

# Biodiversity

## **THE PATH WE SHARE**

A Natural Resources Strategy  
for Nova Scotia 2011-2020  
Five-year Progress Report

### **APPENDIX 2**

# GOAL 5: GOOD GOVERNANCE

Establish clear and effective leadership and governance related to biodiversity in Nova Scotia.

## 13 Lead and work with others to improve the conservation and sustainable use of biodiversity.

### WHAT WE'RE DOING

- The department became a part of the Atlantic Habitat Partnership Initiative with the Government of Canada, Atlantic provincial governments, and Ducks Unlimited Canada. The aim of the partnership is to protect, maintain, and restore over 16 000 hectares (40,000 acres) of key wetlands in all four Atlantic provinces.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.
- The department created a Forest Biodiversity Science Advisory Committee to enhance the management of Nova Scotia's Crown-owned woodlands. Members of the committee have experience in biodiversity science, and their independent advice will improve government's capacity to address complex biodiversity conservation and resource-use issues. The committee will focus on helping government identify knowledge gaps that have to be filled for successful implementation of an ecosystem approach to forestry and forest biodiversity conservation.
- The department raised more than \$100,000 since April 1, 2011, for the Species at Risk Conservation Fund through the sale of conservation vehicle licence plates and other means. The department awarded funding in this amount for projects supporting species at risk recovery.
- The department partnered with the Nova Scotia Federation of Agriculture and Dalhousie University to co-fund the Biodiversity Landowners Guide (BioLOG), a website that provides Nova Scotian farmers and landowners with information, resources, and guidance to successfully implement conservation best management practices on their own land. These practices benefit both agricultural production and biodiversity.
- The department revised and updated mainland moose, boreal felt lichen, and wood turtle special management practices and designed new special management practices to protect vulnerable marine bird colonies.
- The department led several opportunities to acquire large additions to the province's Crown land base, including the purchase of 220 000 hectares of former Resolute Forest Products land in December 2012. The department contributes geoscience, forestry, and biodiversity research and advice to inform government land purchases. In collaboration with Nova Scotia Environment, the department provides information on the biodiversity values of lands under consideration for protection. This helps ensure that with such purchases government considers the protection of species at risk, important ecosystems, and the connectivity between habitats.
- The department is working to release a set of ecological landscape analysis reports, which will help guide management on Crown land that is appropriate to the ecological context.

- The department continues to support the Government of Canada's biodiversity goals and targets for 2020 through its efforts provincially and through its work on the federal, provincial, and territorial Biodiversity Working Group.
- Department representatives continue to be a part of the Canadian Wildlife Directors Committee (CWDC). The committee, co-chaired by Environment Canada and a province or territory on a rotating basis (Nova Scotia in 2014), comprises federal, provincial, and territorial wildlife directors, including representatives from Environment Canada, Fisheries and Oceans Canada, and the Parks Canada Agency. As an advisory body on wildlife issues, the CWDC provides leadership in the development and coordination of policies, strategies, programs, and activities that address wildlife issues of national concern and help conserve biodiversity.
- The department has implemented new practices for the management of restricted exotic reptiles in captivity. As interest in the possession and display of these animals continues, and to maintain the safety of the public and the animals, it is necessary that best practices are adopted and maintained by individuals and businesses. Department staff inspect sites where restricted animals are held to ensure that risks are minimized.
- The department completed a High Conservation Value Forest Assessment Report for the Medway District. It sought input from the Mi'kmaq, the Mersey Woodlands Forest Advisory Committee, the Mersey Tobetic Research Institute, the Southwest Nova Biosphere Reserve, and Westfor Management Inc.

# 14 Implement new laws and update existing laws to support biodiversity.

## WHAT WE'RE DOING

- The department developed a legislation review plan. Reviews of several pieces of legislation commenced in the winter of 2013. The plan is updated annually to reflect department and government priorities. Timelines for completion of legislative reviews are variable and range over several months to several years. The review process is collaborative, engaging multiple stakeholders both internal and external to government.
- The department supported the sustainable use and conservation of biodiversity by reviewing the ban on Sunday hunting for all types of hunting. This included a 60-day public consultation where Nova Scotians were invited to share their opinions on Sunday hunting via online submissions, emails, letters, and phone messages. After the public consultation and discussion of options with stakeholders, the department allowed hunting on the first two Sundays of general hunting season.
- The department is exploring options for addressing the conservation and sustainable use of the province's biodiversity in legislation and policy. While these options are being developed, staff continue to collaborate with other departments to respond to threats from invasive species and to support biodiversity in Nova Scotia.

# 15 Develop and implement policies and practices that support biodiversity conservation and sustainable use.

## WHAT WE'RE DOING

- The department developed a legislation review plan. Reviews of several pieces of legislation commenced in the winter of 2013. The plan is updated annually to reflect department and government priorities. Timelines for completion of legislative reviews are variable and range over several months to several years. The review process is collaborative, engaging multiple stakeholders both internal and external to government.
- The department revised and updated mainland moose, boreal felt lichen, and wood turtle special management practices and designed new special management practices to protect vulnerable marine bird colonies.
- The department collaborated with the Mi'kmaq on developing a recovery plan for black ash, a threatened tree species of cultural and economic importance to the Mi'kmaq.
- The department completed a distribution analysis for the endangered mainland moose, using sighting records and results of the Deer and Moose Pellet Group Inventory for the period 1999–2011. This information is used in conjunction with the provincial ecological land classification to define mainland moose concentration areas and to update special management practices.
- The department participated on the Scientific Advisory Committee of the Nova Scotia Crown Share Land Legacy Trust. The purpose of this committee is to advise the trustees on the conservation value and priority of lands proposed for securement by applicants to the trust.
- The department is developing a biodiversity-based work plan that will bring together expertise from DNR's wildlife and forestry divisions to support the implementation of landscape-level planning.
- The forest pre-treatment assessment data collection program has been modified to include biodiversity considerations when determining harvest management prescriptions.

# 16 Collaborate with the Mi'kmaq of Nova Scotia on the conservation and sustainable use of biodiversity.

## WHAT WE'RE DOING

- The department collaborated with the Mi'kmaq on the development of a recovery plan for black ash, a threatened tree species of cultural and economic importance to the Mi'kmaq.
- The department consulted with the Mi'kmaq on the Mainland Moose Recovery Action Plan.
- The department formed a moose co-management working group with the Mi'kmaq to work on a collaborative adaptive harvest management plan.

# 17 Work with others to achieve sustainability by balancing economic, environmental, and social values.

## WHAT WE'RE DOING

- The department raised more than \$100,000 since April 1, 2011, for the Species at Risk Conservation Fund through the sale of conservation vehicle licence plates and other means. The department awarded funding in this amount for projects supporting species at risk recovery.
- The department became a part of the Atlantic Habitat Partnership Initiative with the Government of Canada, Atlantic provincial governments, and Ducks Unlimited Canada. The aim of the partnership is to protect, maintain, and restore over 16 000 hectares (40,000 acres) of key wetlands in all four Atlantic provinces.
- The department led several opportunities to acquire large additions to the province's Crown land base, including the purchase of 220 000 hectares of former Resolute Forest Products land in December 2012. The department contributes geoscience, forestry, and biodiversity research and advice to inform government land purchases. In collaboration with Nova Scotia Environment, the department provides information on the biodiversity values of lands under consideration for protection. This helps ensure that with such purchases government considers the protection of species at risk, important ecosystems, and the connectivity between habitats.
- The department co-led the Parks and Protected Areas Plan with Nova Scotia Environment to conserve biodiversity and increase connectivity. Released in 2013, *Our Parks and Protected Areas: A Plan for Nova Scotia* builds on extensive consultations and activities over the past several years. Through these consultations, members of the public, including Nova Scotia Mi'kmaq, helped identify potential lands for protection and provided input about our provincial parks.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.
- The department created a biodiversity web page that contains information related to wild species, species at risk, ecosystems and habitats, and the sustainable use of wild species. The biodiversity web page will be a focal point for biodiversity knowledge and information in Nova Scotia.
- The department partnered with the Nova Scotia Federation of Agriculture and Dalhousie University to co-fund the Biodiversity Landowners Guide (BioLOG), a website that provides Nova Scotian farmers and landowners with information, resources, and guidance to successfully implement conservation best management practices on their own land. These practices benefit both agricultural production and biodiversity.
- The department collaborated with the Nova Scotia Department of Agriculture, the Nova Scotia Federation of Agriculture, and landowners on methods to reduce damage caused by nuisance deer and bears on agriculture crops such as blueberries. Regulatory changes were made to create special hunting stamps to make the sustainable harvest of nuisance wildlife easier.
- The department approved a proposal that balances agriculture production with biodiversity conservation and use on approximately 100 hectares of Crown lands at Belleisle Marsh, Annapolis County.
- The department contracted a consulting firm that facilitated multiple workshops with various stakeholders on the subject of spruce budworm management.

# GOAL 6: RESEARCH AND KNOWLEDGE SHARING

Increase and share knowledge about biodiversity to help governments and interested groups make informed decisions and take responsible action.

**18** Develop expertise, methods, and systems that will improve biodiversity knowledge and promote the sharing of knowledge.

## WHAT WE'RE DOING

- The department completed improvements to the Biodiversity Investigations Reporting System, which enables a broader range of species tracking and sharing with collaborators.
- The department created a biodiversity web page that contains information related to wild species, species at risk, ecosystems and habitats, and the sustainable use of wild species. The biodiversity web page will be a focal point for biodiversity knowledge and information in Nova Scotia. The portal is available at [novascotia.ca/natr/biodiversity](http://novascotia.ca/natr/biodiversity)
- The department created a Forest Biodiversity Science Advisory Committee to enhance the management of Nova Scotia's Crown-owned woodlands. Members of the new committee have experience in biodiversity science, and their independent advice will improve government's capacity to address complex biodiversity conservation and resource-use issues. The committee will focus on helping government identify knowledge gaps that have to be filled for successful implementation of an ecosystem approach to forestry and forest biodiversity conservation.
- The department regularly updated the inventory of significant wildlife habitats. It is available at [novascotia.ca/natr/wildlife/habitats/hab-data](http://novascotia.ca/natr/wildlife/habitats/hab-data). Sites of rare species, large concentrations of animals, and rare habitats are mapped, and site data are collected in a database. This information is vital for environmental impact assessments and integrated resource management, and it plays a role in planning for protected areas and in designing wildlife inventories.
- The department collaborated with researchers and practitioners from the federal departments of Fisheries and Oceans and Natural Resources, Nova Scotia Environment, and staff from the New Brunswick Department of Natural Resources to develop a new classification of Nova Scotia's coastline. The classification is summarized in *A Physiographic Coastline Classification of the Scotian Shelf Bioregion and Environs: The Nova Scotia Coastline and the New Brunswick Fundy Shore* (see [dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012\\_051-eng.pdf](http://dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012_051-eng.pdf)).
- In response to the progression of white-nose syndrome, the department partnered with the Mersey Tobeatic Research Institute to create two tools for the public to report bat sightings: a telephone hotline and a simple online reporting form.
- The department developed a Landscape Modelling Framework (LMF) with the Applied Geomatics Research Group (AGRG). AGRG is a team of research scientists, research associates, and graduate

students applying a suite of geomatics technologies to explore environmental, health, and social issues. The LMF is a multi-scale, species-independent framework for habitat characterization, using GIS. It provides tools to classify and quantify the landscape, prepare data, and export information for use in statistical analysis and modelling.

- The department is working to release a set of ecological landscape analysis reports, which will help guide management on Crown land that is appropriate to the ecological context.

# 19 Integrate biodiversity values into planning and decision making, including the economic valuation of ecosystem goods and services.

## WHAT WE'RE DOING

- The department led several opportunities to acquire large additions to the province's Crown land base, including the purchase of 220 000 hectares of former Resolute Forest Products land in December 2012. The department contributes geoscience, forestry, and biodiversity research and advice to inform government land purchases. In collaboration with Nova Scotia Environment, the department provides information on the biodiversity values of lands under consideration for protection. This helps ensure that with such purchases government considers the protection of species at risk, important ecosystems, and the connectivity between habitats.
- The department co-led the Parks and Protected Areas Plan with Nova Scotia Environment to conserve biodiversity and increase connectivity. Released in 2013, *Our Parks and Protected Areas: A Plan for Nova Scotia* builds on extensive consultations and activities over the past several years. Through these consultations, members of the public, including Nova Scotia Mi'kmaq, helped identify potential lands for protection and provided input about our provincial parks.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.
- The department uses Strategic Resource Analysis to account for, evaluate, and forecast species habitat requirements over time.
- In spring 2015, the department initiated a pilot project in collaboration with Port Hawkesbury Paper LLP (PHP) to develop and implement a landscape management framework on Crown lands under PHP licence. Important ecological goods and services are supported across landscapes, not within forest stands or landowner properties alone. This framework is designed to enable site-scale forestry activities to be planned with a greater understanding of how larger-scale values are affected across landscapes. Planning with better knowledge of accumulated values and impacts will enable decision making that will both help conserve biodiversity and maintain a sustainable forest industry.
- The department developed a Landscape Modelling Framework (LMF) with the Applied Geomatics Research Group (AGRG). AGRG is a team of research scientists, research associates, and graduate students applying a suite of geomatics technologies to explore environmental, health, and social issues. The LMF is a multi-scale species-independent framework for habitat characterization, using GIS. It provides tools to classify and quantify the landscape, prepare data, and export information for use in statistical analysis and modelling.
- The department is working to release a set of ecological landscape analysis reports, which will help guide management on Crown land that is appropriate to the ecological context.
- The department contributed to the *2012 Canadian Nature Survey*, a collaborative initiative of the federal, provincial, and territorial (FPT) governments of Canada through the FPT *Value of Nature to Canadians Study* taskforce. The survey is significantly contributing to our understanding of the importance of nature to Nova Scotians—by measuring their awareness, participation, and investments in a wide range of nature-based activities. This information is essential to support the integration of biodiversity values in decision making.

## 20 Provide ecological classification systems and other tools that support the ecosystem approach for land, freshwater, and coastal environments.

### WHAT WE'RE DOING

- The department is working to release a set of ecological landscape analysis reports, which will help guide management on Crown land that is appropriate to the ecological context.
- The department regularly updated the inventory of significant wildlife habitats. It is available at [novascotia.ca/natr/wildlife/habitats/hab-data](http://novascotia.ca/natr/wildlife/habitats/hab-data). Sites of rare species, large concentrations of animals, and rare habitats are mapped, and site data are collected in a database. This information is vital for environmental impact assessments and integrated resource management, and it plays a role in planning for protected areas and in designing wildlife inventories.
- The department collaborated with researchers and practitioners from the federal departments of Fisheries and Oceans and Natural Resources, Nova Scotia Environment, and staff from the New Brunswick Department of Natural Resources to develop a new classification of Nova Scotia's coastline. The classification is summarized in *A Physiographic Coastline Classification of the Scotian Shelf Bioregion and Environs: The Nova Scotia Coastline and the New Brunswick Fundy Shore* (see [dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012\\_051-eng.pdf](http://dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012_051-eng.pdf)).
- The department assessed the distribution and composition of coastal colonial bird nesting areas. This information helps in the design of special management practices that enable rockweed harvesting to occur in ways that avoid disturbance to these unique habitats.
- In spring 2015, the department initiated a pilot project in collaboration with Port Hawkesbury Paper LLP (PHP) to develop and implement a landscape management framework on Crown lands under PHP licence. Important ecological goods and services are supported across landscapes, not within forest stands or landowner properties alone. This framework is designed to enable site-scale forestry activities to be planned with a greater understanding of how larger-scale values are affected across landscapes. Planning with better knowledge of accumulated values and impacts will enable decision making that will both help conserve biodiversity and maintain a sustainable forest industry.
- Since the release of the Natural Resources Strategy, the Wildlife Division has prioritized its inventory and classification efforts on higher-conservation-value ecosystem types falling into natural ecological groups with similar environmental drivers. Higher-priority ecosystem groups currently being addressed include the following:
  - Coastal beaches and dunes—The Wildlife Division partnered with the Atlantic Canada Conservation Data Centre (AC CDC) and Parks Canada to survey beach and dune ecosystems of Nova Scotia. Surveys were completed in 2015 with a Wildlife Division expedition to Sable Island. The classification and a scientific report on this important component of provincial ecosystem diversity will be completed in 2016–17.
  - Heathlands—Heathlands are ecosystems dominated by low-growing shrub species from the Heath family. In Nova Scotia, the relative proportion of ecosystem area occupied by temperate heathlands is the highest of any Canadian province. The Wildlife Division has partnered with Saint Mary's University, Environment Canada, and the AC CDC to produce "A Standardized Reference Framework for Acadian Heathlands in Nova Scotia." This three-year project runs from 2015 to 2018 and will include a complete classification of provincial heathlands.

- Karst—Karst is a rugged type of topography formed by processes in which rock dissolves. In Nova Scotia, karst ecosystems include sinkholes, cliffs, caves, and rock pinnacles formed in areas underlain by gypsum or limestone. The kinds of karst ecosystems in Nova Scotia are nationally rare and support significant biodiversity features. The Wildlife Division has spent part of two summers surveying karst, but additional surveys are needed to complete this classification.
- Alpine—Nova Scotia has the strongest expression of alpine conditions in the Maritimes region of Canada. Alpine ecosystems in Nova Scotia are a treeless tundra found on mountain summits and ridges. In 2016, the Wildlife Division has partnered with the AC CDC to begin surveying and mapping alpine ecosystem occurrences on the northern tip of Cape Breton.
- In 2013, the department republished *Forest Ecosystem Classification for Nova Scotia*. It combines Part I: Vegetation Types, Part II: Soil Types, and Part III: Ecosites (originally published in 2010) as a single, more-streamlined guide. The guide is a result of 10 years of forest ecosystem classification (FEC) project work.
- In 2013, the department published *A Woodland Owner's Guide to Forest Ecosystem Classification in Nova Scotia*. This guidebook provides a brief introduction to FEC and how a trained FEC professional can help landowners make more predictable and sustainable forest management decisions.

# 21 Conduct and coordinate high-priority inventories and monitoring of biodiversity.

## WHAT WE'RE DOING

- Bats—The department partnered with the Mersey Tobeatic Research Institute to create two tools for the public to report bat sightings: a telephone hotline and a simple online reporting form. DNR demonstrated national leadership by initiating the assessment of three bat species threatened by the progression of white-nose syndrome. The three species are now designated as endangered by the Committee on the Status of Endangered Wildlife in Canada.
- Boreal felt lichen—The department improved the efficacy of the GIS-based Boreal Felt Lichen (BFL) Habitat Model to predict BFL occurrence and managed harvesting around BFL areas.
- Canada lynx—The department worked with partners to assess the efficacy of the 100-metre buffers required by the interim special management practice around all highland bogs within the defined Canada lynx management area.
- Deer
  - The department worked with partners to develop improved methods and models for deer population monitoring and management. The department routinely conducts surveys and collects data to monitor deer. Results from this collaboration will help optimize resources and improve monitoring results.
  - The department adapted deer management methods in agricultural landscapes to account for locally higher abundance, while maintaining a landscape-scale, ecological zoning approach to deer management.
- Mainland moose—The department completed a distribution analysis for the endangered mainland moose, using sighting records and results of the Deer and Moose Pellet Group Inventory for the period 1999–2011. This information is used in conjunction with the provincial ecological land classification to define mainland moose concentration areas and to update special management practices.
- The department updated the Action Plan for the Recovery of Eastern Moose (*Alces alces americana*) in mainland Nova Scotia.
- Eastern mountain avens—The department is working with the Nature Conservancy, local community, and researchers to conserve and restore bog habitat for this endangered plant, which occurs only at two locations globally, in western Nova Scotia and in the northeastern USA.
- The department added 19 species of plants and animals to the listings for species at risk in Nova Scotia—Including three species of bats, the barn swallow, and the snapping turtle—bringing the total number of species on the protected list to 60.
- The department integrated the collection of butterfly data into field work planning to contribute to the Atlantic Canada Conservation Data Centre's *Maritimes Butterfly Atlas*. This research will serve as a basis for understanding the status of and future changes to the distribution of these insects.
- In collaboration with the Atlantic Canada Conservation Data Centre (AC CDC), a bird monitoring project was carried out at Belleisle Marsh in June-July 2015. This project was to assess bird species richness and abundance between habitat types and to help inform a long-term monitoring plan for the site. A total of 70 bird species were detected, including evidence of 16 species of conservation concern breeding on or near the site.

## 22 Report regularly on the state of biodiversity in Nova Scotia.

### WHAT WE'RE DOING

- The department created a biodiversity web page that contains information related to wild species, species at risk, ecosystems and habitats, and the sustainable use of wild species. The biodiversity web page will be a focal point for biodiversity knowledge and information in Nova Scotia. The portal is available at [novascotia.ca/natr/biodiversity](http://novascotia.ca/natr/biodiversity).
- Work continues on the state of biodiversity report; it has not been released yet.
- In collaboration with Nova Scotia Environment, the department contributed to Environment Canada's *Canadian Protected Areas Status Report 2012–2015*. This report provides information on the current state of protected areas in Canada and recent trends. It covers Canada's protected areas system as a whole and at the federal, provincial, and territorial levels.
- The department continues to contribute data to the Canadian Wildlife Health Cooperative (CWHC). CWHC provides a Canada-wide perspective on wildlife health, while helping to identify and assess emerging problems at a local level.
- The department continues to contribute wetland and habitat data to the North American Waterfowl Management Plan through its Eastern Habitat Joint Venture

# GOAL 7: ECOSYSTEM APPROACH

Work together to maintain and restore healthy wildlife populations, ecosystems, and ecosystem processes.

**23** Promote and apply an ecosystem approach within the department and in partnership with other departments and interested groups.

## WHAT WE'RE DOING

- The department co-led the Parks and Protected Areas Plan with Nova Scotia Environment to conserve biodiversity and increase connectivity. Released in 2013, *Our Parks and Protected Areas: A Plan for Nova Scotia* builds on extensive consultations and activities over the past several years. Through these consultations, members of the public, including Nova Scotia Mi'kmaq, helped identify potential lands for protection and provided input about our provincial parks.
- The department worked collaboratively with Nova Scotia Environment and consulted with municipalities, the Nova Scotia Mi'kmaq, community groups, industry, non-governmental organizations, and hundreds of individuals to complete the designation of more than 100 properties as wilderness areas, nature reserves, and parks. These designations mean that 12.26 per cent of Nova Scotia's landmass is now protected.
- The department partnered with the Nova Scotia Federation of Agriculture and Dalhousie University to co-fund the Biodiversity Landowners Guide (BioLOG), a website that provides Nova Scotian farmers and landowners with information, resources, and guidance to successfully implement conservation best management practices on their own land. These practices benefit both agricultural production and biodiversity.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.
- The department developed a Landscape Modelling Framework (LMF) with the Applied Geomatics Research Group (AGRG). AGRG is a team of research scientists, research associates, and graduate students applying a suite of geomatics technologies to explore environmental, health, and social issues. The LMF is a multi-scale, species-independent framework for habitat characterization, using GIS. It provides tools to classify and quantify the landscape, prepare data, and export information for use in statistical analysis and modelling.
- The department is working to release a set of ecological landscape analysis reports, which will help guide management on Crown land that is appropriate to the ecological context.
- The department uses Strategic Resource Analysis to account for, evaluate, and forecast species habitat requirements over time.
- The department continued involvement with the Otter Ponds Forest demonstration site. Otter Ponds demonstrates the philosophy, science, and practice of uneven-aged management in the Acadian Forest. Management practices are certified to the Forest Stewardship Council's Maritime Standard. Otter Ponds is managed by a unique partnership that includes four non-governmental organizations (Eastern Shore

Forest Watch, the Ecology Action Centre, the Mooseland and Area Community Association, the Nova Scotia Woodlot Owners and Operators Association), a forestry company (Northern Pulp Ltd), and the Province of Nova Scotia. The partners jointly manage a 500 hectare (1,200-acre) Crown parcel near Mooseland, within the Halifax Regional Municipality.

## 24 Integrate an ecosystem approach into wildlife species management.

### WHAT WE'RE DOING

- Canada lynx—The department worked with partners to assess the efficacy of the 100-metre buffers required by the interim special management practice around all highland bogs within the defined Canada lynx management area.
- Deer
  - The department worked with partners to develop improved methods and models for deer population monitoring and management. The department routinely conducts surveys and collects data to monitor deer. Results from this collaboration will help optimize resources and improve monitoring results.
  - The department adapted deer management methods in agricultural landscapes to account for locally higher abundance, while maintaining a landscape-scale, ecological zoning approach to deer management.
- Mainland moose—The department completed a distribution analysis for the endangered mainland moose, using sighting records and results of the Deer and Moose Pellet Group Inventory for the period 1999–2011. This information is used in conjunction with the provincial ecological land classification to define mainland moose concentration areas and to update special management practices.
- The department updated the Action Plan for the Recovery of Eastern Moose (*Alces alces americana*) in mainland Nova Scotia.
- The department led several opportunities to acquire large additions to the province's Crown land base, including the purchase of 220 000 hectares of former Resolute Forest Products land in December 2012. The department contributes geoscience, forestry, and biodiversity research and advice to inform government land purchases. In collaboration with Nova Scotia Environment, the department provides information on the biodiversity values of lands under consideration for protection. This helps ensure that with such purchases government considers the protection of species at risk, important ecosystems, and the connectivity between habitats.
- The department co-led the Parks and Protected Areas Plan to conserve biodiversity and increase connectivity. *Our Parks and Protected Areas: A Plan for Nova Scotia* builds on extensive consultations and activities over the last several years. Through these consultations, members of the public, including Nova Scotia Mi'kmaq, helped identify potential lands for protection and provided input about our provincial parks.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.

- The department collaborated with researchers and practitioners from the federal departments of Fisheries and Oceans and Natural Resources, Nova Scotia Environment, and staff from the New Brunswick Department of Natural Resources to develop a new classification of Nova Scotia's coastline. The classification is summarized in *A Physiographic Coastline Classification of the Scotian Shelf Bioregion and Environs: The Nova Scotia Coastline and the New Brunswick Fundy Shore* (see [dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012\\_051-eng.pdf](https://dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012_051-eng.pdf)).
- The department is working to release a set of ecological landscape analysis reports, which will help guide management on Crown land that is appropriate to the ecological context.
- The department uses Strategic Resource Analysis to account for, evaluate, and forecast species habitat requirements over time.
- The department developed a Landscape Modelling Framework (LMF) with the Applied Geomatics Research Group (AGRG). AGRG is a team of research scientists, research associates, and graduate students applying a suite of geomatics technologies to explore environmental, health, and social issues. The LMF is a multi-scale, species-independent framework for habitat characterization, using GIS. It provides tools to classify and quantify the landscape, prepare data, and export information for use in statistical analysis and modelling.

# 25 Improve efforts to support the recovery of populations of species at risk.

## WHAT WE'RE DOING

- Bats—The department partnered with the Mersey Tobeatic Research Institute to create two tools for the public to report bat sightings: a telephone hotline and a simple online reporting form. DNR demonstrated national leadership by initiating the assessment of three bat species threatened by the progression of white-nose syndrome. The three species are now designated as endangered by the Committee on the Status of Endangered Wildlife in Canada.
- The department collaborated with the Mi'kmaq on developing a recovery plan for black ash, a threatened tree species of cultural and economic importance to the Mi'kmaq.
- Boreal felt lichen—The department improved the efficacy of the GIS-based Boreal Felt Lichen (BFL) Habitat Model to predict BFL occurrence and managed harvesting around BFL areas.
- Canada lynx—The department worked with partners to assess the efficacy of the 100-metre buffers required by the interim special management practice around all highland bogs within the defined Canada lynx management area.
- Mainland moose—The department completed a distribution analysis for the endangered mainland moose, using sighting records and results of the Deer and Moose Pellet Group Inventory for the period 1999–2011. This information is used in conjunction with the provincial ecological land classification to define mainland moose concentration areas and to update special management practices. Resource-use planning and operations will be conducted in these areas to minimize impacts to this endangered species and aid in its recovery.
- The department updated the Action Plan for the Recovery of Eastern Moose (*Alces alces americana*) in mainland Nova Scotia.
- Eastern mountain avens—The department is working with the Nature Conservancy, local community, and researchers to conserve and restore bog habitat for this endangered plant, which occurs only at two locations globally, in western Nova Scotia and in the northeastern USA.
- The department accepted all of the Auditor General's recommendations relating to the protection and recovery of species at risk and related long-term planning, outlined in the Auditor General's June 2016 report on species at risk. To improve efforts to support the recovery of populations of species at risk, the department is developing a comprehensive multi-year work plan that will be released by October 31, 2016. The work plan will use a risk management approach to prioritize the most critical tasks relating to recovery and monitoring plans and the establishment of recovery teams. It will include a process to formally track and respond to new recommendations from recovery teams.

## 26 Collaborate with others to complete a network of conservation areas to support the protection of biodiversity and the connectivity of landscapes.

### WHAT WE'RE DOING

- The department co-led the Parks and Protected Areas Plan with Nova Scotia Environment to conserve biodiversity and increase connectivity. Released in 2013, *Our Parks and Protected Areas: A Plan for Nova Scotia* builds on extensive consultations and activities over the past several years. Through these consultations, members of the public, including Nova Scotia Mi'kmaq, helped identify potential lands for protection and provided input about our provincial parks.
- The department worked collaboratively with Nova Scotia Environment and consulted with municipalities, the Nova Scotia Mi'kmaq, community groups, industry, non-governmental organizations, and hundreds of individuals to complete the designation of more than 100 properties as wilderness areas, nature reserves, and parks. These designations mean that 12.26 per cent of Nova Scotia's landmass is now protected.
- The department became a part of the Atlantic Habitat Partnership Initiative with the Government of Canada, Atlantic provincial governments, and Ducks Unlimited Canada. The aim of the partnership is to protect, maintain, and restore over 16 000 hectares (40,000 acres) of key wetlands in all four Atlantic provinces.
- The department led several opportunities to acquire large additions to the province's Crown land base, including the purchase of 220 000 hectares of former Resolute Forest Products land in December 2012. The department contributes geoscience, forestry, and biodiversity research and advice to inform government land purchases. In collaboration with Nova Scotia Environment, the department provides information on the biodiversity values of lands under consideration for protection. This helps ensure that with such purchases government considers the protection of species at risk, important ecosystems, and the connectivity between habitats.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.
- A Wildlife Division priority is the Crown's acquisition of coastal islands containing important wildlife habitats in areas that support multiple conservation initiatives, such as the Musquodoboit Harbour Ramsar site, the Eastern Shore Islands Wildlife Management/Wilderness Area, and Lobster Bay (Yarmouth County).

## 27 Assess the cumulative impact of human activities on biodiversity and help to avoid, mitigate, or compensate for biodiversity loss, whenever possible.

### WHAT WE'RE DOING

- Landscape Management Framework—The department is implementing this pilot project in cooperation with Port Hawkesbury Paper LLP (PHP) on its Crown land licence. Important ecological goods and services are supported across landscapes, not within forest stands or landowner properties alone. This framework is designed to enable site-scale forestry activities to be planned with a greater understanding of how larger-scale values are affected across landscapes. Planning with better knowledge of accumulated values and impacts will enable decision making that will both help conserve biodiversity and maintain a sustainable forest industry.
- The department conducted numerous meetings with wind energy developers to assess the cumulative impacts of developments on terrestrial habitat and migratory birds, and to provide guidance on strategies to minimize these impacts through project design.

# GOAL 8: EDUCATION AND SHARED STEWARDSHIP

Engage Nova Scotians in understanding, appreciating, and taking care of the province's biodiversity.

---

**28** Provide opportunities for Nova Scotians to learn more about biodiversity and to commit themselves to its stewardship.

## WHAT WE'RE DOING

- The department partnered with the Nova Scotia Federation of Agriculture and Dalhousie University to co-fund the Biodiversity Landowners Guide (BioLOG), a website that provides Nova Scotian farmers and landowners with information, resources, and guidance to successfully implement conservation best management practices on their own land. These practices benefit both agricultural production and biodiversity.
- The department held a three-day open house in June 2013, with over 50 displays that attracted more than 6,000 people. The open house provided visitors the opportunity to learn about the department and the role stewardship plays in managing Nova Scotia's natural resources.
- The department organized and participated in the Kids in the Forest program and participated in the Nova Scotia Envirothon program. These programs give students the opportunity to engage with nature and to think about the natural world around them and the stewardship role they play in it.
- The department created a biodiversity web page that contains information related to wild species, species at risk, ecosystems and habitats, and the sustainable use of wild species. The biodiversity web page will be a focal point for biodiversity knowledge and information in Nova Scotia.
- The department participates in Open Forest Day, which includes family-fun activities along a hiking trail. The trail features information booths and presentations on the role of forests in the environment, the economy, and our lives; basic woods safety; biodiversity in the garden; and more.
- The department conducted public and visitor surveys to better understand how visitors to the Shubenacadie Provincial Wildlife Park use this resource and the educational programs delivered jointly with the Ducks Unlimited Centre. This work will inform future improvements to both the facility and the programs delivered so that Nova Scotians continue to be engaged in the conservation of biodiversity and its stewardship.
- The department worked with Ducks Unlimited Canada and the Atlantic Canada Opportunities Agency to develop a new plan for education and interpretation at the Shubenacadie Provincial Wildlife Park as well as physical improvements to the park and the Ducks Unlimited Canada Greenwing Legacy Centre. These improvements are designed to update the existing high-quality education and outreach programs, provide an improved visitor experience, and continue the work of engaging Nova Scotians of all ages in the stewardship of our biodiversity.
- The Department of Natural Resources (DNR) is looking for new ways to ensure consistent application of appropriate tools for public participation and for deeper engagement with the public in government's

decision-making process. A draft guide on principles and guidelines was built on the IAP2 (International Association for Public Participation) philosophy that there is a spectrum of public participation. Feedback was solicited from academics and stakeholders. DNR is now working with the departments of Energy, Environment, and Fisheries and Aquaculture to develop a shared public participation policy built upon that foundational work.

## 29 Work with educators, communities, youth, and non-government organizations to develop and deliver biodiversity education programs.

### WHAT WE'RE DOING

- The department created a biodiversity web page that contains information related to wild species, species at risk, ecosystems and habitats, and the sustainable use of wild species. The biodiversity web page will be a focal point for biodiversity knowledge and information in Nova Scotia.
- The department partnered with the Nova Scotia Federation of Agriculture and Dalhousie University to co-fund the Biodiversity Landowners Guide (BioLOG), a website that provides Nova Scotian farmers and landowners with information, resources, and guidance to successfully implement conservation best management practices on their own land. These practices benefit both agricultural production and biodiversity.
- In cooperation with the Nova Scotia Federation of Agriculture and Dalhousie University, the department published an insert in the *Chronicle Herald* aimed at educating youth about biodiversity on farms and approaches to conservation in the agricultural landscape.
- The department held a three-day open house in June 2013, with over 50 displays that attracted more than 6,000 people. The open house provided visitors the opportunity to learn about the department and the role stewardship plays in managing Nova Scotia's natural resources.
- The department delivered on-site education programs and school outreach programs to students.
- The department organized and participated in the Kids in the Forest program and participated in the Nova Scotia Envirothon program. These programs give students the opportunity to engage with nature and to think about the natural world around them and the stewardship role they play in it.
- The department participates in Open Forest Day, which includes family-fun activities along a hiking trail. The trail features information booths and presentations on the role of forests in the environment, the economy, and our lives; basic woods safety; biodiversity in the garden; and more.
- The department is entering into a partnership with the Halifax Regional School Board and the Shubenacadie Wildlife Park to deliver a biodiversity education program.

# 30 Support action on priority issues, including alien invasive species, climate change, species at risk, habitat protection, wildlife management, and protected areas.

## WHAT WE'RE DOING

- Bats—The department partnered with the Mersey Tobeatic Research Institute to create two tools for the public to report bat sightings: a telephone hotline and a simple online reporting form. DNR demonstrated national leadership by initiating the assessment of three bat species threatened by the progression of white-nose syndrome. The three species are now designated as endangered by the Committee on the Status of Endangered Wildlife in Canada.
- Black ash—The department collaborated with the Mi'kmaq on developing a recovery plan for black ash, a threatened tree species of cultural and economic importance to the Mi'kmaq.
- Boreal felt lichen—The department improved the efficacy of the GIS-based Boreal Felt Lichen (BFL) Habitat Model to predict BFL occurrence and managed harvesting around BFL areas.
- Canada lynx—The department worked with partners to assess the efficacy of the 100-metre buffers required by the interim special management practice around all highland bogs within the defined Canada lynx management area.
- Mainland moose—The department completed a distribution analysis for the endangered mainland moose, using sighting records and results of the Deer and Moose Pellet Group Inventory for the period 1999–2011. This information is used in conjunction with the provincial ecological land classification to define mainland moose concentration areas and to update special management practices. Resource-use planning and operations will be conducted in these areas to minimize impacts to this endangered species and aid in its recovery. The department updated the Action Plan for the Recovery of Eastern Moose (*Alces alces americana*) in mainland Nova Scotia.
- Eastern mountain avens—The department is working with the Nature Conservancy, local community, and researchers to conserve and restore bog habitat for this endangered plant, which occurs only at two locations globally, in western Nova Scotia and in the northeastern USA.
- The department accepted all of the Auditor General's recommendations relating to the protection and recovery of species at risk and related long-term planning, outlined in the Auditor General's June 2016 report on species at risk. To improve efforts to support the recovery of populations of species at risk, the department is developing a comprehensive multi-year work plan that will be released by October 31, 2016. The work plan will use a risk management approach to prioritize the most critical tasks relating to recovery and monitoring plans and the establishment of recovery teams. It will include a process to formally track and respond to new recommendations from recovery teams.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.
- The department co-led the Parks and Protected Areas Plan with Nova Scotia Environment to conserve biodiversity and increase connectivity. Released in 2013, *Our Parks and Protected Areas: A Plan for Nova Scotia* builds on extensive consultations and activities over the past several years. Through these

consultations, members of the public, including Nova Scotia Mi'kmaq, helped identify potential lands for protection and provided input about our provincial parks.

- The department worked collaboratively with Nova Scotia Environment and consulted with municipalities, the Nova Scotia Mi'kmaq, community groups, industry, non-governmental organizations, and hundreds of individuals to complete the designation of more than 100 properties as wilderness areas, nature reserves, and parks. These designations mean that 12.26 per cent of Nova Scotia's landmass is now protected.
- The department regularly updated the inventory of significant wildlife habitats. It is available at [novascotia.ca/natr/wildlife/habitats/hab-data](http://novascotia.ca/natr/wildlife/habitats/hab-data). Sites of rare species, large concentrations of animals, and rare habitats are mapped, and site data are collected in a database. This information is vital for environmental impact assessments and integrated resource management, and it plays a role in planning for protected areas and in designing wildlife inventories.
- The department is working to release a set of ecological landscape analysis reports, which will help guide management on Crown land that is appropriate to the ecological context.
- The department uses Strategic Resource Analysis to account for, evaluate, and forecast species habitat requirements over time.
- The department formed a collaborative Spruce Budworm Management Team to begin reviewing future priorities and tasks relating to a potential spruce budworm outbreak. The department reallocated resources to future management technology and development tools for use in managing spruce budworm.
- In 2012, the Province of Nova Scotia conducted a pest risk analysis (PRA) on the brown spruce longhorn beetle (BSLB), using the Risk Analysis Framework developed as part of the National Forest Pest Strategy under the Canadian Council of Forest Ministers (CCFM). The area of interest for this PRA was restricted to Nova Scotia, and the triggers that led to its initiation were the new BSLB finds outside the containment area and the need to re-evaluate BSLB risk management in light of successes, failures, and new science. The analysis, which rates the overall risk of BSLB to the forests of Nova Scotia as low-moderate, was published on the CCFM website in 2014 ([ccfm.org/english/coreproducts-forestpests.asp](http://ccfm.org/english/coreproducts-forestpests.asp)).

# 31 Work with others to identify and address emerging biodiversity issues and opportunities for innovation.

## WHAT WE'RE DOING

- The department became a part of the Atlantic Habitat Partnership Initiative with the Government of Canada, Atlantic provincial governments, and Ducks Unlimited Canada. The aim of the partnership is to protect, maintain, and restore over 16 000 hectares (40,000 acres) of key wetlands in all four Atlantic provinces.
- The department led several opportunities to acquire large additions to the province's Crown land base, including the purchase of 220 000 hectares of former Resolute Forest Products land in December 2012. The department contributes geoscience, forestry, and biodiversity research and advice to inform government land purchases. In collaboration with Nova Scotia Environment, the department provides information on the biodiversity values of lands under consideration for protection. This helps ensure that with such purchases government considers the protection of species at risk, important ecosystems, and the connectivity between habitats.
- The department co-led the Parks and Protected Areas Plan with Nova Scotia Environment to conserve biodiversity and increase connectivity. Released in 2013, *Our Parks and Protected Areas: A Plan for Nova Scotia* builds on extensive consultations and activities over the past several years. Through these consultations, members of the public, including Nova Scotia Mi'kmaq, helped identify potential lands for protection and provided input about our provincial parks.
- The department developed *Guidelines for Biodiversity-Rich Landscapes* to inform planning under the Western Crown Lands Conceptual Plan. A biodiversity-rich landscape (BRL) is characterized by a breadth of species and ecosystems, including but not limited to species at risk. The dominant value is conservation. Although resource development can be undertaken in these areas, protection of biodiversity and habitats will guide management and resource extraction.
- The department partnered with the Nova Scotia Federation of Agriculture and Dalhousie University to co-fund the Biodiversity Landowners Guide (BioLOG), a website that provides Nova Scotian farmers and landowners with information, resources, and guidance to successfully implement conservation best management practices on their own land. These practices benefit both agricultural production and biodiversity.
- The department collaborated with the Nova Scotia Department of Agriculture, the Nova Scotia Federation of Agriculture, and landowners on methods to reduce damage caused by nuisance deer and bears on agriculture crops such as blueberries. Regulatory changes were made to create special hunting stamps to make the sustainable harvest of nuisance wildlife easier.
- The department created a Forest Biodiversity Science Advisory Committee to enhance the management of Nova Scotia's Crown-owned woodlands. Members of the committee have experience in biodiversity science, and their independent advice will improve government's capacity to address complex biodiversity conservation and resource-use issues. The committee will focus on helping government identify knowledge gaps that have to be filled for successful implementation of an ecosystem approach to forestry and forest biodiversity conservation.
- The department formed a collaborative Spruce Budworm Management Team to begin reviewing future priorities and tasks relating to a potential spruce budworm outbreak. The department reallocated resources to future management technology and development tools for use in managing spruce budworm.

- The department developed a Landscape Modelling Framework (LMF) with the Applied Geomatics Research Group (AGRG). AGRG is a team of research scientists, research associates, and graduate students applying a suite of geomatics technologies to explore environmental, health, and social issues. The LMF is a multi-scale species-independent framework for habitat characterization, using GIS. It provides tools to classify and quantify the landscape, prepare data, and export information for use in statistical analysis and modelling.
- In response to federal program changes, DNR assumed a leadership role in the collection and transport of suspected rabies specimens for diagnostic testing, in partnership with the departments of Agriculture and Health and Wellness, so that any occurrence of this serious disease is detected as soon as possible, enabling effective wildlife management and public health responses.
- Bellisle Marsh is the largest parcel of Crown land in the Annapolis Valley. It is valuable as wildlife habitat and for hunting, agriculture, and Acadian archaeological resources. DNR designed and completed a new tendering process to award leases to farmers at this site. This process ensures that proposed farming practices incorporate biodiversity conservation and continued use of the site for waterfowl hunting. It demonstrates how an integrated approach to land management can accommodate multiple conservation and sustainable use objectives.

## 32 Cooperate with communities as they identify and implement local actions addressing biodiversity.

### WHAT WE'RE DOING

- Black ash—The department collaborated with the Mi'kmaq on developing a recovery plan for black ash, a threatened tree species of cultural and economic importance to the Mi'kmaq.
- Eastern mountain avens—The department is working with the Nature Conservancy, local community, and researchers to conserve and restore bog habitat for this endangered plant, which occurs only at two locations globally, in western Nova Scotia and in the northeastern USA.
- The department led several opportunities to acquire large additions to the province's Crown land base, including the purchase of 220 000 hectares of former Resolute Forest Products land in December 2012. The department contributes geoscience, forestry, and biodiversity research and advice to inform government land purchases. In collaboration with Nova Scotia Environment, the department provides information on the biodiversity values of lands under consideration for protection. This helps ensure that with such purchases government considers the protection of species at risk, important ecosystems, and the connectivity between habitats.
- The department formed a collaborative Spruce Budworm Management Team to begin reviewing future priorities and tasks relating to a potential spruce budworm outbreak. The department reallocated resources to future management technology and development tools for use in managing spruce budworm.
- The department continues to be involved in multiple community support and stewardship activities to promote wetland and biodiversity stewardship throughout the province, especially in the agricultural sectors. Wetland and waterfowl conservation activities have included a combination of guided walks/tours, education projects, and support for agencies and community groups involved in wetland and waterfowl conservation projects.