, ratios of juveniles per adult females (a key metric to track annual recruitment) were 4.57 and 5.10, respectively. These values are lower than historical baselines obtained by Dibblee (1971)[45] and Gregory (2012)[46]. Muskrat harvest remains dominated by juveniles, albeit at a lesser proportion than historically, which suggests a relatively stable population.

Figure 2-13.
Muskrat Harvest Per Year Between 2007 - 2020.

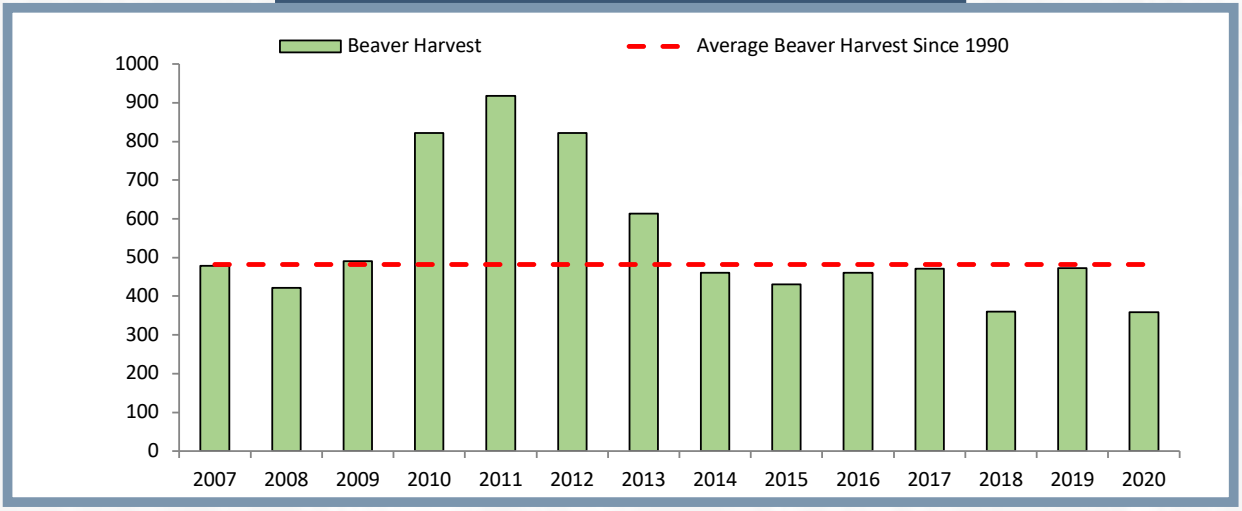


(II) Beaver

As a keystone species, beavers (S5) are of elevated management importance. Suitable habitat exists across much of the province, with highest population densities occurring in eastern and western regions of PEI. Since the 2007 State of the Wildlife report, average beaver harvest has declined steadily from a high of 917 in 2011 to 359 in 2020 (a decrease of 60.8%,) (***Figure 2-14***), coinciding with comparable decreases in average pelt prices.

FFW carried out a small aerial food cache survey in the fall of 2020 to establish density estimates in a few key watersheds. Thirty-five active colonies were observed within watershed areas representing 5.3% of the province; extrapolating the results yields a province-wide estimate of 660 fall colonies and a population of 3,825 (+/- 1,184). Current harvest levels (5-year average) therefore account for a maximum of 16% of the fall population and are not suppressing populations.

Figure 2-14.
Beaver Harvest Per Year Between 2007 - 2020.



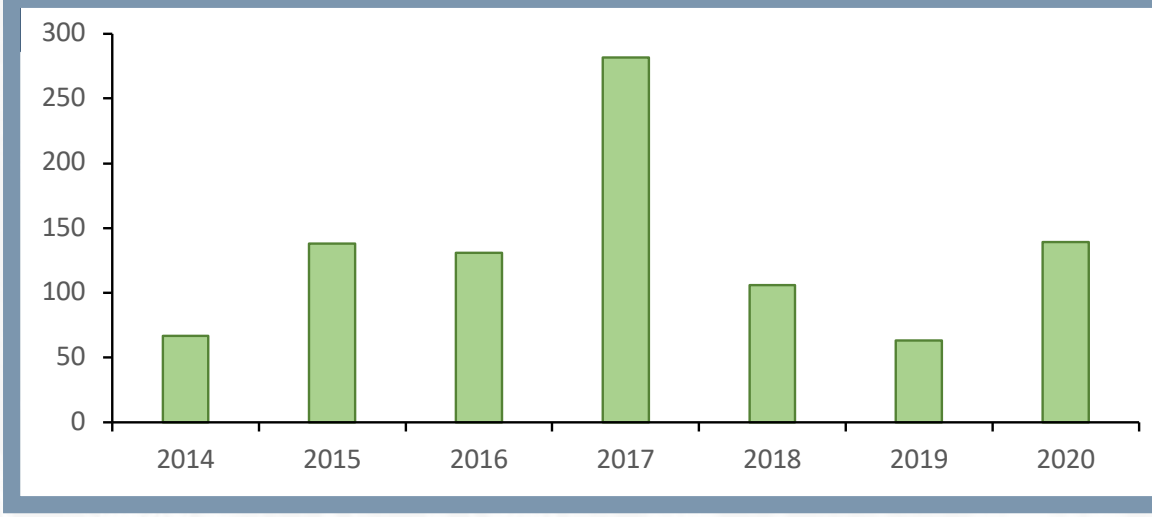
Beaver Dams and Impoundments

Managing the impacts of beavers is complex and needs to consider economic, social and wildlife implications. The PEI Beaver Policy (FFW 2011) dictates management objectives in order to:

- maintain wildlife diversity and habitat
- maintain beaver as an integral part the fur industry on PEI
- incorporate beaver management into long term watershed management plans
- reduce infrastructure damage caused by beavers
- address water quality issues, and
- maintain fish passage.

Due to the high road and population density on PEI, conflicts often arise between beaver activity and human infrastructure. To limit damage to critical infrastructure (roads and buildings), private property, and water quality, management actions usually involve trapping beavers to remove them from the area. Since 2014, 926 beavers have been removed in areas where such issues arise (***Figure 2-15***).

Figure 2-15.
Number of Beavers Removed (y-axis) from Impacted Areas Between 2014-2020.



(III) Coyote

Coyotes are another furbearer species of management importance due to concerns around public/pet safety and livestock predation. Coyotes are established across PEI and it's believed the population is stable at levels approaching carrying capacity. A historic high coyote harvest of 589 (trapping only) animals was recorded in 2013/14, and annual harvests of over 400 continue to be realized (***Figure 2-16***). Mean home range size on PEI has been estimated at 20 km2[47] yielding a province wide estimate of 283 home ranges and an overall fall population estimate of at least 2000 individuals. Current harvest levels are therefore unlikely to exceed 25% of the population, a significant but sustainable level of harvest[48].

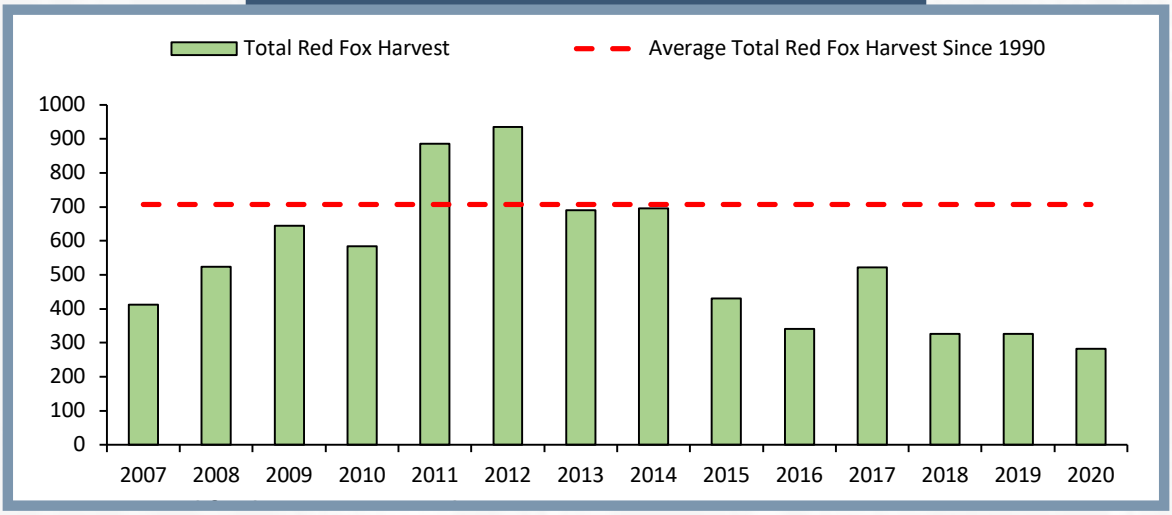
Figure 2-16.
Coyote Harvest Per Year Between 2007 - 2020.

(IV) Red Fox

Red fox, listed as S5, was designated PEI's provincial mammal in 2018. Before the arrival of coyotes in the early 1980s the species was the top predator in the province. Since 2007, red foxes have maintained their established presence in developed areas. In fact, artificially high densities in the Charlottetown area precipitated a sarcoptic mange outbreak beginning in 2018 (***see Section 2.4***). Despite locally high mortality, foxes remain distributed across the province at viable levels.

Red fox harvest within the reporting period averaged 500 and peaked at 875 in 2012/2013 (***Figure 2-17***), roughly 70% of the all-time high of 1249, recorded in 1993. A declining harvest trend, consistent with that observed for other furbearers, is apparent and reflects poor market conditions and overall reductions in trapper effort. Given that red fox populations can handle annual harvest of up to 75% of the population[48] it's unlikely that current harvest levels are depressing populations.

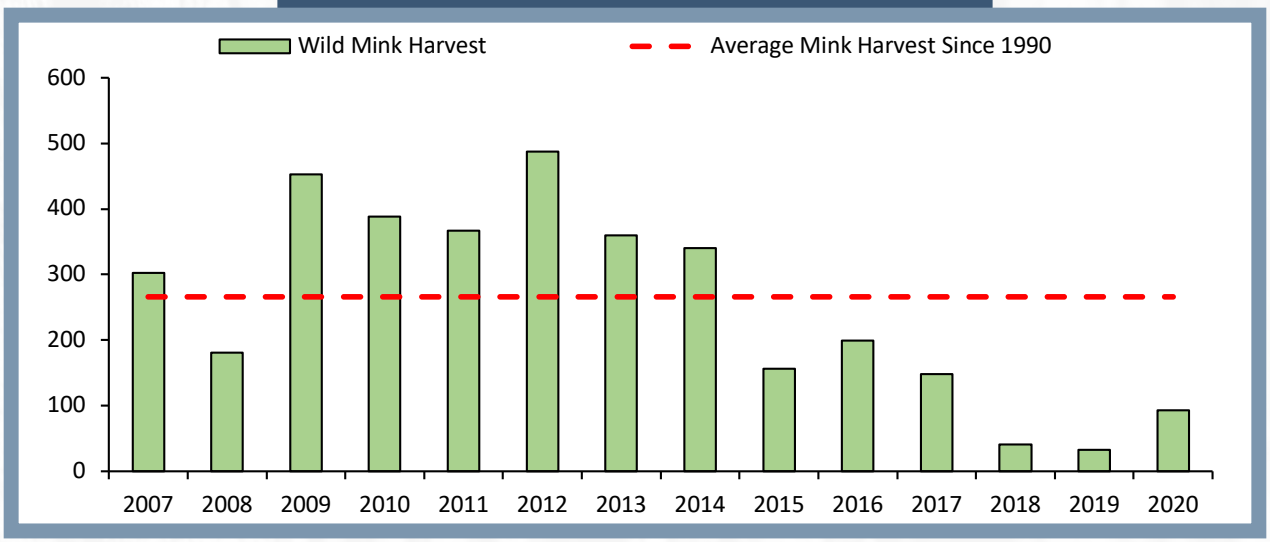
Figure 2-17.
Red Fox Harvest Per Year Between 2007 - 2020.



(V) Mink

American mink, listed as S5, is a difficult species for which to derive population estimates due to their reclusive behaviors, habitat use, and lack of obvious sign. Although occasionally detected during monitoring programs for other species, focused programs are required to estimate mink distribution and abundance and no such programs are currently in place. Neither habitat nor prey are limited for mink on PEI and so it is expected that the mink population remains secure. Mink harvests suffered a precipitous decline (***Figure 2-18***) in the last half of the reporting period due to a collapse of the market for wild mink fur.

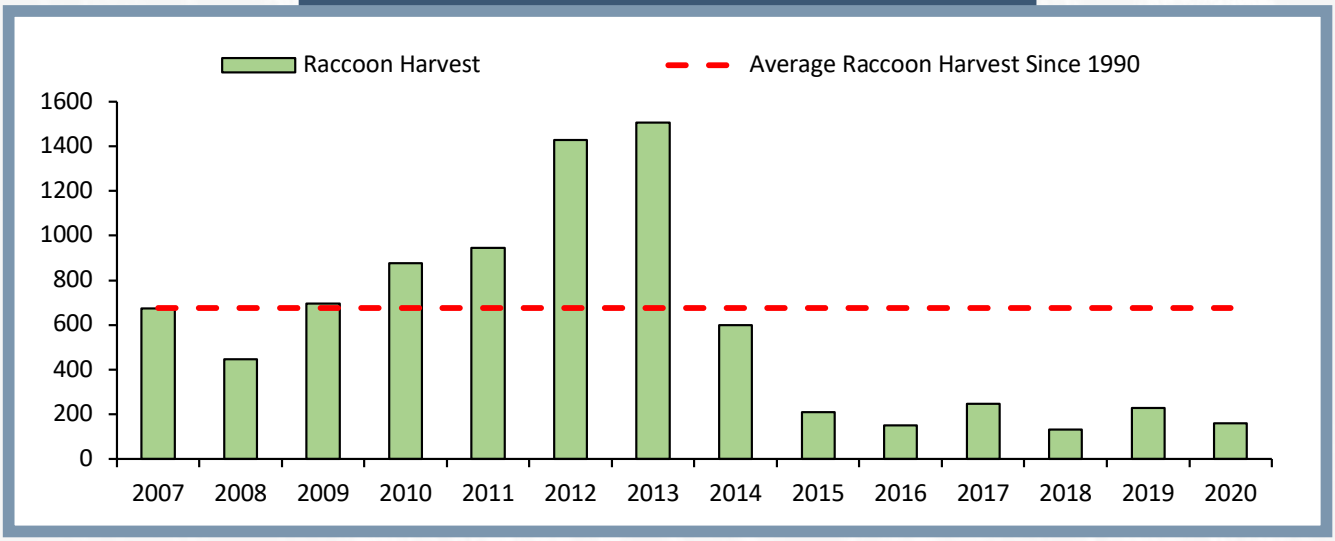
Figure 2-18.
Wild Mink Harvest Per Year Between 2007 - 2020.



(VI) Raccoon

Raccoons, listed as SNA on PEI, aren't inherently territorial and can achieve densities that bring them into persistent conflicts with people and lead to disease outbreaks. This is particularly true in the absence of enough harvest pressure, such as in developed areas or when fur markets are depressed. This situation began to materialize in 2014 (***Figure 2-19***) when raccoon prices dropped dramatically leading to concurrent declines in harvest levels. In recent years, the number of raccoons removed under nuisance permit has exceeded those taken for fur during the trapping/hunting seasons. Elevated densities present concerns around a potential incursion of raccoon strain rabies from neighboring provinces, a situation that would require a rapid response and localized depopulation to prevent rapid spread.

Figure 2-19.
Raccoon Harvest Per Year Between 2007 - 2020.



(VII) Red Squirrel and Striped Skunk

Although little hard data exist for either species, trail camera information, nuisance reports, and anecdotal observations suggest that both red squirrel and striped skunk are common and they are listed as S5 and SNA, respectively, in PEI. As common pest species, both are regularly subject to nuisance wildlife removal, but little fur trapping effort has been devoted to either in recent years. In the late 2000s as many as 481 red squirrel pelts were exported from PEI, but just 13 total squirrel pelts and five skunk pelts have been shipped since 2017. Red squirrel is incidentally noted during most monitoring programs, particularly those occurring in softwood dominated forest stands. Striped skunks, likewise, remain abundant in residential and agricultural areas.

2.3.4 Non-game Wildlife Groups

Eastern newt

(I) Herptiles (Amphibians and Snakes)

PEI is home to 10 amphibian species and three snake species (***Table 2-5***). Herptiles are cold-blooded vertebrates that spend winter in hibernation or dormancy. Amphibians require aquatic environments for breeding, while snakes breed on dry land. In spring, snakes exit their hibernation sites (hibernacula) where they can congregate in large numbers.

Most of PEI's amphibians can be easily observed or identified during breeding periods. Frogs and toads can be heard calling at dusk from wetlands and impoundments, often all at the same time. It is also common to see amphibian egg masses and young of the year (tadpoles) in vernal pools, ponds, and marshes across PEI in spring and summer.

Snakes are often much harder to observe due to their secretive habits. Local snake populations can be put at risk if hibernation, breeding, or maternal roosting sites are disturbed, especially since snakes may use anthropogenic sites or areas that may be unintentionally destroyed by people during site maintenance and construction activities (such as old basements or retaining walls). Pickerel frog and smooth green snake are both listed as S2 on PEI and very few observations of these species have been made in recent years.

Table 2-5. *Statuses of PEI Amphibians and Snakes.*

Common Name	Provincial Status
Pickerel frog	S2
Smooth greensnake	S2
Blue-spotted salamander	S3
Eastern red-backed salamander	S3
Green frog	S3
Northern leopard frog	S3
Red-bellied snake	S3
Yellow-spotted salamander	S4
Eastern newt	S4
American toad	S4
Spring peeper	S4
Wood frog	S4
Common gartersnake	S4

Wood frog

Olive-sided flycatcher

(II) Forest Birds

PEI forests are home to a diverse bird community. Our forests provide shelter, food, and breeding habitat for approximately 90 species. Some forest birds are residents and can be found in PEI year-round (e.g., black-capped chickadee). Other forest birds, such as the olive-sided flycatcher (inset), migrate long distances to breed and rear their young on PEI, with many returning to southern US states, and Central and South America in late summer and fall.

According to The State of Canada's Birds 2019 report[16] forest bird species across the country have increased 7% overall since 1970. While this statistic suggests a positive trend, there are population differences between resident and migrating forest bird species.

Resident forest birds that winter in North America increased by 34% since 1970, while migrating forest birds that winter in South America declined by 31%, and species that rely on forest crops like seeds or fruit have declined by 39% since 1970. Long-distance migrators face multiple threats on their breeding grounds, migration routes, and wintering grounds, including habitat loss and degradation, light pollution, and roaming domestic cats.

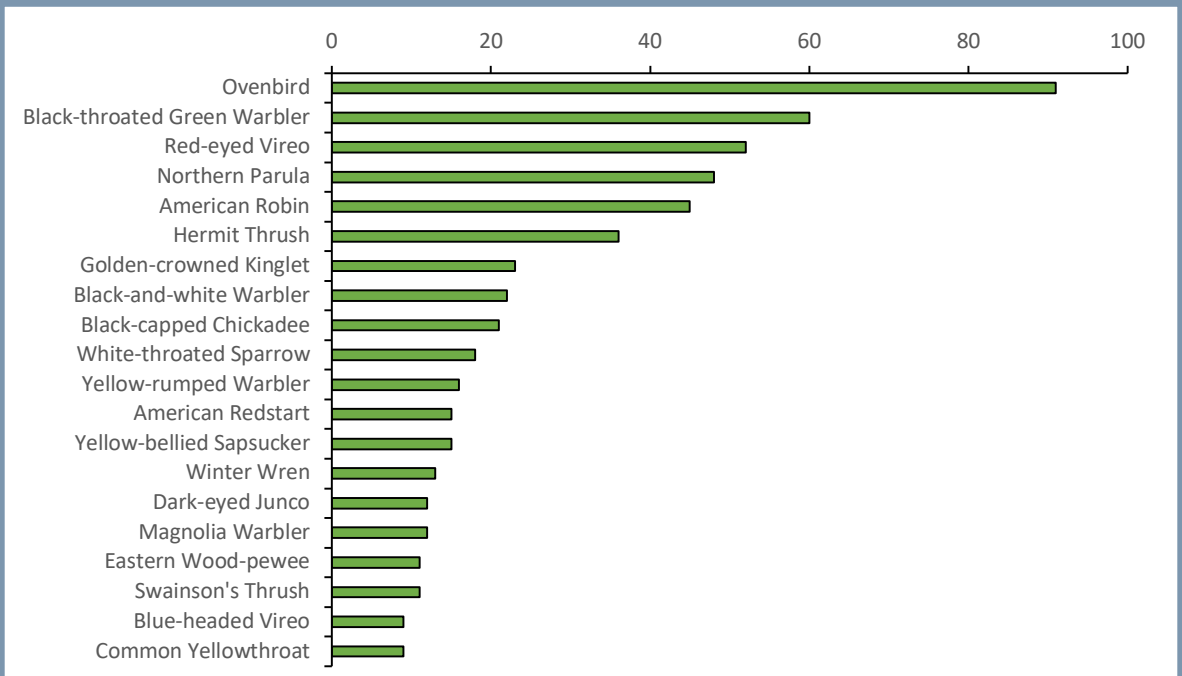
FFW has been working to better understand and protect forest birds and their habitats through increased survey effort (***see Section 4.1***), targeted land securement (***see page 3.2***), and the PEI Forested Landscape Priority Place for Species at Risk initiative (***see Section 4.2***). In 2020, FFW initiated its own forest bird survey, which targets songbirds and woodpeckers, species with territorial males that can be identified by sound. During the initial season, FFW staff conducted surveys at 48 survey stations in forested landscapes and recorded 635 detections of forest songbirds and woodpeckers. ***Table 2-6*** lists species with more sensitive status rankings, and ***Figure 2-20*** highlights the top 20 species detected during FFW surveys.

Table 2-6. *Species of Conservation Concern Observed During Forest Bird Surveys in 2020.*

Common Name	Number of Detections	Provincial Status
Black-backed woodpecker	1	S1
Canada warbler	2	S2
Rose-breasted grosbeak	2	S2
Olive-sided flycatcher	1	S2
Eastern wood-pewee	11	S3
Ruby-crowned kinglet	6	S3
Cape May warbler	3	S3
Northern waterthrush	3	S3
Yellow-bellied flycatcher	2	S3

Figure 2-20.

Top 20 Bird Species Detected with Total Detections of Territorial Singing Males During 2020 Forest Bird Surveys on PEI.



Great Horned Owl

(III) Birds of Prey (Raptors and Owls)

Birds of prey include raptors (e.g., osprey, harrier, eagles, hawks, falcons, and vultures) and owls. These species often take the role as apex predators within their respective ecological communities. Most birds of prey on PEI utilize either forested or open terrestrial landscapes for breeding and/or foraging.

As a group, birds of prey have rebounded 110% since 1970[16]. Species like bald eagle, red-tailed hawk, osprey, and northern harrier are commonly observed across PEI. Fifteen species of raptors and owls are known to, or potentially, breed on PEI (***Table 2-6***). Recent evidence of breeding behavior for peregrine falcon and broad-winged hawk (successful nest attempts) may prompt rank updates for these species in the future if the trend continues.

Merlin

Red-tailed Hawk

Table 2-6. *Status of Breeding Raptors and Owls of PEI.*

Common Name	Provincial Status
Broad-winged hawk	S1
Short-eared owl	S1
Long-eared owl	S1
Northern goshawk	S4
Sharp-shinned hawk	S4
Red-tailed hawk	S4
Northern harrier	S4
Merlin	S4
American kestrel	S4
Northern saw-whet owl	S4
Great Horned owl	S4
Bald eagle	S5
Osprey	S5
Barred owl	S5
Peregrine falcon	SU*

An exception to these increases is northern saw-whet owl, which has experienced a range-wide decline in observations of almost 50% since 2012[17]. This small owl species breeds in PEI forests and takes a short migration to the northern United States for the winter.

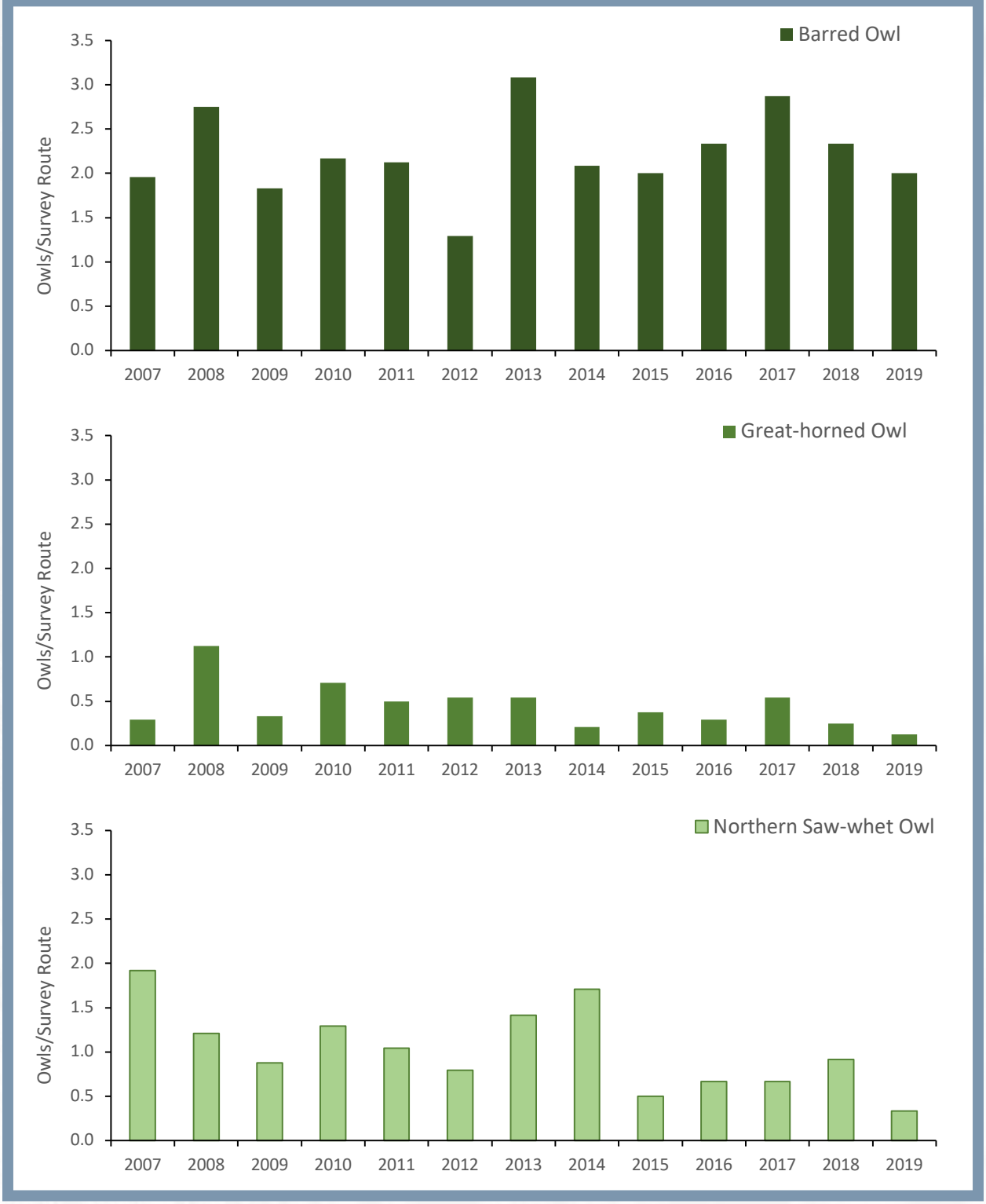
Since 2001, dedicated volunteers and FFW staff have assisted Birds Canada in conducting nocturnal forest owl surveys (***see Section 4.1.2.2***) to develop an index of owl abundance. Owl responses to playback of forest owl calls have fluctuated from year to year, but appear to be trending upward for barred owl, and downward for great-horned and northern saw-whet owl (***Figure 2-21***).

Northern Saw-whet owl

Peregrine falcon

Figure 2-21.

Owl Detections Per Survey Route for Barred Owl (top), Northern Saw-whet Owl (middle), and Great-horned Owl (bottom) Between 2007 and 2019 (No Surveys Conducted in 2020).



Virginia rail

(IV) Marsh Birds

Waterbird numbers have experienced moderate growth in Canada due largely to wetland conservation efforts[15]. Four species of marsh birds were ranked for PEI (***see Table 2-7***).

Marsh bird species can be difficult to monitor, especially secretive birds like rails and bitterns, making acquisition of reliable data difficult. Marsh birds were surveyed annually via the Maritime Marsh Monitoring Program (MMMP)[49] between 2012-2018 at a few select wetland sites across PEI (***see Table 2-7*** for counts of observations). Virginia rail was the least observed during MMMP surveys, which is not surprising given its natural breeding range.

All species listed in ***Table 2-7*** rely on grassy marshlands with an open water component - features typically observed in many of our beaver meadows. These types of wetlands are typically difficult to access, so many wetlands are not surveyed. With the continued use of remote acoustic recorders FFW hopes to survey these harder-to-reach areas to gauge presence of these species.

Table 2-7. *Statuses and Number of Observations of PEI Marsh Birds.*

Common Name	Provincial Status	Observations 2012-2018
Virginia rail	S2	9
Pied-billed grebe	S4	96
American bittern	S4	21
Sora	S5	51

Great Blue Heron

(V) Colonial Waterbirds

Offshore islands and coastlines on PEI house several colonies of double-crested and great cormorants, as well as great blue herons, and common terns statuses provided in (***Table 2-8***). These colonies, though sometimes difficult to reach, can be reliably surveyed via nest counts.

Due to noticeable changes in colony sizes in the 1980s, FFW has been surveying cormorant colonies for decades. Great cormorants are surveyed annually, as resources allow, and double-crested cormorants every five years. Over the last few decades, double-crested cormorants have been steadily increasing while great cormorants steadily decreasing. Based on results from colony nest counts since 2007, great cormorant numbers remain at all-time lows (peak nest count was ~1500 nests in 1988), but may have stabilized (***Figure 2-22***); and double-crested cormorants have dropped in recent years after peaking at almost 15,000 nests in 2009 (***Figure 2-23***).

Dedicated surveys for great blue heron and common tern are planned in the future. Breeding evidence for Arctic tern is lacking and it is assumed they do not use PEI to breed, though they can be observed during post- and pre-breeding periods.

Table 2-8. *Statuses of Colonial Nesting Waterbirds on PEI.*

Common Name	Provincial Status
Great Cormorant	S1
Common Tern	S1
Arctic Tern	S1
Great Blue Heron	S4
Double-crested Cormorant	S5

Figure 2-22.
Total Double-Crested Cormorant Nest Counts Between 2007 and 2019
*(*Surveys Not Conducted in 2012, 2013, 2015, 2017).*

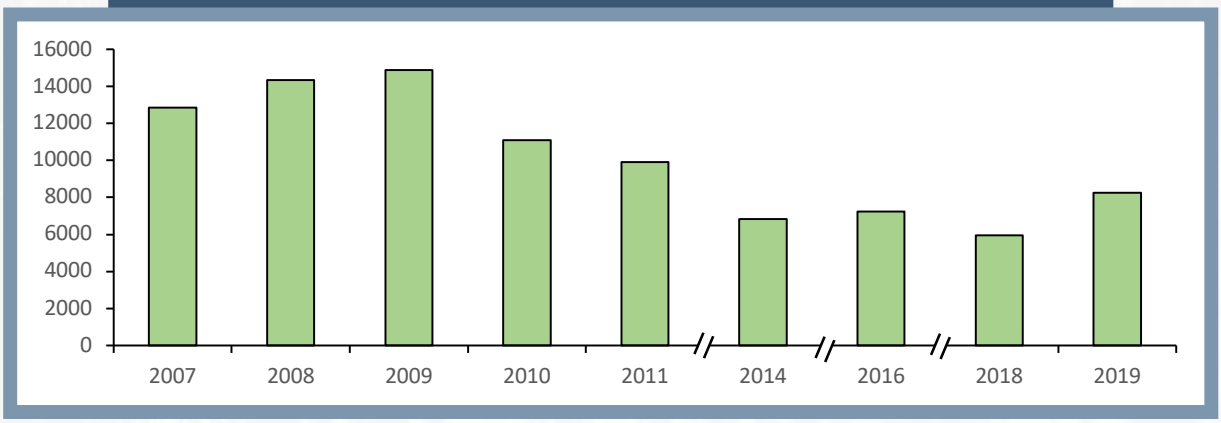
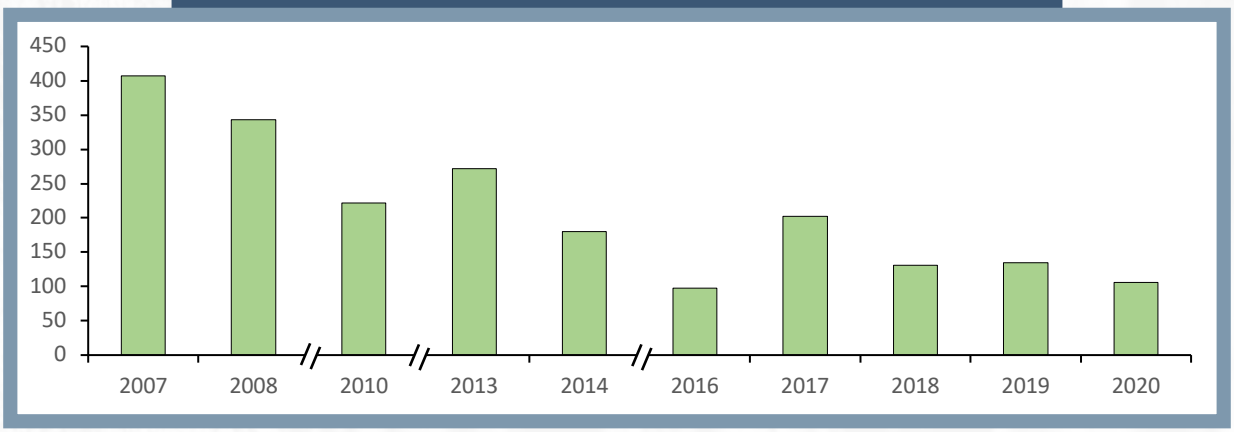


Figure 2-23.
Total Great Cormorant Nest Counts Between 2007 and 2020
*(*surveys not conducted in 2009, 2011, 2012, and 2015).*



2.3.5 Fish

(I) Brook Trout

The brook trout is PEI's most prolific freshwater sport fish and is found in streams and ponds across the Island. PEI streams are short and flow through rich estuaries and bays before reaching salt water. The combination of mineral-rich groundwater and nutrients originating from agricultural land have created ideal conditions for brook trout. An abundance of groundwater discharging from springs at ~7C throughout the year helps to maintain good stream flows in summer and keeps most streams relatively cool, even in warm summer weather. Elevated summer water temperatures can occur in slow flowing streams in areas of low relief or where rivers are highly impounded.

The anadromous or sea-run brook trout grow quite large on a rich diet in estuaries and bays, reaching sizes up to 3 kg (7 lbs). Their size and flavorful orange-coloured flesh make them a prized sport fish and anglers focus on coastal and estuarine areas early in the fishing season.

FFW, with the assistance of watershed groups, monitors juvenile salmonid abundance at a limited number of index sites. Many watershed organizations are now carrying out their own fish population surveys. The brook trout densities from four of these index sites from 2008-2020 are shown in ***Figure 2-24***. While density can fluctuate from year to year, these long-term data sets can show trends and allow general comparisons. Some sites show more variability than others, for example the Howells Brook site on West River. Brook trout density in the Cranes site on Morell River is lower than the other index sites but has remained consistent. It should be noted that these sites were selected to monitor juvenile Atlantic salmon so brook trout densities may be lower than expected at other locations.

Figure 2-24

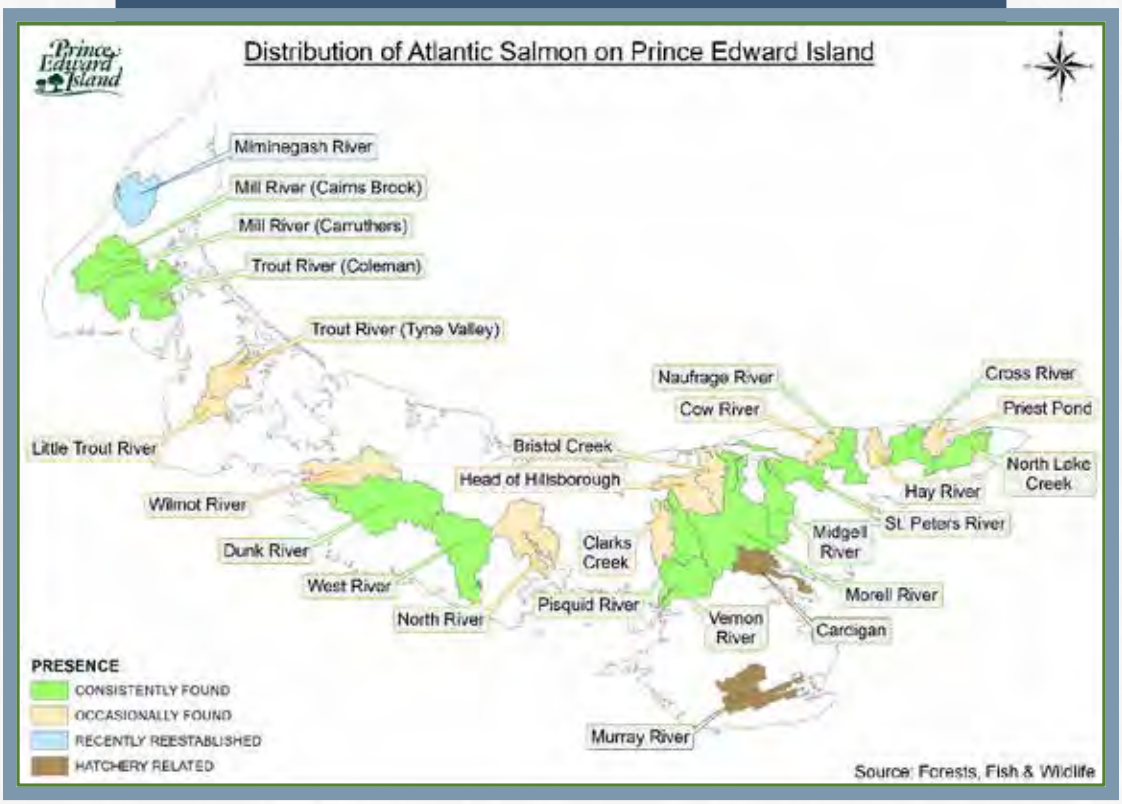
Number of Brook Trout Per 100m2 from One Index Site on the Mill River (Howlan), Little Trout River (Richmond), West River (Howells Brook), and Morell River (Cranes) from 2008 to 2020.

(Note: Mill and Morell Rivers were not surveyed in 2011, 2012, 2013 and 2019. Little Trout River was not surveyed in 2012, 2013 and 2019 and West River was not surveyed in 2009. Some of the West River data were provided by the Central Queens Wildlife Federation).

(II) Atlantic Salmon

Atlantic salmon has been called the "King of Fish" because of its strong, silvery body and epic journey between freshwater and saltwater to complete its life cycle. Atlantic salmon were historically present in approximately 70 rivers in PEI. Some rivers have shown consistent presence of Atlantic salmon but populations in others are more variable (***Figure 2-25***). Salmon in two rivers, Murray and Cardigan, are believed to be derived from salmon which have escaped from private aquaculture operations. A province-wide survey conducted in 2019 found 17 rivers with juvenile Atlantic salmon but depending on the year, as many as 26 have been recorded. It is difficult to pinpoint the number of rivers with Atlantic salmon in any given year due to sporadic sampling and variability in numbers, especially when population levels are severely depressed and year classes of juvenile salmon are missing. Electrofishing surveys are currently used to locate juvenile salmon in PEI streams. However, new technologies, such as Environmental DNA (eDNA) are becoming useful tools in monitoring populations that are rare or endangered.

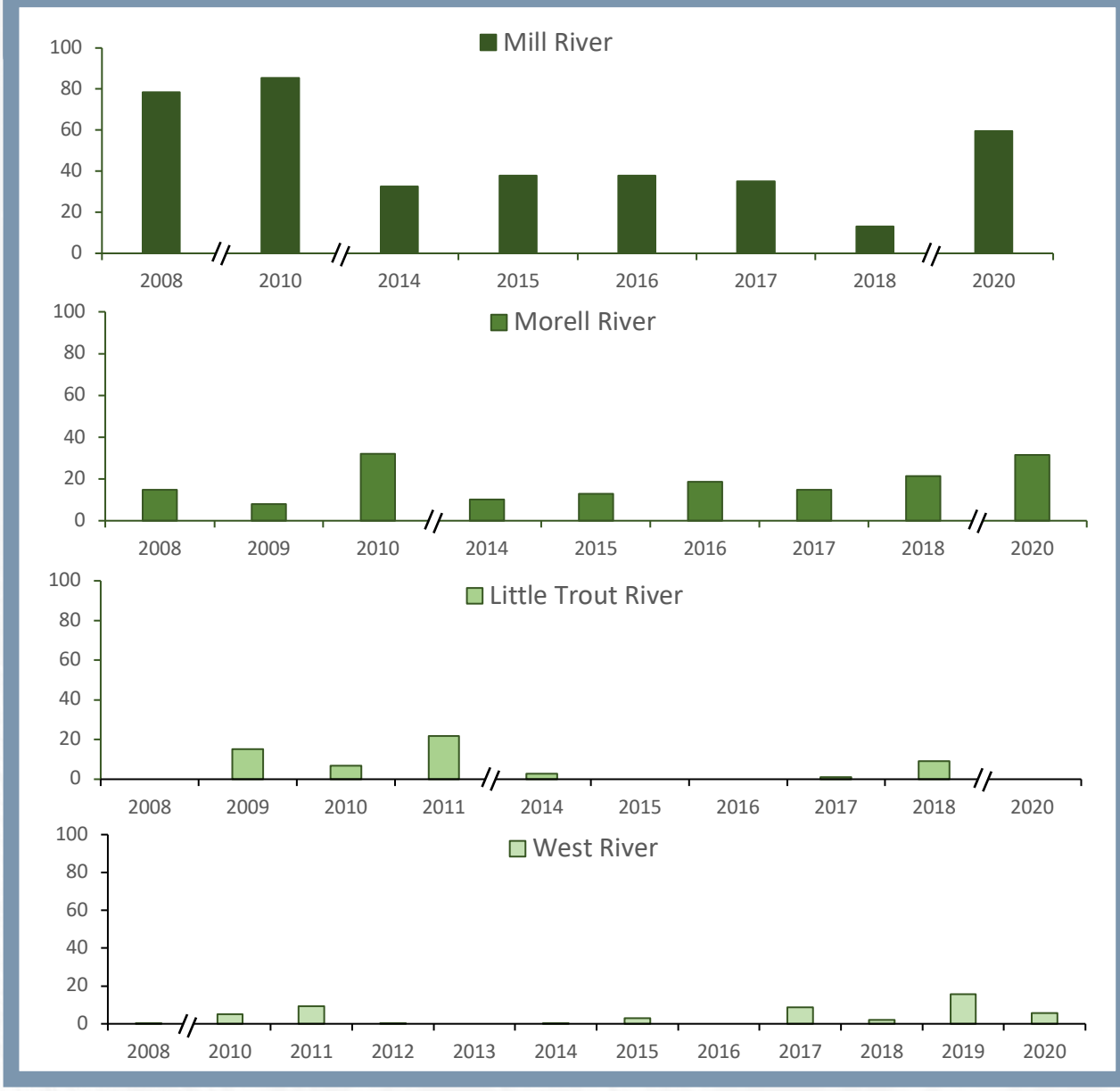
Figure 2-25.
Distribution of Atlantic Salmon on PEI.



The Province monitors juvenile salmon densities at four index sites (***Figure 2-26***). The Mill River site on Carruthers Brook in Howlan has consistently had the highest densities of juvenile salmon. Juvenile densities in West River and Little Trout River are more sporadic and indicative of low populations.

Figure 2-26

Number of Atlantic Salmon Per 100m2 (y-axis) from One Index Site on the Mill River, Little Trout River, West River and Morell River from 2008-2010.

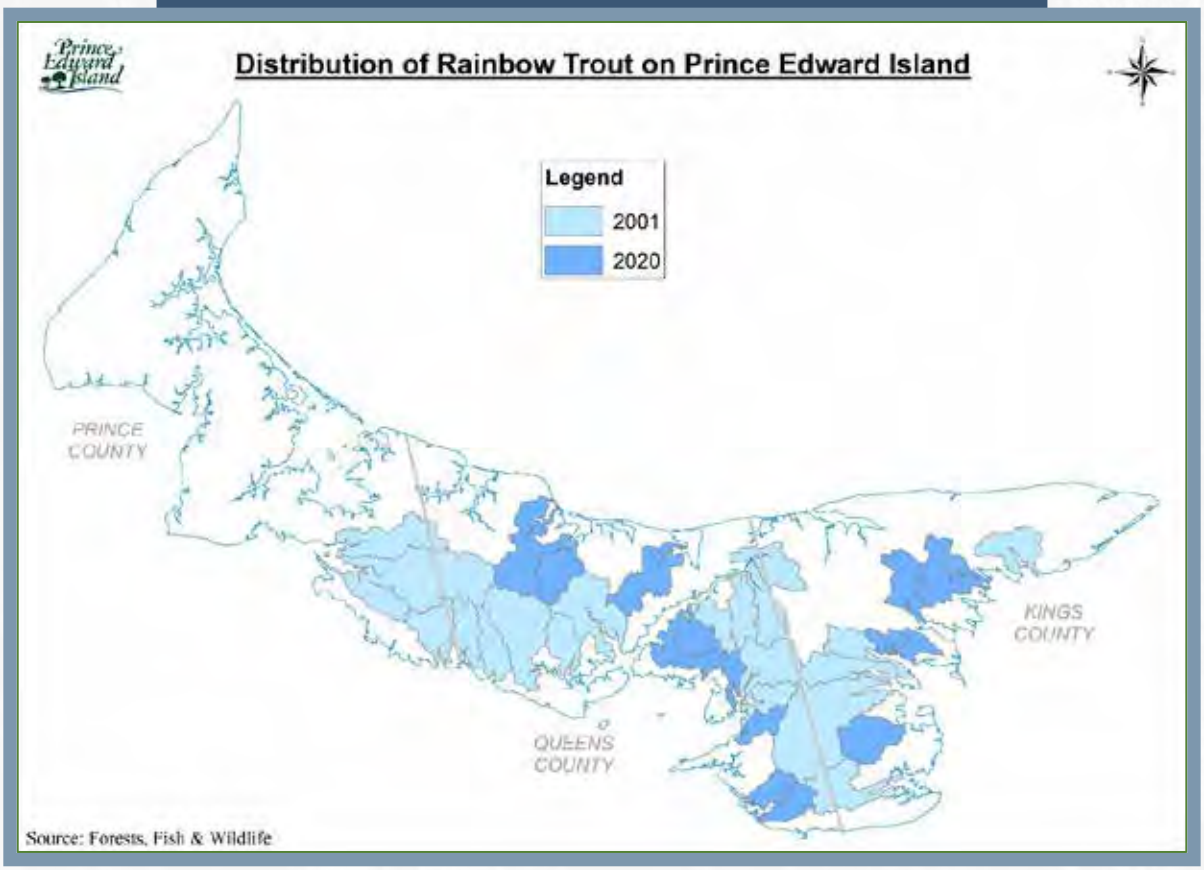


(Note: Mill and Morell Rivers were not surveyed in 2011, 2012, 2013 and 2019. Little Trout River was not surveyed in 2012, 2013 and 2019 and West River was not surveyed in 2009. Some of the West River data were provided by the Central Queens Wildlife Federation.)

(III) Rainbow Trout

Rainbow trout have been present in Prince Edward Island since the early 1900s. They were brought to PEI from the west coast for food and sport and are currently found in over 30 rivers primarily in the central and southeastern parts of PEI. There has been an increase in rainbow trout presence and abundance in the past 20 years with an additional eight watershed containing them in 2020 vs 2001 (***Figure 2-27***). Rainbow trout are moving from established watersheds to rivers nearby, but the most noticeable change is their more recent expansion along the north side of the Island. Rainbow trout are now routinely angled in the Winter River, after previously being established in the Wheatley River and Hunter River. There have been sporadic reports of rainbows seen in more northeastern rivers, for example Morell and North Lake.

Figure 2-27.
PEI Watersheds with Rainbow Trout, 2020 and 2021.



The anadromous form of rainbow trout, known as steelhead, can grow to as much as 4 kg (9 lbs) by feeding on the ample food supply in our enriched, productive estuaries. Large steelhead move upstream in the fall in preparation for spawning the following spring. The Province initiated an extended angling season for rainbow trout in 2010 and has slowly increased the number of rivers included and the length of the time available to fish. In 2020, 19 rivers were included, with some sections open to extended angling up to November 30. From 2013 to 2020, an average of 300 people registered each year. There is no additional cost for anglers to participate in this extended season, however they are expected to complete and return a logbook detailing angling activities and success at the end of each season. Anglers appreciate the extra time to fish and enjoy beautiful fall weather and feedback has been overwhelmingly positive.

(IV) Brown Trout

Brown trout are native to Europe, and like rainbow trout, were brought to North America in the early 1900s for recreational fishing or aquaculture purposes. While brown trout have become a popular sport fish in other Atlantic provinces, they are only seen occasionally in Prince Edward Island. There is no evidence to suggest brown trout are currently spawning in PEI and they are believed to be straying from nearby Nova Scotia rivers. However, angler reports of brown trout catches have been increasing, particularly along the south shore of the Island in central and southeastern rivers. There is a strong possibility that brown trout will eventually establish sustaining runs in PEI.

2.4 - Wildlife Illness, Disease, and Fish Mortality

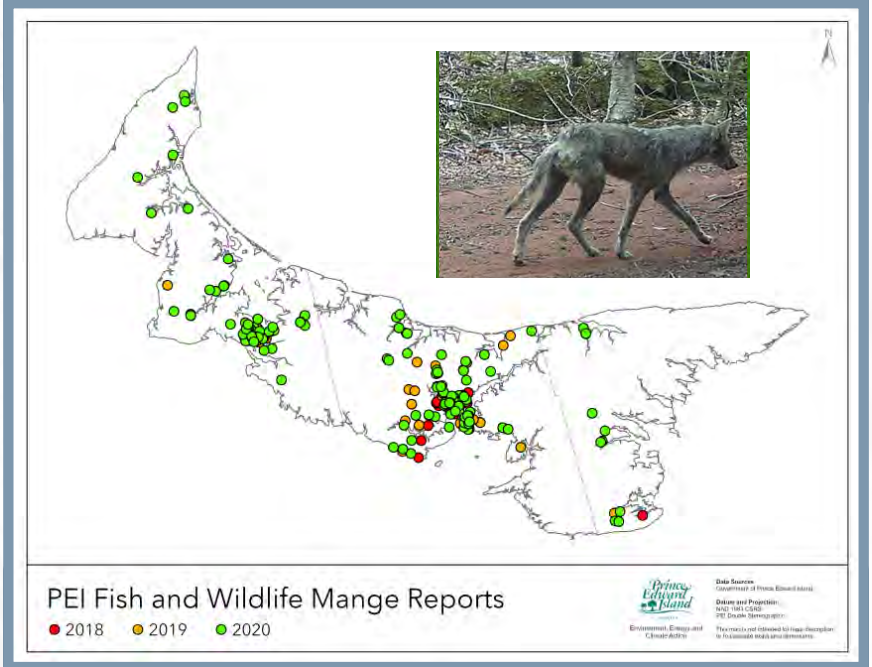
2.4.1 Wildlife Illness and Disease

(I) Mange

Sarcoptic mange is a common wildlife disease in North America that on PEI primarily affects red foxes and coyotes. Caused by an infestation of mites that burrow into the skin of the affected animal, the condition causes chronic scratching and accompanying hair loss and skin lesions, progressing to organ failure and death in severe cases. Mange was first diagnosed on PEI in the early 1990s in a cluster of coyotes in Kings County, with no subsequent cases until the fall of 2016 when an individual red fox was diagnosed in the Rocky Point area. An outbreak of mange has since spread across much of the province, with 67 diagnosed cases in red foxes and coyotes recorded in all areas except eastern Kings County, as of 2020 (***Figure 2-28***), with additional observations reported to FFW by Islanders. Sampling of foxes and coyotes harvested by hunters and trappers suggests a prevalence of roughly 9.6%, although this estimate is preliminary and not without bias.

Figure 2-28

PEI Fish and Wildlife Mange Reports 2018-2020



Forests, Fish and Wildlife has fielded over 280 calls related to sarcoptic mange between 2016-2020 and has maintained acommitment to intervene and humanely euthanize severely affected animals when practical and appropriate. Forests, Fish and Wildlife is also collaborating with and financially supporting the Canadian Wildlife Health Cooperative in active research around sarcoptic mange prevalence and transmission dynamics in wild canids of PEI.

FFW recognizes the prolonged suffering associated with the late stages of this disease and assesses each report for opportunities to intervene and humanely euthanize affected animals. Treatment is available that can assist recovery in individual animals but does not minimize the extent or duration of an outbreak. Treatment in wild animals is generally not supported and can in fact prolong an outbreak and prevent the population from developing an inherent resistance to the causative mites.

(II) White Nose

White-nose syndrome is caused by a fungal pathogen, *Pseudogymnoascus destructans* (Pd). Pd affects hibernating bats by making them more active than usual, so they burn more fat and quickly use up reserves needed to survive the winter. First appearing in North America at Albany, NY, Pd grows in cool, dark and damp places and can survive long periods of time in suitable environments as well as on different surfaces such as clothing or recreational gear and so can be moved through human activities. Bats can pick up the fungus from their environment or spread it from bat to bat when in close contact. Pd has resulted in the deaths of millions of bats in North America. On PEI the populations of little brown myotis and the Northern myotis have been dramatically reduced by Pd.

(III) Trichonomosis

Trichonomosis is an infectious disease caused by the microscopic protozoan *Trichomoniasis gallinae*, a bird parasite. This disease infects the upper digestive tract, as well as major organs like the liver and lungs. Transmission is known to occur where birds such as pigeons, doves, and finches congregate at feeding and watering sites. On PEI, the disease was first recorded in purple finches in 2008[51]. Since then, the disease has persisted on PEI and its spread may be caused by ingestion of infected bird seed at feeding stations[52].

(IV) West Nile Virus

West Nile Virus (WNV) is a mosquito-borne illness that is prevalent in wild birds like crows, jays, and ravens (i.e., corvids) as well as raptors and common passerines like American goldfinch. The illness impacts the central nervous system causing symptoms including loss of coordination and head tilting. On PEI, three cases of WNV in crows were recorded in 2018 and remain the only cases to date in the province.

(V) Newcastle's Disease

Newcastle's is a viral disease that can cause neurologic distress in colonial nesting birds. It is a CFIA reportable disease due to its potential to cause widespread mortality in poultry flocks. PEI's first diagnosed cases of Newcastle's disease occurred in double-crested cormorants in the fall of 2018. These animals were found within residential areas and presented with severe lethargy and classic head twisting suggesting neurologic disease. PEI features some relatively dense double-crested cormorant nesting colonies which could facilitate rapid transmission, but no further observed mortality suggests these were isolated occurrences.

(VI) Canine Distemper

Canine distemper, like rabies, is caused by a virus that affects the brain and causes neurologic symptoms including abnormal behavior, lethargy and/or aggressiveness in wild canines, mustelids (weasels, skunks, mink, otter) and raccoons. In other parts of North America distemper causes annual mortality events in furbearers, especially raccoons. On PEI however cases are more sporadic, and no cases were diagnosed between 2007-2020. Distemper remains a disease of low prevalence, but ongoing surveillance is required to detect wider scale impacts.

(VII) Saprolegnia

Wild fish are susceptible to a number of parasites and diseases. In the last few years, there have been increased reports of salmon and trout with skin infections. These infections begin as small round patches but can grow until the fish is almost completely covered in white, cream, or brown cotton-like growths on the skin and fins. While this may appear as a fungus, the infection is a cold-water mould most likely caused by Saprolegnia parasitica. These infections can lead to skin damage, poor health, or even mortalities. Our trout and salmon are particularly vulnerable to infection when they undergo physiological changes and mechanical damage associated with spawning. While this mould probably exists in all rivers, some areas, for example West River, appear to have a higher incidence of infection than others. FFW will continue to monitor the prevalence of Saprolegnia in PEI rivers in partnership with watershed groups and the Canadian Wildlife Health Cooperative at the Atlantic Veterinary College.

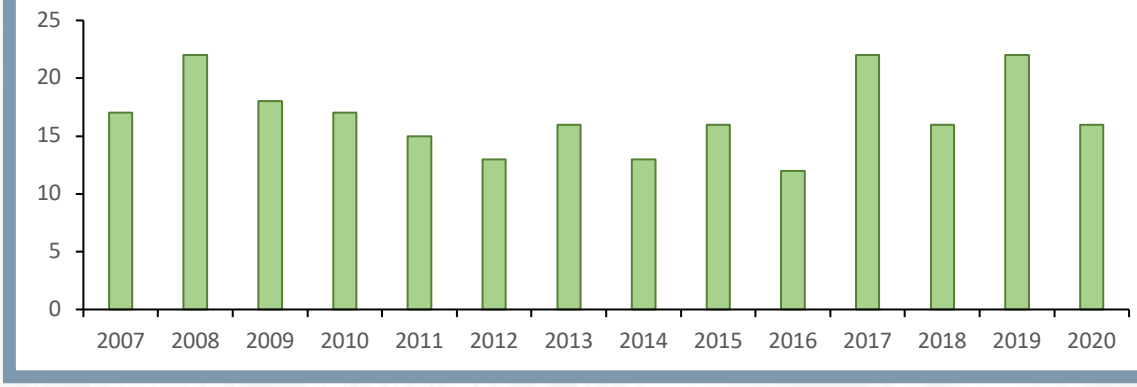
Flammulina Velutipes Mushrooms

2.4.2 Fish Mortality Events

Fish kills occur each year in freshwater and coastal environments. Some of these events are related to natural mortality while others are caused by human activity. An example of natural mortality occurs in spring, when large numbers of smelt and gaspereau enter freshwater streams to spawn. Inevitably, some of the weaker fish will not survive the stresses of spawning and hundreds of dead fish can be seen on the stream bottom, particularly below obstructions such as beaver dams, bridges and culverts. Another type of natural mortality event is related to anoxia, a lack of oxygen in water at certain times of the year. For example, a coastal pond with heavy snow and ice cover can have pockets of anoxic water that can mix throughout the water column when ice melts.

Many Islanders and visitors are familiar with anoxic conditions in estuaries and bays (**see inset**). Lime-green or white colored water and a foul rotten egg odor make these events easily recognizable. Nitrate originating from agricultural land, golf courses or leaching from septic systems can lead to over-enrichment and increased growth of phytoplankton and algae, particularly sea lettuce. Their death and decomposition cause oxygen levels to diminish. In more severe cases, this lack of oxygen can lead to the death of fish, shellfish, and invertebrates. Approximately 10-20 anoxic estuaries are recorded each year (***Figure 2-29***), with some recurring annually. The provincial Department of Environment, Energy and Climate Action monitors several estuaries, employing continuous reading oxygen loggers to track dissolved oxygen concentration. The Department also relies on reports from the public, watershed groups, researchers, and other government staff to maintain an annual list of water bodies experiencing anoxia.

Figure 2-29.
Total Number of Estuaries Experiencing Anoxic Events Per Year Since 2007.



Fish kills on PEI can also result from pollution and a principle contaminant in freshwater is pesticides. From 2008-2020, 16 fish kills in freshwater were reported, of which 11 have been attributed to pesticide run-off. One fish kill in 2020 occurred after manure entered a stream from a broken pipe. It can be difficult to prove definitively that pesticides have killed fish because of the delay between when the fish died and when the kill was reported and investigated. The insecticide azinphos-methyl was implicated in a spate of fish kills in PEI in the late 1990s and early 2000s. Since that time, regulations surrounding the use of azinphos-methyl, including a 2002 ban on its use in fields that border waterways, have reduced the negative impacts of this product on the aquatic environment. In recent years, the fungicide chlorothalonil is found most often during fish kill investigations. Chlorothalonil was implicated in 10 of the 15 pesticide-related fish kills in PEI between 2008 and 2020.

Brook Trout

3.0 - State of Wildlife Habitat

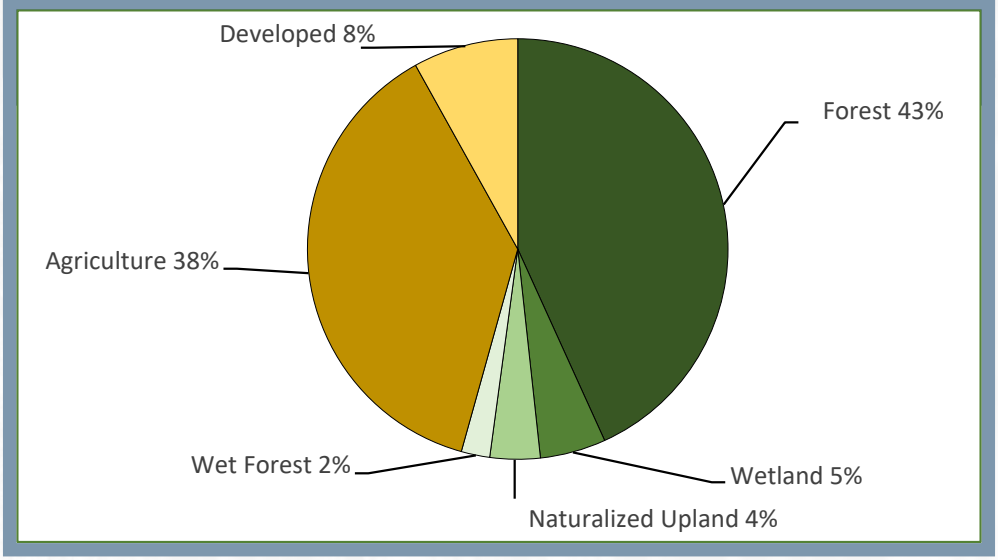
3.1 - Land Use and Wildlife Habitat

In the 1700s, PEI's landscape consisted almost entirely of forests, wetlands, and sand dunes. By 1900, only 30% of the original forest remained and many wetlands had been converted or altered for agriculture. The current PEI landscape is vastly different now than from the past, with an obvious effect on the capacity of the landscape to support native species and biodiversity across the Island.

The 2020 State of Forest Report details and summarizes PEI land use patterns and statistics over the past 10 years. The various land use categories described both in that report and here, are based on the 2010 and 2020 Corporate Land Use Inventories (CLUI). The 2020 CLUI uses interpretation of high-resolution aerial photography, processed and analyzed by professional photo interpreters. The methods used in the 2020 CLUI follow those used for the 2010 CLUI. This report uses the same information but reflects more on how land use patterns may interact with wildlife habitat use.

3.1.1 Land Use and Habitat Change

Figure 3-1.
Percent of Landscape Cover Types on PEI.



Land use between 2010 and 2020 did not change dramatically. The amount of developed lands on PEI increased by less than 1%, whereas the amount of agricultural use on the landscape decreased by 0.18% (***Table 3-1***). The amount of forests and naturalized uplands decreased by 0.71% and 3.42%, respectfully. Combined, agriculture and developed lands (***see Appendix 3A***) make up 46% of land area on PEI (***Figure 3-1***).

Forests make up 43.2% of land area on PEI (***Table 3-1***); of this, 63% (27% of total land area – ***Appendix 3-B***) is classified as regenerative to young, and 37% (16% of total land area – ***Appendix 3-C***) is classified as old to mature. Regenerative forests can be highly productive in terms of biodiversity and for popular PEI game, however, the reduced quantity of mature forests has resulted in a change of mature forest bird communities. Surveying and monitoring of PEI's forest songbird community is ongoing, with a focus on interior mature forest species (***see Sections 2.3.4-II, and 4.1.2.1-III***). This ratio was approximately 58% to 42% in 2010, respectively.

Abandoned fields, pasture, grasslands, and shrublands make up a small proportion (4%) of total land area on PEI (***Figure 3-1***). These areas, as well as agricultural zones, are used by a variety of open country wildlife species including bobolink (a species at risk), northern harrier, Hungarian partridge, savannah sparrow, meadow vole, coyote, red fox, and even some nesting waterfowl.

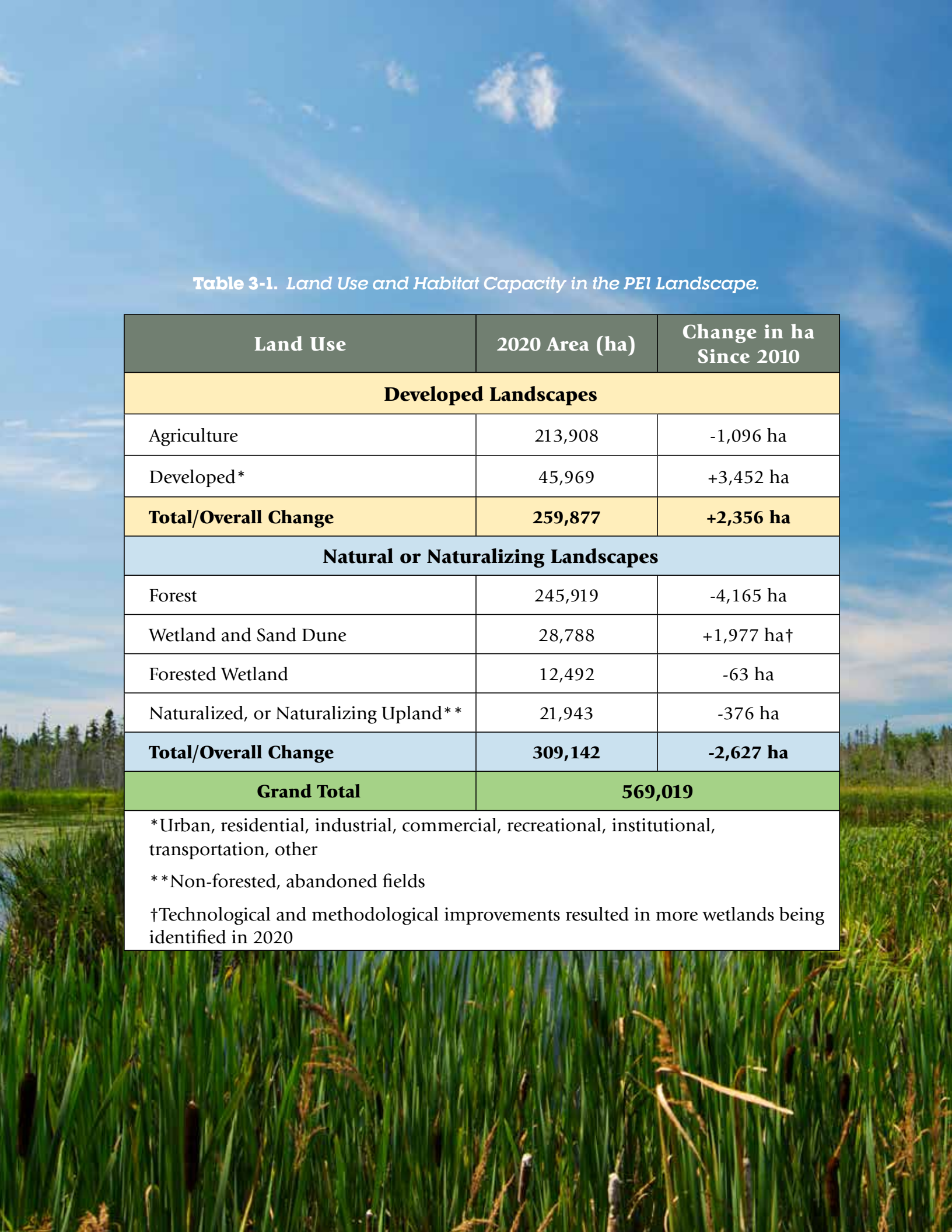


Table 3-1. *Land Use and Habitat Capacity in the PEI Landscape.*

Land Use	2020 Area (ha)	Change in ha Since 2010
Developed Landscapes		
Agriculture	213,908	-1,096 ha
Developed*	45,969	+3,452 ha
Total/Overall Change	**259,877**	**+2,356 ha**
Natural or Naturalizing Landscapes		
Forest	245,919	-4,165 ha
Wetland and Sand Dune	28,788	+1,977 ha†
Forested Wetland	12,492	-63 ha
Naturalized, or Naturalizing Upland**	21,943	-376 ha
Total/Overall Change	**309,142**	**-2,627 ha**
Grand Total	**569,019**	

*Urban, residential, industrial, commercial, recreational, institutional, transportation, other

**Non-forested, abandoned fields

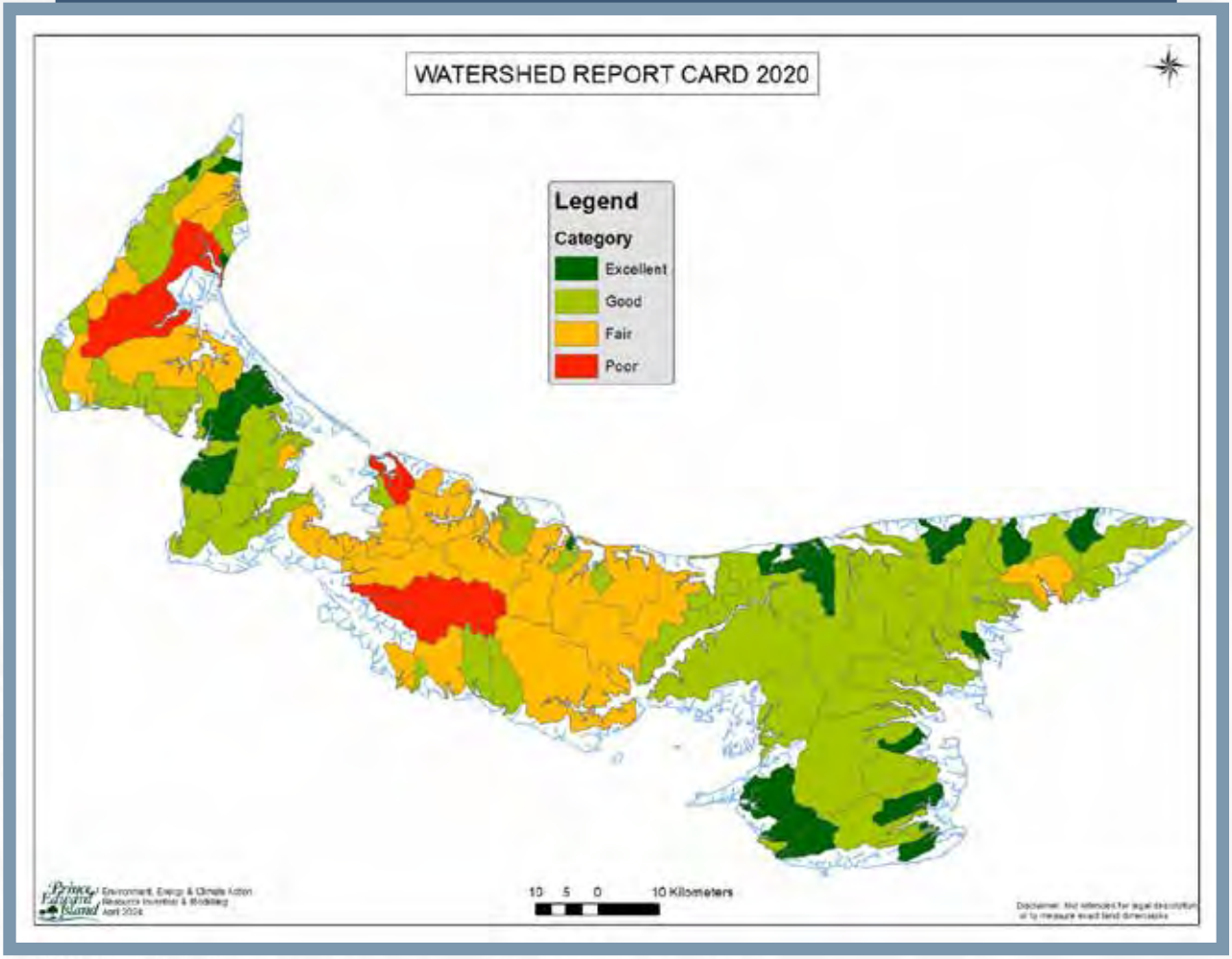
†Technological and methodological improvements resulted in more wetlands being identified in 2020

3.1.2 Watercourses and Wetlands

(I) Watercourses and Riparian Areas

There are more than 5135 km of stream and approximately 260 watersheds or drainage basins throughout the province (***see Appendix 3-D***). Due to PEI's small size and relatively flat topography, groundwater inputs account for a large proportion (65%) of source surface water. These cool groundwater inputs provide the ideal cold-water conditions for salmonid species such as brook trout and Atlantic salmon. Water quality and quantity in streams can be linked to land-use practice; watersheds in more forested parts of the province are typically healthier than those impacted by development, deforestation, and agriculture. ***Figure 3-3*** shows results of 2020 water quality report cards by watershed.

Figure 3-3.
2020 Water Quality Characterization Per Watershed Where Monitoring Occurs.



Streamside or riparian areas refer to the transition zones between aquatic and terrestrial systems. These areas are important connections between land and water, and enable a transmission of energy, nutrients and minerals between ecosystems[53]. Riparian areas can also act as important wildlife corridors, particularly in heavy-use landscapes. In many parts of the province, these ribbons of vegetation along rivers provide the only connections between blocks of forest.

In PEI, a 15m legislated buffer around watercourses and wetlands provides some protection to riparian areas. Altering habitat by building or repairing structures within this buffer is only allowed under authority of a permit from Department of Environment, Energy and Climate Action. Growing of crops within the buffer is also not permitted, in most cases.

(II) Stream Blockages and Fish Passage

Most PEI watercourses are impacted by public and private stream crossings and dams that have been built over the years for industrial, recreational, or aesthetic reasons. Given the dense network of roads on PEI, there are many culverts, bridges, and places where streams intersect roads that increase the potential for barriers to fish passage to all or some species of fish. In addition to human-made structures, natural dams (such as beaver dams, downed trees, or rooting) can also block fish passage. Barriers at head of tide are particularly influential to fish passage as the fish in these systems can lose habitat access to most of the river. Different fish species have different abilities to traverse and jump blockages; Atlantic salmon are known for their jumping ability, while smelt and gaspereau can only traverse low slope areas.

Identifying and addressing fish passage issues within watersheds is a focus for many Island watershed groups and is a topic of increased public awareness and expectation. Watershed groups work with government, other non-profit organizations, and funding programs to find solutions to get the fish moving. The PEI Department of Transportation and Infrastructure (DTI) routinely replaces old structures in lower parts of PEI watersheds with natural-bottom bridges that facilitate both upstream and downstream fish migration. That said, other public crossings are more difficult to remedy due to budgetary and site-specific logistical constraints. Private crossings have historically been problematic and difficult to fix, due to a combination of lack of awareness and financial constraints to the landowners. In recent years, progress has been made by providing increased funding, particularly to the agricultural community through agricultural stewardship programs.

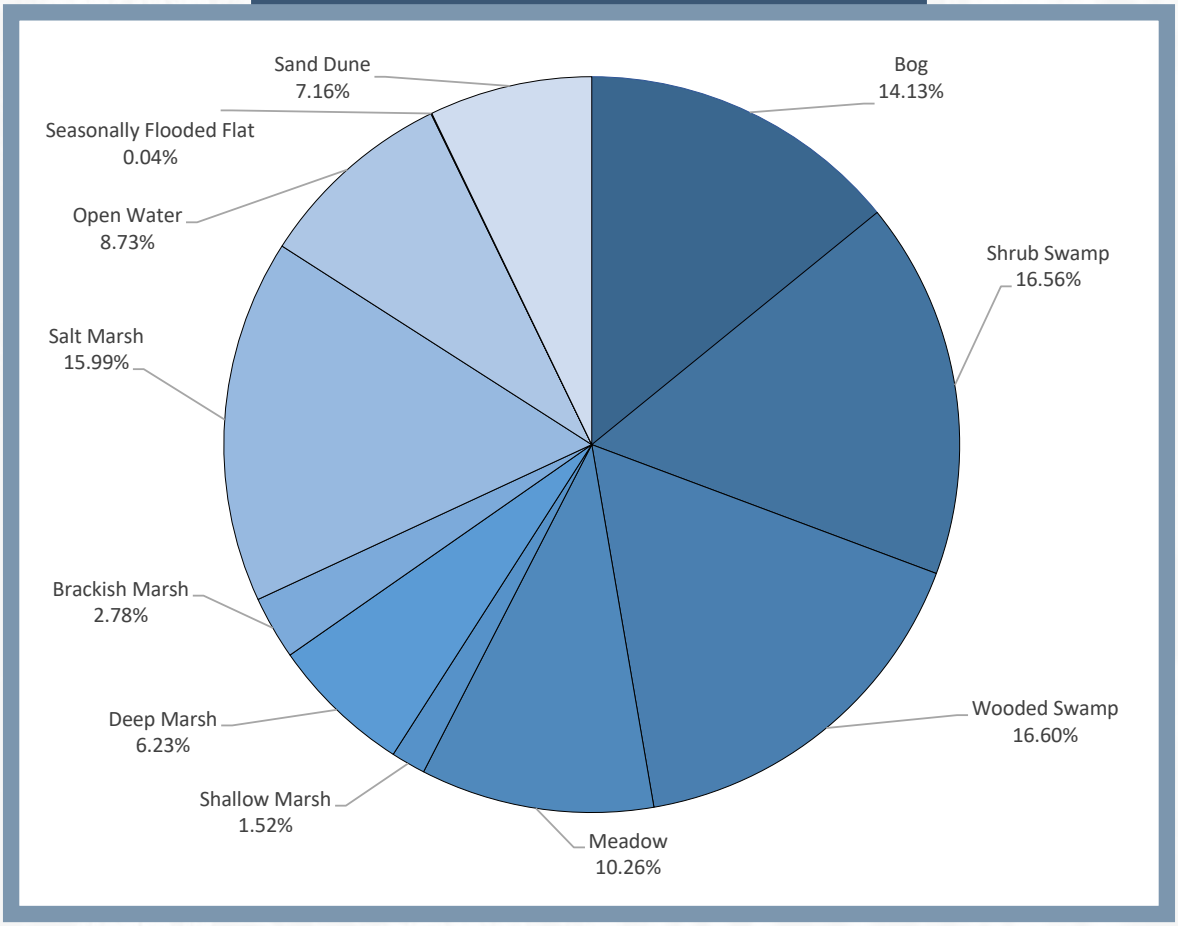
In recent years, groups including Ducks Unlimited Canada, some watershed organizations, DTI and FFW have partnered to construct more innovative fish passage at some of the many artificial impoundments in the province. These passages are constructed with rock lined channels simulating natural channels and can provide better upstream migration of smelts, alewife and gaspereau, in addition to trout and salmon. Examples include projects at Harmony Junction, Staverts Pond, McKennas Pond, MacCarricks Pond, Campbells Pond, Stordys (Sherrens/Stewarts) Pond, and MacLeans Pond.

(III) Wetlands

The 2020 CLUI reports an increase of approximately 1900 ha of wetlands since 2010. This increase is due to advancements of technology and improved methods of wetland delineation being used for wetland identification.

In the 2020 CLUI, 41,280 ha of the landscape were classified as wetlands (***Appendix 3-E***), 65% of that (26,851 ha) are freshwater wetlands that can be divided into seven classes (***Figure 3-4***). More than two thirds of freshwater wetlands in PEI are classified as either shrub or wooded swamp. These features are often overlooked as wetlands due to the presence of vegetation and lack of open water. They often are areas of relatively high biodiversity and many bird species rely on them like American woodcock, olive-sided flycatcher, northern waterthrush, and Canada warbler to name a few.

Figure 3-4.
2020 Wetland Area (ha) by Wetland Class.



(IV) Impoundments

Impoundments refer to blockage or damming of naturally flowing streams to create ponds for a variety of purposes. Pre-settlement PEI had few inland open water areas other than coastal barrier ponds (e.g., South Lake, Nail Pond, Deroche Pond), a few natural ponds (e.g., O'Keefe's Lake, Glennfinnan, Portage Lake) and scattered beaver ponds. During European settlement, rivers and streams were dammed to harness energy for mills to produce grist, lumber, textiles, generate hydro-electric power, and provide water for agricultural purposes. Currently there are 550 impoundments across PEI, about 25% are managed either by the Province or co-managed with Ducks Unlimited Canada or other conservation partners.

Impoundments can provide a variety of wetland habitat for invertebrates, birds, amphibians, and mammals but – if improperly managed – can block fish access to upstream spawning areas. Habitat types created by impoundments include open water wetland, grassy marsh, and riparian shrub cover.

(V) Salt and Brackish Marsh

In the 2020 CLUI, 7744 ha were classified as salt or brackish marsh wetland, an increase of approximately 700 ha since the 2010 CLUI. This increase is attributed to enhanced technology in detecting and assessing wetland conditions rather than net gain.

3.1.3 Invasive Species

Non-native invasive species can lead to localized loss of habitat. There is strong link between land use and the spread of invasive species. The fragmented nature of wildlife habitat on PEI is particularly vulnerable to invasive species due to increased edge habitat and associated high rates of disturbance. Changes in available light, wind speed, humidity, temperature, and soil moisture within a fragmented natural landscape can favor invasives over native species. In areas where the natural landscape is impacted by localized disturbances, invasive species such as Oriental bittersweet, giant hogweed, and Japanese knotweed can displace native species remaining in undisturbed patches. Basic descriptions of different invasive species groups and how they affect the PEI landscape are provided in ***Appendix 4***.

People can unknowingly spread invasive insects and diseases to new areas, allowing for establishment of new populations that can have negative effects on Island ecosystems and ecosystem processes/ services. Emerald ash borer and beech leaf-mining weevil are examples of invasive insects present in the Maritimes but not currently detected on PEI. These are species that can spread through importing wood products like raw timber or firewood.

Best practices for firewood use include:

- **Buy firewood where you intend to burn it or at the most conveniently located nearby location.**
- **Buy certified heat-treated (kiln-dried) firewood if you must travel with wood.**
- **Check with parks or campgrounds before you visit for their rules about firewood.**

To help prevent the spread of invasive insects on PEI, the PEI Invasive Species Council received funding for two firewood disposal bins at PEI's points of entry (Wood Islands and Borden-Carleton) to provide travelers entering PEI the opportunity to safely dispose of firewood from other jurisdictions. QR codes are present at each bin that allow the public to scan and access more information on the movement and use of firewood.

In 2017, a koi was captured in the Morell River and a year later, one was caught in the Tignish River. Goldfish have been found in some urban ponds, for example Deadman's Pond in Victoria Park. In 2020, goldfish were observed in a private pond in the headwaters of Black River in Queens County. There are many reasons why owners release goldfish and koi but the impacts on our aquatic ecosystem can be devastating. Goldfish are becoming a problem around the world, with the invasive fish competing for space and food with native species and disturbing aquatic habitats by tearing up aquatic plants for food and fouling the water. FFW works with local watershed groups to remove koi and goldfish when they are found.

3.2 - Land Acquisition and Management

Most land on PEI (roughly 90%) is privately owned, and so actively purchasing and protecting high value properties is an important conservation strategy. The Province purchased more than 475 hectares of wildlife habitat specifically for conservation between 2007-2020. These lands were secured through a combination of provincial funding, and federal support via the Canada Nature Fund of Environment and Climate Change Canada.

St. Charles Pond

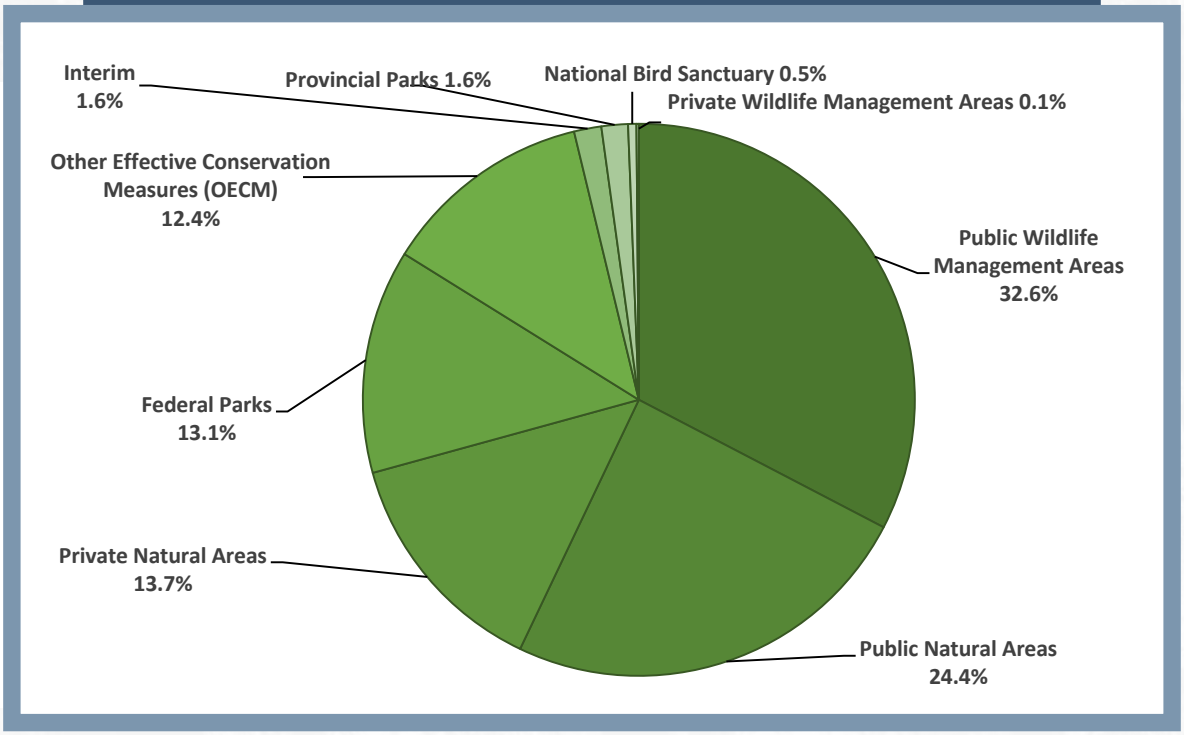
An example of the Province's land securement efforts is St. Charles Pond in Selkirk, Kings County. Previously a private property closed to public access, PID 181362 consists of a 200-hectare freshwater pond at the headwaters of the Fortune River with accompanying mature riparian softwood cover. The property is immediately adjacent to the Dingwells Mills Wildlife Management Area. A possible future FFW goal is to have the two properties appended to form the fourth largest protected area in the Province. Large, contiguous patches of low-lying mature softwoods provide habitat for a suite of species including the provincially rare Canada jay. Subsequent investments to improve access to the pond for waterfowl hunting, canoeing, trapping, and angling mean that the public will be able to explore and enjoy this important area for years to come.

3.2.1 Public and Protected Lands

The contributions of protected and conserved areas to climate change objectives, biodiversity conservation, and societal health have been increasingly recognized in the last decade. Both the provincial and federal governments have allocated significant resources to reach ambitious protected and conserved areas targets, 7% for PEI and 20% Canada-wide.

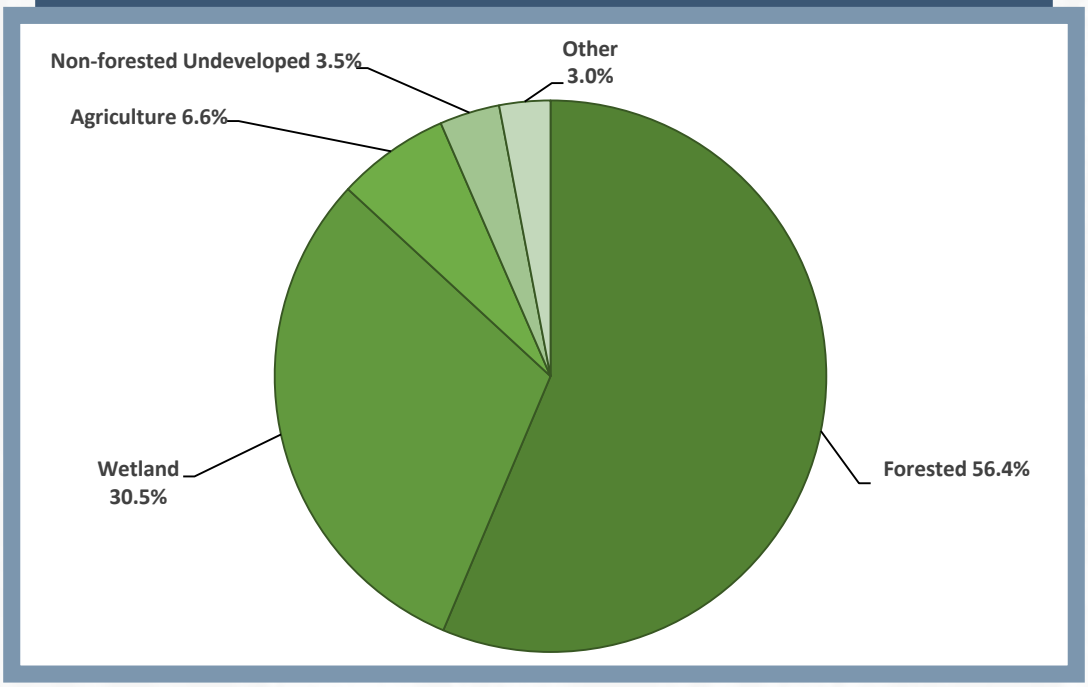
The PEI protected areas target of 7% has been recognized by government and conservation partners as a challenge to reach given PEI's developed landscape and high proportion of private land. Since the 2007 SOW Report, the Protected and Conserved Areas Network (PACN) on PEI has increased by over 50%, totaling 26,340 ha or 4.67% of the province. These include designated Natural Areas, Wildlife Management Areas, PEI National Park, and "Other Effective Conservation Measures" or OECMs (***Figure 3-5***). These areas are managed under a regime to conserve the biodiversity value of the local habitats.

Figure 3-5.
PEI's Protected and Conserved Areas Network by Category as of 2020.



Most of PEI's Protected and Conserved Areas Network (PCAN) is forested, with significant wetland components represented as well (***Figure 3-6***). Agriculture within the PCAN is limited and opportunities to retire and restore these areas to natural habitat will be explored. Non-forested areas present opportunities for passive or active restoration.

Figure 3-6.
PEI's Protected and Conserved Areas Network by Land Use, as of 2020.



4.0 - Fish and Wildlife Programs

4.1 - Wildlife Monitoring Framework

4.1.1 Overview

Healthy and sustainable wildlife populations are important to Islanders and are priorities for FFW. This is articulated in law and in policy. PEI's wildlife and habitats have intrinsic value and are key health indicators for the ecosystems in which Islanders live, work and play.

FFW has been monitoring wildlife populations directly and indirectly for decades. Many of the longer-term programs had their origin in game management. More contemporary programs have expanded the focus to include biodiversity, non-game species, and species of conservation or management interest.

Wildlife monitoring has historically been about cooperation and partnerships among provincial and federal biologists, environmental non-government organizations and community-based groups have been common, including several large citizen science projects. In recent years, more attention has been paid to drawing links among various species groups or connecting species information to ecosystems. For example, modern beaver wetland monitoring not only provides information on this species, it helps biologists understand the contributions these landscapes make to other species including amphibians, various bird groups, and bats (***see Section 4.1.2 - VI***).

4.1.2 Monitoring Initiatives

It is not possible to monitor everything. Capacity necessitates a Priority Species, Priority Habitat/ Ecosystems and Priority Threats approach where focus on key species or species groups within key habitats forms the basis of the monitoring framework. The framework aims to address what is practical and achievable, in order to be better able to contribute to future State of Wildlife reporting. ***Table 4-1*** lists several monitoring initiatives that are designed to provide information on the integrity of PEI ecosystems and inform policy or planning decisions aimed at maintaining native species and their habitats.

Table 4-1. *Survey and Monitoring Initiatives by FFW and Partners in Collaboration.*

Survey	Target Species/Group	Methodology	Start Date – Timeline/ Frequency	Measured Parameters
FFW – led Efforts				
Wildlife trail cameras	Furbearers, hare	Remote camera deployment	2020 - indefinite	Detections/ occupancy
Drum survey	Ruffed grouse	Roadside point count	2016 - annual	Drumming males per stop (abundance index)
Crowing pheasant survey	Ring-necked pheasant	Roadside point-count	2010 - 2020	Crowing males (abundance index)
Breeding bird survey	Forest songbirds	Off trail forest point counts	2020 - annual	Singing males (abundance index)
Winter waterfowl	Overwintering ducks	Station counts (ice free bridge overpasses)	1988 - biennial	Species presence, abundance
Colonial Bird Nest Counts	Cormorants, herons, terns	Physical counting of nests	1976 (cormorants) - annual	Active nests per colony
Beaver meadow biodiversity	Birds, bats, amphibians	Automated recording units	2019 – annual, temporary	Species presence, wetland biodiversity
Hunter harvest survey	Game and furbearers	Email, mobile phone	1971 annual/ intermittent, indefinite	Game and furbearer harvest
Collaborative Surveys				
North American Bat Monitoring Program (NABat)	Bats	Roadside and remote ultrasonic detection surveys	2020 - annual	Relative presence
Singing ground survey (USFWS)	American woodcock	Roadside point count	1968 - annual	Singing males (abundance index)
Atlantic Canada shorebird survey (CWS)	Migratory shorebirds	Site-specific counts	2020 -annual	Individuals
Atlantic forest owl survey (Birds Canada)	Forest owls	Roadside call-broadcast point count	2001 - annual	Responsive owls
Piping plover breeding site monitoring (INT, CWS)	Piping plover	Nest counts, productivity monitoring (support role)	2012 - annual	Piping plover nests, adults, young
Maritime breeding bird atlas (Birds Canada)	Local breeding birds	Roadside point-count	2006-2010	Breeding evidence
Brood Stock Collection (Abegweit Fish Hatchery)	Local salmonids	Electro-fishing	Federally-run since 1930s Provincially run since 1997	Quantity of brood stock collected
Fish abundance indexing	Brook trout and Atlantic salmon	Electro-fishing	Provincially run since 1997	Abundance index from repeated annual surveys

4.2 - Funding Programs

(I) WILDLIFE CONSERVATION FUND

The PEI Wildlife Conservation Fund (WCF) was created by the Province in 1998 using revenue generated from provincial hunting, angling, and trapping license sales. The Fund supports local conservation projects aimed at enhancing fish and wildlife habitat, supporting local research projects and inventory initiatives, and building a conservation ethic through education. Between 2007 and 2020, revenue from the WCF and licence plate sales exceeded $2,000,000 and supported hundreds of conservation projects throughout PEI (PEI Wildlife Conservation Fund [peiwcf.ca]).

(II) WATERSHED MANAGEMENT FUND

The Watershed Management Fund grew to $1.2 million annually in 2020 and supports the 25 community-based watershed groups under the PEI Watershed Alliance umbrella. Money is allocated to each group based on a formula considering area managed, performance measures, amount of non-provincial funds leveraged, and community involvement. Work of groups through this funding falls into the four main categories: watershed planning, habitat rehabilitation and enhancement, outreach and education, and research and monitoring.

Watershed groups are invested in working with stakeholders and their communities in finding and implementing solutions to local environmental issues including maintaining sustainable ecosystems with healthy populations of animals and plants. Money is also provided to the PEI Watershed Alliance to build watershed group capacity across the Island.

(III) PEI FORESTED LANDSCAPE PRIORITY PLACE FOR SPECIES AT RISK

The Province of PEI and Environment and Climate Change Canada have identified PEI's forested landscape as one of 11 Priority Places in Canada. Priority Places for Species at Risk are one way that federal and provincial governments are implementing the Pan-Canadian approach to transforming species at risk conservation in Canada. The identification of Priority Places is based on their significant biodiversity values, concentrations of species at risk, and opportunities to advance conservation efforts.

The PEI Forested Landscape Priority Place for Species at Risk (FLPP) brings together forested landscape interest groups, such as conservation groups, Indigenous communities and organizations, governments, forest practitioners, and woodlot owners to identify and act on opportunities to advance conservation of forest habitats and the species at risk they support.

WHY THE 'PEI FORESTED LANDSCAPE'?

The PEI forested landscape was identified as a Priority Place for Species at Risk because:

- **PEI's forest has a rich biodiversity, as many plant and animal species are near the northern or southern limits of their natural ranges.**
  - » **PEI forests are home to 13 Species at Risk that have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) & over 300 provincially rare species.**
- **Many strong partners work on forest conservation in PEI, therefore there were many opportunities to collaborate and complement existing work.**
- **Work to conserve forests will provide many co-benefits for ecosystem services and human health and well-being.**

Since 2019, FLPP core team members and partners have implemented projects aimed at improving conservation outcomes for the PEI forested landscape and species at risk. Projects supported through the FLPP have been identified to address key pressures or strategies identified by the core team and/or to directly conserve or improve the condition of forests in PEI and conservation outcomes for biodiversity and species at risk.

For more information on the PEI Forested Landscape Priority Place for Species at Risk program, including a list of projects that have been funded through the initiative visit the FLPP website.

PrinceEdwardIsland.ca/en/information/environment-energy-and-climate-action/pei-forested-landscape-priority-place-for-species

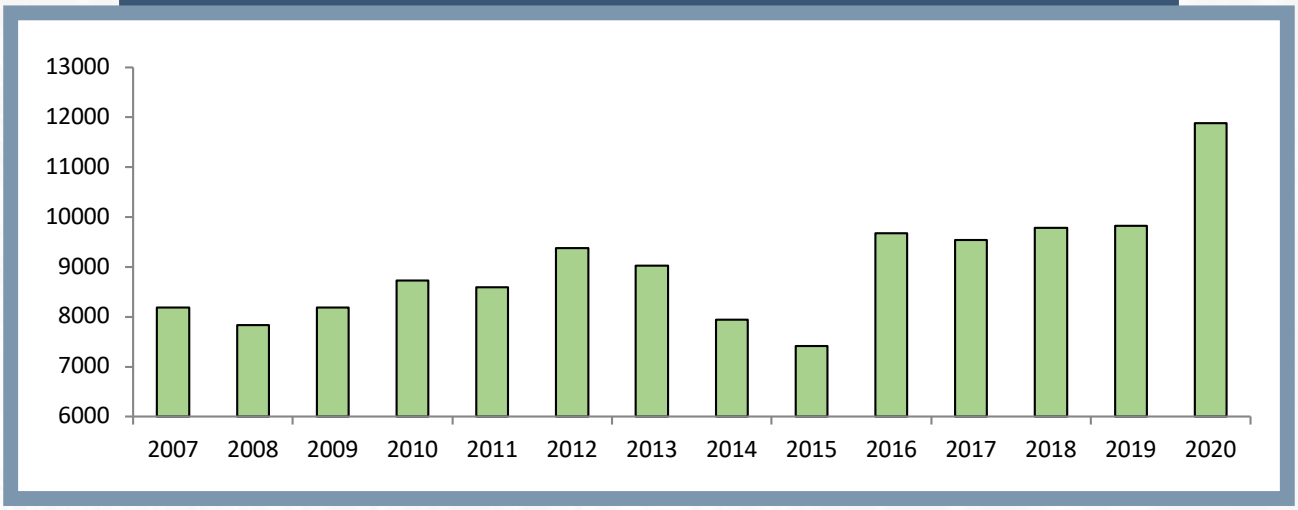
4.3 - Licenses and Permits

4.3.1 Angling

Angling license sales were lagging below historic levels until about 2016 but have increased since that time. There was a 52% increase in license sales between 2007 and 2020 (***Figure 4-1***). Several factors can influence license sales on a yearly basis. For example, most angling licenses are sold early in the season and many anglers only fish within the first two weeks. If weather conditions are unfavorable during this period, people may forego angling for the entire season. In 2014 and 2015, many estuaries, bays and ponds were covered in ice in April and anglers were unable to access their usual locations. The COVID-19 pandemic had the opposite effect on angling participation. Although COVID restrictions caused a two-week delay in the 2020 angling season, license sales, driven by strong online purchases, surged to levels not seen since the 1990s. Angling was considered a safe outdoor activity at a time when most organized activities were curtailed.

Figure 4-1.

Total Annual Number of Angling Licenses Sold between 2007 and 2020.



To maintain and increase angler numbers, it is important to provide a variety of fishing opportunities throughout the season. For example, the extended season for rainbow trout fishing continues to grow in popularity and has contributed to increased interest and participation in angling.

4.3.2 Hunting

A game hunting licence is required to hunt any game species on PEI (***see Section 2.3***). In 2011, the Furbearer Hunting License was introduced as a separate license to be able to hunt coyote, fox, and raccoon. The new license was added to allow FFW to better understand the number of people participating in this activity and to conduct surveys on furbearer harvest.

North America has seen declining participation in hunting since the 1980s, and the same trend is true on PEI. License sales have steadily dropped over the last three decades, from about 3500 in 1990 to less than 2000 in 2020. Between 2007 and 2020, the number of resident game licenses sold decreased by about 25% (***Figure 4-2***); furbearer license sales have remained relatively stable since the introduction in 2011. The two licenses are mutually exclusive, and many hunters will purchase both.

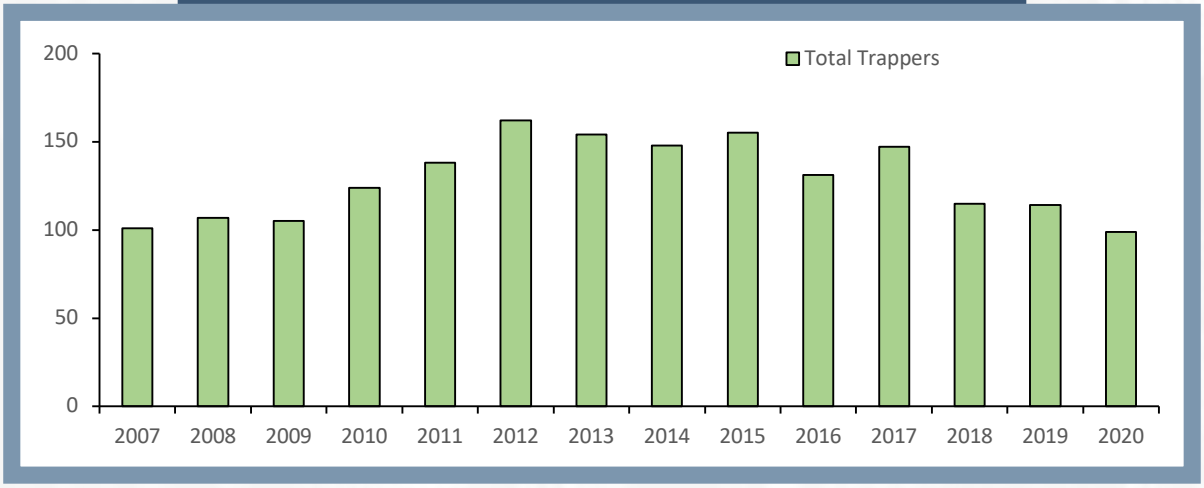
Figure 4-2.
Total Annual Number of Resident Game Licenses Sold between 2007 and 2020.

Furbearer licenses introduced in 2011

4.3.3 Fur Trapping

All fur trappers on PEI must purchase an annual Resident Fur Harvesting License. To be eligible to purchase a license, trappers must complete a mandatory two-day Trapper Education Course and have not had their privileges suspended since taking the course. Annual trapping licenses sold peaked at about 650 in the 1980s but – in step with fur markets – declined and stabilized at relatively low levels since about 1990. Between 2007 and 2020, the average number of licenses purchased annually was 128 (***Figure 4-3***) - an increase of 10% from the 10-year average prior to the reporting period. Phone surveys of fur harvesting license holders reveal that just 50-70% set traps on an annual basis.

Figure 4-3.
Annual Trapping Licenses Sold between 2007 and 2020.



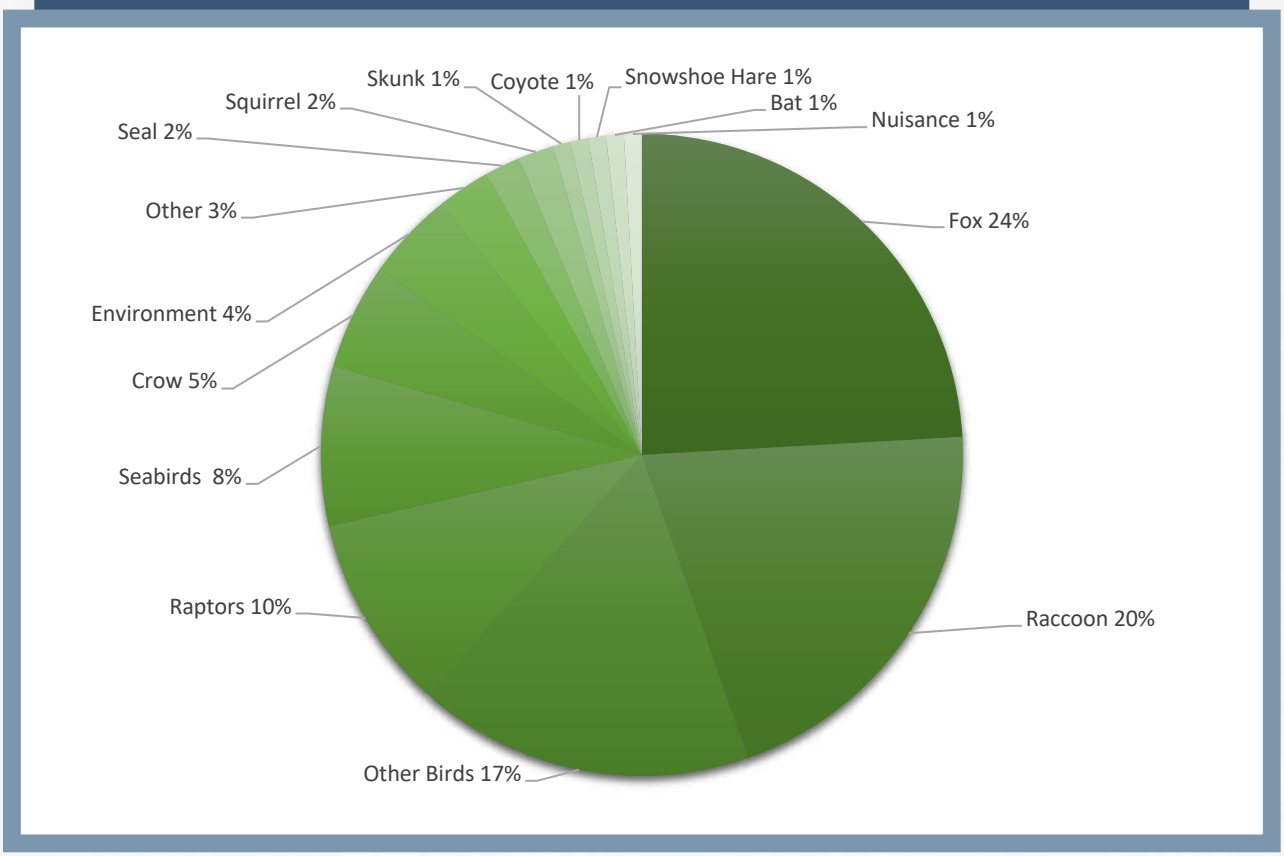
4.4 - Wildlife-Human Interactions

4.4.1 Human Interactions with Wildlife and the Wildlife Hotline

FFW receives and responds to hundreds of calls from the public regarding wildlife illness, injury, conflict and general inquiries. Wildlife are most active during the spring through fall breeding and rearing seasons and wildlife-human interactions tend to increase during these times. FFW maintains an after-hours wildlife response line from April to November to ensure that wildlife concerns can be addressed in an appropriate and timely fashion outside of regular office hours. Though the public may call the response line for any wildlife-related issue, not all wildlife-human interactions require direct or immediate intervention from FFW staff; education and advice are often enough to address callers' concerns.

In 2019, 110 calls were received on the FFW after-hours wildlife response line. Foxes, raccoons, and birds were the subject of most after hours calls (***Figure 4-4***). This is likely due to the high visibility of these animals, and their vulnerability during certain times of year (e.g. weaning or fledging in spring and early summer). The high number of fox calls is related to the increase in mange in and around urban areas on PEI.

Figure 4-4.
Proportional Distribution of After-hours Wildlife Response Line Call Topics in 2019.



4.5 - Education and Community Engagement

FFW places a high priority on education, including through community outreach and public events, activities, and programs. Throughout the year, staff participate in a wide variety of activities designed to increase residents' and non-residents' knowledge of Prince Edward Island's local wildlife species, habitats, policies, and interactions.

4.5.1 FFW Education Offerings

Firearm Safety, Hunter and Trapper Education

FFW is responsible for providing education to new hunters and offering the resources they need to help foster responsible, safe, and ethical members of the hunting community. This includes:

i. **Canadian Firearms Safety Course** (non-restricted and restricted) – in 2020, approximately 165 people attended the Firearms Safety Courses on Prince Edward Island.

ii. **PEI Hunter Safety Course** – since 2007, approximately 2700 people have taken the Hunter Education Course on Prince Edward Island.

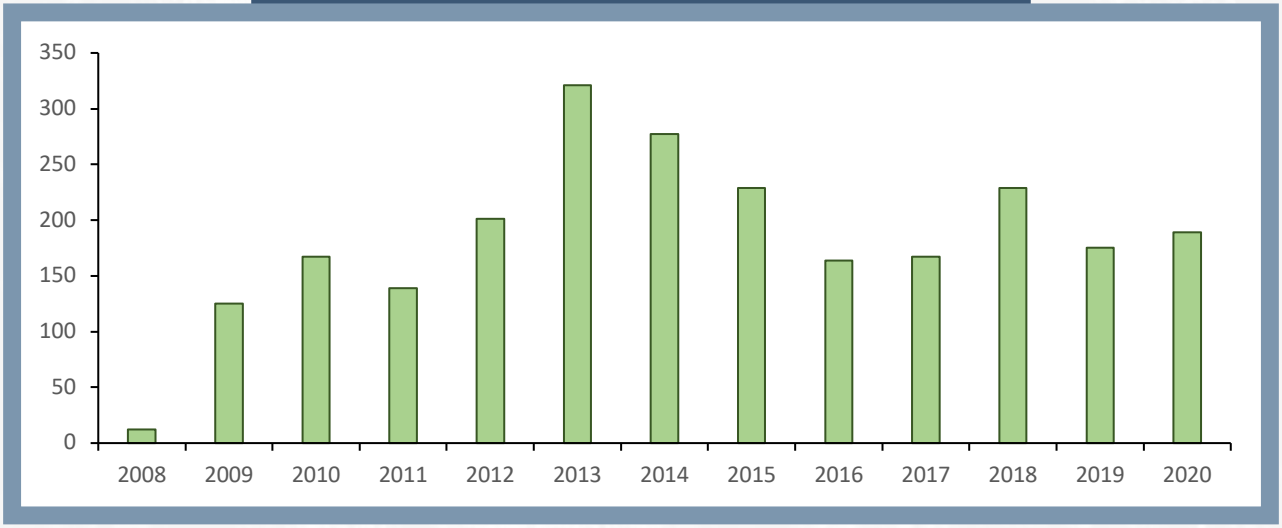
iii. **PEI New Hunters Workshop** – Each year 80-90 people participate in the annual Hunting Workshop.

iv. **PEI Trapper Education Course** – since 2008, 387 students have attended the Trapper Education Course on PEI.

Above: *participants and instructors from the 2022 Hunting Workshop. Every year FFW hosts a one-day hunting workshop for new hunters at the Charlottetown Trap and Skeet Club. During the workshop participants are offered a chance to complete their hunter safety course with certificate, practice shooting under the supervision of experienced shooters, gain guidance on map and compass use, be introduced to Conservation Officers, and learn about waterfowl hunting techniques.*

Hunter education certification is a two-step process: students must first complete an online course provided by the International Hunter Education Association, followed by an in-person practical session and test offered by FFW staff. Successful participants are given a Wildlife Card, which is a requirement in order to carry a firearm in wildlife habitat. ***Figure 4-5*** shows the number of hunters in PEI that have passed through the system.

Figure 4-5.
Number of New Certified Hunters per Year Since 2008.



4.5.2 Community Engagement

Community outreach and education is invaluable in promoting understanding of the relationship between conservation and consumptive and non-consumptive recreational activities. In 2020, FFW participated in outreach initiatives including, but not limited to:

i. **PEI Envirothon –** this science-based, international (North America) competition for high school students boasted nine teams from Island schools, averaging 45 students and approximately 15 volunteers annually.

ii. **School Visits** – FFW staff make frequent school visits throughout the year on request to inform students on wildlife biology and conservation.

iii. **Winter Woodlot Tour** – FFW staff participate in the Winter Woodlot Tour each winter to engage with visitors and provide information on fish and wildlife matters.

4.6 Provincial Partners in Habitat Conservation and Stewardship

FFW partners with several organizations on PEI to promote wildlife habitat conservation and stewardship (***Table 4-2***).

Table 4-2. *Provincial Partners in Habitat Conservation and Stewardship on PEI.*

Partner	Mandate	Accomplishments
Abegweit Biodiversity Fish Hatchery	To produce a minimum of 50,000 Atlantic salmon fry, 40,000 brook trout fingerlings and 4,000 yearling brook trout annually.	In 2012, PEI's only hatchery supplying brook trout and Atlantic salmon for stocking announced that it could no longer produce the fish at its private facility. To fill that void, the Abegweit First Nation constructed a small hatchery in Scotchfort. In 2013, the Abegweit Biodiversity Enhancement Hatchery was officially opened. The hatchery is operated by the Abegweit Conservation Society, an arm of the Abegweit First Nation. It is under contract with the Province to produce a minimum of Atlantic salmon fry, brook trout fingerlings and yearling brook trout annually. Hatchery staff, FFW staff and several watershed groups work together to collect brood stock to stock the offspring each year. The Conservation Society also oversees the Plamu'k na Kitapina'q (Fish Friends) program in over 20 PEI schools. During this program, salmon eggs are incubated in the classroom and school children learn about their life cycle, habitats, threats and what individuals can do to help salmon and the environment.
Ducks Unlimited Canada	Protection and restoration of wetlands and associated upland habitats that support healthy populations of ducks and other wildlife, advancing wetland science and policy, and educating the public on the importance of wetland conservation.	Since 2007, DUC has secured almost $8,000,000 towards various objectives that include habitat retention, restoration, research and evaluation, wetland policy, and conservation planning and has helped conserve close to 7,000 ha of wetland and associated uplands on PEI.
Eastern Habitat Joint Venture	Protect and restore landscapes that support healthy bird populations.	Between 2010 and 2020, over $6.5 million has been allocated to EHJV habitat and research projects. On PEI, Ducks Unlimited Canada (DUC) and the Nature Conservancy of Canada (NCC) have been allotted funds through this program to support their habitat restoration, improvement and securement initiatives.
Island Nature Trust	Acquiring, managing, and protecting a network of connected natural areas throughout PEI for the benefit of wildlife and people.	Protection of over 7,000 acres, including off-shore islands, hardwood, softwood, and mixed-wood forests, as well as forested wetlands and coastal properties. Key participants in monitoring for piping plover and bank swallow as well as many community outreach programs.
Nature Conservancy Canada	To mobilize Canadians to accelerate conservation and unlock solutions to support national and international biodiversity goals.	Have helped protect more than 2,770 ha of some of the most ecologically significant lands on PEI.

Partner	Mandate	Accomplishments
Nature PEI	Protect the flora and fauna of the province; promote, encourage, and enjoy the study of nature; nurture a greater appreciation of the value of our wildlife and its habitat; hold educational meetings and demonstrations designed to further public knowledge of our wildlife.	Has led or participated in citizen science initiatives documenting plants, lichens, terrestrial molluscs, freshwater mussels, under-surveyed arthropods, and birds. Recent projects include supporting an online Illustrated Flora of Prince Edward Island, and a project promoting red fox health.
PEI Invasive Species Council	To increase awareness and understanding of invasive species, develop an invasive species monitoring framework, and to advocate for invasive species management and control in PEI.	Has provided leadership, expertise and advice on the management of invasive species to a variety of interest holders as well as led the development and implementation of an early detection rapid response plan for priority invasive species in PEI.
PEI Watershed Alliance	To support watershed groups' efforts to improve and protect ecosystem quality of PEI watersheds for the benefit of all island residents.	Worked with FFW to create the Watershed Management Fund formula, providing groups with the ability to confidently pursue long-term plans and projects. The Watershed Strategy, published in 2015, is a collaboration between the Alliance and PEI FFW, setting out 27 strategies intended to improve partnerships and guide watershed management activities according to five broad goals.

5.0 - Future Priorities

5.1 - Habitat

FFW will work towards achieving protections for 7% of PEI's total land area, a challenge given PEI's population density. To work through this challenge, FFW will incorporate strategies including:

- seeking funding opportunities to acquire lands for the provincial protected areas network, with a focus on forest and wetland properties and building connectivity within the network;
- expanding private land protections through conservation agreements under the *Wildlife Conservation Act*;
- working collaboratively with partner organizations to coordinate land securement efforts; and
- assisting landowners who are interested in land stewardship and private protection by exploring programming options available to them for protecting land. (e.g. Long-term Expanded Riparian Buffer Incentive).

FFW will prioritize lands based on the best available data (e.g., species at risk models, updated wetlands inventory, connectivity analyses).

5.2 - Wildlife Management and Monitoring

FFW will continue to collect, manage, and analyse data on wildlife populations of conservation or management concern. Key focus will be on tracking harvest, occupancy, and habitat use of game and furbearer species; use of indicator species or species groups as measures of biodiversity and habitat effectiveness (such as forest songbird and wetland biodiversity assessments); working collaboratively with partners in PEI to assess specific concerns including: the spread of wildlife disease such as mange, and the status of various game and non-game species of management or conservation concern. Summary reports on findings will be essential to determining appropriate management and monitoring actions, which will adapt as trends in population and landscape-use dictate. FFW will also incorporate innovative techniques to monitor the state of wildlife on PEI, including the use of occupancy and habitat suitability modelling, and movement tracking (e.g., the MOTUS wildlife tracking network), remote sensing and eDNA technology.

5.3 - Human Dimensions

FFW will continue to support local hunting, trapping, and angling communities and will increase the emphasis on non-traditional stakeholders like birders and recreationalists. FFW will also work to grow public tolerance and knowledge regarding wildlife-human interactions.

5.4 - Policy and Legislation

FFW will modernize the Wildlife Policy for PEI, and other policy documents and legislation on an as needed basis. Modernization or amendments will incorporate data from wildlife science efforts (e.g., harvest and occupancy data). FFW will also engage with the Species At Risk Advisory Committee to pursue species at risk agreements that recognize PEI's unique situation with regards to the proportion of private land ownership, population density, and relative disturbance.

5.5 - Partnerships

Government cannot do it alone, and FFW will continue to pursue healthy partnerships with local and national NGOs (e.g., watershed groups, Birds Canada, Island Nature Trust, the Canadian Wildlife Health Cooperative, etc.) government agencies (e.g., Environment and Climate Change Canada, Atlantic Flyway Council, etc.) researchers and citizen science efforts.

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7.0 - Appendices

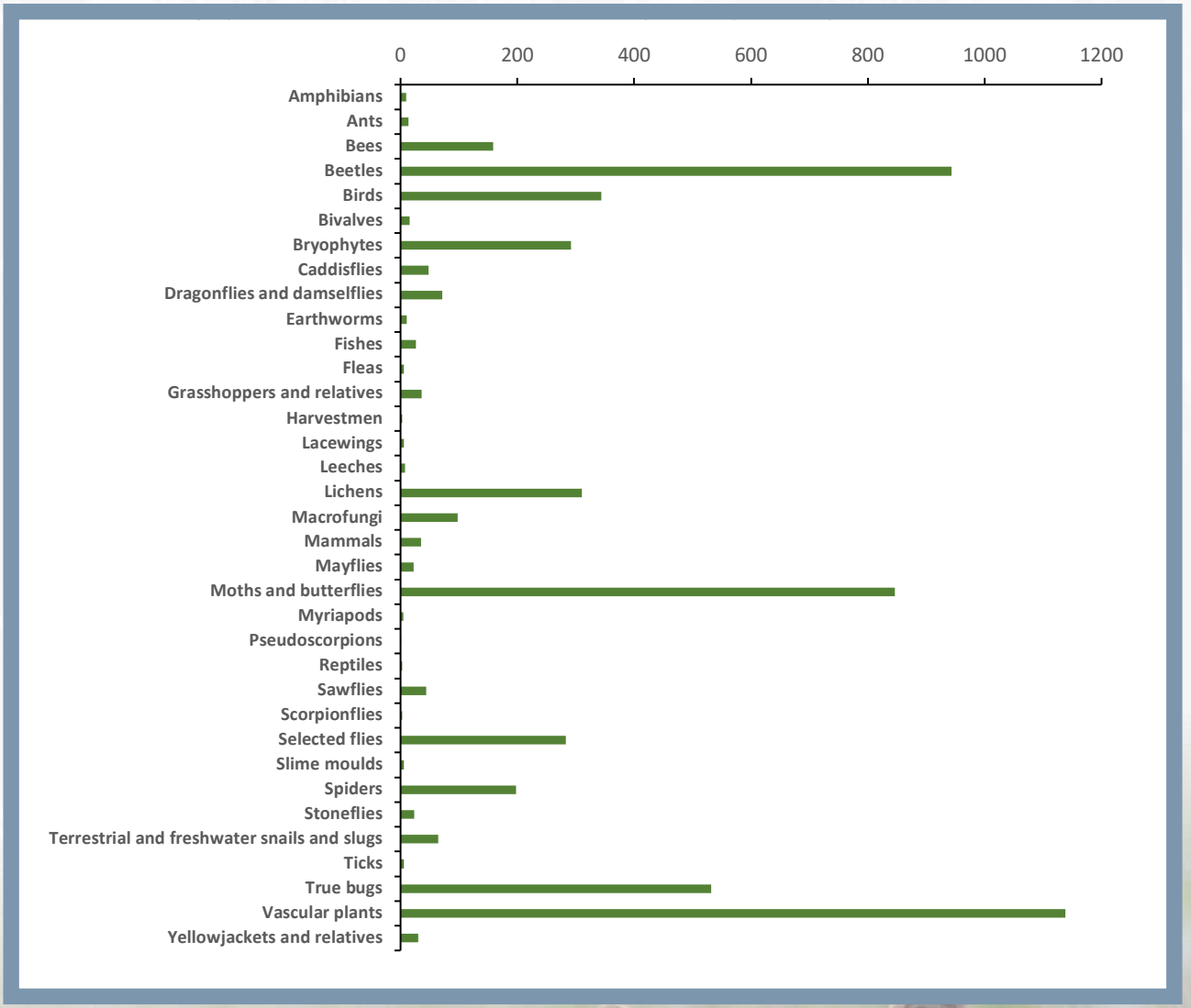
Appendix 1. Conservation Ranks and Definitions Used in 2020 and 2010 Status of Wild Species in Canada Report.

	Provincial Conservation Rank	Definition
2020	Presumed Extirpated (SX)	Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
	Possibly Extirpated (SH)	Species or community occurred historically in the province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become possible extirpated without such a 20-40-year delay if the only known occurrences in a province were destroyed or if it had been extensively and unsuccessfully looked for. This rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
	Critically Imperiled (S1)	Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.
	Imperiled (S2)	Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.
	Vulnerable (S3)	Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
	Apparently Secure (S4)	Uncommon but not rare; some cause for long-term concern due to declines or other factors.
	Secure (S5)	Common, widespread, and abundant in the province.
	Unrankable (SU)	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
	Unranked (SNR)	Provincial conservation status not yet assessed.
	Not Applicable/Exotic (SNA)	A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

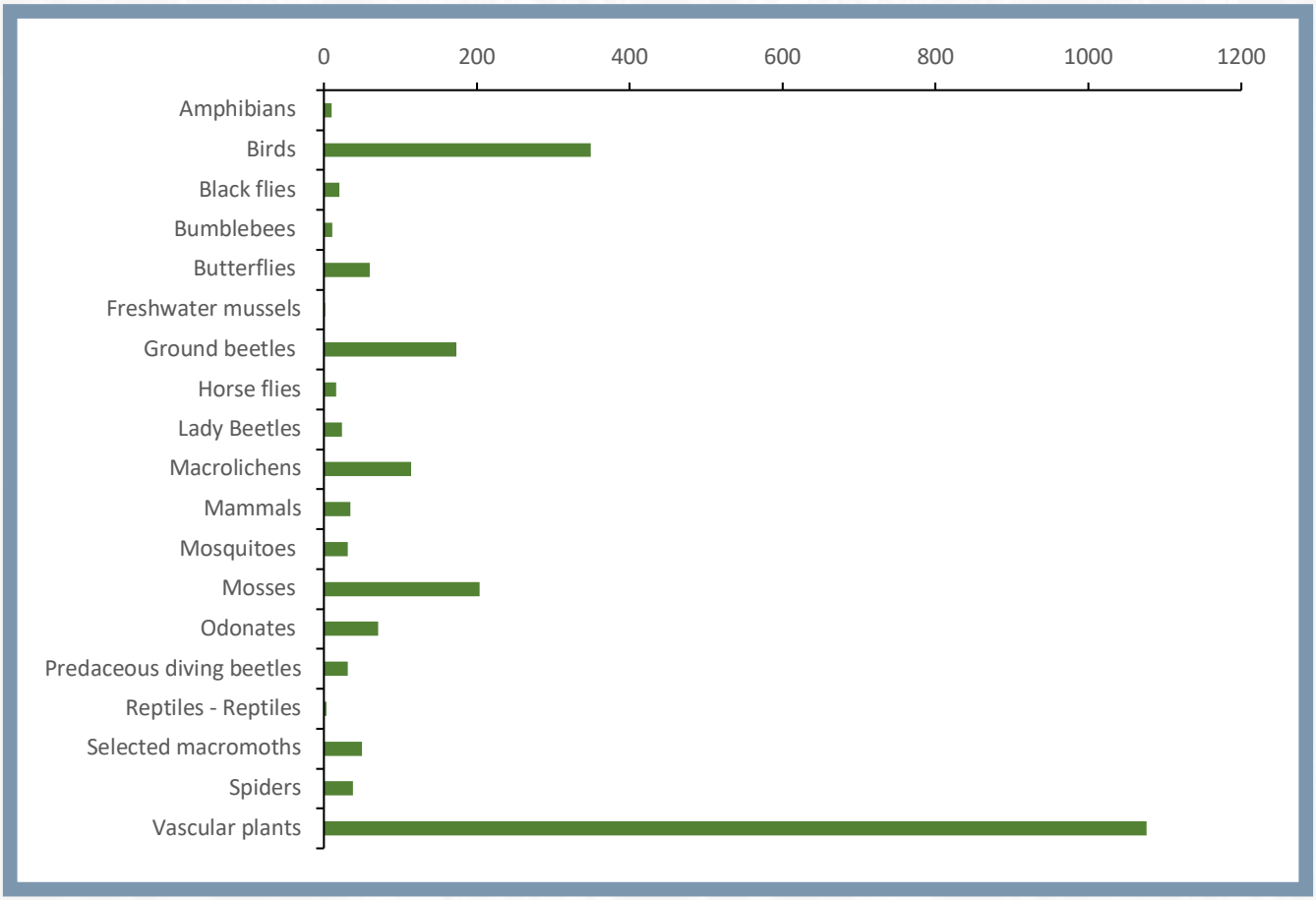
2010	Provincial Conservation Rank	Definition
	Extinct (0.2)	Species that are extirpated worldwide (i.e., they no longer exist anywhere). This rank partially replaces the rank of Extirpated/Extinct, used in the Wild Species 2000 report.
	Extirpated (0.1)	Species that are no longer present in a given geographic area, but occur in other areas. This rank partially replaces the rank of Extirpated/Extinct, used in the Wild Species 2000 report.
	At Risk (S1)	Species for which a formal, detailed risk assessment (COSEWIC status assessment or provincial or territorial equivalent) has been completed and that have been determined to be at risk of extirpation or extinction (i.e. Endangered or Threatened). A COSEWIC designation of Endangered or Threatened automatically results in a Canada General Status Rank (Canada rank) of At Risk. Where a provincial or territorial formal risk assessment finds a species to be Endangered or Threatened in that particular region, then, under the general status program, the species automatically receives a provincial or territorial general status rank of At Risk.
	May Be At Risk (S2)	Species that may be at risk of extirpation or extinction and are therefore candidates for a detailed risk assessment by COSEWIC, or provincial or territorial equivalents.
	Sensitive (S3)	Species that are not believed to be at risk of immediate extirpation or extinction but may require special attention or protection to prevent them from becoming at risk.
	Secure (S4)	Species that are not believed to belong in the categories Extinct, Extirpated, At Risk, May Be At Risk, Sensitive, Accidental or Exotic. This category includes some species that show a trend of decline in numbers in Canada but remain relatively widespread or abundant.
	Undetermined (SU)	Species for which insufficient data, information, or knowledge is available with which to reliably evaluate their general status.
	Not Assessed (SNA)	Species that are known or believed to be present regularly in the geographic area in Canada to which the rank applies but have not yet been assessed by the general status program.
	Exotic	Species that have been moved beyond their natural range as a result of human activity. In this report, Exotic species have been purposefully excluded from all other categories.
	Accidental	Species occurring infrequently and unpredictably, outside their usual range.

Appendix 2. Taxonomic Groups and Numbers of Species Assessed for the General Status of Wild Species in Canada 2010 and 2020.

2-A. *Number of Species Assessed Per Taxonomic Group 2020 (N=5641)*

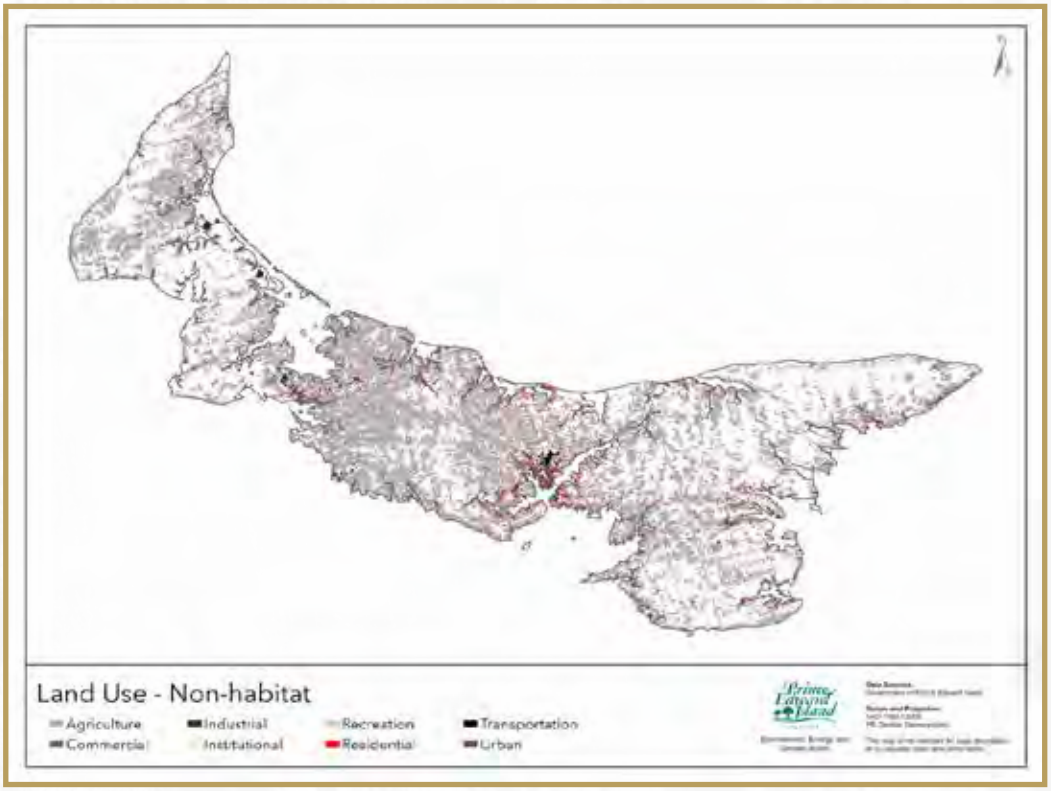


2-B. Number of Species Assessed Per Taxonomic Group 2010 (N=2318)

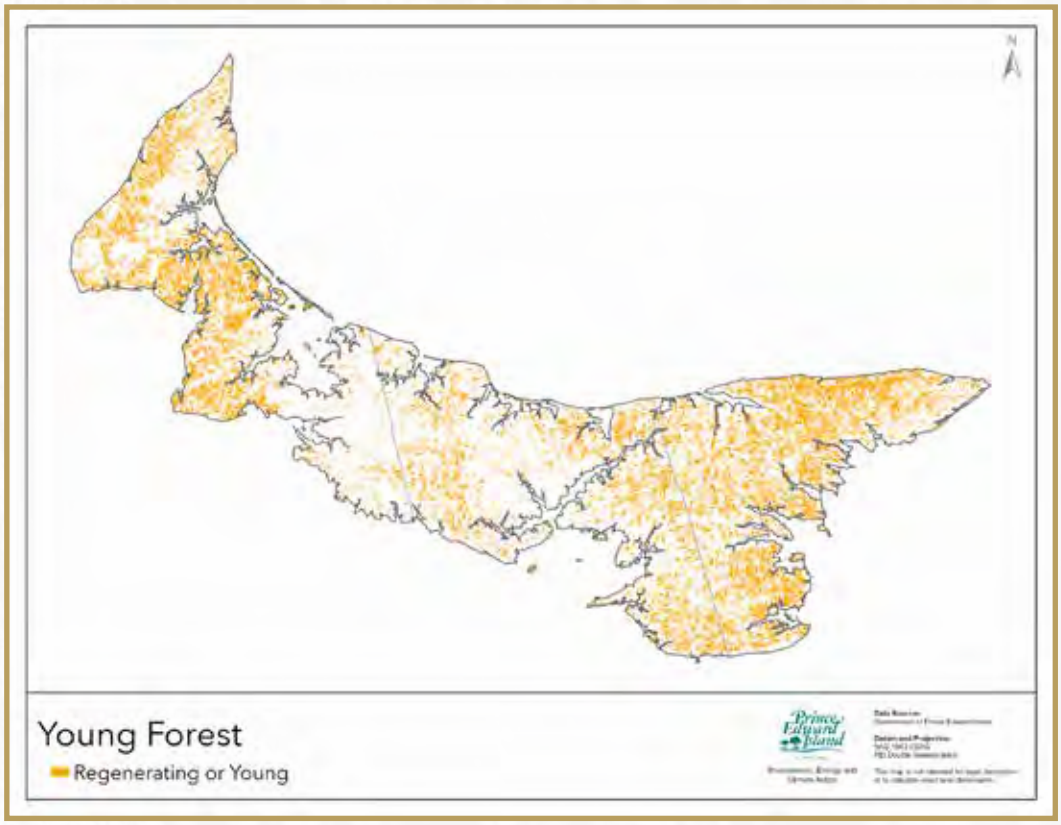


Appendix 3. Habitat Maps

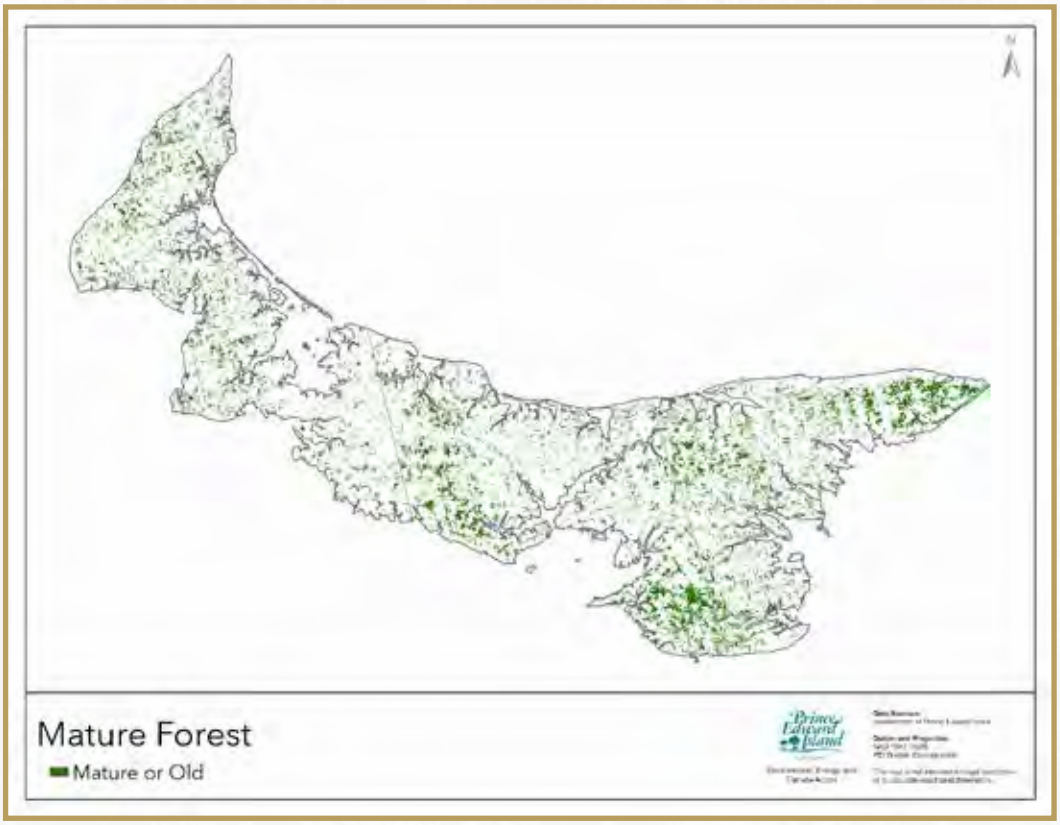
Appendix 3-A - Agriculture and Developed Lands



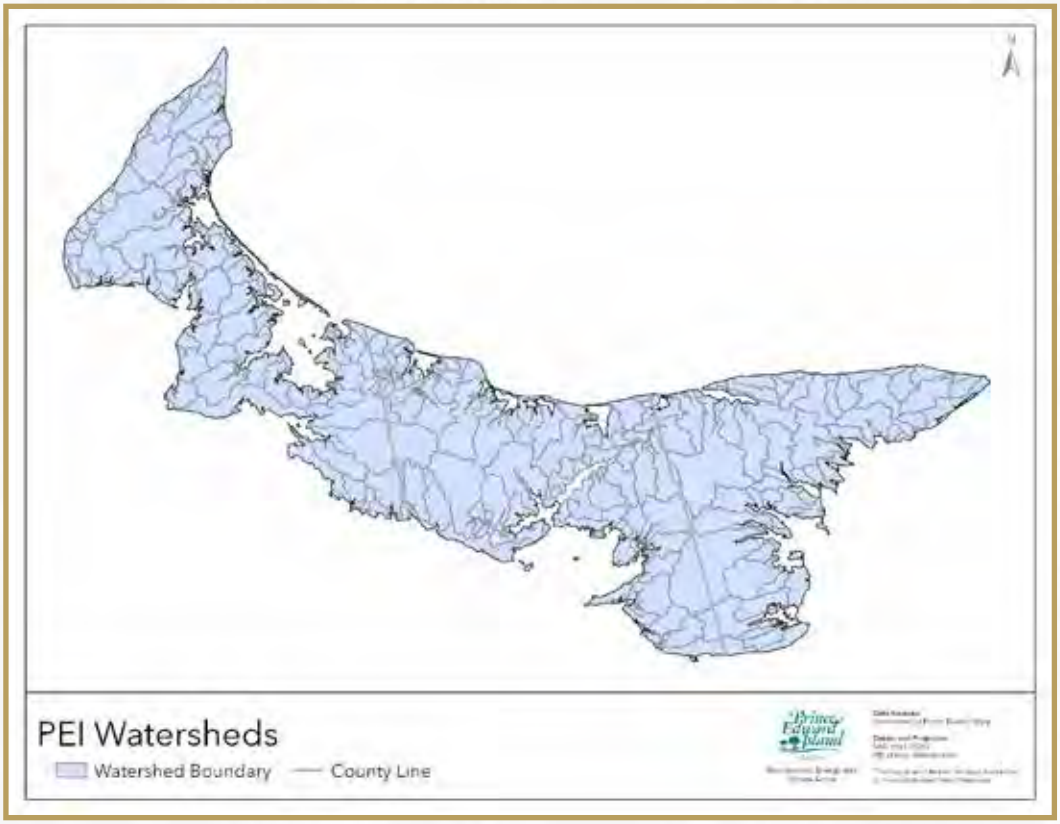
Appendix 3-B - Young Forest



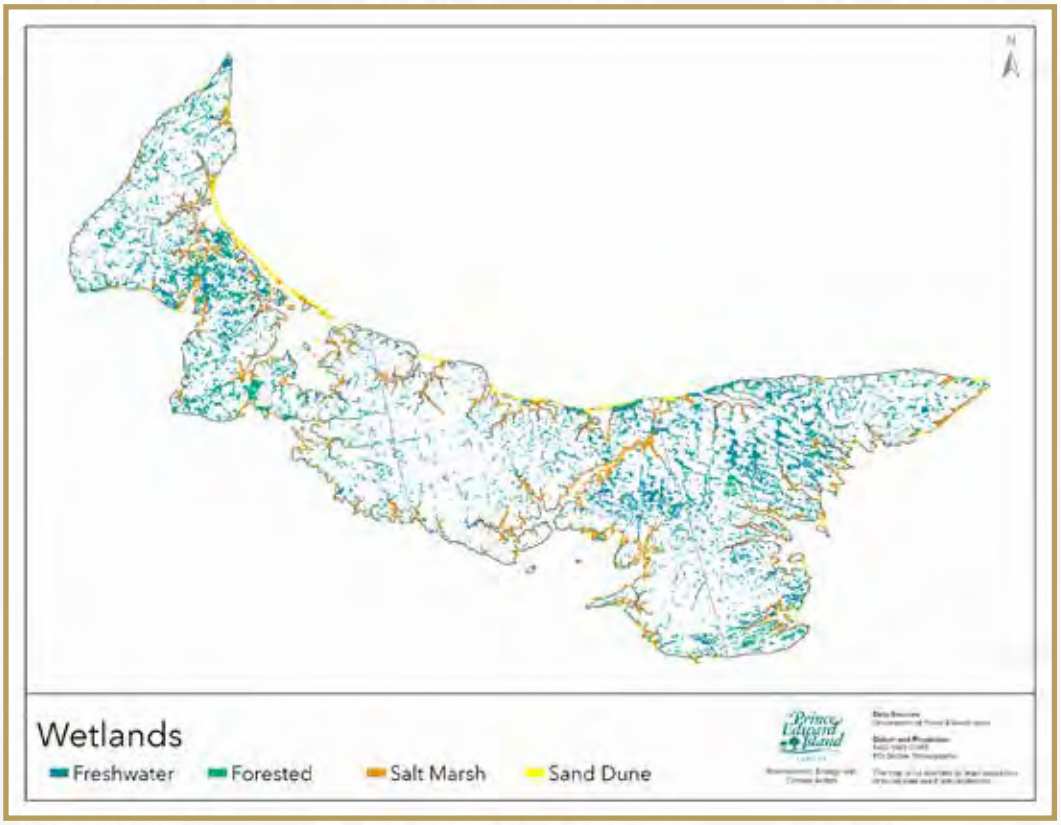
Appendix 3-C - Mature Forest



Appendix 3-D - PEI Watersheds



Appendix 3-E - Wetlands



Female Northern Harrier

Appendix 4. Invasive Species on PEI

Terrestrial Invasive Plants Affecting Forest

Invasive plant species can have a variety of impacts on forest ecosystems including alteration of the terrestrial carbon, nitrogen, and hydrologic cycles, suppression of natural succession trajectories, displacement of native species and degradation of wildlife habitat. There are several invasive plant species that pose a significant threat to forest ecosystems on PEI. Below are examples of some of the plant species currently impacting PEI forests.

Oriental Bittersweet

Oriental bittersweet (Celastrus orbiculatus) is a deciduous, woody vine native to southeast Asia that has become established in various locations across PEI, but most significantly in the Georgetown area. This vine poses a significant threat to native plant communities and is identified as a high-level threat to deciduous, coniferous, and mixed conifer-deciduous forests, old fields, grasslands, riparian areas, and fresh wetlands. With its rapid twining growth, bittersweet climbs over and shades vegetation, preventing photosynthesis as it makes way to the top of the canopy. As it climbs, the twining growth girdles the trees and shrubs, restricting nutrient and water flow. Weakened and overloaded trees become increasingly susceptible to wind throw and loss of limbs.

Garlic Mustard

Garlic mustard (Allliaria petiolata) is a significant threat to forest ecosystems due to its ability to successfully invade forest understories and become the dominant understory species. It is also an allelopathic species, producing chemicals in its roots that inhibit the growth of other plant species. These chemicals also affect the growth and regeneration of mycorrhizal fungi that support the ability of trees and plants to absorb nutrients and water. Recent studies have shown that arbuscular mycorrhizal fungi that can form mutualistic symbiotic relationships with many terrestrial plants are reduced from the roots of tree seedlings growing in soils where Garlic mustard have invaded. Garlic mustard is currently present in several locations on PEI, including the Stratford and Cavendish areas. Heavily invaded areas have very low understory biodiversity.

Glossy Buckthorn

Glossy buckthorn (Frangula alnus) is a common invasive woody shrub found across PEI, forming dense thickets that crowd and shade out native vegetation, transforming ecosystems visually, structurally, and chemically. Glossy buckthorn alters soil characteristics, increasing soil nitrogen, carbon, pH and moisture. Once the glossy buckthorn population exceeds approximately 30% cover in a woodland, it further suppresses seedling growth, reducing species diversity and disrupting succession. Glossy buckthorn stands also decrease the recruitment of native shrubs and reduce the diversity and quality of food for many bird species.

Terrestrial Invasive Plants Impacting Riparian Habitat

Many riparian invasive species form dense monocultures by outcompeting native riparian plant communities, resulting in a reduction in local diversity and impairing critical riparian ecosystem services including increased flood risk, erosion and movement of sediment. Changes in riparian vegetation can also have cascading impacts through the terrestrial-aquatic interface, degrading and disrupting terrestrial inputs to aquatic food webs. There are many invasive species currently impacting riparian areas across PEI. Below are some examples of species that are currently having significant impacts.

Giant Hogweed

Giant hogweed (Heracleum mantegazzianum) is a perennial herbaceous flowering plant that forms dense monocultures in areas it has invaded. The plant is monocarpic, reproducing only once in its lifetime (usually 3 to 5 years following germination) and producing a vast number of seeds that typically disperse over short distances (<10 m), but can spread further in water due to their buoyancy. Invaded habitat is characterized by reduced biodiversity, reduced invertebrate abundance, suppressed natural succession of woody plants and increased riverbank erosion in riparian areas. Giant hogweed also poses a significant threat to human health. Giant hogweed sap can cause phytophotodermatitis, triggering extreme sensitivity to sunlight and producing severe burns and blisters. As a result, recreational activities such as fishing and canoeing are significantly impacted in invaded riparian areas.

Giant hogweed is known to be present in at least two locations on PEI (West River and MacLeans Pond). Both populations are now being managed by the PEI Invasive Species Council and local watershed groups but represent significant populations and have a high risk of spread.

Purple Loosestrife

Purple loosestrife (Lythrum salicaria) is an invasive, emergent, perennial riparian plant that is common on PEI. This fast-spreading invasive species causes local reductions in native plant species richness displacing native sedges, cattails and other plants. It can also cause seasonal shifts in the availability of local nutrients in water bodies due to varying decomposition rates, as compared to native riparian species. This plant species is regulated on PEI.

Yellow Flag Iris

Yellow flag iris (Iris pseudacorus) is an aquatic perennial plant that invades fresh, brackish and salt-water systems. If left untreated it can result in dense stands that out-compete native species, such as cattails, sedges and rushes. The dense network of underwater roots collect sediment and raise the local elevation of the system, changing the wetlands' hydrological functions which results in a limited amount of open water. Over time the system will become drier, allowing trees and shrubs to establish. This habitat shift results in a loss in food supply and nesting habitat for local fish and bird populations that rely on wetlands. Yellow flag iris can currently be found in a number of rivers and streams across PEI.

Freshwater Invasive Plants

Freshwater invasive plant species are a significant threat that affect fish habitat on PEI. Ecological impacts include altering the macrophyte community composition, modifying macroinvertebrate species richness and abundance, depleting oxygen and altering food web structures. Dense macrophyte stands can increase the flood risk by impeding river flow, hindering recreational use of areas and reducing water flow and availability in irrigation and drainage systems.

Canada Waterweed

Canada waterweed (Elodea canadensis) is frequently used as an aquarium plant that can become highly invasive when released into wild habitats. It has been identified in Stratford, Georgetown and the Knox Dam area on PEI, where it is impacting freshwater ecosystems. It has small bright green leaves and begins growing in early spring when the water is cool. Canada waterweed grows rapidly and can clog shallow ponds, slow-flowing rivers and streams, preventing or slowing fish movement due to the choked waterways. It also alters water quality and outcompetes native plants.

Fragrant Water Lily

Fragrant water lily (Nymphaea odorata) is an exotic/introduced perennial aquatic plant found in freshwater on PEI. It has large, pinkish flowers, spreads by seed and rhizomes and its aggressive growth habit forms dense mats. It is genetically different from the native water lily, of the same species (N. odorata), which has white flowers and is found in only two locations on PEI.

Fragrant water lily can thrive in a wide range of light conditions, temperatures, water depths and pH levels. It adversely changes the ecosystem where it is growing by crowding out native plants; covering the surface of the water with its large, floating leaves and reducing the sunlight that penetrates the water; increasing the water temperature by absorbing sunlight; reducing the oxygen levels as its vegetation decays in the fall and changing water pH levels. Increased nutrients from the decaying plant material and lower oxygen levels cause the growth of algae and reduce water quality. The result of these adverse changes is a reduction in plant and animal biodiversity.

Often, its introduction to new areas is through the aquarium and horticulture trade; it is planted, transplanted and swapped by gardeners; is often disposed of improperly; and its long stems can readily wrap around the motors of recreational boats. Fragrant water lily has been introduced to several freshwater habitats across PEI.

Invasive Forest and Agricultural Insects

Outbreaks of invasive herbivorous invertebrates and fungal pathogens can cause significant disturbance to both natural and managed ecosystems. There are many examples of invasive insects that are currently present on PEI and several that are not yet present but have been detected in the Maritimes and pose a significant risk. Some insect pests are agriculture based and, either through management or host preference, can impact native species, wildlife and their habitats.

Beech Leaf-Mining Weevil

The beech leaf-mining weevil (Orchestes fagi) is an invasive species of weevil that causes defoliation of European and American beech trees and eventual tree mortality. In Nova Scotia, this has resulted in significant losses of beech trees after successive years of defoliation in affected areas. Originally it was detected in Nova Scotia in 2012, but anecdotally may have been there since as early as 2006 and has now spread to PEI. Weevils were confirmed in Charlottetown in 2021 and are suspected to have been present prior to that. The adult weevil spends long periods of its life living under bark scales and crevasses of several tree species; therefore, it is easily transported in firewood.

Lymantria dispar dispar, previously referred to as the European Gypsy Moth

Lymantria dispar dispar (LDD) was introduced to Northeastern US in the 1860s and has since spread to several provinces including PEI, NB, NS, Ontario and Quebec. LDD is predicted to further expand its range on PEI and establish larger population numbers as temperatures rise as a result of climate change. Eggs are laid on the bark and branches of a variety of tree species (over 300 species) as well as in other protected areas such as rock piles, lawn furniture, wood piles or recreational vehicles and equipment. Larvae feed in the tree canopy and chew holes in the leaves. Later instar larvae can totally defoliate trees, potentially resulting in tree mortality. The LDD moth is regulated in Canada by the Canadian Food Inspection Agency ("Schedule I of the Plant Protection Regulations prohibits the movement of any material infested with this pest"). Currently all of PEI is regulated for LDD.

Beech Leaf-Mining Weevil

Prince Edward Island
State of Wildlife 2020 Report

Forests, Fish and Wildlife Division

DG-957