RENEW

Report No. 9

1998-99

What is RENEW?

The Wildlife Ministers' Council of Canada answered the call in 1988 for a cooperative response to the growing number of endangered species in Canada by establishing **RENEW**, the committee on the REcovery of Nationally Endangered Wildlife. The committee recognizes the critical importance of joint efforts to protect species at risk. Along with non-governmental organizations, it involves federal, provincial and territorial agencies in coordinating and promoting wildlife conservation. The government agencies each remain responsible for management of species in their own jurisdictions.

The committee's mandate, as outlined in the 1988 strategy, has the following national objectives:

- No endangered species in Canada will be allowed to become extirpated or extinct;
- No new species will be allowed to become threatened or up-listed to endangered;
- When and where possible, extirpated species will be reintroduced to Canada;
- Recovery plans will be prepared for all threatened and endangered species;
- Recovery programs will be initiated, where feasible, to work towards removing species from threatened, endangered, or extirpated status.

The **RENEW** committee is chaired by David Brackett, Director General of the Canadian Wildlife Service, Environment Canada. The committee consists of federal, provincial and territorial wildlife directors and representatives from the Canadian Nature Federation, the Canadian Wildlife Federation, and the World Wildlife Fund Canada. Recovery teams, made up of representatives and experts from a wide variety of organizations, work to ensure the survival of endangered species across Canada. The **RENEW** Secretariat, based at the Canadian Wildlife Service in Ottawa, functions as the link between the **RENEW** committee, the recovery teams and the public.

The **RENEW** committee's activities stem from the work of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), a body of government, academic and non-government experts which lists species at risk and evaluates the level of risk. By April 1998, COSEWIC had listed 307 species at risk.

Over the past 11 years, the RENEW committee's activities have focused primarily on the protection and recovery of terrestrial vertebrates, which includes mammals, birds, reptiles and amphibians. However, the scope of activities is expanding and now includes an ecosystem recovery team and teams for plants.

The RENEW Report is also accessible at
http://www.cws-scf.ec.gc.ca/es/renew/index_e.html

NEW!
Species at Risk in Canada — Web Site
www.speciesatrisk.gc.ca

A new searchable database provides information on species at risk listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) — facts about biology, habitat, population, distribution, risk factors, protection and recovery efforts.

The web site was developed in partnership by Environment Canada (CWS), the Canadian Wildlife Federation, the Canadian Museum of Nature and Natural Resources Canada.

Contents

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Letter from the Chair

It is my pleasure to present the ninth report of the committee on the REcovery of Nationally Endangered Wildlife (RENEW), covering the period 1 April 1998 to 31 March 1999. The report documents a number of recovery successes — and the challenges posed by species that continue to decline despite our efforts. Recovery teams for several plants and an ecosystem have been added under the RENEW umbrella, which until recently focused on terrestrial vertebrates. RENEW will be looking at encompassing more taxonomic groups in the future.

RENEW is undergoing a period of self-evaluation. In consultation with interested parties, we are grappling with how to streamline the existing national recovery system to make it more effective and efficient, while ensuring broader participation of those affected by recovery actions. In 1998/99, consultation workshops on renewing the national endangered species program, held in Hull, Quebec, resulted in several recommendations. These include that: a specified time-frame should be followed in producing recovery plans; habitat should be considered an inherent component of recovery planning; all stakeholders should be involved in the recovery process; jurisdictional responsibilities should be respected; and the cost of species conservation should be shared among all Canadians.

Options being explored to improve the recovery process include adopting a new, more concise format for drafting recovery plans, so that more effort would be directed towards recovery actions instead of plan writing. A two-stage Recovery Plan is being discussed, that would consist of a Recovery Strategy to be developed within a short time frame, followed by a Recovery Action Plan. The concept for a two-stage Recovery Plan was presented to Wildlife Ministers at their meeting in September 1998. As well, the review and approval process is being streamlined to reduce the time required to obtain jurisdictional approval for strategies.

A report outlining recommendations for improving the recovery system is being developed by the National Recovery Working Group, which reports to the Canadian Wildlife Directors' Committee. The group is composed of recovery team members, federal and provincial agency representatives, and a non-government representative. Their report, expected in 1999/2000, will be based on results from the national consultation workshops and discussions within the group and with various stakeholders.

As you read the RENEW ninth report, I am sure that you will be impressed by the number of organizations and individuals involved in recovery activities and their earnest dedication to the recovery of endangered and threatened species. As the second millennium dawns, we must build on the existing cooperation to meet the growing challenges ahead.

Sincerely,

David Brackett
Chair, RENEW

Executive Summary

From broad surveys in the field to isolated captive-breeding programs in zoos and other facilities, RENEW teams undertook extensive recovery activities in 1998/1999. This report details those efforts, and provides a comprehensive overview of the status of RENEW recovery plans and the funding and person years allocated to the recovery of species at risk during the year.

The work of 28 particularly active RENEW teams is featured in the "Species Recovery Updates" section (pages 4-36), which outlines the research/monitoring and recovery actions undertaken in 1998/99, the progress achieved in recovering the species, and the objectives for the 1999/2000 fiscal year. Photographs and range maps accompany these summaries. The activities of five teams that were less active during the reporting period are summarized on page 37. Where recovery actions are on hold, species appear only in the "Status of RENEW Plans Table", pages 42-43.

RENEW team members enjoyed some encouraging results during the year. Captive-bred stocks of whooping cranes were considered to be self-sustaining and representative of the wild population, such that biologists were able to stop collecting whooping crane eggs for captive-rearing. After several years of captive-raised swift foxes being released into the wild, the species was downlisted by COSEWIC in 1998 from extirpated to endangered. In southern Ontario, 14 active Acadian flycatcher nests were found; historically, only 36 nests had ever been reported in Canada. The eastern loggerhead shrike population increased to 31 pairs from 18 pairs in 1997, and the two captive breeding facilities now have a total of 44 founder shrikes. Finally, as a result of recovery work in the South Okanagan, a new species was discovered for Canada: the Merriam's shrew (*Sorex merriami*).

Species at risk recovery often addresses conservation problems that are chronic in nature. The challenges faced in 1998/99 included the decline of Vancouver Island marmot numbers in the wild, to less than 100 individuals (the entire world population); the death over the winter of two of the 10 marmots at the Toronto Zoo; the fledging of only two young by the largest roseate tern colony (50 breeding pairs); and the continued decline in Canada of burrowing owls, at the rate of 16% per year.

In 1998/99, 33 recovery teams were in place covering 37 species. A recovery team was formed for the black rat snake, and for the first time, RENEW recovery teams have been established for plants (Long's braya / Fernald's braya, and the red mulberry). In addition to having one team for the two brayas, multiple-species teams exist for the Acadian flycatcher / hooded warbler, and for the four species covered by the South Okanagan ecosystem plan. There are two teams for each of the loggerhead shrike (eastern and prairie populations) and piping plover (Atlantic and prairie populations). Recovery teams have not yet been formed for the Pacific water shrew, Townsend's mole, northern bobwhite, and the B.C. populations of the northern leopard frog and sage grouse.

During the year, considerable progress was made in developing recovery plans for several species. A recovery plan was approved for Blanding's turtle, bringing to 16 the number of plans that have been approved for species on the 1998 COSEWIC list. The eastern massasauga rattlesnake recovery plan was revised following external review, and will soon be submitted to the RENEW committee for final approval. The review process has been completed for the Acadian flycatcher/hooded warbler and king rail plans, which are now undergoing approval by the responsible jurisdictions. Plans for the Vancouver Island marmot, piping plover, and prothonotary warbler were revised and distributed for external review. A recovery strategy prepared for the Peary caribou, testing a new draft recovery plan format developed by the National Recovery Working Group, is being revised. Plans have been drafted but not yet submitted to RENEW for the black rat snake, spiny softshell turtle, red mulberry, and wood bison. Plans are in preparation for the wolverine (eastern population), blue racer, Lake Erie water snake, South Okanagan ecosystem, and the Fernald's and Long's brayas.

In addition to providing a structure for recovery efforts across Canada, RENEW attracts considerable funding. In 1998/99, 98 donors representing government agencies, companies, non-governmental organizations, universities and others contributed $6.26 million to recovery work. This total does not include the cost of salaries, which amounted to 126.33 person years (PYs), about 17 PYs less than last year's total. Funding of direct expenses increased significantly in 1998/99 over the previous year's value of $4.02 million. Increased funding for the prothonotary warbler, spiny softshell turtle, Vancouver Island marmot, loggerhead shrike, whooping crane, burrowing owl, spotted owl, Peary caribou and marbled murrelet accounts for most of this difference.

Species Recovery Updates

This section details recovery efforts undertaken for RENEW species in 1998/99. The summaries are ordered alphabetically within taxonomic groups: mammals, birds, reptiles, plants, and one ecosystem. The summaries and maps are based on the best available information as of March 31, 1999. While extensive research and recovery activities have been undertaken for many species, for others, recovery activities have been limited. On page 37 at the end of this section, a quick rundown is included of five species for which few recovery activities are currently underway. Species for which recovery efforts are on hold are mentioned in the "Status of RENEW Plans" table (pages 42-43).

Each summary indicates when the species was listed by COSEWIC, and whether it has been listed in the United States and/or by the World Conservation Union (IUCN). If a category is missing, it means the category is not relevant for that particular species. The category definitions given by COSEWIC, the U.S. Endangered Species Act, and by the IUCN are listed on page 37 at the end of this section.

Mammals

American Marten [Newfoundland population] *(Martes americana atrata)*

photo by J.D. Taylor

Recovery

Recovery team chair: J. Brazil, Nfld./Labrador Dept. of Forest Resources & Agrifoods

Recovery plan status: approved 1995

Plan goal: to increase the free-living marten population in Newfoundland to a level at which it will not become threatened with imminent extinction or extirpation

American Marten continued

Research/Monitoring (1998/99):

- research continued on marten demographics; individuals were radio-collared and followed over an extended period; parameters measured included home range, habitat selection, productivity, and mortality;
- marten were surveyed in predominantly black spruce forests in Terra Nova National Park, and factors influencing marten survival were investigated;
- a study continued into the impact of applying modified wood harvesting on local marten populations.

Recovery Actions (1998/99):

- captive breeding of three females and one male continued at Salmonier Nature Park; no young were born in 1998;
- a modified snare and trap were made mandatory in two parts of the island in order to reduce accidental marten mortalities;
- two marten were introduced into remote parts of Terra Nova National Park, where no marten occurred.

Progress (1998/99):

- the population remained stable during the year;
- both animals introduced to remote parts of Terra Nova National Park are doing well;
- two juvenile marten born in the park were found dead in the fall; one of them died in an illegal snare.

Objectives (1999/2000):

- revise the recovery plan and submit a draft for review in 1999/2000;
- continue to meet with the forest industry on devising a strategy to protect sufficient marten habitat in the short and long term;
- continue to consider establishing a provincial ecological and wildlife reserve in the Little Grand Lake area to protect the core marten population.

Status

COSEWIC: Not at Risk, 1979; Threatened, 1986; Endangered, 1996

Latest population estimate: about 300 marten in Newfoundland (1998)

Present causes for concern: habitat loss from timber harvesting and fires; accidental trapping and snaring; competition with other mammals for prey species

Peary Caribou [Banks Island, High Arctic and Low Arctic populations]

(Rangifer tarandus pearyi)

Recovery

Recovery team chair: A. Gunn, N.W.T. Dept. of Resources, Wildlife and Economic Development

Recovery plan status: a draft National Recovery Strategy is currently being edited and reviewed

Plan goals: to prevent extinctions; to enable Endangered populations to improve their status to Threatened; to enable Threatened populations to improve their status to Vulnerable

Research/Monitoring (1998/99):

- Western Queen Elizabeth Islands (Bathurst Island): monitored calf production; sampled plant biomass and collected caribou antlers for genetic analysis of population structure;
- Banks Island and northwest Victoria Island: monitored population size and structure and calf production;
- Banks Island: completed 5-year research on diet, habitat, snow conditions, and caribou condition in winter;
- Melville, Banks and Victoria islands and mainland: initiated genetic analysis of population structures and relationships;
- Banks Island and northwest Victoria Island: collected wolf scats to determine diet and potential impacts of wolf predation on caribou; Sachs Harbour (Banks Island) has requested research on the effects of wolves on caribou.

Recovery Actions (1998/99):

- held meetings with stakeholders to draft regional implementation plans;
- held a Population Viability Analysis meeting, using predictive modeling to guide recovery planning.

Progress (1998/99):

- the harvest quota was continued on Banks, northwest Victoria, and Bathurst islands.

photo courtesy Parks Canada

Peary Caribou continued

Objectives (1999/2000):

- finalize and approve implementation plans for the Inuvialuit Settlement Region and Nunavut;
- develop methods to determine population boundaries, and to estimate trend in population size, vital rates and immigration/emigration for the eastern Queen Elizabeth Islands;
- establish a program to monitor trends for Prince of Wales-Somerset islands-Boothia Peninsula caribou, and initiate research on gaps in ecological knowledge;
- monitor spring movements between Prince of Wales and Somerset islands;
- monitor calf production on Banks, northwest Victoria, and Melville islands;
- use satellite telemetry to determine seasonal movements and estimate mortality on Banks and Victoria islands;
- determine timing, locations and mortality during seasonal sea-ice crossings of caribou on Victoria Island (Dolphin and Union herd);
- establish community-based monitoring of winter conditions, snow conditions and wolf diet on Banks, northwest Victoria and Melville islands;
- implement wolf management on Banks Island, if necessary.

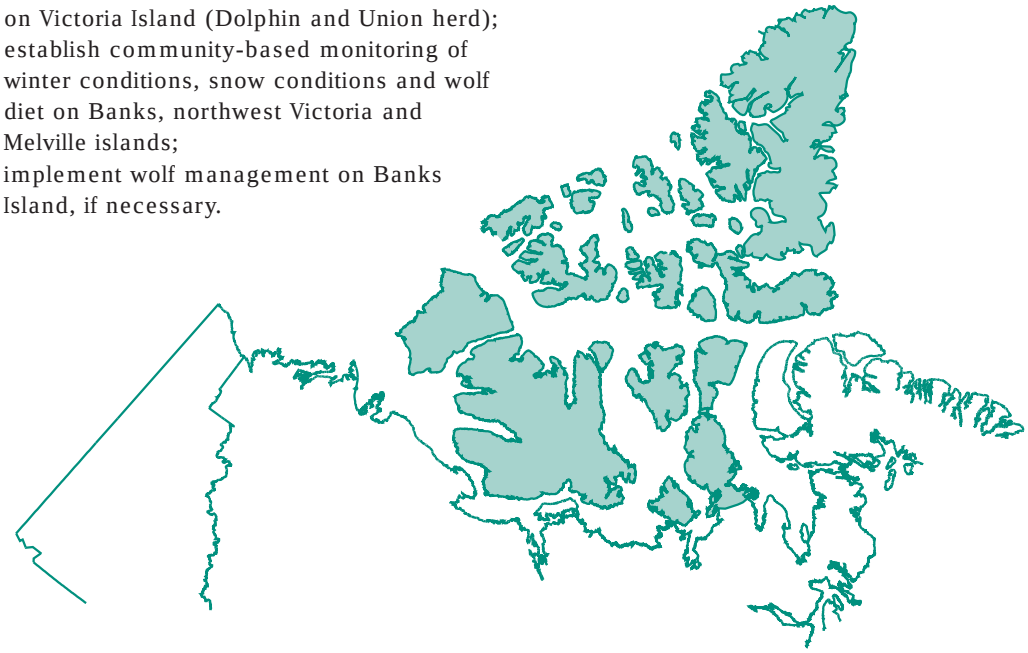
Status

COSEWIC: Banks Island / High Arctic, Endangered, 1991; Low Arctic, Threatened, 1991

IUCN: Endangered, 1996

Latest population estimate: western High Arctic: 1100 caribou at least one year old (1997); eastern High Arctic: unknown, but hunters report local increases (1997); Banks Island, 365-507 caribou at least one year old (1998); NW Victoria Island, 433-583 caribou at least one year old (1998); Dolphin and Union Herd (Victoria Island) 28,000 caribou, including calves (1997); Prince of Wales-Somerset islands, <100, no calves seen (1995); and Boothia Peninsula (includes barren-ground caribou) 6700 (1995)

Present causes for concern: uncertainty of climate trends for the western High Arctic population; unknown levels of wolf predation; and unknown relationship among muskoxen, wolves, and caribou on Banks and Prince of Wales-Somerset islands



Swift Fox *(Vulpes velox)*

photo by Lu Carbyn

Recovery

Recovery team chair:
S. Brechtel, Alberta Dept. of Environment

Recovery plan status:
approved 1995

Plan goal: to achieve a viable, self-sustaining population of swift foxes, well distributed across suitable habitats on the Canadian prairies, which would result in its removal from the Endangered category by the year 2000

Research/Monitoring (1998/99):

- repeated part of a 1996 census to assess the health of the core population in the Alberta/Saskatchewan border area;
- completed graduate research on the ecology and habitat use of Canadian swift foxes.

Recovery Actions (1998/99):

- continued to integrate swift fox habitat conservation into government land use regulations.

Progress (1998/99):

- after completing a five-year release program, further releases were deferred in 1998/99 to allow analysis of the health and growth of the wild population;
- the census to assess the health of the core population on the Alberta/Saskatchewan border area indicated a stable to increasing population and healthy reproduction; at least 80% of the population is comprised of the wild-borne offspring of released animals;
- the recovery team is poised to achieve its initial goal by the year 2000; the central population in the core area is growing and the range is slowly expanding into adjacent areas.

Objectives (1999/2000):

- strengthen habitat and natal den site protection through established government land-use planning and management programs; incorporate new site and ecological information into management decisions;
- work with the state of Wyoming to define the size and extent of the swift fox population that has spread from Canadian releases into the United States;
- undertake low-level tracking of the Canadian population (focusing on the more easterly range in and around Grasslands National Park) to ensure population survival; document distribution, and prepare for a repeat of the overall census scheduled for the winter of 2000/2001;
- continue production and distribution of communication and educational materials;
- clarify the overall impact of poison and trapping programs aimed at coyotes, and implement management strategies to prevent swift fox mortality;
- integrate and distribute results of graduate research on the ecology and habitat use of Canadian swift foxes.

Status

COSEWIC: Extirpated, 1978; Endangered, 1998

IUCN: Lower risk: conservation dependent (1996)

Latest population estimate: 289 foxes in the wild in Canada, majority on Alberta/Saskatchewan border (1996), plus a small population in adjacent areas of Wyoming, USA

Present causes for concern: small population subject to severe climatic variation; accidental poisoning or trapping; cultivation and industrial development of key mixed-grass prairie habitats; predation by coyotes

Vancouver Island Marmot *(Marmota vancouverensis)*

Recovery

Recovery team chair: D. Janz, B.C. Ministry of Environment, Lands and Parks

Recovery plan status: first plan was approved in 1994; review of a new plan is being coordinated by the RENEW Secretariat

Revised plan goals: to maintain the existing Nanaimo-Cowichan Lake population at not fewer than 200 animals, within the currently known distribution of the species; when a second stable or increasing population of 100-200 animals is discovered or established, to request that COSEWIC downlist the species to Threatened; when a third stable or increasing population of 100-200 animals is established, to request downlisting of the species to Vulnerable

Research/Monitoring (1998/99):

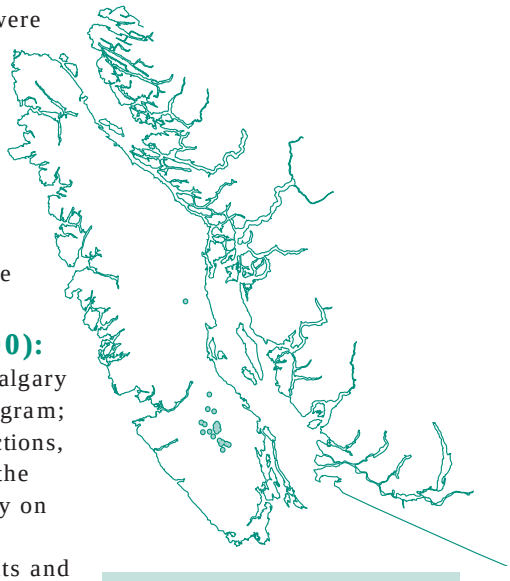
- continued population counts;
- used radio-telemetry to track dispersion of animals;
- collected fecal and blood samples, and tested these for *Yersinia* and other potential pathogens; although several species of *Yersinia* were identified, mortality could not be attributed to a particular pathogen.

Progress (1998/99):

- the Marmot Recovery Foundation was established and obtained Registered Charitable status; the Foundation is tasked with implementing the recovery plan and raising the funds necessary to do so;
- there were 237 "adoptions" of marmots in 1998, including adoptions from Finland, Japan, Switzerland and the Czech Republic (up from 102 adoptions in 1997);
- musicians from Victoria organized a "Marmot-Aid" benefit concert;
- over 4000 people responded to the "Save the Marmot" campaign;
- the BC government and MacMillan Bloedel Limited each pledged $1 million to support recovery efforts;
- a conceptual plan for the Mount Washington breeding facility was completed;

photo by Andrew Bryant

- captive breeding efforts were expanded at the Toronto Zoo (another 4 marmots were added to the original 6; 2 of the 10 subsequently died), and the Calgary Zoo received 4 marmots in August to establish a second captive colony.



Objectives (1999/2000):

- add 6-8 animals to the Calgary Zoo captive-breeding program;
- plan additional reintroductions, habitat assessment, and the dedicated breeding facility on Vancouver Island;
- continue population counts and radio-telemetry work;
- continue public extension activities;
- initiate a graduate study of habitat availability for reintroduction.

Status

COSEWIC: Endangered 1979

U.S. and IUCN: Endangered 1984; reconfirmed by IUCN in 1996

Latest population estimate: fewer than 100 individuals (1998)

Present causes for concern: small population and confined geographic distribution (90% within ~150 km^2); structural population change (>50% of the world's population now lives in regenerating clearcuts); associated impacts due to logging; disease; and predation by cougars, wolves and eagles

Wood Bison *(Bison bison athabascae)*

Recovery

Recovery team chair: C. Gates, University of Calgary

Recovery plan status: in draft

Plan goal: to re-establish a minimum of four viable, healthy, free-roaming wood bison populations in their original range, and other herds where the potential exists; and to establish long-term cooperative management programs for wood bison in which rural communities and Aboriginal people play an integral role

Research/Monitoring (1998/99):

- census done of the Yukon herd in March 1999 (450 bison);
- continued research on the effects of prescribed burning on riparian meadow habitat in the Slave River Lowlands;
- continued to actively monitor and exclude bison in a Bison Control Area, to protect the Nahanni and Mackenzie herds from infection by diseased bison dispersing out of Wood Buffalo National Park;
- completed a disease risk assessment for captive wild bison and cattle;
- initiated two graduate research projects to: (a) incorporate local ecological knowledge in a landscape model to predict the occurrence of infected bison; and (b) determine a culturally acceptable direction for long-term management of the recovery project, through a study of the attitudes of First Nations people to the Hook Lake project in Fort Resolution, NWT;

Status

COSEWIC: Endangered, 1978; Threatened, 1988

U.S.: Endangered in Canada, 1970

IUCN: Lower risk: conservation dependent, 1996

Latest estimate: 3500 (2800 in six wild populations, and 700 disease-free animals in four captive breeding herds)

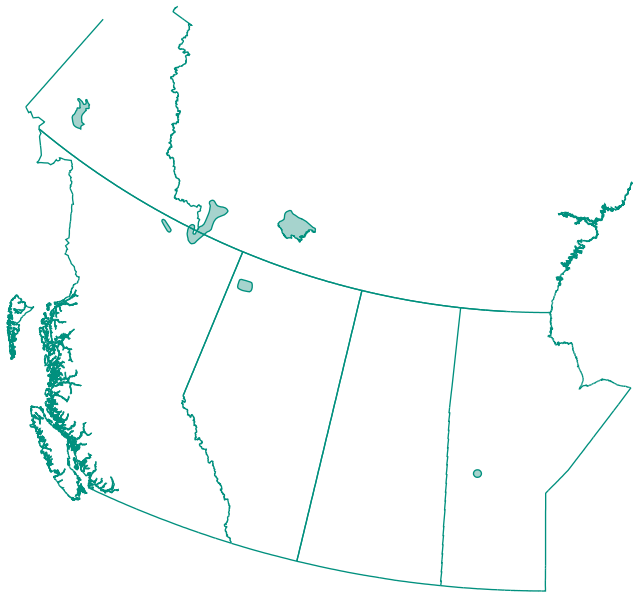
Present causes for concern: some herds infected with tuberculosis and brucellosis; potential for infection of other populations; small number of viable populations; genetic impoverishment of some populations; expansion of bison ranching and escape of commercial plains bison into the wild; loss of habitat to agriculture; containment of a wild plains bison herd; wolf predation; poaching; and accidental deaths

photo by Cormack Gates

- continued graduate research on the population genetics of bison;
- initiated a study of competition between woodland caribou and the rapidly increasing wood bison herd in the Aishik Lake area of southern Yukon;
- continued the Hook Lake Wood Bison Recovery Project to determine the feasibility of eliminating disease by capturing and treating wild juveniles;
- monitored the population status of the Little Buffalo River herd (west of the Slave River);
- conducted aerial surveys to determine size and composition of the Nahanni herd, and composition of the Mackenzie herd;
- conducted a course on post-mortem of diseased bison (Fort Resolution, NWT);

Wood Bison continued

- surveyed the Chitek Lake population, and radio-collared two more animals (to total 5);
- censused the Hay Zama herd;
- COSEWIC has commissioned a 10-year review on the status of wood bison.



Recovery Actions (1998/99):

- 19 wood bison were moved to a holding site in northeastern BC to be habituated before release to the wild;
- the recovery team met to review a draft national recovery plan, coordinate activities, and review policy;
- a meeting of stakeholders was held to discuss recovery actions and wood bison management in northeastern BC;
- BC drafted a provincial recovery plan, which is being implemented, and undertook to complete the national plan;
- work continued towards a transfer of wood bison from Canada to Russia;
- the Yukon released a new management plan.

Progress:

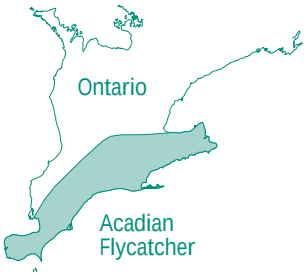
- Slave River Lowlands captive bison herd now numbers 59 disease-free animals, 10 of which are pregnant two-year-old females;
- a disease risk assessment estimated the probability of healthy wood bison herds adjacent to Wood Buffalo National Park becoming infected at one in eight years for brucellosis and one in six years for tuberculosis;
- the reintroduction of wood bison to Alaska is stalled as the U.S. Fish and Wildlife Service considers the proposal;
- a wood bison recovery area in BC has been proposed, which would compliment those in Alberta, the NWT and Yukon.

Objectives (1999/2000):

- release a paper on the cultural and natural paleohistory and recent history of wood bison in Alaska based on traditional knowledge, radiocarbon dates, and subfossil evidence;
- complete the national recovery plan;
- monitor the status of populations;
- conduct a risk assessment for brucellosis and tuberculosis, and contribute to the development of management guidelines to protect healthy wild and captive herds of bison in the risk zone.

Acadian Flycatcher *(Empidonax virescens)* and Hooded Warbler *(Wilsonia citrina)*

Acadian Flycatcher photo by S.J. Lang/VIREO



Recovery

Recovery team chair: M. Cadman, Canadian Wildlife Service

Recovery plan status: in draft

Plan goal: to improve the status of the hooded warbler and Acadian flycatcher in Canada, such that their status will be down-listed to Vulnerable and Threatened, respectively

Status

COSEWIC: Acadian flycatcher, Endangered, 1994; hooded warbler, Threatened, 1994

Latest population estimates: Acadian flycatcher: 35-50 pairs (1998); hooded warbler: 144-207 pairs (1998)

Present causes for concern: drastic reduction of habitat due to agriculture and development throughout the Canadian range

Research/Monitoring (1998/99):

- conducted an extensive survey of known and potential nesting sites (1998);
- conducted research on habitat use, productivity and effects of logging in South Walsingham.

Recovery Actions (1998/99):

- commenced conservation activities in four of the five Core Conservation Areas (habitat management in Lambton County Woods; community-based conservation actions in Fonthill and Skunk's Misery);
- saved one important property in Elgin County from development, and achieved modification of the logging plan of another.

Progress (1998/99):

- as a result of the 1998 survey, 14 Acadian flycatcher nests were found, and it was determined that wooded ravines are an important nesting habitat for this species;
- work began on a "habitat needs" brochure for distribution to landowners, planners, land managers and foresters;
- a study was initiated on the use of canopy gaps by hooded warblers, to provide input to forest managers.

Objectives (1999/2000):

- continue developing community-based conservation activities in Core areas;
- commence forest restoration work in Short Hills Provincial Park;
- research the use of canopy gaps by hooded warblers;
- inform all landowners, Conservation Authorities and municipalities of the presence of the species on their properties, and provide a brochure on habitat conservation needs;
- commence an initiative to reduce diameter cutting and encourage long-term sustainable use of forests;
- continue research into the effects of logging and silvicultural techniques on both species;
- identify additional Core Conservation Areas;
- continue habitat management in Lambton County Forest;
- commence long-term, volunteer-based monitoring of key sites;
- commence banding and expand productivity studies.

Burrowing Owl *(Speotyto cunicularia)*

Recovery

Recovery team chair: G. L. Holroyd, Canadian Wildlife Service

Recovery plan status: approved 1995

Plan goal: to increase populations of this species in Canada to self-sustaining levels, such that the species is no longer considered Endangered or Threatened

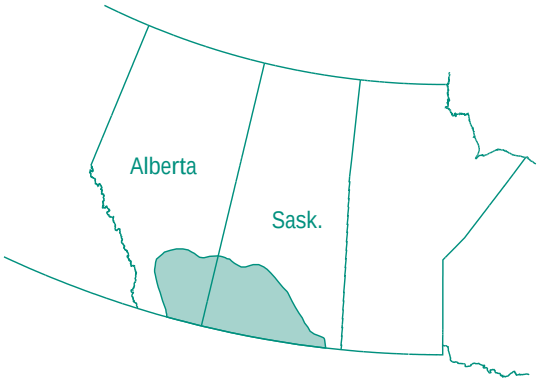
Research/Monitoring (1998/99):

- conducted the second year of a post-fledging survival study; found that 44% died in the second half of the summer;
- conducted an inventory of owls in prairie dog colonies in and near Grasslands National Park, Saskatchewan;
- reviewed five years of trend block surveys;
- undertook the first year of a male foraging study;
- field tested a roadside survey technique for use across the continent.

Recovery Actions (1998/99):

- finalized protocol for use of artificial burrows in research projects;
- BC began Phase II of its reintroduction program, focusing on habitat enhancement, now that captive breeding and release techniques have been developed;
- experimental releases of captive bred owls resulted in pairings with wild owls in southern Saskatchewan and BC;
- Moose Jaw opened a burrowing owl interpretive center near the Trans-Canada highway;
- use of captive-raised owls for public education was expanded during the year.

photo by Lorne Scott



Status

COSEWIC: Threatened, 1978 and 1991, Endangered, 1995

Latest population estimate: 1000 breeding pairs in Alberta and Saskatchewan (1995); extirpated in BC and Manitoba.

Present causes for concern: continuing decline in population (16% per year); low productivity due to limited food supply; high summer mortality; limited information on migration and winter ecology

Progress (1998/99):

- the populations being studied increased in 1998 for the first time since monitoring began; the increase was the result of a greater number of young being produced in 1997 because of high prey populations;
- review of five years of trend block surveys showed an 85% decline in central Alberta, but a stable population in the Eastern Irrigation District in southern Alberta; landowners across both provinces continue to report declines;

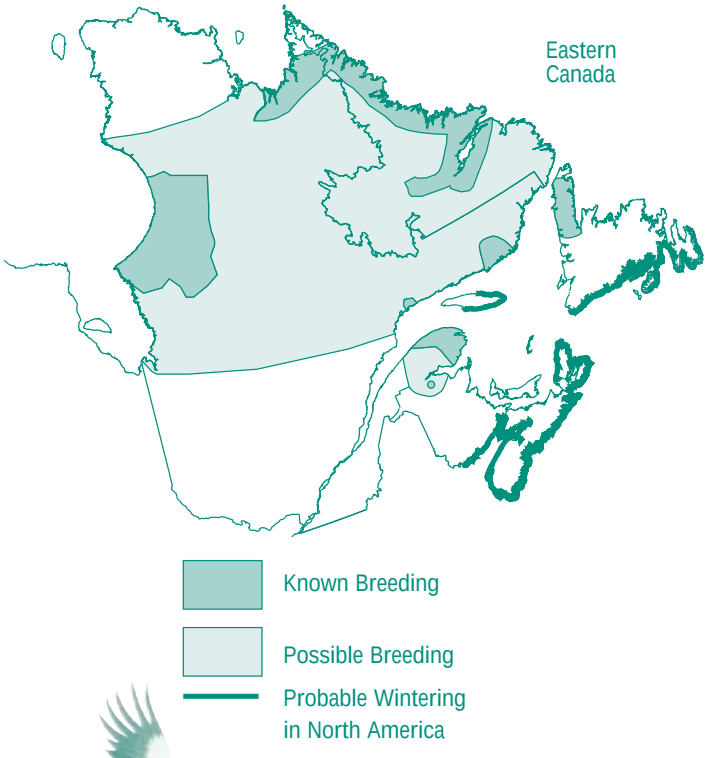
Burrowing Owl *(Speotyto cunicularia)*

- the second International Burrowing Owl Symposium concluded that burrowing owls are declining across a significant portion of the species' range in western North America;
- population models showed that low productivity may be the major factor driving the decline of this species;
- the inventory of owls in prairie dog colonies in and near Grasslands National Park found low productivity in the park and moderate productivity outside the park;
- two owls from Saskatchewan were found wintering in south Texas and northern Tamaulipas;
- a major owl wintering area was located in central Mexico;
- male foraging study showed highly variable home range size;
- Operation Burrowing Owl membership declined due to perceived threats from a proposed federal endangered species law.

Objectives (1999/2000):

- continue to support landowner stewardship through Operation Burrowing Owl in Saskatchewan and Operation Grasslands Community in Alberta;
- continue experimental releases of captive-bred owls in Saskatchewan and BC;
- investigate the foraging behaviour of males to gain insight into the lack of productivity;
- determine the severity and causes of post-fledging mortality of adults and young;
- study the winter ecology of burrowing owls in central Mexico;
- use stable isotope ecology to determine the origin of wintering owls.

Harlequin Duck [Eastern population] *(Histrionicus histrionicus)*



Recovery

Recovery team chair: W.A. Montevecchi, Memorial University

Recovery plan status: approved in 1994

Plan goal: to increase the eastern North American population of harlequin ducks to a level where its status can be down-listed to Vulnerable

Research/Monitoring (1998/99):

- expanded satellite telemetry research of the previous year in northern Quebec and in northern Labrador;
- conducted survey of breeding grounds in western Newfoundland;
- intensified winter surveys in Newfoundland;
- banded birds in Newfoundland, Labrador, Quebec and Maine;

Harlequin Duck continued

- obtained blood and fecal samples for research on genetic relationships and food habits, respectively; samples are being consolidated to develop research papers for eastern North America.

photo by Tom Vezo/VIREO

Recovery Actions (1998/99):

- continued to implement public information programs including distribution of brochures and videos;
- continued to develop partnership agreements;
- contracted an updated status report which was reviewed and is now being revised.

Progress (1998/99):

- confirmed that birds in the northern part of the breeding range overwinter off the western coast of Greenland;
- both satellite telemetry data and an initial analysis of tissue samples collected for genetic research support the possibility of there being two populations of harlequins in eastern North America: a northern population that winters in Greenland, and a southern population that winters in the U.S.;
- U.S. researchers are colour-banding harlequins on their Maine wintering grounds and Canadian banding efforts are intensifying to contribute to our understanding of the size, movement and survival rate of the eastern North American population.

Objectives (1999/2000):

- focus on colour-banding and in some instances nasal-tagging birds to explore movement patterns in eastern North America;
- collect blood and fecal samples throughout the range of the eastern population(s), to augment the research on genetic relationships, feeding ecology, and food requirements of harlequins in eastern North America;
- attempt to assess the population size and distribution of harlequin ducks in Greenland (where anecdotal evidence suggests that the population may be below the old and often quoted number of 5000 birds).

Status

COSEWIC: Endangered, 1990

Latest population estimate: 1200-1500 individuals in Eastern Canada (1998)

Present causes for concern: habitat loss and degradation due to hydroelectric development and other natural resource extraction industries; oil pollution at sea; low population in eastern North America; increasing disturbance from adventure tourism; possible disturbance from military low-level flying; accidental hunting mortalities, and possibility of poaching

Henslow's Sparrow *(Ammodramus henslowii henslowii)*

photo by George Peck

Recovery

Recovery team chair: R. Pratt, Canadian Wildlife Service

Recovery plan status: approved 1994

Plan goal: to maintain or enhance the wild population of Henslow's sparrow nesting in Canada, to the point where the population is stabilized at a level permitting the removal of its Endangered status by COSEWIC

Research/Monitoring (1998/99):

- no further directed surveys have been undertaken; surveys have been found to be unproductive for this species.

Recovery Actions (1998/99):

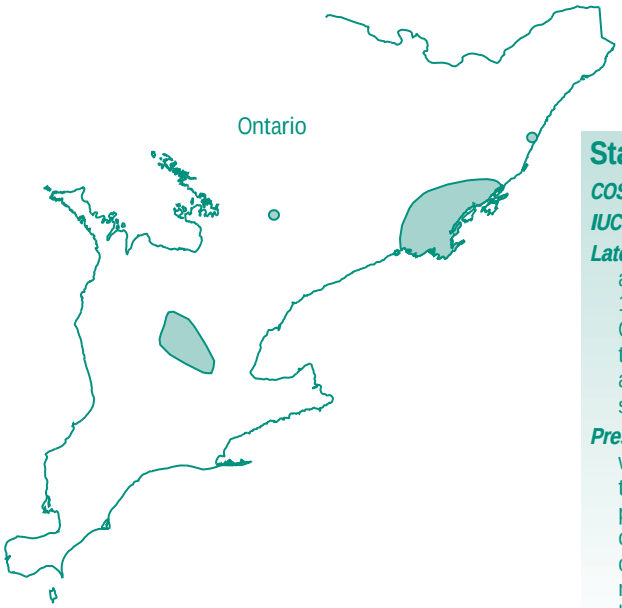
- habitat management was initiated at Ostrander Point in Prince Edward County: approximately 1/3 of the area identified for treatment in the 1997/98 management plan was mowed and cleared of brush.

Progress (1998/99):

- while there is no evidence of current breeding in Canada, there are breeding populations in New York State, not far from the Prince Edward County area of Ontario;
- these breeding colonies are thought to be the most likely source of the unmated birds still occasionally seen in Southern Ontario;
- if suitable habitat can be provided near suspected migration routes, there is a possibility for colonization;
- in the meantime, other grassland species will benefit from the habitat management efforts.

Objectives (1999/2000):

- continue habitat management at Ostrander Point in Prince Edward County by mowing another 1/3 of the area;
- monitor managed areas to assess the effects of management practices on grassland and other bird groups.



Status

COSEWIC: Endangered, 1993

IUCN: Lower risk: Near Threatened, 1996

Latest population estimate: between 1991 and 1996, surveys recorded no more than 1 to 3 breeding pairs per year in southern Ontario; in the past two years (1997/98), there have been no records of breeding and only a few sporadic sightings of singing males

Present causes for concern: conversion of wintering habitat in the southeastern U.S. to other uses; vulnerability of a small population inhabiting an isolated area; loss of suitable breeding habitat due to conversion of grassland to cropland, and natural succession of fallow fields to brushland and forest

King Rail *(Rallus elegans)*

Recovery

Recovery plan chair: L. Maynard, Canadian Wildlife Service

Recovery plan status: draft submitted for review

Plan goal: to increase the population size of the king rail in Canada, such that the species is no longer considered Endangered

Research/Monitoring (1998/99):

- finalized a king rail survey protocol, and used it to survey king rails in southern Ontario in the spring;
- developed and field-tested a wetland/king rail habitat assessment model;
- continued a Great Lakes Basin Wetland Atlas project to develop a database of wetlands in the Great Lakes Basin, to consist of a range of attributes for individual wetlands including records of species at risk such as the king rail;
- conducted research to assess wetland function and the impacts of habitat fragmentation, human induced stressors, water level fluctuations and climate change scenarios on core king rail breeding sites ("Wetland Trends Through Time").

Recovery Actions (1998/99):

- contacted all public and private landowners where king rails have been known to occur;
- initiated a project to restore wetlands adjacent to core king rail breeding habitat in the St. Clair area.

Progress (1998/99):

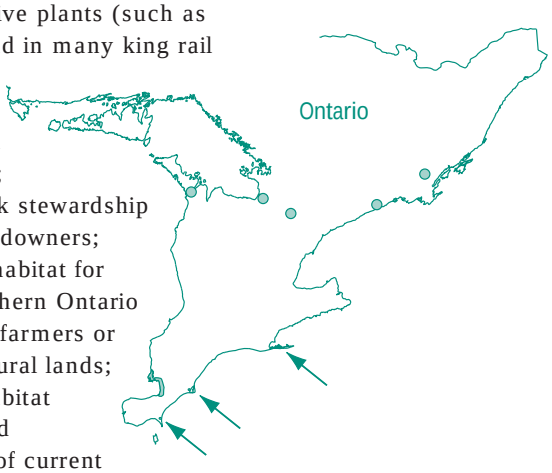
- prepared and reviewed a second draft of the recovery plan.

Objectives (1999/2000):

- conduct an intensive spring survey of king rails in 17 southern Ontario wetlands where they have been previously found;
- synthesize king rail/wetland research for publication and distribution to various audiences;
- develop a preliminary action plan for wetland species of conservation concern, part of a multi-species approach to king rail recovery planning;
- continue the "Wetland Trends Through Time" research project;
- continue the Great Lakes Basin Wetland Atlas project;

photo by D. & M. Zimmerman/VIREO

- investigate wetland plant ecology and management of invasive plants (such as Phragmites spp.) found in many king rail breeding sites and Great Lakes coastal marshes, starting with Long Point, Lake Erie;
- develop species at risk stewardship options for private landowners; much of the existing habitat for species at risk in southern Ontario is privately owned by farmers or is adjacent to agricultural lands;
- further develop the habitat assessment model and investigate the effect of current and past wetland habitat management practices on king rails (such as the effect of burning);
- research and document the status and distribution of king rail populations in the U.S., and establish contact with U.S. researchers studying the species;
- prepare and distribute a king rail fact sheet to increase public awareness.



Status

COSEWIC: Vulnerable, 1985; Endangered, 1994

Latest population estimate: 50 pairs (1998)

Present causes for concern: habitat loss and degradation; human activities such as draining, filling and dredging continue to threaten remaining wetlands in Ontario; very low population size

Loggerhead Shrike [Eastern and Prairie populations]

(Lanius ludovicianus)

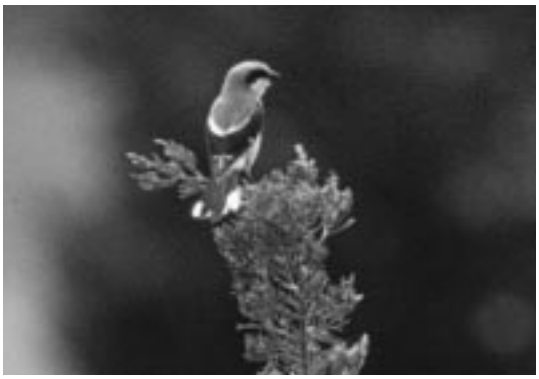


photo by Chris Grooms

Recovery

Recovery team chair: Eastern, R. Wenting, Canadian Wildlife Service
Prairie, B. Johns, Canadian Wildlife Service

Recovery plan status: approved 1993; subject to a five-year review in 1999

Plan goal: to maintain or enhance wild populations nesting in Canada such that their Threatened/Endangered status assigned by COSEWIC may be removed

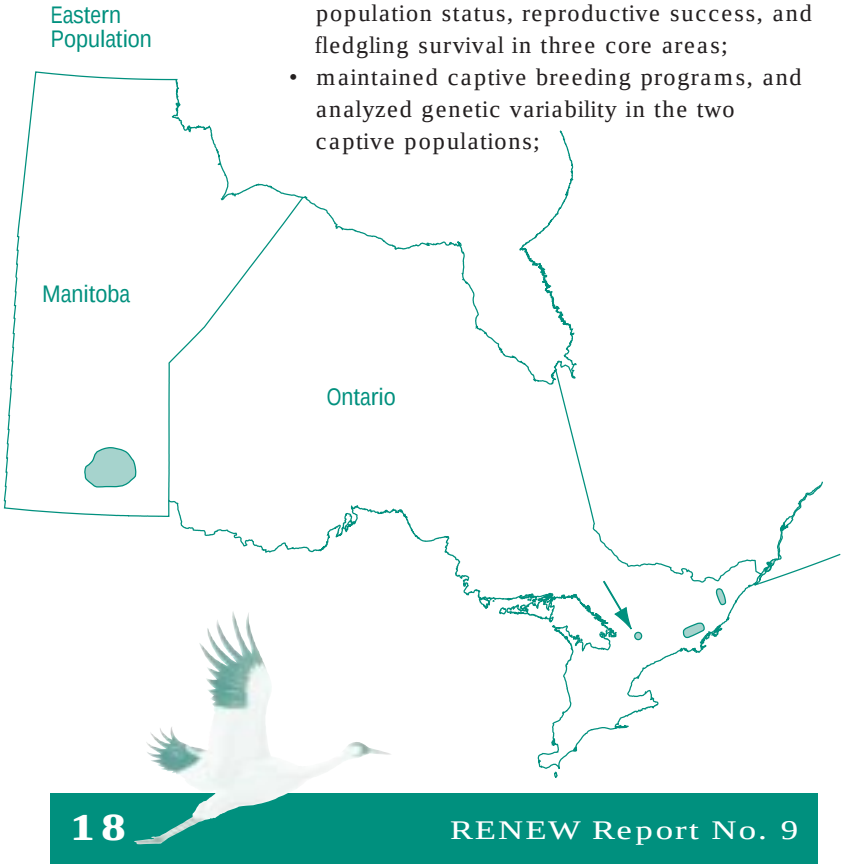
Research/Monitoring (1998/99):

Eastern Team:

- continued field studies to determine population status, reproductive success, and fledgling survival in three core areas;
- maintained captive breeding programs, and analyzed genetic variability in the two captive populations;
- studied effects of road signage and mailbox fliers on traffic speed on rural roads;
- undertook toxicological studies of the road dust suppressant "Dombind", and studies of avian use of treated and untreated roads.

Prairie Team:

- conducted a prairie-wide population survey;
- continued the more intensive monitoring of the southwestern Manitoba population;
- conducted stable-hydrogen isotope analysis of feathers to link breeding and wintering grounds.



Recovery Actions (1998/99):

Eastern Team:

- Ontario Ministry of Natural Resources produced a video on the species for use in landowner contacts, sent information packages to >270 owners of Ontario shrike habitat, and conducted interviews with 20 landowners;
- collected 32 more nestlings to augment the two captive breeding populations;
- completed a protocol for the release of captive-reared birds;
- mapped and characterized habitat for Ontario's Conservation Land Tax Incentive Program at 60 nest sites used in the last 5 years;
- undertook some habitat management in eastern Ontario (cleared overgrown habitat and planted conifers);
- posted signs to reduce vehicle speeding on roads adjacent to breeding habitats, in an effort to reduce road kills.

Prairie Team:

- initiated a nest site database for use in GIS applications related to environmental assessments.

Progress (1998/99):

Eastern Team:

- the number of breeding pairs increased to 31 pairs in 1998 from 18 pairs in 1997 (probably mostly due to milder winter weather), and new sighting locations were noted;

- five birds were produced in captivity; the two captive breeding facilities now have a total of 44 founder birds, representing a broad genetic range of the remaining wild population, and having the potential to produce many young for release to the wild;
- DNA analysis determined there is not much genetic variability in the two captive populations; a computer program has been designed to identify specimens for pairing that would increase the genetic variability;
- landowners in core breeding areas are now better informed about the plight of the loggerhead shrike, and support for conservation efforts has increased;
- Ontario Ministry of Environment is moving towards eliminating use of Dombind on provincial roads;
- the overall adequacy of habitat remains questionable for the species in eastern Canada.

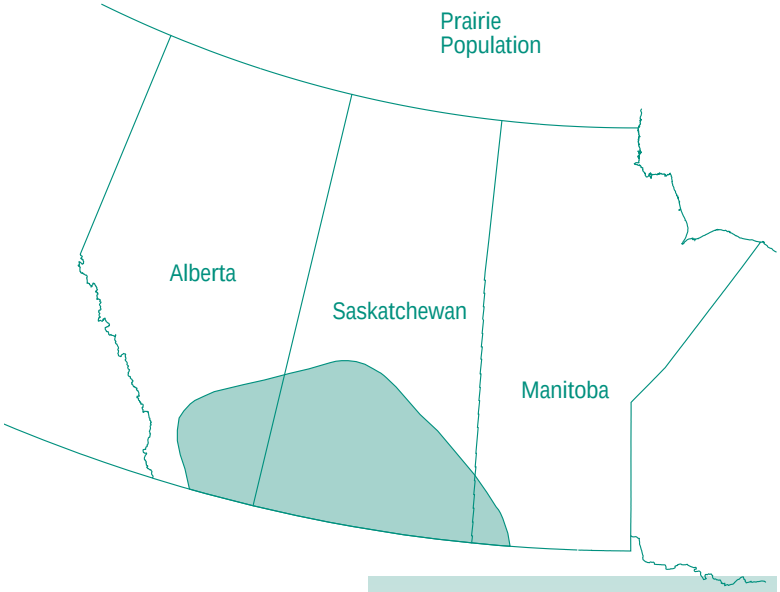
Prairie Team:

- continued population monitoring;
- planted trees under "Operation Grassland Community";
- initiated a status report on the Prairie population.

Objectives (1999/2000):

Eastern Team:

- continue monitoring of populations in core areas, monitoring for shrikes in newly-identified areas, banding of wild population in core areas, and contacts with landowners;
- continue to develop captive propagation skills and begin production of birds for release;
- select potential release sites on properties of cooperating landowners, and identify captive birds for a possible release in 2000 (pending endorsement by both the CWS-Ontario Region and the Ontario Ministry of Natural Resources, and determination by the Eastern recovery team that the established protocol for such a release could be met);
- research release cage design (one breeding pair per cage; both adults and fledglings would be released) and construct a prototype on private property;



- develop communication strategies with Canadian Wildlife Service and Ontario Ministry of Natural Resources relative to potential release;
- undertake the five-year review of recovery plan, and broaden recovery team membership to include representation from landowner/cattlemen associations;
- develop habitat improvement/habitat management guidelines for private landowners, and prepare a habitat conservation strategy;
- maintain maximum viability and genetic variability of the captive population;
- increase the involvement of volunteers in monitoring activities.

Prairie Team:

- finalize the Prairie population status report;
- complete the report on the 1998 prairie population survey;
- continue population monitoring;
- determine the wintering grounds of the Prairie population.

Status

COSEWIC: Eastern pop. Endangered, 1991; Prairie pop. Threatened, 1991

Latest population estimates: Eastern population, Ontario: 31 breeding pairs in 1998 (29 in three core areas of Napanee, Smiths Falls and Carden; one pair on Manitoulin Island; one pair near Alvanley in Bruce County); and 9 single birds; Quebec: 3 single shrikes; Prairie population: no current estimate available; in 1994 and 1996, estimates were: 500 pairs in Manitoba, several thousand pairs in Saskatchewan, and 2500 pairs in a third of the Alberta range

Present causes for concern: habitat loss and degradation; changing agricultural practices that impact on short grass habitat; collisions with vehicles; pesticide contamination; increased human disturbance, and climate change

Marbled Murrelet *(Brachyramphus marmoratus)*

photo by John Deal

Recovery

Recovery team chair:
A. Harfenist, Canadian Wildlife Service

Recovery plan status: the existing plan, approved in 1993, is out of date and requires refocus

Plan goal: to improve the status of the marbled murrelet from Threatened to Vulnerable in Canada

Research/Monitoring (1998/99)

- developed a method to compare and prioritize forest habitat to be protected for marbled murrelets on Vancouver Island;
- continued work to determine multi-scale habitat factors and annual variations that affect marbled murrelets nesting on the west coast of Vancouver Island;
- determined the behaviour and habitat use of marbled murrelets at sea in Barclay Sound and inland in the Carmanah-Walbran area;
- completed a nesting habitat assessment of Tree Farm License 46;
- conducted reconnaissance-level surveys in watersheds along the central coast, and ranked suitability of watersheds for nesting marbled murrelets;
- developed a first estimate of fecundity and adult survival;
- correlated nesting success with forest habitat characteristics on the Sunshine Coast;
- described nests found using radio telemetry in Desolation Sound;
- correlated numbers of detected occupancies with forest structural characteristics in Clayoquot Sound and Sunshine Coast;
- determined nesting densities in Ursus Valley;
- conducted inventories in two watersheds in the Queen Charlotte Islands.

Recovery Actions (1998/99):

- two strategies (Identified Wildlife Management Strategy, Landscape Unit Planning) were released in early spring 1999, both of which provide tools for protecting some marbled murrelet habitat.

Progress (1998/99):

- interim habitat protection measures are in effect for known nest sites, but the total amount of land that can be set aside under the interim measures is limited.

Objectives (1999/2000):

- rewrite the recovery plan to make it more relevant and useful;
- produce a conservation needs assessment for marbled murrelets, summarize research and monitoring results to date, and describe management options.

Status

COSEWIC: Threatened, 1990
U.S.: Threatened, 1992
IUCN: Lower risk: Near Threatened, 1996
Latest population estimate: na
Present causes of concern: loss and degradation of nest sites as old-growth forests are harvested and fragmented, and associated increases in nest predation; oil spills; and possibly drowning in fishing nets

Peregrine Falcon *(anatum) (Falco peregrinus anatum)*

Recovery

Recovery team chair: G. L. Holroyd, Canadian Wildlife Service

Recovery plan status: approved 1987

Plan goal: to enhance the wild population in Canada to a level where it is no longer considered Endangered

Research/Monitoring (1998/99):

- provincial wildlife agencies completed their annual monitoring;
- completed annual monitoring in Wood Buffalo National Park;
- satellite telemetry indicated that one peregrine flew into Hurricane Mitch while trying to cross the Caribbean Sea, and likely perished.

Recovery Actions (1998/99):

- a new release program began in Kelowna, BC in 1998 to reintroduce falcons to the Okanagan valley.

Progress (1998/99):

- monitoring in Wood Buffalo National Park indicated the park population was stable; provincial monitoring data from the past two years were obtained;
- an update status report was submitted to COSEWIC for review.

Objectives (1999/2000):

- draft a new recovery plan;
- secure commitments to undertake the five-year national inventory in 2000;
- continue the Kelowna release program;
- expand the satellite telemetry tracking to determine the timing and routes of migrating falcons and the winter locations.

photo by Geoff Holroyd

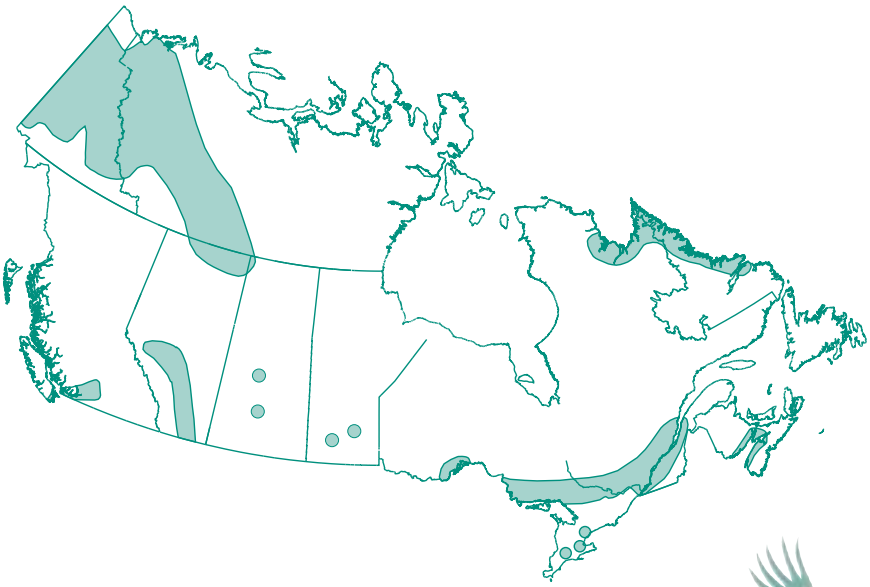
Status

COSEWIC: Endangered, 1978

U.S.: Endangered, 1970, 1984

Latest population estimates: 400 pairs in NWT and YT (1995) and 85 pairs across southern Canada (1995)

Present causes for concern: pesticide use, including organochlorine on wintering range; small population in southern Canada; little protection at nest sites from disturbance such as rock climbers; limited protection for prey habitats



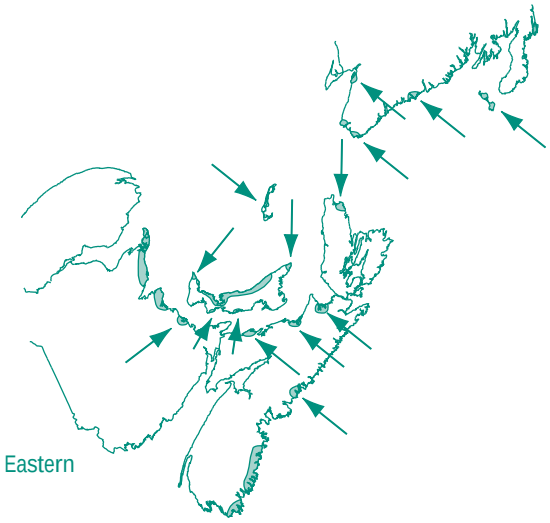
Piping Plover [Eastern and Prairie populations] *(Charadrius melodus)*

Recovery

Recovery team chairs: Eastern, D. Amirault, Canadian Wildlife Service
Prairie, J.P. Goossen, Canadian Wildlife Service

Recovery plan status: approved 1989; a revised plan submitted in 1997 is currently under review

Revised plan goals: to maintain a self-sustaining piping plover population of at least 1626 adults in the Prairie and 670 adults in the Atlantic portions of its range, and to maintain at least the current range of the species



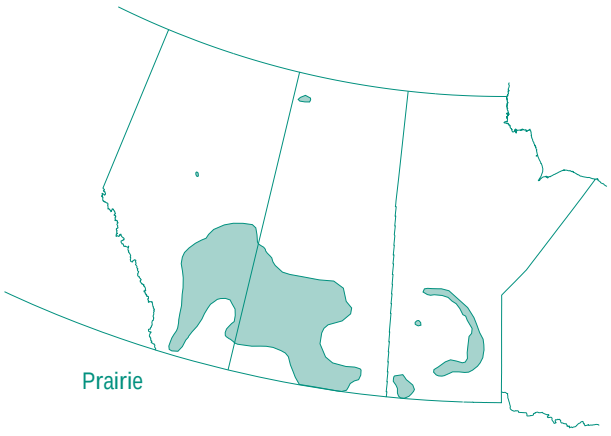


photo by Brian Johns

Research/Monitoring (1998/99):

Eastern Team:

- conducted graduate research using piping plover vocalizations to recognize and monitor individuals;
- completed 1998 mini-census;
- conducted research on Cuban wintering grounds: banding, evaluation of wintering ground populations in Cuba and their habitat;
- initiated banding research on breeding grounds in New Brunswick, Newfoundland, Prince Edward Island and Quebec;
- initiated production of CD version of New Brunswick Piping Plover Atlas;
- updated Prince Edward Island Piping Plover Atlas.

Prairie Team:

- carried out plover surveys at selected sites in Alberta, Saskatchewan, Manitoba and Ontario;
- studied productivity and developed a computer simulation model of piping plovers at Lake Diefenbaker, Saskatchewan;
- continued the Prairie piping plover multi-media atlas, and expanded it to include Great Lakes information;
- carried out a public attitude survey in the Lake Diefenbaker area of Saskatchewan, concerning attitudes on water management and endangered species.

Piping Plover continued

Recovery Actions (1998/99):

Eastern Team:

- continued volunteer-based guardianship programs in all Eastern Canadian provinces;
- enhanced vehicle enforcement on New Brunswick and Prince Edward Island beaches;
- produced "The Piping Plover in Eastern Canada" brochure to assist educational programs within the region.

Prairie Team:

- used predator exclosures in Alberta, Saskatchewan and Ontario;
- established a guardian program at Grand Beach, Manitoba through Manitoba Parks;
- carried out egg and chick translocations at Lake Diefenbaker, Saskatchewan.

Progress (1998/99):

Eastern Team:

- there was an increase between 1997 and 1998 in the number of adult piping plovers counted on beaches in Prince Edward Island (from 60 to 81), and New Brunswick (from 139 to 159), but there was a decline in the number of adults counted in Quebec (from 90 to 72), Nova Scotia (from 98 to 76) and Newfoundland (from 35 to 27);
- corporate sponsorship of piping plover recovery efforts was established.

Prairie Team:

- a graduate project on nest exclosures in Alberta was completed;
- a nest exclosure pilot study was successful in Alberta and Saskatchewan; nest exclosures were used successfully on two western Ontario nests;
- a progress report on the 1997 Lake Diefenbaker piping plover project was completed;
- an Alberta information brochure on piping plovers was revised and published;
- habitat protection efforts at an Alberta site served as a demonstration site for ranchers.

Objectives (1999/2000):

Both Teams:

- complete the piping plover recovery plan and a CWS Occasional Paper on the 1996 Census.

Eastern Team:

- continue graduate research on piping plover vocalizations;
- conduct surveys at selected nesting beaches;
- continue research on Cuban wintering grounds: banding, evaluation of wintering ground populations in Cuba and their habitat;
- continue banding research on breeding grounds in New Brunswick, Newfoundland, Prince Edward Island and Quebec;
- establish guardianship programs in New Brunswick (2) and Quebec;
- initiate production of a CD version of the Prince Edward Island piping plover atlas.

Prairie Team:

- continue use of predator exclosures at various sites;
- continue guardianship program at Grand Beach, Manitoba by Manitoba Parks;
- produce the Prairie and Great Lakes piping plover multi-media atlas;
- monitor piping plovers at various sites.

Status

COSEWIC: Endangered 1985

U.S.: Great Lakes population, Endangered, 1985; northern Great Plains and Atlantic and Gulf Coast populations, Threatened, 1986

IUCN: Vulnerable, 1996

Latest population estimate: 428 and 420 adults in the Eastern population in 1996 and 1998, respectively; and 1687 adults in the Prairie population (1996)

Present causes for concern: continued threats to the species' habitat and reproductive success, including human disturbance, artificial water levels, natural beach succession, and unnatural increases in predator numbers

Prothonotary Warbler *(Protonotaria citrea)*

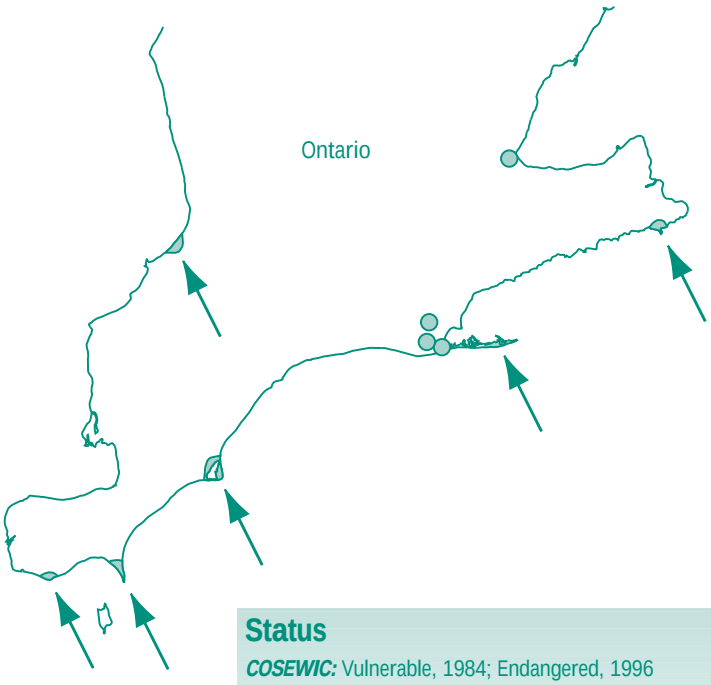
photo by Arthur Morris/VIREO

Recovery

Recovery team chair: J. McCracken, Bird Studies Canada

Recovery plan status: in draft

Plan goal: to increase populations of the prothonotary warbler in Canada to self-sustaining levels, such that the species does not become Extirpated



Status

COSEWIC: Vulnerable, 1984; Endangered, 1996

Recent population estimate: 17 pairs plus 10 unmated males (1998)

Present causes for concern: nesting failures due to competition with house wrens; parasitism from brown-headed cowbirds; shortage of cavity nest sites; destruction of breeding habitat; destruction of wintering habitat (coastal mangrove forest)

Research/Monitoring (1998/99):

- completed preliminary research on reducing competition for nest sites with tree swallows;
- completed preliminary assessment of the status of wintering habitat;
- completed census of the breeding population;
- continued monitoring of breeding success (including parasitism and predation rates).

Recovery Actions (1998/99):

- continued the nest box program initiated in 1997 (170 boxes added), to enhance the breeding habitat and create more nesting opportunities, and to reduce levels of parasitism, predation and inter-specific competition;
- developed an educational brochure aimed at the general public, landowners, land managers, policy makers and naturalists.

Progress (1998/99):

- over 80% of the Canadian population is now nesting in nest boxes;
- the population is showing some signs of recovery in Canada, from about 20 adults in 1996, to 38 in 1997, and 44 in 1998;
- the nest box program has been demonstrated to eliminate cowbird parasitism and greatly reduce mammalian predation.

Objectives (1999/2000):

- continue the nest box program;
- initiate a colour banding study, to determine the extent of emigration from the U.S., site faithfulness, and population turnover;
- assess the level of habitat damage that resulted from an intense wind storm at one of the core breeding sites;
- distribute the educational pamphlet to landowners and the interested public;
- foster the protection of critical wintering habitat (mangrove forest) in the Latin American core wintering area.

Roseate Tern *(Sterna dougallii)*

Recovery

Recovery team chair: S. Boates, Nova Scotia Dept. of Natural Resources

Recovery plan status: approved 1992; revision of plan underway

Plan goal: to maintain the integrity of the current breeding population in Canada and to increase its size to a level at which the status can be down-listed to Vulnerable

Research/Monitoring (1998/99):

- surveyed known roseate tern colonies on Country Island, Grassy Island, and Wedge Island in Nova Scotia;
- surveyed other parts of Nova Scotia for terns generally, and did ground checks to locate roseate tern nesting sites;
- graduate research on roseate terns on Country Island completed.

Recovery Actions (1998/99):

- undertook a tern restoration project on Country Island, which included using noise to scare predatory gulls away from the island so the tern population could re-establish, and organizing mainland school children to construct artificial tern nests for distribution on this and other nearby islands;
- ensured nest shelters were intact and used by the terns on Brothers Island;
- conducted a CBC radio interview on roseate terns to broaden public knowledge;
- drafted a Hinterland Who's Who folder on the roseate tern.

Progress (1998/99):

- roseate terns were discovered for the first time on Dort's Island, near Country Island, and re-discovered on Wedge Island; the pattern of tern movements suggests that roseate terns and other terns occupy clusters of islands and shift from one place to another;
- roseate tern numbers on Country Island increased from one to three pairs;
- roseate terns suffered a particularly poor year on Brothers Island due to predation and rough weather; the island had the highest number of breeding pairs anywhere in Canada (50), but fledged only two chicks;
- the Nova Scotia Endangered Species Act was passed, which will provide legal protection for roseate terns.

photo by Mark Elderkin

Objectives (1999/2000):

- publish the roseate tern Hinterland Who's Who and complete Who's Who video;
- continue population restoration efforts on Country and Brothers islands;
- manage vegetation on Wedge Island (e.g., cut down raspberry bushes to allow grasses to grow and create good nesting habitat);
- cull crows and ravens from Brothers Island, where they were a significant problem in 1998/99;
- COSEWIC to re-assess status of the roseate tern.

Status

COSEWIC: Threatened, 1986

U.S.: Endangered, 1987 (Atlantic coast south to N. Carolina population)

Recent population estimate: about 120 pairs in Canada (1998)

Present causes for concern: low population size over its entire Canadian (predominantly Nova Scotian) range; low survival of young; high predation by gulls during breeding and by humans on wintering grounds; negative effects of toxic chemicals on reproductive success; dependence of the roseate tern on protection from predators enhanced by association with other tern populations, which are also threatened by disturbance and predation

Spotted Owl *(Strix occidentalis caurina)*

photo courtesy Canadian Wildlife Service

Recovery

Recovery team chair: D. Dunbar, B.C. Ministry of Environment, Lands and Parks

Recovery plan status: Two documents have been produced in place of a recovery plan, but the recovery team does not currently view these as an adequate substitute:

- Spotted Owl Management Plan Options Report (Spotted Owl Recovery Team, 1994)
- Spotted Owl Management Plan: Strategic Component (Spotted Owl Management Inter-agency Team, 1997)

In recent years, a few spotted owl pairs have been found outside the area covered by these documents.

Management plan goal: to achieve a reasonable level of probability that owl populations will stabilize, and possibly improve, in the long-term without significant short-term impacts on timber supply and forestry employment

Research/Monitoring (1998/99):

- continued spotted owl inventory and monitoring project;
- banded 33% of known owls for long-term monitoring of known sites, reproductive success and juvenile dispersal success;
- assessed younger forest stands for spotted owl habitat suitability;
- radio-tracked 10 spotted owls to assess their home range and habitat use.

Recovery Actions (1998/99):

- draft resource management plans were completed for 13 Special Resource Management Zones required under the Spotted Owl Management Plan; the plans will provide a critical link and direction between spotted owl management and operational activities.

Progress (1998/99):

- spotted owl inventories located nests and/or critical roost sites; this information was incorporated into resource management planning to reduce the risk of incidental loss of habitats by timber harvesting;
- inventory, monitoring and radio telemetry of spotted owls are ongoing but more information is required before population estimates can be revised or refined;
- spotted owl habitat continues to be eroded, increasing the birds' risk of extinction.

Management Plan Objectives (1999/2000):

- complete spotted owl inventories to identify nests and/or critical roost sites;
- complete habitat inventories in forest stands aged 80-100 years;
- continue to apply leg bands to all individuals for long-term monitoring; revisit banded birds to determine status, site tenacity;
- continue to maintain and update spotted owl databases;
- complete the minimum number of radio-telemetry relocations for each spotted owl to determine home range size and habitat selection;
- complete the evaluation of forest stand attributes in the study area; assess and determine suitable owl habitat;
- implement resource management plans to ensure operational activities comply with the Spotted Owl Management Plan;
- adapt the plans as required to reflect new information that is made available in 1999/2000.

Status

COSEWIC: Endangered, 1986

U.S.: Threatened, 1990

IUCN: Lower risk: Near Threatened (1996)

Latest population estimates: about 100 pairs (1998)

Present causes for concern: loss of old growth forest habitat to timber harvesting; predation by great horned owls; competition with barred owls; toxic pollution resulting in thinned egg shells

Whooping Crane *(Grus americana)*

Recovery

Recovery team chair: B. Johns, Canadian Wildlife Service

Recovery plan status: a second plan was approved in 1993

Plan goal: to increase populations of the whooping crane to the point where its status classification can be improved; a 1995 memorandum of understanding with the U.S. indicated that a population of 1000 individuals is the desired goal

Research/Monitoring (1998/99):

- conducted breeding ground surveys to monitor nesting effort in Wood Buffalo National Park;
- monitored the use of staging habitat in Saskatchewan;
- conducted research regarding the food resources available on the breeding grounds;
- conducted research regarding the causes of chick mortality on the breeding grounds;
- completed an assessment of Interlake, Manitoba, as a potential reintroduction site;
- initiated a study of Wisconsin as a potential reintroduction site;
- completed a winter sites selection study for a reintroduced population.

Recovery Actions (1998/99):

- captive breeding centres of Florida, the Calgary Zoo (2), the International Crane Foundation (7), and Patuxent Wildlife Center (20) raised cranes for release;
- in Canada and the U.S., continued to develop release techniques using trucking and ultralight aircraft to teach migration routes.

Progress (1998/99):

photo by Brian Keating

- the Wood Buffalo population increased from 182 cranes in winter 1997/98, to 183 cranes after the 1998 breeding season (adult and subadult survival was near normal, but chick production was lower than expected, and 18 cranes were lost in a fall storm en route to Texas);
- for the fourth consecutive year, more than 40 pairs of whooping cranes bred in the wild in Wood Buffalo National Park;
- since 1993, 175 captive-bred whooping cranes have been released into the wild in Florida; there are currently 73 cranes in this non-migratory population.

Objectives (1999/2000):

- continue monitoring the Wood Buffalo population;
- continue raising cranes for release in Florida;
- continue research on food resources and causes of chick mortality on the breeding grounds;
- complete the study investigating suitable reintroduction habitat in Wisconsin.

Status

COSEWIC: Endangered, 1978

U.S.: Threatened, 1967; Endangered, 1970 and 1993

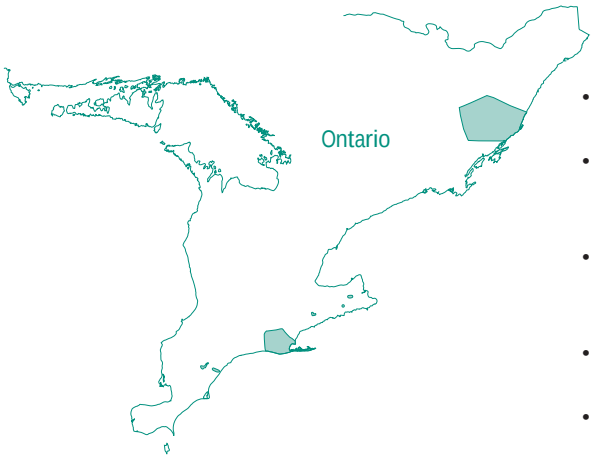
IUCN: Endangered, 1996

Latest population estimate: 183 birds (including 49 pairs) in the Wood Buffalo-Aransas population (1998)

Present causes for concern: small, localized breeding population in Canada; deteriorating winter habitat due to boat traffic, wave erosion and dredging; deteriorating breeding habitat due to drought

Black Rat Snake *(Elaphe obsoleta obsoleta)*

photo by Kent Prior



Recovery

Recovery team chair: S. Thompson, Ontario Ministry of Natural Resources

Recovery plan status: framework for a plan has been drafted

Research/Monitoring (1998/99):

- research to identify habitat requirements, determine amount of land required to protect populations, and effects of habitat fragmentation on individual movement and gene flow among populations;
- analyzed genetic population structure at multiple spatial scales (hibernacula, local populations, regional populations);
- monitored hibernacula populations across the Frontenac Axis, at St. Lawrence Islands National Park, Queen's University Biological Station; and on an ad hoc basis at Murphy's Point and Charleston Lake provincial parks.

Recovery Actions (1998/99):

- interpretive displays and public outreach programs are underway at all provincial parks and St. Lawrence Islands National Park in eastern Ontario.

Progress (1998/99):

- movement patterns, habitat use, and population ecology of the snake are better understood (e.g., documented preference for edge habitat, high gene flow among hibernacula).

Objectives (1999/2000, and beyond):

- map all snake occurrences and locations of hibernacula throughout Ontario and conduct landscape ecology study of Frontenac Axis population;
- identify, characterize, and map new hibernacula locations;
- monitor all populations, especially those in protected areas, and document road mortality;
- circulate St. Lawrence Islands National Park monitoring protocols to Ontario provincial parks for implementation;
- continue research on the dispersal and recruitment of young snakes;
- increase awareness and sensitivity of the public;
- coordinate efforts with the Algonquin to Adirondack conservation initiative to identify areas of high priority;
- work with land trusts and landowners to secure protection of snake habitat; develop habitat protection guidelines for landowners, resource agencies, and municipalities;
- encourage protection of key snake habitat elements (hibernacula, nest sites);
- discourage road construction and upgrading within 200–500 m of hibernacula.

Status

COSEWIC: Threatened, 1998

Latest population estimates: not available

Present causes for concern: habitat loss/alteration (particularly in southwestern Ontario); road mortality; and persecution (including collecting)

Blanding's Turtle [Nova Scotia population] *(Emydoidea blandingii)*

Recovery

Recovery team chair:
T. Herman, Acadia University

Recovery plan status: approved in 1998

Plan goal: to realize a self-sustaining population of Blanding's turtle within the historical range in Nova Scotia

Research/Monitoring (1998/99):

- continued to monitor the Blanding's turtle population in Kejimkujik National Park;
- continued to mark and monitor Blanding's turtles (mostly adults) at a site found outside the park;
- continued a survey of genetic variation in populations throughout the North American range of the species;
- continued study of turtle nest predation by raccoons.

Recovery Actions (1998/99):

- placed screens over nests to protect them from raccoons and other predators.

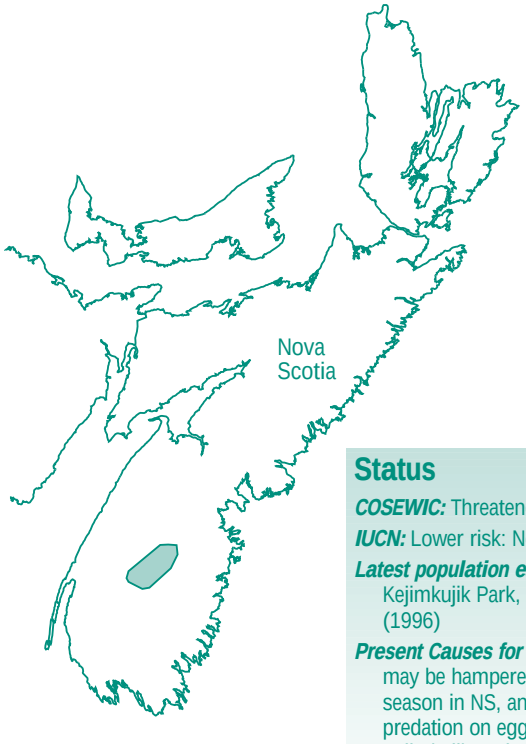
Progress (1998/99):

- genetic evidence to date suggests that Nova Scotia turtles contain a disproportionate amount of the total genetic diversity of the species, and that there may be genetically-recognizable sub-groups within the Nova Scotia population;
- a significant population of adults was found outside the park, and additional juveniles were located at a second site outside the Park.

Objectives (1999/2000):

- continue intensive monitoring of the population recently discovered outside the park (especially at the new juvenile site), including research on seasonal movement patterns, nesting behaviour, and estimates of abundance;
- continue to develop a predictive habitat model, based on data from within the park, to locate any additional populations outside the park, integrating new GIS technology and provincial databases where appropriate;
- continue and expand the assessment of population genetic structure, including paternity assessment within clutches, relatedness among sub-populations within Nova Scotia, and the relationship between NS populations and those elsewhere in North America.

photo by Tom Herman



Status

COSEWIC: Threatened, 1993

IUCN: Lower risk: Near Threatened, 1996

Latest population estimate: 132 adults in Kejimkujik Park, >50 adults outside park (1996)

Present Causes for Concern: clutch success may be hampered by the short incubation season in NS, and by nest flooding; raccoon predation on eggs and young, aggravated in Kejimkujik National Park by development of park facilities near turtle nest site

Blue Racer *(Coluber constrictor foxii)*

photo by Ben Porchuk

Recovery

Recovery team chair (interim):
B. Porchuk, Bird Studies Canada

Recovery plan status: in preparation

Plan goal: to achieve a minimum of two demonstrably secure populations in Ontario and thereby permit the down-listing of designated status from Endangered to Vulnerable

Research/Monitoring (1998/99):

- continued annual population monitoring at hibernacula (over-wintering sites) and by chance encounters (mark-recapture using pit tags);
- continued collection of morphological data;
- conducted regular road kill surveys on the eastern half of Pelee Island (the snake's known range);
- monitored artificial nest sites provided in 1996 for eggs and nesting conditions (e.g., moisture levels, temperature, decomposition rates);
- initiated a two-year radio-telemetry study of female eastern fox snakes, which often share hibernacula and nest sites with blue racers, on the eastern side of Pelee Island, in hopes of discovering additional racer microhabitats.

Recovery Actions (1998/99):

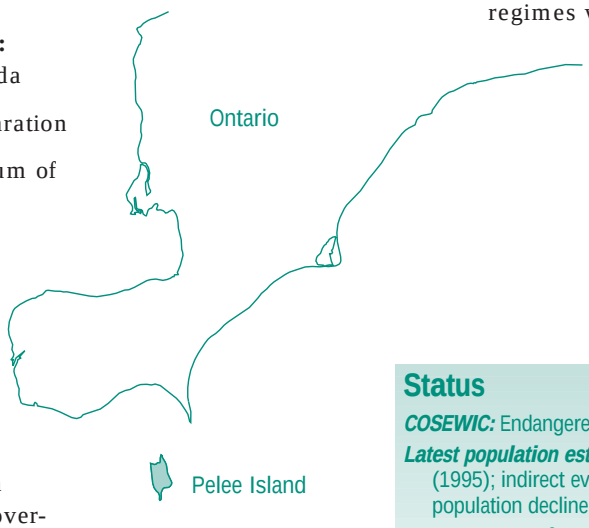
- conducted annual population monitoring;
- acquired a 60-acre property on the eastern part of Pelee Island, containing an important breeding area for blue racers and possibly some hibernacula.

Progress (1998/99):

- the Ontario Ministry of Natural Resources is limiting expansion of the local aggregate company's north end quarry, which will save a few key hibernacula.

Objectives (1999/2000):

- continue population monitoring through mark-recapture and spring funnel-trapping at usual sites and a few new ones;
- continue monitoring of road kills;
- create more artificial nesting sites, and monitor the temperature regimes within them.



Status

COSEWIC: Endangered, 1991

Latest population estimate: 205 adults (1995); indirect evidence of population decline in recent years

Present causes for concern: habitat loss due to increased commercial, residential and cottage development; continued road kill and loss of breeding sites; population numbers may be below minimum viability level

Eastern Massasauga Rattlesnake *(Sistrurus catenatus catenatus)*

Recovery

Recovery team chair:
K. Prior, Canadian Wildlife Service

Recovery plan status: in draft

Plan goal: to achieve viable populations of massasaugas in tall-grass prairie and peatland ecosystems; and to retain the current distribution, structure, and connectivity among local (sub)populations throughout the Bruce Peninsula and Georgian Bay population regions

Research/Monitoring (1998/99):

- continued population monitoring at Bruce Peninsula National Park, Georgian Bay Islands National Park, Killbear Provincial Park;
- began population surveys at Ojibway and Wainfleet;
- continued demographic research at Killbear Provincial Park;
- conducted a detailed analysis of population genetic structure;
- launched a province-wide study of the species' landscape ecology.

Recovery Actions (1998/99)

- launched a Sistrurus Information Network (http://www.terra-plex.com/sin/);
- consulted with Ecoplans on a Bruce West Lands development proposal;
- continued proactive public outreach in all population regions;
- launched the Toronto Zoo "Living with Wildlife" video;
- held a "Rattlesnake Anti-venom and Snakebite Therapy Workshop" at Resort Tapatoo; a "Managing Human-Rattlesnake Interactions Conference" at Killbear Provincial Park; and the second International Symposium on the Conservation and Management of Massasaugas at Toronto Zoo;
- consulted with the U.S. Fish and Wildlife Service on species listing candidacy in the U.S.;
- in September, the recovery team formally commented on the new Fish and Wildlife Conservation Act being proposed by the Ontario Government.

Progress (1998/99):

- efforts in implementing recovery objectives have become better coordinated;

photo by Frances Barry

- recovery efforts were acknowledged through receipt of the Conservation Achievement Award from the Niagara Peninsula Conservation Authority.

Objectives (1999/2000):

- conduct a cooperative ecological research and population monitoring project for the Ojibway & Wainfleet populations;
- design, produce, and distribute a global distribution map poster, re-print the "Wanted Alive" poster, and develop a snake identification guide;
- work to mitigate negative consequences of improving Normandy Road through Lasalle Woods ESA (Ojibway population);
- plan for an experimental re-location study at Bruce Peninsula National Park;
- complete the landscape ecology study;
- conduct population viability analyses for the Ojibway and Wainfleet populations;
- explore options for massasauga reintroduction in cooperation with tallgrass prairie restoration efforts.

Status

COSEWIC: Threatened, 1991

Latest population estimates: 250 in Killbear Provincial Park; probably <100 in each of Ojibway and Wainfleet populations (1998)

Present causes for concern: primarily loss of critical habitat to development (Ojibway population) and natural succession (Wainfleet population), population isolation/reduction through habitat fragmentation, and direct mortality on roads; persecution by humans remains a major cause for concern for all populations

Spiny Softshell Turtle *(Apalone spinifera spinifera)*

Recovery

Recovery team chair: Ontario, M. Oldham and M. Obbard, Ontario Ministry of Natural Resources, Quebec, M. Léveillé, Société de la faune et des parcs, Québec

Recovery plan status: national plan in draft; Quebec plan completed; Ontario plan in draft

Plan goal: down-listing of the eastern spiny softshell turtle from Threatened to Vulnerable in Canada

photo by Mike Oldham

Research/Monitoring (1998/99):

Ontario

- surveyed potential habitat on the Sydenham River to locate additional nest sites;
- collected infertile eggs for contaminant analysis by the Canadian Wildlife Service;
- collected hatchling success data;
- radio-tracked 2 individuals on the Thames River to learn about their movements and locate hibernation sites.

Quebec

- captured 6 female and 4 male spiny softshell turtles in the Missisquoi River delta in July 1998 and tracked them until February 1999;
- characterized the habitat at each of the 243 localization points, and located a new (second) hibernating site on the river.

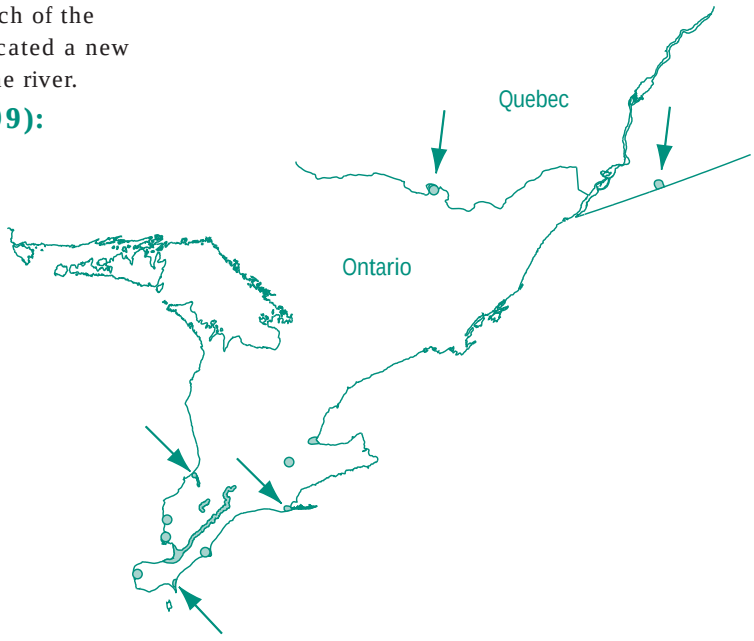
Recovery Actions (1998/99):

Ontario

- rehabilitated nest sites along the Thames River in Ontario;
- protected over 100 nests from predators on the Thames, and at Long Point and Rondeau.

Quebec

- the Nature Conservancy of Canada is pursuing discussions to acquire the one known nesting site in Quebec;
- distributed educational pamphlets on spiny softshell turtles to each house in the Quebec part of Lake Champlain; presented a slide show in three camp-grounds, and set up an information booth at a boat ramp for one day;
- contacted the wildlife agencies of New York and Vermont about collaborating on research and protection of this species.



Spiny Softshell Turtle continued

Progress (1998/1999):

Ontario

- the rehabilitation work is proving to be effective: at one rehabilitated site, more than 20 nests were laid, whereas only 9 were laid in 1997;
- extended habitat surveys in 1998 led to new discoveries: a hibernation site on the Thames River, and additional nest sites on the Sydenham River;
- contaminant analysis of infertile eggs is underway;
- as a result of ongoing education work, the public is reporting turtle sightings and becoming involved with habitat rehabilitation efforts.

Quebec

- after two years of radio-tracking turtles, three hibernating sites have been identified in the northern Lake Champlain area, and some observations have been made concerning their movement: spiny softshells were able to move large distances; males moved shorter distances than females; females showed fidelity for nesting and hibernation areas; and some individuals used a summer range in 1998 that was different from the summer range used in 1997;
- the 1998 data revealed that some areas in the northern part of Missisquoi Bay were used during the nesting season and during the summer, in addition to two known areas, Pike River and Chapman Bay.

Objectives (1999/2000):

Ontario

- continue 1998/99 research and recovery efforts, including nest site survey work on the Thames and Sydenham rivers, and nest success monitoring;
- focus on additional telemetry work on the Thames, within the City of London, and on Lake Erie.

Quebec

- radio-track six females in June 1999, to locate their nesting sites;
- collect infertile eggs for contaminants analysis;
- continue research on movement and habitat use by spiny softshell turtles in northern Lake Champlain, using radio-telemetry;
- initiate a capture-marking/recapture study along the Pike and Missisquoi rivers, to make morphological measurements; take tissue samples for future DNA analysis; and estimate population size;
- establish an observers network along the Ottawa, Richelieu, and St. Lawrence rivers;
- release a new poster to differentiate the spiny softshell turtle from the other Quebec turtle species.

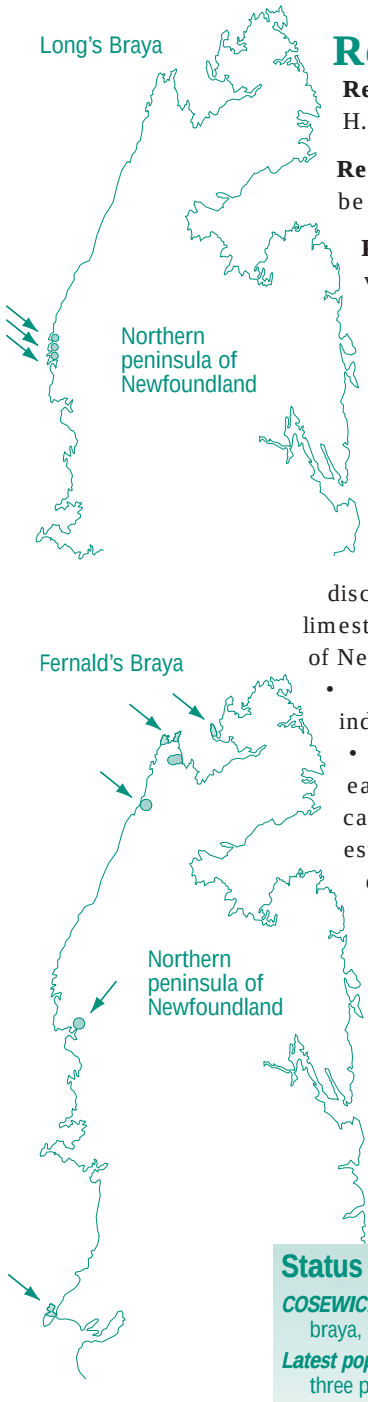
Status

COSEWIC: Threatened, 1991

Latest population estimate: reliable Canadian population estimates are still lacking; general estimates are 1000-2000 softshells in southern Ontario, probably <100 in Quebec. In Ontario in 1998, there were at least 133 nesting females at Long Point, 61 at Rondeau, and 68 along the 20 km stretch of the Thames River directly downstream of Springbank Dam in London

Present causes for concern: poaching of nests, particularly on the Thames River; nest destruction by predators, particularly at Rondeau; continued loss of suitable nesting, basking and hibernation sites; isolation by unsuitable habitat of populations which may have been formerly contiguous; vulnerability of populations to habitat fragmentation; possible effects of contaminants; and introduction of exotics (e.g., Florida softshell turtle)

Fernald's Braya *(Braya fernaldii)* and Long's Braya *(Braya longii)*



Recovery

Recovery team chairs: L. Hermanutz and H. Mann, Memorial University

Recovery plan status: in preparation, to be submitted by July 1999

Plan goal: to ensure the long-term viability of both Long's and Fernald's brayas in their native habitat, the limestone barrens of the Northern Peninsula, and if necessary to establish *ex-situ* populations in protected areas within the barrens

Research/Monitoring (1998/99):

- intensive reconnaissance led to discovery of braya populations on the limestone barrens of the Northern Peninsula of Newfoundland;
- determined the number and density of individuals in each population;
- determined the disturbance regime of each site (anthropogenic — meaning caused by humans — or natural), and established long-term monitoring sites at each location by permanently tagging individuals;
- measured growth and reproductive characteristics of tagged plants;
- compared life history characteristics of plants in different disturbance regimes to learn about factors affecting long-term viability and persistence.

Status

COSEWIC: Long's braya, Endangered, 1997 / Fernald's braya, Threatened 1997

Latest population estimate: Long's braya: 6000 plants in three populations; Fernald's braya: 1500 plants in four populations

Present causes for concern: loss of limestone barrens habitat by gravel quarrying, road building and human development

Long's Braya photo by Joe Brazil

Recovery Actions (1998/99):

- worked towards establishing interim habitat protection for "at-risk" habitats, as well as stewardship initiatives with landowners of Long's and Fernald's braya sites;
- an ex-situ seed bank was established at Memorial University Botanical Gardens.

Progress (1998/99):

- confirmed there were only three extant populations of Long's braya, and fewer plants in the four populations of Fernald's braya than previously thought; the actual distributions of plants within known populations were more extensive than expected.

Objectives (1999/2000):

- locate additional populations;
- compare growth rate, survival rate, reproductive fitness and seedling recruitment of populations from different disturbance regimes;
- measure environmental characteristics at each site;
- sample the genetic diversity of all populations, and determine the rate of natural outcrossing;
- define the components of the natural disturbance regime (type, severity, intensity and size) within the limestone barrens, and use this information to gauge the impact of humans on the long-term stability and viability of the braya species;
- initiate education programs in communities associated with the limestone barrens of the Northern Peninsula;
- visit Mayors of communities close to "at risk" habitats to garner support for conservation efforts.

Red Mulberry *(Morus rubra)*

Recovery

Recovery team chair: J.D. Ambrose, Toronto Zoo

Recovery plan status: in draft

Plan goal: to conserve and, if necessary, restore functioning of red mulberry populations to long-term stability in two regions of its occurrence in southern Ontario, and thereby facilitate its down-listing

Research/Monitoring (1998/99):

- census done on six major populations; initiated a demographic monitoring program to evaluate the viability of red mulberry in Canada;
- estimated the magnitude of hybridization in the six core populations using RAPD genetic markers;
- compared the leaf morphology of red, white and hybrid mulberries and developed a hybrid index for field identification;
- compared northern and southern populations of red mulberry with respect to habitat characteristics and growth in a greenhouse environment.

Recovery Actions (1998/99):

- white mulberries have been culled from Point Pelee periodically since 1993;
- in 1998, white mulberry trees were tagged and culled from selected regions of Fish Point Provincial Nature Reserve and Point Pelee National Park.

Progress (1998/99):

- existence of hybrids was confirmed for Point Pelee through genetic analyses; analysis of all intermediate-type trees is continuing;
- southern and northern habitats have been found to have significant differences, but no differences in growth between populations when grown in a common environment have been detected; the growth experiment will continue for another year;
- large differences in leaf morphology have been found between red and white mulberries; hybrids appear more like whites than reds.

Objectives (1999/2000):

- initiate an experimental removal of white mulberry, with appropriate controls, to assess the effects of removing neighbouring white mulberry on hybridization and fertility of red mulberry; this will also assist in identifying a reasonable exclusion distance for culling white mulberry;
- extend demographic monitoring for population viability analysis.

Status

COSEWIC: Threatened, 1987

Latest population estimate: 117 trees (107 in the six largest populations + 10 additional individuals in another four sites); numerous white mulberry/red mulberry hybrids also occur in many of these populations

Present causes for concern: hybridization with white mulberry, small populations for retaining population viability, twig blight in some populations causing mortality

photo by John Ambrose

South Okanagan Ecosystem

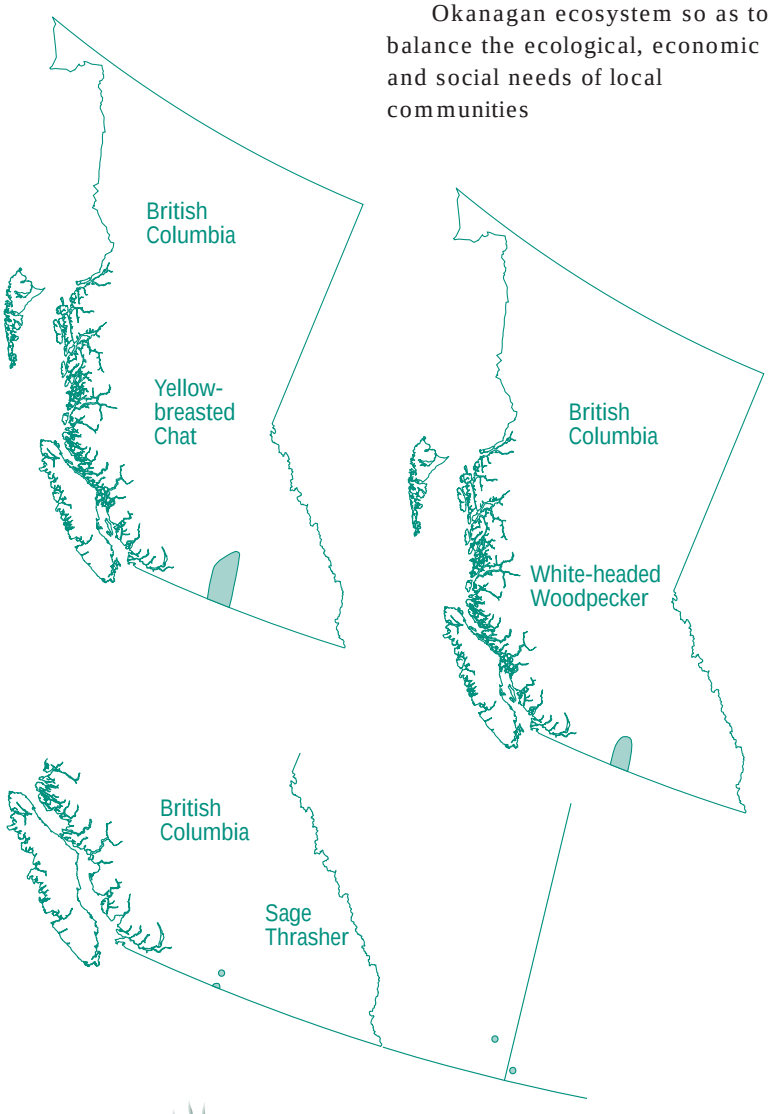
Yellow-breasted chat photo by Ruth Sullivan

Recovery

Recovery Team Chair:
D. Cannings, Cannings Holm Consulting

Recovery plan status:
ecosystem plan in preparation

Plan goals: to maintain a sufficient amount and diversity of habitats to sustain ecosystem function in the South Okanagan; to maintain viable populations of all native species; to manage the South Okanagan ecosystem so as to balance the ecological, economic and social needs of local communities



Research/Monitoring (1998/99):

- completed a scientific assessment of the state of the South Okanagan ecosystem;
- initiated a landscape modeling project;
- continued graduate research analyzing habitats in the south Okanagan with the purpose of outlining an efficient reserve system that would preserve all habitat elements in the area.

Recovery Actions (1998/99):

- produced a habitat atlas for 32 provincially Red- or Blue-listed species in the south Okanagan, to aid land-use decision-making in the area;
- a Prospectus for Ecosystem Recovery in the South Okanagan was produced to garner higher-level support from all levels of government.

Progress (1998/99):

- discovered a new species for Canada: the Merriam's shrew (*Sorex merriami*).

Objectives (1999/2000):

- complement the prospectus with a strategic plan;
- continue modeling project to produce a broad-based model of the socio-economic and environmental impacts of various development options in the South Okanagan.

Status

COSEWIC: pygmy short-horned lizard (*Phrynosoma douglassii douglassii*), Extirpated, 1992; sage thrasher (*Oreoscoptes montanus*), Endangered, 1992; white-headed woodpecker (*Picoides albolarvatus*), Threatened, 1992: yellow-breasted chat [B.C. population] (*Icteria virens auricollis*), Threatened, 1994

Latest population estimates: not available; this is a broad plan which covers many species sharing a common habitat

Present causes for concern: continued loss and degradation of habitat

Update Wrap-Up

Mammals

Black-footed Ferret (*Mustela nigripes*)

COSEWIC status: Extirpated, 1978
The goal of the recovery efforts is to down-list the status of the black-footed ferret from Extirpated to Endangered, through reintroduction of captive-bred animals within the historical range of the species. Implementation of recovery efforts is on hold, however, since the prey base (black-tailed prairie dogs) is too limited to sustain a viable population of wild ferrets in Canada. The captive breeding program at the Toronto Zoo, which is in support of the North American recovery program, continued in 1998/99.
Recovery team chair: E. Wiltse, Saskatchewan Environment and Resource Management

Wolverine [Eastern population] (*Gulo gulo*)

COSEWIC status: Endangered, 1989
In 1998/99, the recovery team contacted native communities in northern Quebec and Labrador, to solicit their support for proposed recovery actions that would impact on the northern wolverine population. Wolverine sightings and other information was collected from native people, suppliers, hunters, other residents, and visitors to the area. The draft recovery plan is being revised as a result of discussions with representatives of native band councils. It is anticipated that the recovery plan will be submitted for approval by RENEW during the 1999/2000 fiscal year.
Recovery team chair: M. Huot, Ministère de l'env. et de la faune, Québec

Birds

Kirtland's Warbler (*Dendroica kirtlandii*)

COSEWIC status: Endangered, 1979
The last confirmed breeding record for this species in Canada was in 1945, but singing males are still occasionally seen in early successional pine habitat in Ontario. Recovery actions planned for 1999/2000 include a survey of potential habitat in Ontario, especially sites that are close to the Michigan population, to determine whether there is a breeding population of Kirtland's warblers in Canada. If breeding birds are located, activities will be undertaken to maintain or increase the population.
Recovery team chair: R. Pratt, Canadian Wildlife Service

Sage Grouse (*Centrocercus urophasianus urophasianus*)

COSEWIC status: Prairie pop.: Endangered, 1998;
B.C. pop.: Extirpated, 1997
A sage grouse recovery team for the Prairie population has been formed outside the auspices of RENEW, with representation from a very broad cross-section of stakeholders in Alberta and Saskatchewan. The team is following the general structure and format of previous RENEW recovery plans in the development of the sage grouse plan. In February 1999, a working group provided an initial draft of the recovery plan to the full recovery team for review.
Prairie recovery team co-chairs: K. Lungle (AB) and W. Harris (SK)

Amphibian

Northern Leopard Frog [Southern Mountain populations, BC] (*Rana pipiens*)

COSEWIC status: Endangered, 1998
The exact causes of the population's decline are not known, but contributing factors likely include loss and degradation of wetland habitat, introduction of game fish, pesticide use, disease, and increased ultraviolet radiation. A recovery team has not yet been established, but monitoring of the population and limited research on movements and habitat use are underway.
Species contact: L. Friis, B.C. Ministry of Environment, Lands and Parks

Category Definitions

Category definitions:

Committee on the Status of Endangered Wildlife in Canada (COSEWIC):

Extinct: A species that no longer exists.
Extirpated: A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered: A species facing imminent extirpation or extinction.
Threatened: A species likely to become endangered if limiting factors are not reversed.
Vulnerable: A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk: A species that has been evaluated and found to be not at risk.
Indeterminate: A species for which there is insufficient scientific information to support status designation.
Species: Any indigenous species, subspecies, variety or geographically defined population of wild fauna and flora.
http://www.cosewic.gc.ca/cosewic/Terms.cfm

U.S. Endangered Species Act:

Endangered: any species which is in danger of extinction throughout all or a significant portion of its range.
Threatened: any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
http://www.fws.gov/r9endspp/esasum.html

IUCN Red List Categories:

Extinct: A taxon is extinct when there is no reasonable doubt that the last individual has died.
Extinct in the wild: a taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically endangered: a taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of five criteria.
Endangered: a taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of five criteria.
Vulnerable: a taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of five criteria.
Lower risk: a taxon is Lower Risk when it has been evaluated, but does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. Conservation Dependent: taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
2. Near Threatened: taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
3. Least Concern: taxa which do not qualify for Conservation Dependent or Near Threatened.

http://www.iucn.org/themes/ssc/redlists/categor/htm

RENEW Recovery Teams *(*chair)*

ACADIAN FLYCATCHER/HOODED WARBLER

M. Cadman*	Canadian Wildlife Service
P. Carson	Consultant
K. Elliot	Ontario Ministry of Natural Resources
L. Friesen	Canadian Wildlife Service
M. Gartshore	Consultant
D. Martin	Consultant
J. McCracken	Bird Studies Canada
J. Oliver	Long Point Region Conservation Authority
B. Stutchbury	York University
D. Sutherland	Ontario Ministry of Natural Resources
A. Woodliffe	Ontario Ministry of Natural Resources

AMERICAN MARTEN (Newfoundland population)

J. Brazil*	Nfld. & Labrador Dept. of Forest Resources & Agrifoods
L. Bateman	Sir Wilfrid Grenfell College, Observer
J.A. Bissonette	Utah State University
D. Brain	Abitibi-Price
M. Cahill	Nfld. & Labrador Dept. of Forest Resources & Agrifoods
P. Deering	Terra Nova National Park
O. Forsey	Consultant
D. Harrison	University of Maine
B. Hearn	Canadian Forest Service
G. Jennings	Consultant
J. Lemon	Consultant
L. Mayo	Nfld. & Labrador Dept. of Forest Resources & Agrifoods
M. McGrath	Nfld. & Labrador Dept. of Forest Resources & Agrifoods
G. Mitchell	Consultant
L. Moores	Newfoundland Forest Service
L. O'Driscoll	Nfld. & Labrador Dept. of Forest Resources & Agrifoods
M. Pitcher	Salmonier Nature Park
G. Van Dusen	Corner Brook Pulp & Paper Ltd.

BLACK-FOOTED FERRET

E. Wiltse*	Sask. Dept. of Env. & Res. Management
S. Brechtel	Alberta Dept. of Environment
J. Carnio	Toronto Zoo
L. Dickson	Canadian Wildlife Service
P. Fargey	Grasslands National Park
C. Schroeder	Saskatchewan Natural History Society
R. Stardom	Canadian Wildlife Service

BLACK RAT SNAKE

S. Thompson*	Ontario Ministry of Natural Resources
M. Gartshore	Consultant
J. Leggo	St. Lawrence Islands National Park
M. Ogilvie	Ontario Ministry of Natural Resources
K. Prior	Canadian Wildlife Service
A. Yagi	Ontario Ministry of Natural Resources

BLANDING'S TURTLE (Nova Scotia population)

T. Herman*	Acadia University
S. Bleakney	Acadia University
J.S. Boates	Nova Scotia Dept. of Natural Resources
C. Drysdale	Kejimkujik National Park
M. Elderkin	Nova Scotia Dept. of Natural Resources
J. Gilhen	Nova Scotia Museum
P. MacDonald	Nova Scotia Dept. of Natural Resources
I. Morrison	Kejimkujik National Park
T. Power	Nova Scotia Dept. of Natural Resources

BLUE RACER

B. Porchuk (interim)*	Bird Studies Canada
R. Brooks	University of Guelph
C. Campbell	Consultant
T. Crabe	Pinery Provincial Park
J. Kamstra	Gartner Lee Ltd.
T. Mason	Toronto Zoo
B. McCloskey	University of Windsor
B. Murphy	Royal Ontario Museum
K. Prior	Canadian Wildlife Service
R. Willson	University of Guelph
A. Woodliffe	Ontario Ministry of Natural Resources
R. Zappalorti	Herpetological Associates

BURROWING OWL

G. Holroyd*	Canadian Wildlife Service
U. Banasch	Canadian Wildlife Service
S. Brechtel	Alberta Dept. of Environment
B. Bristol	PFRA-Agriculture and Agrifood Canada
D. Brodie	Kamloops Wildlife Park
M. Chutter	B.C. Ministry of Environment, Lands & Parks
G. Court	Alberta Dept. of Environment
K. De Smet	Manitoba Dept. of Natural Resources
G. Duck	Moose Jaw Exhibition Grounds
P. Fargey	Parks Canada
R. Fyfe	Canadian Preservation Trust
W. Harris	Sask. Dept. of Env. & Res. Management
B. Haug	Technical expert
E. Leupin	B.C. Ministry of Environment, Lands & Parks
D. Low	B.C. Ministry of Environment, Lands & Parks
R. Martin	Eastern Irrigation District
R. Poulin	Sask. Dept. of Env. & Res. Management
K. Scalise	Sask. Dept. of Env. & Res. Management
J. Schmutz	University of Saskatchewan
D. Scobie	Avocet Environmental Inc.
R. Sissons	University of Alberta
M. Skeel	Nature Saskatchewan
J. Spicer	Operation Grassland Community
P. Strankman	Canadian Cattlemen's Association
D. Todd	Sask. Dept. of Env. & Res. Management
H. Trefry	Canadian Wildlife Service
L. Veitch	Sask. Dept. of Agriculture
G. Wagner	Conor Pacific Environmental
T. Wellicome	University of Alberta

EASTERN MASSASAUGA RATTLESNAKE

K. Prior*	Canadian Wildlife Service
R. Black	Ontario Ministry of Natural Resources
K. Cedar	Ojibway Nature Centre
K. Frohlich	Niagara Peninsula Conservation Authority
R. Gray	Ontario Ministry of Natural Resources
B. Johnson	Toronto Zoo
J. Middleton	Brock University
C. Parent	Ontario Ministry of Natural Resources
S. Parker	Heritage Canada
P. Pratt	Ojibway Nature Centre
M. Villeneuve	Heritage Canada
A. Yagi	Ontario Ministry of Natural Resources
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ESKIMO CURLEW

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S. Brechtel	Alberta Dept. of Environment
S. Carriere	N.W.T. Dept. of Resources, Wildlife and Economic Development
P. Laporte	Canadian Wildlife Service
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FERNALD'S BRAYA/LONG'S BRAYA

L. Hermanutz*	Memorial University of Newfoundland
H. Mann*	Memorial University of Newfoundland
D. Ballam	Newfoundland Dept. of Tourism, Culture and Recreation
T. Bell	Memorial University of Newfoundland
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J. Maunder	Nfld. & Labrador Dept. of Tourism, Culture and Recreation
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W. Nicholls	Memorial University of Newfoundland
G. Ringius	Ringius and Associates Consulting Firm
N. Smith	Consultant

HARLEQUIN DUCK (Eastern population)

W. Montevecchi*	Memorial University of Newfoundland
D. Amirault	Canadian Wildlife Service
M. Bateman	Environment Canada
J. Brazil	Nfld. & Labrador Dept. of Forest Resources & Agrifoods
S. Gilliland	Canadian Wildlife Service
R.I. Goudie	Consultant
R. Milton	Nova Scotia Dept. of Natural Resources
G. Mittelhauser	Coastal Maine Biological Research Station, Observer
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K. Tripp	U.S. Fish and Wildlife Service, Observer

HENSLOW'S SPARROW

R. Pratt*	Canadian Wildlife Service
M. Austen	Technical expert
M. Cadman	Canadian Wildlife Service
D. Cuddy	Ontario Ministry of Natural Resources
R. Knapton	Bird Studies Canada

KING RAIL

L. Maynard*	Canadian Wildlife Service
P. Ashley	Canadian Wildlife Service
L. Friesen	Consultant
J. Haggeman	Canadian Wildlife Service
D. Lebedyk	Essex Region Cons. Authority
D. McLachlin	Ducks Unlimited Canada
D. Sutherland	Natural Heritage Information Centre
R. Weeber	Bird Studies Canada
A. Woodliffe	Ontario Ministry of Natural Resources

KIRTLAND'S WARBLER

R. Pratt*	Canadian Wildlife Service
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I. Bowman	Ontario Ministry of Natural Resources
H. Dewar	Canadian Wildlife Service

LAKE ERIE WATER SNAKE

D. Hector*	Ontario Ministry of Natural Resources
D. Coulson	Ontario Ministry of Natural Resources
P. Hunter	Ontario Ministry of Natural Resources
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LOGGERHEAD SHRIKE

R. Wenting*	Canadian Wildlife Service

Eastern Team

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Prairie Team

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K. De Smet	Manitoba Dept. of Natural Resources
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MARBLED MURRELET

A. Harfenist*	Canadian Wildlife Service
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M. Chutter	B.C. Ministry of Environment, Lands & Parks
D. Lindsay	TimberWest Forest Ltd.

M. MacDuffee	Western Canada Wilderness Committee
T. Manley	Friends of Ecological Reserves
B. Redhead	Parks Canada

PEARY CARIBOU (Banks Island, High Arctic and Low Arctic populations)

A. Gunn*	N.W.T. Dept. of Resources, Wildlife and Economic Development
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PEREGRINE FALCON (ANATUM)

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C. Dauphiné	Canadian Wildlife Service
M. Elderkin	Nova Scotia Dept. of Natural Resources
M. Hoefs	Yukon Dept. of Renewable Resources
G. Holroyd	Canadian Wildlife Service
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PIPING PLOVER

Atlantic Team

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Prairie Team

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PROTHONOTARY WARBLER

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RED MULBERRY

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ROSEATE TERN

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D. Amirault	Canadian Wildlife Service, Observer
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T. D'Eon	Volunteer
P. Laporte	Canadian Wildlife Service
M. Leonard	Dalhousie University

SOUTH OKANAGAN ECOSYSTEM

(team covers pygmy short-horned lizard, sage thrasher, white-headed woodpecker, and yellow-breasted chat)

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D. Fraser	B.C. Ministry of Environment, Lands & Parks

L. Hartley	Community Planner
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A. McLean	B.C. Ministry of Forests
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G. Scudder	University of British Columbia
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SPINY SOFTSHELL TURTLE

Ontario Team

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R. Brooks	University of Guelph
P. Carson	Consultant
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P. Galois	Consultant
M. Gartshore	Consultant
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D. Martin	Upper Thames River Cons. Authority
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Quebec Team

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M. Huot	Société de la faune et des parcs, Québec
J. Jutras	Société de la faune et des parcs, Québec
C. Lanthier	Société zoologique de Granby

SPOTTED OWL

D. Dunbar*	B.C. Ministry of Environment, Lands & Parks
F. Bunnell	University of British Columbia
B. Harper	B.C. Ministry of Environment, Lands & Parks
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B. Rosenburg	B.C. Council of the Forest Industry
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SWIFT FOX

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G. Stuetz	Swift Fox Conservation Society

VANCOUVER ISLAND MARMOT

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R. McLaughlin	MacMillan Bloedel Ltd.
D. Nagorsen	Royal British Columbia Museum
R. Simmons	B.C. Ministry of Environment, Lands & Parks

WHOOPING CRANE (Canada/United States International joint team)

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G. Archibald	International Crane Foundation
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G. Gee	Patuxent Wildlife Research Centre
D. Hjertaas	Sask. Dept. of Env. & Res. Management
B. Huey	Whooping Crane Conservation Association
S. Nesbitt	Wildlife Research Laboratory
G. Tarry	Calgary Zoo

WOLVERINE (Eastern population)

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V. Banci	RESCAN, British Columbia
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WOOD BISON

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H. Reynolds	Canadian Wildlife Service
H. Schwantje	B.C. Ministry of Environment, Lands and Parks
R. Stephenson	Alaska Dept. of Fish and Game, Observer

Status of RENEW Plans

Species Common Name	Plan Status 98/99	Jurisdiction(s) Involved
Mammals		
American Marten [Newfoundland population]	approved in 1995	NF, Parks Canada, CFS
Black-footed Ferret	on hold	AB, SK, MB, CWS, Parks Canada
Cougar [Eastern population]	on hold,pending confirmation an indigenous pop. exists	CWS, NS, NB, ON, QC
Grizzly Bear [Prairie population]	on hold, pending confirmation an indigenous pop. exists	undetermined
Pacific Water Shrew	no team yet formed	BC
Peary Caribou [High Arctic, Low Arctic and Banks Island populations]	a draft National Recovery Strategy is being reviewed	NT, AB, CWS
Swift Fox	approved in 1995	AB, MB, SK, CWS, Parks Canada
Townsend's Mole	no team yet formed	BC
Vancouver Island Marmot	first plan approved in 1994; second plan being revised	BC, CWS
Wolverine [Eastern population]	in preparation	NF, QC
Wood Bison	in draft	MB, AB, BC, NT, YT, CWS, Parks Canada
Woodland Caribou [Gaspésie population]	approved 1993; team disbanded after objectives accomplished in 1995	QC
Birds		
Acadian Flycatcher/ Hooded Warbler	in draft	CWS, ON
Burrowing Owl	approved in 1995	CWS, AB, BC, MB, SK, Parks Canada
Eskimo Curlew	recovery actions are on hold until the existence of the species is verified, preferably by the discovery of breeding birds	CWS, NT, AB, SK
Greater Prairie Chicken	approved in 1993; team disbanded after it was decided that recovery was not feasible	AB, ON, MB, SK
Harlequin Duck [Eastern population]	approved in 1994	CWS, NF, NS
Henslow's Sparrow	approved in 1994	CWS, ON
King Rail	in draft	CWS, ON
Kirtland's Warbler	in draft	CWS, ON
Loggerhead Shrike [Eastern/Prairie populations]	approved in 1993	CWS, AB, SK, MB, ON

Status of RENEW Plans continued

Species Common Name	Plan Status 98/99	Jurisdiction(s) Involved
Marbled Murrelet	approved in 1993	CWS, BC, Parks Canada
Mountain Plover	on hold; few occur in Canada—numbers seen are generally <12	CWS
Northern Bobwhite	no team yet formed	ON
Peregrine Falcon *(anatum)*	approved in 1987	CWS, all provinces (except PEI) and territories, Parks Canada
Piping Plover [Prairie/Eastern populations]	revised plan submitted in 1997, needs revision	CWS, AB, SK, MB, QC, NB, NS, NF, PE, Parks Canada
Prothonotary Warbler	in draft	CWS, ON
Roseate Tern	approved in 1992	CWS, NS
Sage Grouse [Prairie population]	no team under RENEW	AB, SK
Spotted Owl	Management Options Report and Management Plan documents produced instead of recovery plan	BC, CWS
Whooping Crane	approved in 1993	CWS, NT, SK, Parks Canada
Reptiles		
Black Rat Snake	framework for a plan has been drafted	ON, CWS, Parks Canada
Blanding's Turtle [N.S. population]	approved in 1998	NS, Parks Canada
Blue Racer	in preparation	ON, CWS
Eastern Massasauga Rattlesnake	in draft	ON, CWS, Parks Canada
Lake Erie Water Snake	in preparation	ON
Spiny Softshell Turtle	in draft	ON, QC, CWS
Amphibians		
Northern Cricket Frog	approved in 1997; team resigned; implementation team yet to be formed	ON
Northern Leopard Frog [B.C. population]	team yet to be formed	BC
Plants		
Fernald's Braya/Long's Braya	in preparation	NF
Red Mulberry	in draft	ON, CWS, CFS, Parks Canada
Ecosystem		
South Okanagan Ecosystem (Pygmy Short-horned Lizard, Sage Thrasher, White-headed Woodpecker, Yellow-breasted Chat)	in preparation	BC, CWS

1998 List of Canadian Species at Risk

MAMMALS	BIRDS	AMPHIBIANS	REPTILES	FISH
EXTINCT Sea Mink, Woodland Caribou (Queen Charlotte Islands pop.)	Great Auk, Labrador Duck, Passenger Pigeon	none	none	Banff Longnose Dace, Blue Walleye, Deepwater Cisco, Longjaw Cisco
EXTIRPATED Atlantic Walrus (NW Atlantic pop.), Black-footed Ferret, Gray Whale (Atlantic pop.), Grizzly Bear (Prairie pop.)	Greater Prairie-Chicken, Sage Grouse (British Columbia pop.)	none	Pygmy Short-horned Lizard (B.C. pop.)	Gravel Chub, Paddlefish
ENDANGERED Beluga Whale (St.Lawrence River pop.), Beluga Whale (Ungava Bay pop.), Beluga Whale (SE Baffin Island/Cumberland Sound pop.), Bowhead Whale (Eastern Arctic pop.), Bowhead Whale (Western Arctic pop.), Cougar (Eastern pop.), Marten (Newfoundland pop.), Peary Caribou (Banks Island pop.), Peary Caribou (High Arctic pop.), Right Whale, Swift Fox, Vancouver Island Marmot, Wolverine (Eastern pop.)	Acadian Flycatcher, Burrowing Owl, Eskimo Curlew, Harlequin Duck (Eastern pop.), Henslow's Sparrow, King Rail, Kirtland's Warbler, Loggerhead Shrike (Eastern pop.), Mountain Plover, Northern Bobwhite, Peregrine Falcon *(anatum)*, Piping Plover, Prothonotary Warbler, Sage Grouse (Prairie pop.), Sage Thrasher, Spotted Owl, Whooping Crane	Northern Cricket Frog, Northern Leopard Frog, (Southern Mountain pop.)	Blue Racer, Lake Erie Water Snake, Leatherback Turtle	Atlantic Whitefish, Aurora Trout, Nooksack Dace, Salish Sucker
THREATENED Beluga Whale (Eastern Hudson Bay pop.), Harbour Porpoise (Northwest Atlantic pop.), Humpback Whale (North Pacific pop.), Pacific Water Shrew, Peary Caribou (Low Arctic pop.), Sea Otter (Pacific coast), Townsend's Mole, Wood Bison, Woodland Caribou (Gaspésie pop.)	Hooded Warbler, Loggerhead Shrike (Prairie pop.), Marbled Murrelet, Roseate Tern, White-headed Woodpecker, Yellow-breasted Chat (B.C. pop.)	none	Black Rat Snake, Blanding's Turtle (Nova Scotia pop.), Eastern Massasauga Rattlesnake, Spiny Softshell Turtle	Benthic Texada Island Stickleback, Black Redhorse, Blackfin Cisco, Channel Darter, Copper Redhorse, Deepwater Sculpin (Great Lakes pop.), Eastern Sand Darter, Enos Lake Stickleback, Lake Simcoe Whitefish, Lake Utopia Dward Smelt, Limnetic Texada Island Stickleback, Margined Madtom, Shorthead Sculpin, Shortjaw Cisco, Shortnose Cisco
VULNERABLE Beluga Whale (Eastern High Arctic/Baffin Bay pop.), Black-tailed Prairie Dog, Blue Whale, Eastern Mole, Ermine (Queen Charlotte Islands pop.), Fin Whale, Fringed Myotis Bat, Gaspé Shrew, Grey Fox, Grizzly Bear, Harbour Seal (Lacs des Loups Marins pop.), Humpback Whale (Western North Atlantic pop.), Keen's Long-eared Bat, Northern Bottlenose Whale (Atlantic Ocean [Gully pop.]), Nuttall's Cottontail (B.C. pop.), Ord's Kangaroo Rat, Pallid Bat, Plains Pocket Gopher, Polar Bear, Southern Flying Squirrel, Sowerby's Beaked Whale, Spotted Bat, Western Harvest Mouse (B.C. pop.), Wolverine (Western pop.), Woodland Caribou (Western pop.), Woodland Vole	Ancient Murrelet, Barn Owl, Caspian Tern, Cerulean Warbler, Ferruginous Hawk, Flammulated Owl, Ipswich Sparrow, Ivory Gull, Least Bittern, Long-billed Curlew, Louisiana Waterthrush, Pacific Great Blue Heron, Peregrine Falcon *(pealei)* Peregrine Falcon *(tundrius)*, Prairie Warbler, Queen Charlotte Goshawk, Red-headed Woodpecker, Red-shouldered Hawk, Ross' Gull, Short-eared Owl, Yellow-breasted Chat (Eastern pop.)	Cœur d'Alène Salamander, Fowler's Toad, Pacific Giant Salamander, Great Basin Spadefoot Toad, Mountain Dusky Salamander, Northern Leopard Frog (Prairie pop.), Smallmouth Salamander	Eastern Hognose Snake, Eastern Short-horned Lizard, Eastern Yellow-bellied Racer, Five-lined Skink, Northern Prairie Skink, Spotted Turtle, Wood Turtle	Atlantic Cod, Banded Killifish (Nfld. pop.), Bering Wolffish, Bigmouth Buffalo, Bigmouth Shiner, Black Buffalo, Blackline Prickleback, Blackstripe Topminnow, Brindled Madtom, Central Stoneroller, Charlotte Unarmoured Stickleback, Chestnut Lamprey, Cultus Pygmy Sculpin, Fourhorn Sculpin (Arctic Islands, fresh-water form), Giant Stickleback, Green Sturgeon, Greenside Darter, Kiyi, Lake Chubsucker, Lake Lamprey, Northern Brook Lamprey, Northern Madtom, Orangespotted Sunfish, Pacific Sardine, Pugnose Minnow, Pugnose Shiner, Redbreast Sunfish, Redside Dace, River Redhorse, Rosyface Shiner (Man. pop.), Shortnose Sturgeon, Silver Chub, Silver Shiner, Speckled Dace, Spotted Gar, Spotted Sucker, Spring Cisco, Squanga Whitefish, Umatilla Dace, Warmouth, Western Silvery Minnow, White Sturgeon

1998 List of Canadian Species at Risk continued

MOLLUSCS	LEPIDOPTERA	PLANTS	LICHENS	MOSSES
Eelgrass Limpet	none	none	none	none
none	Karner Blue Butterfly	Blue-eyed Mary, Illinois Tick Trefoil	none	none
Hotwater Physa	Maritime Ringlet Butterfly	Bearded Owl Clover, Bluehearts, Cucumber Tree, Deltoid Balsamroot, Drooping Trillium, Eastern Mountain Avens, Eastern Prickly Pear Cactus, Engelmann's Quillwort, Furbish's Lousewort, Gattinger's Agalinis, Heart-leaved Plantain, Hoary Mountain Mint, Large Whorled Pogonia, Long's Braya, Pink Coreopsis, Pink Milkwort, Prairie Lupine, Seaside Birds-foot Lotus, Skinner's Agalinis, Slender Bush Clover, Slender Mouse-ear-cress, Small White Lady's-slipper, Small Whorled Pogonia, Southern Maidenhair Fern, Spotted Wintergreen, Thread-leaved Sundew, Tiny Cryptanthe, Water-pennywort, Water-plantain Buttercup, Western Prairie White Fringed Orchid, White Prairie Gentian, Wood Poppy	Seaside Centipede	none
Banff Springs Snail	none	American Chestnut, American Ginseng, American Water-willow, Athabasca Thrift, Anticosti Aster, Bird's-foot Violet, Blue Ash, Blunt-lobed Woodsia, Colicroot, Deerberry, False Hop Sedge, Fernald's Braya, Goat's-rue, Golden Crest, Golden Paintbrush, Golden Seal, Hairy Prairie-clover, Kentucky Coffee Tree, Mosquito Fern, Nodding Pogonia, Pitcher's Thistle, Plymouth Gentian, Purple Twayblade, Red Mulberry, Redroot, Round-leaved Greenbrier (ON pop.), Sand Verbena, Small-flowered Lipocarpha, Sweet Pepperbush, Tyrrell's Willow, van Brunt's Jacob's Ladder, Western Blue Flag, Western Spiderwort, White-top Aster, White Wood Aster, Yellow Montane Violet	none	Apple Moss
none	Monarch Butterfly	American Columbo, Bathurst Aster, Bolander's Quillwort, Branched Bartonia, Broad Beech Fern, Buffalograss, Climbing Prairie Rose, Coastal Wood Fern, Dense Blazing Star, Dwarf Hackberry, Eastern Prairie White Fringed Orchid, False Rue-anemone, Fernald's Milk-vetch, Few-flowered Club-rush, Giant Helleborine, Green Dragon, Gulf of St. Lawrence Aster, Hare-footed Locoweed, Hill's Pondweed, Hop Tree, Indian Plantain, Lilaeopsis, Long's Bulrush, Macoun's Meadowfoam, New Jersey Rush, Phantom Orchid, Provancher's Fleabane, Shumard Oak, Smooth Goosefoot, Soapweed, Swamp Rose Mallow, Victorin's Gentian, Victorin's Water Hemlock, Western Silver-leaf Aster, Wild Hyacinth	Cryptic Paw, Oldgrowth Specklebelly, Seaside Bone	none

Funding by Donors

Organization	PYs	$1000s
Abitibi Consolidated	0.5	88.0
Acadia University		2.2
Alaska Government	0.6	3.0
Alberta Conservation Association	0.05	16.86
Alberta Government	2.35	49.4
Alberta Sports, Recreation, Parks and Wildlife Foundation	1.0	10.0
Atlantic Veterinary College		0.5
B.C. Government	23.6	1,152.2
Biodiversity - SLV 2000		10.14
Bird Studies Canada	0.02	
Bouctouche Guardians	0.03	
Calgary Zoo	1.2	47.0
Canada Trust		7.5
Canadian Forest Service	1.5	55.0
Canadian Wildlife Federation		2.0
CareerEdge	0.1	
Corner Brook Pulp and Paper	1.5	63.0
Corporate donations	2.0	73.1
Delta Waterfowl and Wetlands Research Station	0.3	5.0
Ducks Unlimited	0.12	
Ecotrust		13.0
Elsa Wild Animal Appeal of Canada		2.5
Enbridge Inc.		7.5
Environment Canada	12.8	664.86
Endangered Species Recovery Fund (Environment Canada/ World Wildlife Fund Canada)	1.12	99.04

Organization	PYs	$1000s
Essex Region Conservation Authority	0.02	
Forest Renewal BC		1,215.0
Friends of Elk Island	0.1	6.0
Friends of the Environment Foundation		9.0
Habitat Conservation Trust Fund		28.1
Halifax Field Naturalists	0.02	0.8
Human Resources Development Canada	1.7	10.1
Hylcan Foundation		5.0
International Forest Products		7.5
Inuvialuit Implementation Fund	2.0	280.0
Irving Eco-centre – Bouctouche Dune	0.4	0.95
Island Nature Trust	1.2	17.25
James L. Baillie Memorial Fund		1.0
Kamloops Wildlife Park		6.3
Lennox & Addington Conservation Stewardship Council		0.5
Long Point Region Conservation Authority	0.02	1.75
MacMillan Bloedel	1.2	35.0
Manitoba Government	0.87	30.9
Manitoba Hydro	0.25	12.0
Manitoba Plover Guardians	0.04	
Martineau Walker Law Firm		12.0
McGill University	0.25	13.0
Memorial University of Newfoundland	0.6	
Municipal governments		3.2
Natural Science and Engineering Research Council	1.3	92.0
Nature Saskatchewan	1.09	8.3

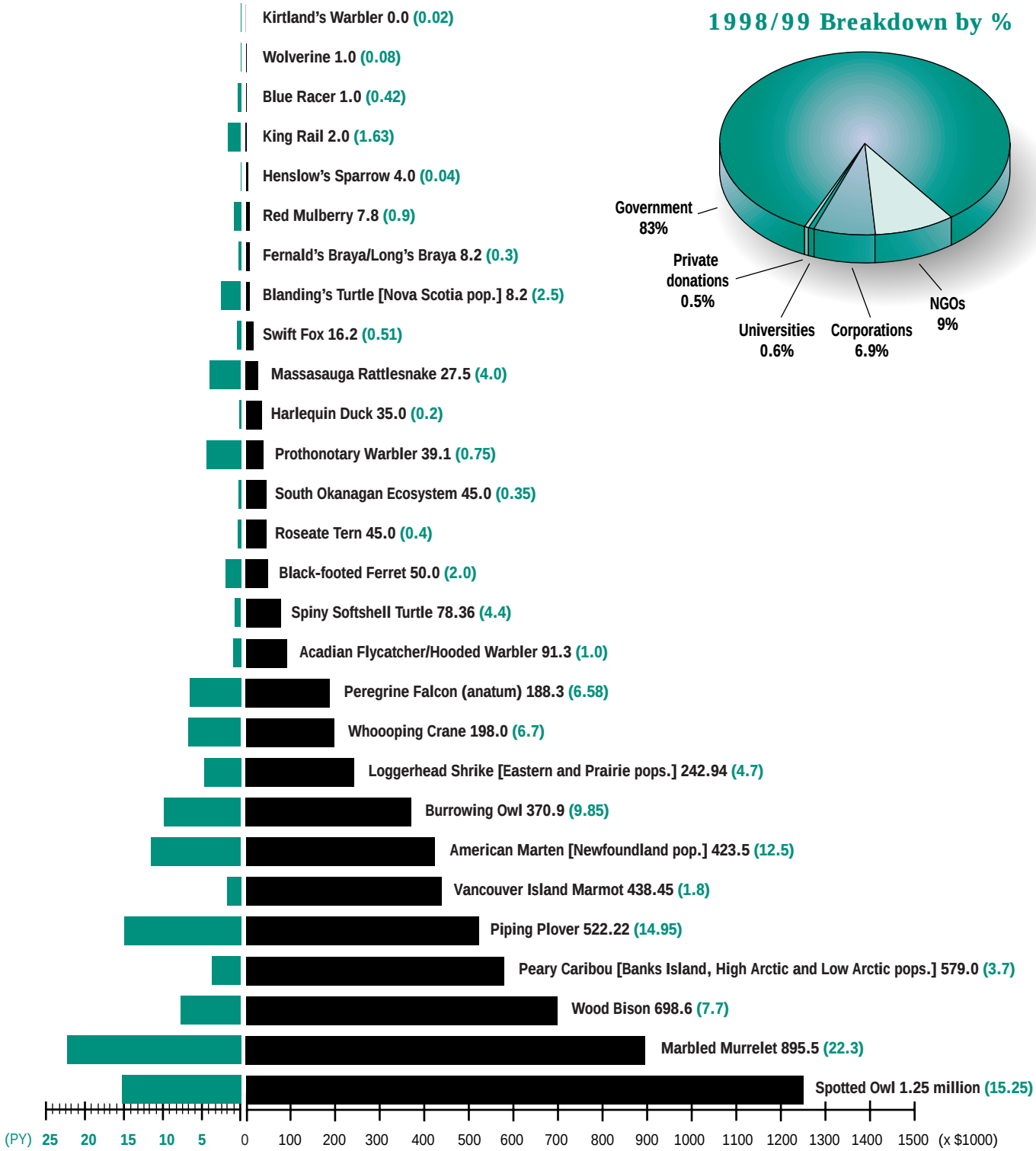
Funding by Donors continued

Organization	PYs	$1000s
Nestucca Trust Fund		12.0
New Brunswick Government	0.08	0.5
Newfoundland/Labrador Government	9.9	255.0
Niagara Peninsula Conservation Authority	0.5	3.0
North American Waterfowl Management Plan		12.0
Northwest Territories Government	4.85	561.3
Nova Scotia Employment Program	1.0	
Nova Scotia Government	0.91	42.0
Nova Scotia Liquor Commission		1.5
Ojibway Nature Centre	0.5	0.5
Ontario Government	7.11	189.15
Operation Grassland Community		5.0
Operation Migration	3.3	49.8
Parks Canada	6.46	266.2
PEI Government	0.02	
Piper Project		128.1
Piping Plover Guardian Program for Nova Scotia	2.5	1.3
Polar Continental Shelf Project		10.0
Private donations	1.27	34.95
Protected Areas Association	0.6	15.0
Quebec Government	0.55	41.32
Quebec Society for the Protection of Birds		5.0
Quebec Wildlife Foundation		20.0
Saskatchewan Government	0.8	38.64
Saskatchewan Wetland Conservation Corporation	0.07	10.0
St-Lawrence Valley Natural History Society		1.4
Science Horizons	0.5	7.9
Simon Fraser University	7.0	
St. Lawrence Action Plan		3.0
Société zoologique de Saint-Félicien	0.03	1.0
Stanley Park Facility		8.5
TimberWest	5.0	62.5
Toronto Zoo	3.0	95.0
University of Alberta	1.0	28.0
University of British Columbia		4.5
University of Calgary	0.2	0.2
University of Guelph	0.17	
University of Maine	0.1	
University of Victoria	5.0	
Vermont Fish and Wildlife Department		7.5
Western Forest Products		9.5
Western Nfld. Model Forest Inc.	1.5	63.0
Wildlife Preservation Trust Fund	2.2	25.0
World Wildlife Fund Canada	0.35	46.5
York University	0.1	
Yukon Government	0.2	30.0
Total	**126.33**	**6.263 million**

PYs = person years

Note:
a difference of $4,000 occurs in funding by donors compared to funding per species (p. 48) due to rounding; a difference of 0.8 occurs in person years.

Funding per Species



1998/99 Breakdown by %

Funding of personnel in 1998/99 (in person years — PYs): 125.53

Funding of expenses in 1998/99 (excluding salaries) = 6.267 million

Note: values are in $1000s, unless otherwise indicated

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