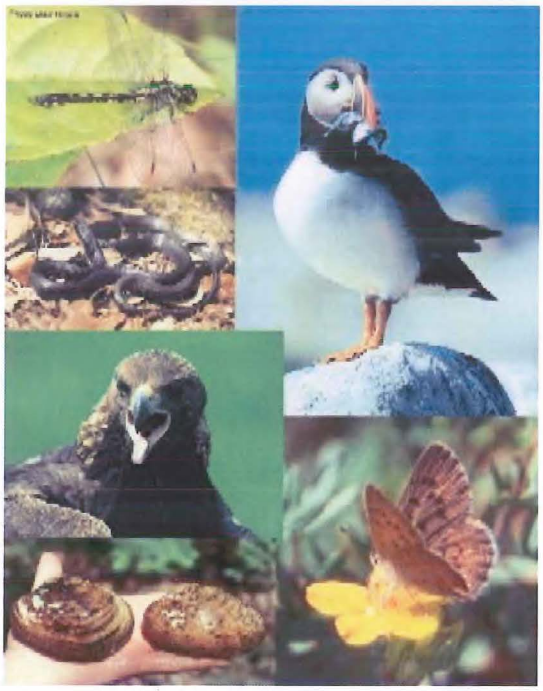
(1) REPORT TO THE INLAND FISHERIES & WILDLIFE COMMITTEE

MRSA TITLE 12, SECTION 10253, SUBSECTION 2

Report on the Maine Endangered and Nongame Wildlife Fund



(2) REPORT TO THE INLAND FISHERIES & WILDLIFE COMMITTEE

MRSA TITLE 12, SECTION 12804

Report describing the status of all current and planned activities and rules pertaining to the conservation or management of Endangered or Threatened species

January 17, 2008

January 17, 2008

To: The Members of the Inland Fisheries & Wildlife Committee
123rd Maine Legislature

From: Roland D. Martin, Commissioner
Maine Dept. of Inland Fisheries & Wildlife

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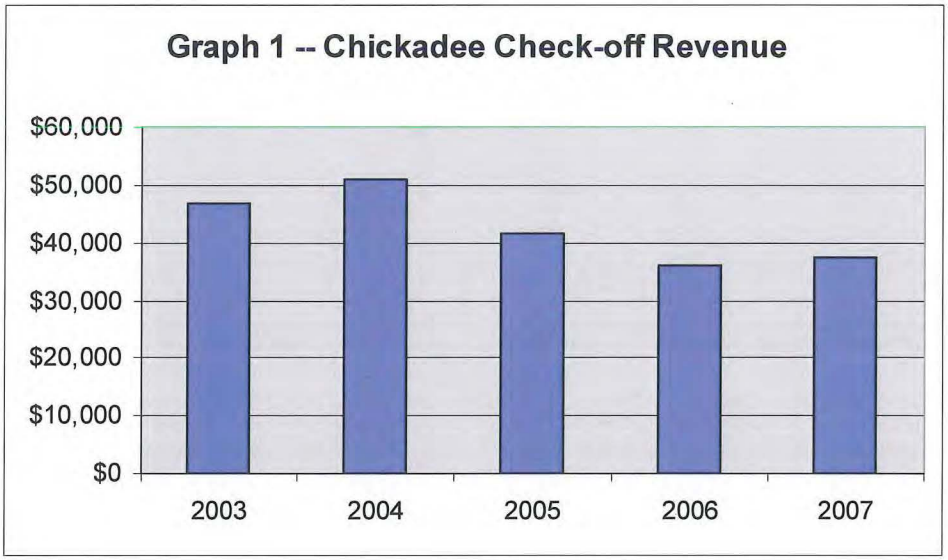
(1) Report on the Maine Endangered and Nongame Wildlife Fund

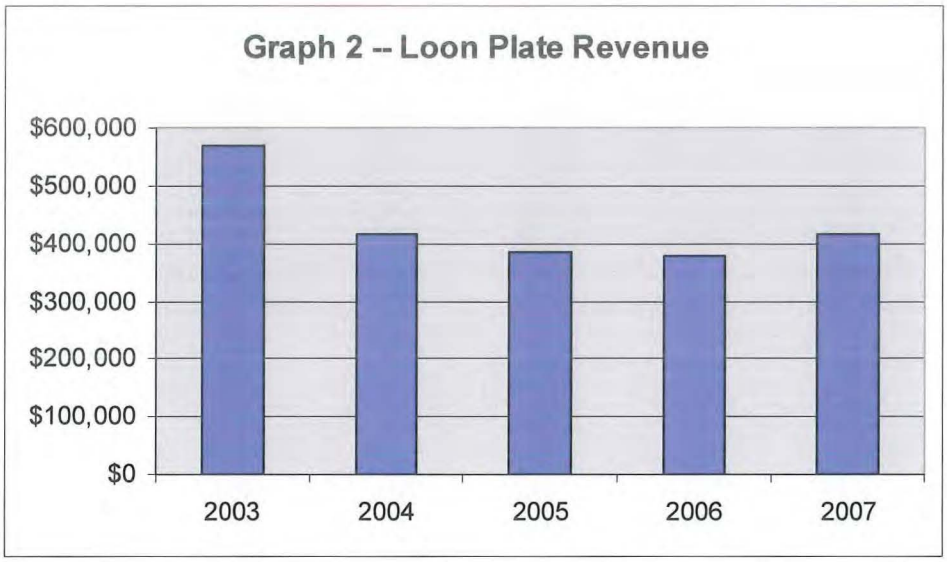
The Maine Legislature has played a significant role in providing the financial foundation for the State's endangered and nongame wildlife conservation programs. In 1983 the Legislature established the Endangered and Nongame Wildlife Fund. Funds from Maine taxpayers, who voluntarily contribute to the "Chickadee Check-off" on their state income tax forms, are deposited in the Endangered and Nongame Wildlife Fund.

During FY2007, "Chickadee Check-off" [graph1] revenue increased slightly to **$37,532;** however, annual contributions to the check-off have declined by $90,000, or approximately 70%, from their high of $129,000 in 1985.



Additional funds for the management of endangered and nongame wildlife became available in 1993, when the Legislature established the Environmental Registration Plate -- the "loon license plate" -- whose revenues are also directed to the Endangered and Nongame Wildlife Fund.

In FY 2007, revenue generated by the Environmental Registration Plate [graph 2] also increased slightly to **$414,877**. [The FY2003 figure of $569,542 was inflated because loon license plate revenue for 2003 included an "extra" quarter of revenue; without this extra quarter, the total revenue would have been $443,721.]



An accounting for the Endangered and Nongame Wildlife Fund for FY2007 is presented in the table below.

Endangered and Nongame Fund	FY2007 Revenue	FY2007 Budget	FY2007 Expenditures
	$505,526*		
Budget Categories			
Personnel Services		$751,338	$710,101
All Other		$354,304	$161,517
Capital		$ 79,000	$ 2,500
Total		$1,184,642	$874,118

*Includes the interest generated by the Chickadee Check-off account

Appendix A provides an overview of our management efforts for FY2007 -- the Endangered and Nongame Wildlife Fund provided critical financial resources to conduct this important work.

(2) Report describing the status of all current and planned activities and rules pertaining to the conservation or management of endangered or threatened species

1) Status of current activities:

Since 1983, the Maine Dept. of Inland Fisheries and Wildlife has achieved significant accomplishments for Maine's endangered / threatened wildlife. The past year continued this successful trend. Appendix A provides an overview of our management efforts for FY2007.

Many of the endangered / threatened wildlife conservation programs undertaken in FY2006 are on-going and have carried over into FY2007. The Department plans no major shift in our efforts or change in overall programmatic direction

2) Planned activities:

a) State Wildlife Grant Program (SWG)

In 2001, Congress created the State Wildlife Grant Program (SWG) to help state and tribal fish and wildlife agencies address conservation of fish and wildlife species of greatest conservation need. This funding was a direct result of "Teaming with Wildlife" efforts sustained for more than a decade by fish and wildlife conservation interests across the country.

Funds appropriated under the State Wildlife Grant program are allocated to states according to a formula that takes into account each state's size and population. To date, Maine has been awarded nearly $4.8 million in SWG funds to support work on many of Maine's rare, Threatened, Endangered, and nongame fish and wildlife. Projects are diverse, covering many species groups, all geographic areas of the state, and ranging in scale from ecosystems to subspecies. Projects vary in length from one to five years, and include baseline surveys, research, and habitat conservation.

In July 2007, the Department received a $605,091 allocation under the State Wildlife Grant Program. These funds are to be used to benefit wildlife, especially species of greatest conservation need, and their habitat. The Wildlife Division has directed a portion of these funds to *Beginning with Habitat*, a program that addresses habitat conservation at a landscape scale; lake habitat inventories and stream survey and database development; eco-regional surveys for rare, threatened, or endangered wildlife in the eastern lowlands region of Maine; the Canada lynx research project, and surveys and investigations of Species of Greatest Conservation Need (SGCN) identified in Maine's Wildlife Action Plan http://www.maine.gov/ifw/wildlife/groups_programs/comprehensive_strategy/index.htm Please refer to Appendix B for an overview of these management activities.

b) Landowner Incentive Program (LIP)

In 2007, the Department received a $707,607 competitive Landowner Incentive Program (LIP) grant from the U. S. Fish and Wildlife Service to provide technical and financial assistance to private landowners for the protection, restoration and management of habitat to benefit at-risk plant and animal species.

The Department of Inland Fisheries and Wildlife provides administrative oversight of Maine's LIP program, and the Maine Natural Areas Program provides LIP outreach. A

Steering Committee, comprised of state and federal agencies and conservation partners, is responsible for generating competitive criteria for distributing LIP funds fairly and equitably, delivery of technical and financial assistance to landowners, administrative and coordination functions, and establishing goals and measurable objectives for the conservation of Maine's species-at-risk and their habitats.

LIP provides financial incentives to private landowners in return for long-term habitat protection for at-risk species and their habitats. The Department and the Maine Natural Areas Program within the Department of Conservation are using LIP funds to administer Maine's Landowner Incentive Program and implement conservation measures critical to five initiatives:

- Enhance stewardship of privately owned lands that support populations of *bald eagle* nesting habitats.
- Increase the capacity to better manage *piping plover* and *least tern* habitat on privately owned beaches.
- Enhance stewardship of privately owned lands that support populations of *Furbish's lousewort*, a perennial wildflower endemic to the St. John River in northern Maine, and the state's only federally listed endangered plant.
- Restore and manage nesting seabird populations on Stratton Island in Casco Bay.
- Preserve viable populations of rare plants and animals within twenty-two species-at-risk focus areas identified through *Beginning with Habitat.*

In the last three years, the state has awarded $1,593,425 for the purchase of conservation easements within ten focus areas that will protect more than 2,843 acres of critical habitat for rare, threatened, and endangered species in southern, western, central, and mid-coastal Maine. The groundswell of landowner interest, as evidenced by the number of unfunded requests for focus area funds, is strong evidence that Maine landowners and its conservation community are poised to continue the work started with prior LIP funding.

The objectives for the 2007 round of LIP funding are to 1) permanently protect, manage, and monitor 500 acres of habitat for at-risk plant and animal species within 22 Focus Areas in southern and coastal Maine through the purchase of conservation easements; 2) increase protection of priority shorebird roosting and feeding habitats in 3 coastal Focus Areas by 100% using permanent, term and restoration strategies; and 3) provide permanent habitat conservation for at least fifteen at-risk species.

More than two-thirds of the state's rare and endangered species occur in southern and coastal Maine and are declining or threatened due to habitat loss from development. Ninety-five percent of these lands are privately owned. Many landowners are often committed in principle to stewardship of at-risk species; until now the lack of financial and technical incentives has limited the scale of long-term conservation on these lands. This grant will be instrumental in implementing recommendations from our *Beginning with Habitat* program by giving private landowners incentives to protect habitat that is critical for endangered and imperiled species.

See Appendix C for an overview of these management activities.

c) Section 6 Funds

Through Section 6 of the Federal Endangered Species Act, Congress has authorized USFWS to distribute funds to the states to help support research, monitoring, and management of federally listed Endangered, Threatened, and Candidate species. Over the years, Maine has annually received roughly $60,000. We make recommendations to Federal Assistance on how we think the money should be spent, but the final funding decision is made by Federal Assistance. In 2007, the Department did not receive funding because of the need to renew our 5-year plan. Funds that were to be received in 2007 will be available in 2008.

3) Status of current rules:

Effective August 9, 2007, the Bald Eagle was removed from the federal list of endangered and threatened species under the Endangered Species Act (ESA). Although it is not longer protected under the ESA, it is still federally protected under the Bald Eagle – Golden Eagle Protection Act, and it remains listed as a Threatened Species under Maine's Endangered Species Act (MESA).

The Maine Department of Inland Fisheries and Wildlife (MDIFW) recently completed the process of recommending updates to the State's Endangered and Threatened Species list. The Department's recommendations were accepted and passed by the Legislature and signed into law by Governor Baldacci on May 24, 2007 and became effective September 20, 2007. The changes include a) 14 new listings, b) 1 delisting, c) a change of status from Endangered to Threatened for 1 currently listed species, and d) adding the qualifier "breeding population only" to 2 species currently listed as Endangered. This is the first update to Maine's list of Endangered and Threatened species since 1997.

This most recent listing process essentially began with completion of ***Maine's Wildlife Action Plan*** in September 2005. Preparation of this document required a comprehensive review of most of Maine's fish and wildlife species, thus providing impetus to this listing process. The official listing process began in November 2005 with establishment of committees organized by species group (i.e. amphibians and reptiles, birds, fish, invertebrates, and mammals). These committees were comprised primarily of MDIFW species experts, who reviewed candidate species under their purview to determine whether a species qualified for listing as Endangered or Threatened under the Maine Endangered Species Act. Each determination was guided by established, scientific criteria and listing guidelines based on mandates of the Act and related rules. Initial recommendations, along with supporting documentation, were then submitted to species experts outside the Department for review and input. Based on reviewer's comments, each listing committee made final modifications to their recommendations, if appropriate. Following the public hearing and comment period in June 2006, and based on public input, the recommendations were modified, and the Commissioner of MDIFW made final recommendations to the Legislature, which has sole authority to make changes to the state's Endangered and Threatened species list – but only upon the recommendation of the Commissioner.

It should be noted that there is now a separate list of state Endangered and Threatened marine species. The Maine Legislature has given The Maine Department of Marine Resources responsibility for maintaining and updating that list.

CHANGES TO MAINE'S ENDANGERED AND THREATENED SPECIES LIST
Effective September 20, 2007

ENDANGERED SPECIES

Birds

American Pipit (*Anthus rubescens*) (Changed to: breeding population only)

Least Bittern (*Ixobrychus exilis*) (New listing)

Peregrine Falcon (*Falco peregrinus*) (Changed to: breeding population only)

Fish

Redfin Pickerel (*Esox americanus americanus*) (New listing)

Invertebrates

Butterflies and Skippers

Juniper Hairstreak (*Callophrys gryneus*) (New listing)

Dragonflies and Damselflies

Rapids Clubtail (*Gomphus quadricolor*) (New listing)

Mammals

New England Cottontail (*Sylvilagus transistionalis*) (New listing)

THREATENED SPECIES

Birds

Barrow's Goldeneye (*Bucephala islandica*) (New listing)

Black-crowned Night Heron (*Nycticorax nycticorax*) (New listing)

Common Moorhen (*Gallinula chloropus*) (New listing)

Great Cormorant (*Phalacrocorax carbo*) (breeding population only) (New listing)

Short-eared Owl (*Asio flammeus*) (breeding population only) (New listing)

Invertebrates

Butterflies and Skippers

Purple Lesser Fritillary (*Boloria chariclea grandis*) (New listing)

Sleepy Duskywing (*Erynnis brizo*) (New listing)

Dragonflies and Damselflies

Boreal Snaketail (*Ophiogomphus colubrinus*) (New listing)

Pygmy Snaketail (*Ophiogomphus howei*) – Delisted (Removed from list)

Ringed Boghaunter (*Williamsonia lintneri*) – Down-listed from **Endangered**

Freshwater Mussels

Brook Floater (*Alasmidonta varicosa*) (New listing)

4) Proposed rules:

There are currently no proposed rules related to Endangered and Threatened species. However, there is some rule-making we may propose in 2008.

- We will likely propose to remove the Bald Eagle from Maine's list of Endangered and Threatened Species under MESA. This will involve rulemaking-like hearings and an official recommendation by the Commissioner to the 2009 Legislature.

- Rules currently associated with MESA will likely be amended to remove the list of Endangered and Threatened species that is currently in the rule and which is outdated and not needed since the Legislature assumed responsibility for maintaining the list in statute. We will also likely remove Essential Habitat protection for the Bald Eagle in anticipation of delisting this species. There is also a possibility we will be proposing Essential Habitat protection of additional Piping Plover and Least Tern nesting sites.

- Although not involving rulemaking, we will be updating Maine's list of Special Concern Species in January 2008, and annually after that. This is an administrative and planning list that has no legal basis. However, species on the Special Concern list may be referenced during Site Law review.

2007 REPORT ON THE ENDANGERED AND NONGAME WILDLIFE FUND

APPENDIX A

AN OVERVIEW OF THE ENDANGERED / THREATENED AND NONGAME WILDLIFE PROGRAM UNDERTAKEN BY THE MAINE DEPARTMENT OF INLAND FISHERIES & WILDLIFE

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ENDANGERED AND THREATENED SPECIES

Implementing successful wildlife management begins with a well thought out plan. To develop the plan, the Wildlife Division has developed a comprehensive species planning process. The major components of the process are: a species assessment providing what we know about a particular species or group of species; input from a Public Working Group to develop species management goals and objectives; and, finally a species management system that lays out a path to achieving the goals and objectives. Maine's species planning process is a "state of the art" approach to incorporating public input to our decision-making process. Below is summary of the species planning efforts over the past year, including an update of the Endangered and Threatened species list.

A public working group was established for Island-nesting Terns to recommend management goals and objectives for this species for the next 15 years. In response to the recommended goals and objectives, species specialists Brad Allen and Lindsay Tudor developed feasibility, desirability, capability of the habitat, and potential consequences statements; identified potential problems in reaching the goals and objectives; and presented some possible strategies to overcome those problems. The recommended goals and objectives were presented to the Commissioner's Advisory Council for their approval and adoption in July 2007. A species assessment for the black racer was completed and reviewed by the Department, and a Freshwater Mussel Assessment was reviewed in August 2007.

Once goals and objectives are adopted, the Wildlife Division develops management systems that document how we are going to meet those goals and objectives. The management systems identify how we will collect data, how those data will be analyzed and interpreted, and establishes management actions that will be implemented under various scenarios. This past year, a management system was written for the Atlantic Puffin and Razorbills by Brad Allen, and Michael Schummer wrote one for Waterfowl, which included the Barrow's Goldeneye, a Maine Threatened Species. Both management systems were reviewed and approved by the Wildlife Division in May 2007.

During the coming year, we expect to complete species assessments for Canada lynx, peregrine falcon, grasshopper sparrow, and ringed boghaunter. We also plan to convene several public working groups to address Canada lynx; Black Racer; freshwater mussels; Grasshopper Sparrow and Upland Sandpiper; Peregrine Falcon; and Ringed Boghaunter. Also, management systems are scheduled to be developed for Black Racer; fresh-water mussels; Island-nesting terns; Leach's Storm-petrel; Least Tern; Piping Plover; Bald Eagle; Golden Eagle; New England Cottontail; and Ringed Boghaunter.

ENDANGERED SPECIES LISTING

Perhaps the most challenging area of wildlife management is recovery of Endangered and Threatened species. The Wildlife Division staff has invested considerable effort in identifying those species at risk and developing plans to recover these species to the point of being delisted. While there have been additions to the list of species needing attention, there have also been ***successes in the recovery of listed species***, most notable being the bald eagle. Additional successes are described in the following sections of this report.

Since European settlement, at least 14 species of wildlife have been extirpated from Maine. To prevent further losses, the Maine Endangered Species Act was enacted in 1975. In 1986, Maine's first list of 23 Endangered and Threatened species was adopted. After MDIFW reviewed the status of many of Maine's wildlife species in the mid-1990s, 20 new species were added to the list in 1997.

Table 1. Maine's Endangered and Threatened species (as of May 24, 2007)

Maine Endangered Species:

American Pipit - *Anthus rubescens* **B**
Black Tern - *Chlidonias niger*
Golden Eagle - *Aquila chrysaetos*
Grasshopper Sparrow - *Ammodramus savannarum*
Least Bittern – *Ixobrychus exilis*
Least Tern - *Sterna antillarum*
Peregrine Falcon - *Falco peregrinus* **B**
Piping Plover - *Charadrius melodus* **
Roseate Tern - *Sterna dougallii* *
Roaring Brook Mayfly - *Epeorus frisoni*
Sedge Wren - *Cistothorus platensis*

Clayton's Copper (butterfly) - *Lycaena dorcas claytoni*
Edwards' Hairstreak (butterfly) - *Satyrium edwardsii*
Hessel's Hairstreak (butterfly) - *Callophrys hesseli*
Juniper Hairstreak (butterfly) - *Callophrys gryneus*
Katahdin Arctic (butterfly) - *Oeneis polixenes katahdin*
Rapids Clubtail (dragonfly) - *Gomphus quadricolor*
Black Racer - *Coluber constrictor*
Blanding's Turtle - *Emydoidea blandingii*
Box Turtle - *Terrapene carolina*
New England Cottontail - *Sylvilagus transitionalis*
Redfin Pickerel - *Esox americanus americanus*

Maine Threatened Species:

Arctic Tern - *Sterna paradisaea*
Atlantic Puffin - *Fratercula arctica*
Bald Eagle - *Haliaeetus leucocephalus***
Barrow's Goldeneye - *Bucephala islandica*
Black-crowned Night Heron - *Nycticorax nycticorax*
Common Moorhen - *Gallinula chloropus*
Great Cormorant - *Phalacrocorax carbo* **B**
Harlequin Duck - *Histrionicus histrionicus*
Razorbill - *Alca torda*
Short-eared Owl - *Asio flammeus* **B**
Upland Sandpiper - *Bartramia longicauda*

Twilight Moth - *Lycia rachelae*
Pine Barrens Zanclognatha (moth) - *Zanclognatha martha*
Ringed Boghaunter (dragonfly) - *Williamsonia lintneri*
Boreal Snaketail (dragonfly) - *Ophiogomphus colubrinus*
Purple Lesser Fritillary (butterfly) – *Boloria chariclea grandis*
Sleepy Duskywing (butterfly) – *Erynnis brizo*
Tomah Mayfly - *Siphlonisca aerodromia*
Tidewater Mucket (freshwater mussel) - *Leptodea ochracea*
Yellow Lampmussel (freshwater mussel) - *Lampsilis cariosa*
Brook Floater (Freshwater mussel) – *Alasmidonta varicosa*
Northern Bog Lemming - *Synaptomys borealis*
Spotted Turtle - *Clemmys guttata*
Swamp Darter (fish) - *Etheostoma fusiforme*

****

Federally Listed Endangered or Threatened Species currently or historically occurring in Maine, but not listed under Maine's Endangered Species Act

Eskimo Curlew - *Numenius borealis**?
Gray Wolf - *Canis lupus*?*
Eastern Cougar - *Felis concolor couguar**?
Canada Lynx - *Lynx canadensis***
Northern Right Whale - *Eubalaena glacialis**
Humpback Whale - *Megaptera novaeangliae**
Finback Whale - *Balaenoptera physalus**
Sperm Whale - *Physeter catodon**
Sei Whale - *Balaenoptera borealis**

Atlantic Ridley Turtle - *Lepidochelys kempi**
Leatherback Turtle - *Dermochelys coriacea**
Loggerhead Turtle - *Caretta caretta***
American Burying Beetle - *Nicrophorus americanus**?
Karner Blue (Butterfly) - *Lycaeides melissa samuelis**?
Atlantic Salmon - *Salmo salar**
Shortnose Sturgeon - *Acipenser brevirostrum**

NOTE: * = Federally listed Endangered Species
** = Federally listed Threatened Species
? = current presence uncertain in Maine.
B = breeding population only.

The Maine Department of Inland Fisheries and Wildlife (MDIFW) recently completed the process of recommending updates to the State's Endangered and Threatened Species list. The Department's recommendations were accepted and passed by the Legislature and signed into law by Governor Baldacci on May 24, 2007. The changes include a) 14 new listings, b) 1 delisting, c) a change of status from Endangered to Threatened for 1 currently listed species, and d) adding the qualifier "breeding population only" to 2 species currently listed as Endangered. This is the first update to Maine's list of Endangered and Threatened species since 1997 (Table 1).

This most recent listing process essentially began with completion of Maine's Comprehensive Wildlife Conservation Strategy in September 2005 (available on the MDIFW website *http://www.state.me.us/ifw/wildlife/compwildlifestrategy/index.htm*). Preparation of this document required a comprehensive review of most of Maine's fish and wildlife species, thus providing impetus to this listing process. The official listing process began in November 2005 with establishment of committees organized by species group (i.e. amphibians and reptiles, birds, fish, invertebrates, and mammals). These committees were comprised primarily of MDIFW species experts, who reviewed candidate species under their purview to determine whether a species qualified for listing as Endangered or Threatened under the Maine Endangered Species Act. Each determination was guided by established, scientific criteria and listing guidelines based on mandates of the Act and related rules. Initial recommendations, along with supporting documentation, were then submitted to species experts outside the Department for review and input. Based on reviewer's comments, each listing committee made final modifications to their recommendations, if appropriate. Following the public hearing and comment period in June 2006, and based on public input, the recommendations were modified, and the Commissioner of MDIFW made final recommendations to the Legislature, which has sole authority to make changes to the state's Endangered and Threatened species list – but only upon the recommendation of the Commissioner.

It should be noted that there is now a separate list of state Endangered and Threatened marine species. The Maine Legislature has given The Maine Department of Marine Resources responsibility for maintaining and updating that list.

--George J. Matula, Jr.

AMPHIBIANS AND REPTILES

Blanding's and Spotted Turtles

Over the past 17 years, MDIFW has actively researched the distribution and status of Blanding's and Spotted Turtles in Maine. Blanding's Turtles (state endangered) are 7 to 10 inches long with a yellow throat and light colored flecking on a helmet shaped shell. Spotted Turtles (state threatened) are 5 to 6 inches in length, have yellow spots on the head, tail, and legs and a somewhat flat, yellow spotted shell. Both species are semi-aquatic preferring small, shallow wetlands in southern Maine including pocket swamps and vernal pools. Undeveloped fields and upland forests surrounding these wetlands provide habitat for nesting, estivating (a period of summer inactivity), and inter-wetland movements.

Despite the attention these turtles have received, habitat loss and fragmentation continue to threaten both species' viability in Maine. The turtle's shell has provided sufficient protection from predators for millions of years, but unfortunately it is no match for a car tire. Both Blanding's and Spotted Turtles are long-lived animals that take a minimum of 7 (Spotted) to 14 (Blanding's) years to reach reproductive age. This coupled with low hatchling success places all the more importance on adult survivorship. Recent population analyses of several freshwater turtle species indicate that as little as 2-3% additive annual mortality of adults is unsustainable, leading ultimately to local population extinction. In other words, losing just a few breeding adult turtles each year to road kill may be the greatest factor threatening the extinction of Blanding's and Spotted Turtles in Maine. To this end, MDIFW and the University of Maine initiated a cooperative research project in 2004 to investigate the extent and significance of road mortality to rare turtles in southern Maine. Doctorate student Frederic Beaudry, after radio-tagging 91 turtles (50 Blanding's and 41 Spotted over three field seasons), is nearing the completion of his research in southern Maine. Fred's work looked at the nature, extent, and frequency of overland movements of Blanding's and Spotted Turtles, the road mortality risk associated with their movements, and the consequences of this mortality on the population viability of both species. One of the results of Fred's research was the discovery that Blanding's Turtles use on average 6.5 unique wetlands within a single season (one individual male Blanding's Turtle used 20!). MDIFW hopes to work with cooperators – including Maine Department of Transportation, The Nature Conservancy, and local towns – to apply results from this research toward designing solutions for areas with a high number of turtle road crossings (e.g., "turtle crossing" signage, barrier fencing, and turtle friendly underpasses).

--Phillip deMaynadier

BIRDS

***Island-Nesting Terns* - Arctic, Common and Roseate Tern Restoration**

Unique seabird collaboration reverses 50-year downward trend Arctic, common, and roseate tern populations were also decimated in the Gulf of Maine in the late 1800s due to a combination of shooting and egging for food and bait. Thousands of terns were also harvested to provide feathers for the growing millinery (hat making) trade. When these activities were halted in the early 1900s, tern populations increased, reaching peak numbers of at least 14,775 pairs in 1931 (including Machias Seal Island). However, expanding gull populations and habitat loss along the coast resulted in a significant population decline over the next 50 years. The combination of predation by gulls, competition for nest sites, and habitat loss reduced the Gulf of Maine tern population to only 5,321 pairs in 1977. To the rescue was a unique collaboration of researchers known as the Gulf of Maine Seabird Working Group. Consisting of biologists and others from eastern Canada and the U.S., they identified the need to increase the number of terns breeding along the Maine coast and to increase the number of islands supporting nesting terns. The decision to remove major tern predators, mainly Great Black-backed and Herring Gulls from a few strategic islands and maintain a staff of biologists on these islands was the catalyst for tern recovery. In 2006, as part of MDIFW's species planning process, a population objective of increasing the 5-year average population of common terns to at least 10,000 pairs, Arctic terns to at least 6,000 pairs, and roseate terns to at least 300 pairs was derived. In 2006, there were 7,817 pairs of common terns nesting on 21 islands, 3,152 pairs of Arctic terns nesting on nine islands, and 243 pairs of roseate terns on four islands.

Despite tremendous success in our recovery efforts for Maine's island-nesting terns, we remain concerned that over 90% of the terns in Maine nest on only 9 managed islands!

--R. Bradford Allen

***Atlantic Puffin* - Active management for 34 years and counting!**

Historically, Atlantic Puffins were more abundant in Maine than present populations; however, data are lacking on historic population levels. Marked declines occurred in puffin populations during the 1800s, largely due to over-exploitation by humans (e.g., unrestricted hunting for food and feathers, egg gathering, etc.) and human occupation of nesting islands.

Reductions in the puffin population in the Gulf of Maine/Bay of Fundy region were noted in 1833 when J. J. Audubon visited the region. Seal Island once was the largest Atlantic Puffin colony in the U.S. By the 1850s, this colony was reduced as a result of shooting and egg collecting. Puffins were eliminated from many Maine islands in the late 1880s due to overharvest for food and feathers. By the 1890s, only 3-5 nesting pairs were reported on Matinicus Rock, with an unknown number still present on Machias Seal Island.

Similar to the scenarios described above, puffin populations began to receive some legal protection in 1900 via The Lacey Act and Maine's Model Wild Bird Act and in 1918 by the Migratory Bird Treaty Act. Additionally, changes in the lifestyle of coastal Mainers that occurred at the turn of the century reduced human pressure on seabirds as a source of food. This combination of human lifestyle changes and protective legislation increased the suitability of coastal islands for alcid nesting.

The Atlantic Puffin colony persisted on Matinicus Rock through the period of heavy exploitation primarily due to protection by resident lighthouse keepers who were appointed as wardens. Puffins on Matinicus Rock and Machias Seal Island, remnants of the Gulf of Maine puffin population, continued to increase during the 1900s to 75-125 nesting pairs on Matinicus Rock and 750-900 nesting pairs on Machias Seal Island in the 1970s. There are approximately 16 million Atlantic Puffins worldwide, with about 338,000 breeding pairs in Canada and U.S.

National Audubon Society's Project Puffin to the Rescue

The National Audubon Society started Project Puffin in 1973 in an effort to learn how to restore puffins to historic nesting islands in the Gulf of Maine. At that time puffins occurred on only two sites, Matinicus Rock and Machias Seal Island. The project began with an attempt to restore Atlantic puffins to Eastern Egg Rock in Muscongus Bay.

Eastern Egg rock is owned by the Maine Department of Inland Fisheries and Wildlife. Young puffins from Great Island in Newfoundland (over 900 in total) were transplanted to Eastern Egg Rock when they were 10-14 days old. The young birds were placed in artificial burrows and hand fed vitamin-fortified fish. As the young puffins left their nests, they each received leg bands so they could be recognized in the future. After spending 2-3 years at sea, it was hoped they would return to establish a new colony at Eastern Egg Rock. In 1984, the National Audubon Society began a similar project on U.S. Fish and Wildlife Service

owned Seal Island National Wildlife Refuge. Seal Island is managed in cooperation with National Audubon Society for colonial nesting birds, including terns, guillemots, petrels and puffins. Puffins now nest on that island after a 150-year absence.

--R. Bradford Allen

Bald Eagle

On June 28, 2007 the U.S. Fish and Wildlife Service (USFWS) announced that the bald eagle would be removed from the federal list of Threatened Species throughout its range in the continental U.S. The species was first listed as an Endangered in 1967 across all southern states (below the 40th parallel). The northern tier of the continental U.S. was added in 1978 when bald eagles were designated as Endangered in 43 states (including Maine) and as Threatened in the remaining five (MI, MN, OR, WI, and WA).

The designation "Endangered" implies a species is in peril across its listed range, while the lesser category "Threatened" indicates jeopardy of becoming endangered. By 1978, only 791 nesting pairs of bald eagles could be documented in the lower 48 states. Historical estimates imply there had once been more than 100,000 nesting pairs in that region. While the species was never listed in Alaska or most of Canada, there was certainly a risk that our national symbol would vanish from most of its historic range.

Recovery plans were outlined for 5 regions of the U.S., and Maine was included in the Northern States Recovery Plan. Agencies, researchers, conservationists, and landowners began decades of programs to safeguard our national symbol. Most wildlife programs placed high priority on eagle population monitoring, habitat protection efforts, studies of environmental contaminants, and special population manipulations as warranted in specific areas to advance bald eagle recovery. Steady progress enabled "downlisting" of bald eagles (from Endangered to Threatened) across the lower 48 states in 1995.

By 2006, bald eagle numbers had rebounded to at least 9,789 nesting pairs in the lower 48 states. USFWS proposed eagle reclassification, national habitat management guidelines, a definition of "disturb" under the Bald Eagle – Golden Eagle Protection Act, future strategies for monitoring the species, and a one-year public comment period. The recent announcement of formal "delisting" (removal of the Threatened Species designation) under federal law becomes one of the premier success stories of the U.S. Endangered Species Act.

Bald eagles are still a rarity in many states, and some will continue special protection of the species under state law. In the 2006 tabulation of breeding populations in the lower 48 states (see http://www.fws.gov/midwest/eagle/population/be_prsmap_wo2006.pdf), more than 70% reside in only 10 states. Maine ranked 8th in abundance of breeding eagles amongst the lower 48 states that year and is the stronghold for the species in the northeastern U.S. In 2006, Maine's 414 nesting pairs represented 74% of all eagles residing in New England – New York.

Strategies for Bald Eagle Recovery in Maine

Even before the species was formally listed as Endangered in Maine, work had begun. In 1962, the National Audubon Society initiated bald eagle monitoring in Maine and five other populations. Although

the survey was limited in scope, annual statistics dropped to lows of 21 nesting pairs and only 4 eaglets fledged in the mid-1960s. USFWS began a program to solicit voluntary protection of nesting habitats in 1972. Early contaminant studies found unprecedented levels of DDE and PCBs in eagle eggs from Maine. The first of six graduate research projects at the University of Maine focused on the state's eagles began in 1976. Transplants of eggs (1974-76) and eaglets (1977-80) helped bolster segments of the population that nearly vanished.

MDIFW had to acquire annual grants and contract much of the early eagle work in the state. The creation of the Maine Endangered and Nongame Wildlife Program in 1984 made direct participation possible with a charitable donation (the "Chickadee Check-off") on state income tax forms to generate the first state funds. The USFWS continued to fund 90% of operational costs of eagle recovery in Maine for 30 years because of its strategic importance to the Northeast. Bald eagle assessments outlined management goals and strategies in 1975, 1980, 1986, and 2004. Annual monitoring of the breeding population, voluntary and regulatory efforts to protect nesting habitat, and public outreach have become constant missions. An array of researchers and land conservation partners now participate in special facets of the program in Maine.

In 1989, MDIFW established formal criteria for bald eagle recovery and details of new "Essential Habitat" rules (see below) in a management system. At present, only one outstanding hurdle remains before state reclassification of eagles. Biological parameters for delisting include viable numbers, self-sustaining levels of reproduction, and favorable population trends. A habitat "safety net" and federal delisting are additional criteria for eagle recovery in Maine. Federal delisting is considered a prerequisite because Maine is a somewhat isolated eagle population. There were no nesting eagles for many years in adjacent areas of New England or southern Quebec, and New Brunswick was the only Canadian province to list bald eagles as Endangered.

Safeguards for habitat were devised as a prudent measure to assure that a subset of broadly distributed nesting areas would remain suitable (via conservation ownership, suitable easements, or long-term cooperative agreements with landowners) regardless of special regulations. Maine has acquired special funds under the Landowner Incentive Program to implement other strategies for building the habitat safety net. When all of the criteria below are met fully, MDIFW will recommend bald eagle delisting under the Maine Endangered Species Act: a change requiring action by the state legislature … possibly in the next session.

The following is Criteria for Delisting Bald Eagles Under the Maine Endangered Species Act:

- Breeding population > 150 nesting pairs for 3 consecutive years [achieved in 1996]
- Annual eaglet production > 150 fledglings for 3 consecutive years [achieved in 1999]
- No annual population declines > 5% for 3 consecutive years [achieved in 2000]
- Federal delisting of bald eagles [achieved 2007]
- Secure at least 50 eagle nesting areas via conservation ownership or suitable easements [achieved 2004]

- Protect an additional 100 eagle nesting areas via conservation ownership, suitable easements, and long-term agreements with private landowners [pending]

Essential Habitat Rules Continue Until State Delisting

Until the status of Threatened Species for bald eagles under state law is removed by the legislature, there are no changes to special protection of eagle nests as Essential Habitat. Projects within mapped areas that are permitted by, licensed by, funded by, or carried out by state or municipal government must be reviewed by MDIFW. The rules do not prohibit land use changes but assures that any necessary adjustments are in place to meet the special needs of nesting eagles. There are currently 559 mapped Essential Habitats for bald eagles. Locations depicting these consultation zones can be viewed in town offices or on the Internet at http://megisims.state.me.us/website/mdifweh/viewer.htm

The Essential Habitat provision arose as a 1988 amendment to Maine's Endangered Species Act enabling special protection of areas currently or historically critical to species recovery. It was a remedy for subjective, inconsistent reviews of to land use changes and other new projects proposed near eagle nests when MDIFW had no formal role in the decision. First implemented in 1990, these rules outline standard criteria for judging each proposal based on local circumstances rather than hard-and-fast prohibitions. All but two of more than 250 Essential Habitat reviews were approved after safeguards for nesting eagles from project timing, buffers, and location became part of municipal and state permits. The account below "Protecting Essential Habitat for Bald Eagle nest sites in Eastern Maine" elaborates on this and other successful partnerships with landowners and conservation partners Downeast to benefit eagles.

2007 Nesting Survey Findings

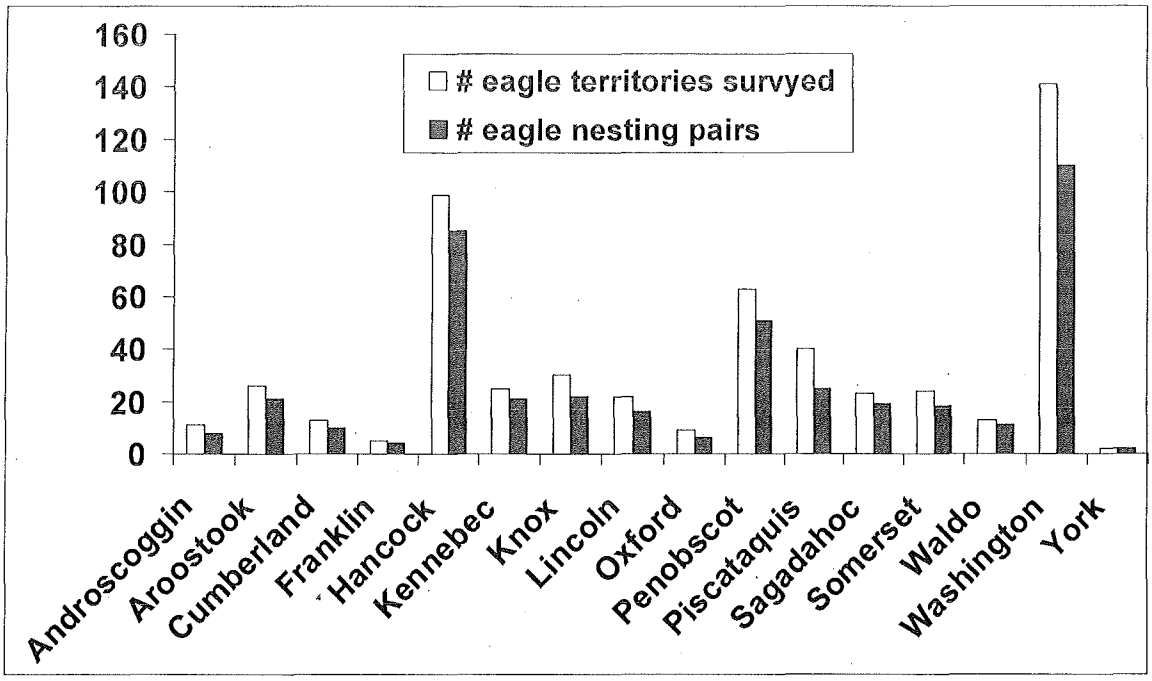
In 2007, the preliminary survey total is 437 nesting pairs but that number is expected to rise slightly as biologists react to reports of new nests and conduct final aerial survey monitoring. More than 45 survey flights have been conducted by MDIFW biologists and contractors to monitor traditional nests, search for new nests, and evaluate eagle reproduction. Thirty-two new eagle nesting pairs have been located in 2007. Also, 44 new, alternate nest locations for established pairs were documented.

Expanding numbers of nesting eagles are evident statewide, but Maine's eagle stronghold is still "Downeast." Washington, Hancock, and Penobscot Counties still support 57% of the statewide population. The region boasts the highest density of nesting eagles between population centers in the Chesapeake Bay (Maryland and Virginia) and Cape Breton Island (Nova Scotia). New eagle pairs have been found this year from Dayton (York County) north to Van Buren (Aroostook County), from Bethel (Oxford County) east to Lubec (Washington County), and offshore in Monhegan (Lincoln County) to upper stretches of the Saint John River (Aroostook County): literally, the length and breadth of Maine! A breakdown of the statewide monitoring effort and eagle numbers by county documented thus far in 2007 appears in Figure 1.

The net increase of only 15 pairs (over the 2006 total of 414 nesting pairs) is deceiving because of limits on survey budgets and very challenging spring weather patterns. A major snowstorm April 5 followed by the torrential rain and wind of an April 16 Nor'easter wreaked havoc with eagle nesting this year. Most Maine

eagles have laid eggs by the end of March. Thus prolonged, adverse weather can readily cause amplified levels of nest loss, exposure of eggs to freezing, etc.

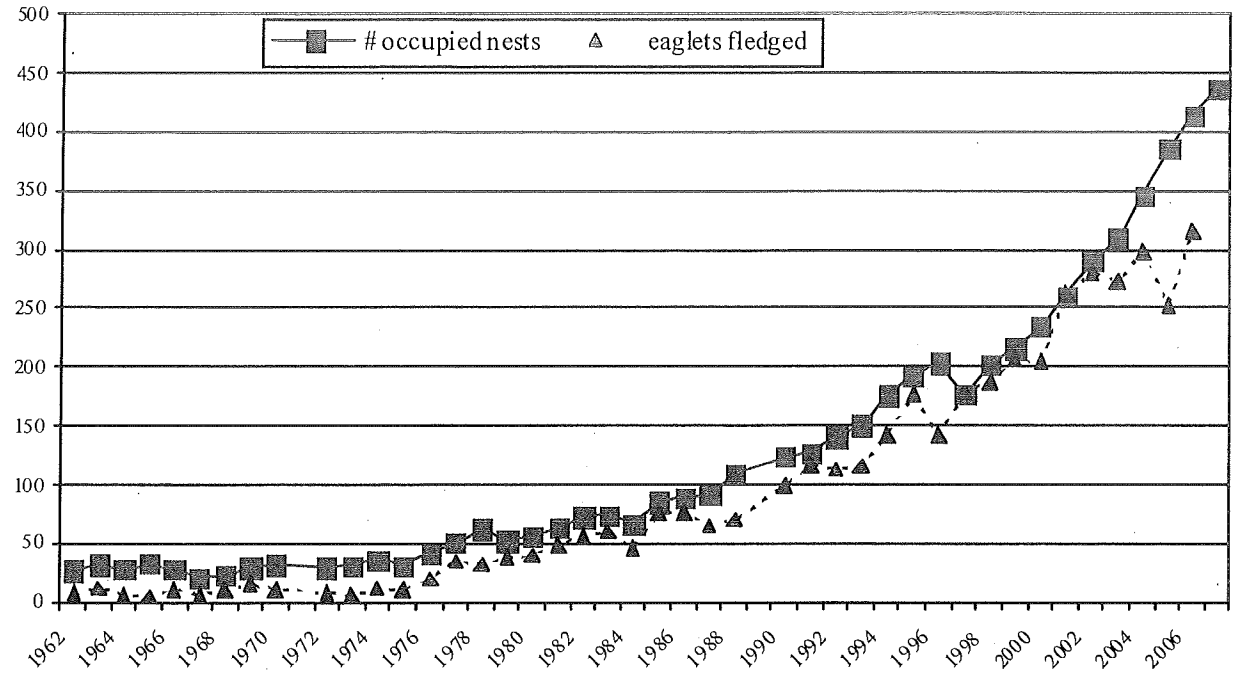
Figure 1. Statewide monitoring effort and eagle numbers by county in 2007



In turn, biologists have more difficulty locating resident eagles after nest failures so we believe that (more than most years) we are undercounting the eagle population in 2007. A national monitoring protocol was first tested in Maine during 2004, and random plots were surveyed to compare against our normal monitoring procedures and found that we effectively had found 82% of actual numbers.

Final levels of nest success and overall productivity have not yet been evaluated this year. A sample of 369 nests with known outcomes has yielded only 240 eaglets. This level of productivity (0.65 fledglings per occupied nest) is considerably below typical rates in Maine. Fortunately, the population is well-buffered against such setbacks now and not nearly as vulnerable to random influences (such as April storms) as it was for the many years when low numbers presented an inherent risk to the eagle's future. A look back at the trends in numbers of nesting pairs and annual eaglet production over the years in Maine reveal the degree of jeopardy that loomed over Maine eagles (Figure 2).

Figure 2. Bald Eagle Recovery Trends in Maine



Lessons From Eagle Recovery and Future Strategies

Most agree that federal delisting of bald eagles is appropriate and that removal of the Threatened designation under Maine's Endangered Species Act is eminent. For 30 years, MDIFW focused toward a goal to re-establish a self-sustaining population of bald eagles across Maine. Many different challenges and were addressed via adaptive management to assure they did not limit eagle recovery. We are confident that the full compliment of state delisting criteria achieves that outcome.

However, the bald eagle still has special needs. We have no evidence that eagles can increase or even sustain their numbers without attention to shoreline habitats they require. Bald eagles, a top-level predator, are very sensitive barometers of environmental quality. Mortality factors that shorten eagle longevity can create population declines. As before, risks will be evaluated and remedies formulated … this time, before jeopardy levels escalate. Biologists would much rather focus on wildlife before facing the perils implied by Endangered and Threatened classifications. Recovery of species (if possible at all) inevitably requires decades of special efforts.

Three years ago, MDIFW Advisory Council adopted a recommendation from a public working group to target an eagle population of 600 nesting pairs in Maine by the year 2019. This objective and one to double the habitat safety net are reasonable and effective safeguards to eagle recovery. The population level translates to modest gains less than half the 8% annual growth rate achieved during peak survey monitoring and habitat protection efforts ongoing since 1990. These functions will not end but be less frequent and rely on sampling so that MDIFW can use limited budgets and staff more for other species of conservation concern. Biologists will sample relative abundance, distribution, reproduction, and nest occupancy rates of the eagle population over time to assure that setbacks do not arise. Maine will be a key state in a national

monitoring protocol to conduct dual-frame sampling (like the U.S. Census Bureau) every 5 years through the year 2028.

The relationship of these indices with land conservation, private stewardship, and "unprotected" eagle habitats will be examined. Thirty years ago, there were only two eagle nesting areas on conservation land. Now there are 89 eagle pairs on lands secured in perpetuity by resource agencies and private conservation partners. The Nature Conservancy, Maine Coast Heritage Trust, Forest Society of Maine, New England Forestry Foundation, and the array of local chapters of the Maine Land Trust Network have negotiated many outstanding purchases or conservation easements to benefit bald eagles and our natural resource legacy for future generations in Maine. Efforts will now focus on 207 partly protected eagle habitats to assure others will remain functional landscapes in the future. The Bald Eagle – Golden Eagle Protection Act, prohibits direct harm to eagles and their nests. National habitat management guidelines were adopted to promote compliance with this federal law.

Maine's intricate coastline and numerous inland waters may provide physical habitat for 700 - 1,000 nesting pairs. This number (= carrying capacity) could rise sharply if runs of migratory fish populations (alewives, shad, eels, etc.) improve. Current efforts to remove legal blocks to alewife passage in the Saint Croix River and proposal to remove 2 dams and bypass another with inadequate fishways in the lower Penobscot River could greatly improve food resources for eagles in much of the state. MDIFW and research partners now have clear baselines on levels of mercury and PCB residues in the eagle population. Neither of these contaminant groups has declined significantly over the last 20 years, unlike the phenomenon with DDE.

The accomplishments in bald eagle recovery programs are indeed remarkable and the most desirable end product in Endangered Species conservation, but there are no quick fixes or guarantees of success. Maine citizens, visitors to the state, and our data all agree that the steady increases in numbers and distribution of Maine's bald eagles have greatly boosted public viewing opportunities to see and enjoy our national symbol. Please remember what was almost lost! Maine's natural resources are invaluable.

You can help in many ways. Contributions to Maine's Endangered and Nongame Wildlife Fund remain the only source of state funds for these programs. Direct contributions, gifts via the Chickadee Check-off on state income tax forms, or partial proceeds from purchase of a Conservation Plate for vehicles registered in Maine all are deposited in this dedicated account and provide the only state revenue to provide match money for other grants and partnerships. Your help and support are encouraged. This work is currently supported by federal State Wildlife Grants, Landowner Incentive Program funds, and state revenues from the Conservation Plate and Chickadee Check-off funds.

--Charlie Todd

Protecting Essential Habitat for Bald Eagle Nest Sites in Eastern Maine

To support the recovery of threatened and endangered species, the Maine Legislature passed an amendment to the State's Endangered Species Act in 1988. This amendment provided the Commissioner of the

Department of Inland Fisheries & Wildlife the authority to designate "Essential Habitats" ... areas that are determined to support certain physical or biological features that are critical for the survival and recovery of a listed species. Essential Habitats for nesting bald eagles represents the most extensive application of this legislated provision, and a means for applied, on the ground management by Department wildlife biologists.

The Essential Habitat Rule provides that any project, which is partly or wholly located within ¼ mile of a designated eagle nest, and which requires a State or municipal permit, or is partly or wholly funded by the State or municipality, must be reviewed by the Department for potential impacts to nesting eagles. A finding of negligible impact must be rendered by the Commissioner before the State or municipal regulatory authority can issue a permit for a project. Applicants are encouraged to consult with Department wildlife biologists prior to submitting a project application so that issues can be identified early in the process and solutions incorporated into a final project design.

There are no automatic prohibitions on the types of projects that can be proposed within the ¼ mile regulated area around a designated eagle nest. Each project must be evaluated independently for impacts, if any, to nesting eagles. The Rule requires Department biologists to assess the geo-physical characteristics of the local habitat to determine if features exist (topography, forest growth, etc.) that would adequately buffer a project from a nest. Key also are the characteristics of the nest site itself, as well as any demonstrated tolerance of the individual pair of birds to the type of development or land use being proposed.

Given that about 60% of the State's bald eagle population resides in Washington and Hancock County, Region C staff have been acutely involved with the implementation and application of the Essential Habitat Rule. Annually, a significant amount of time is spent consulting with landowners and/or their representatives on the provisions and applicability of the Rule, as well as evaluating site conditions for possible impacts to nesting eagles.

In the 17 years that the Rule has been in effect, the vast majority of applications have been approved; often with only minor modifications to safeguard the needs of nesting eagles. With adequate buffering, many projects have only had to limit the timing of certain outside construction activities to avoid disturbance and resulting nesting failure. In fact, there has been only one case where a development proposal could not be successfully integrated with the resident pair of nesting eagles.

Rather than a liability to ownership, it has been our experience that the most landowners are enthusiastic about sharing real estate with nesting eagles, and have been more than willing to accommodate their needs. One key to successful management has been when there has been early communications between Department biologists and applicants to identify issues and incorporate solutions into a final project design.

--Tom Schaeffer

Least Tern

Least terns are the smallest of four species of terns that nest along the coast of Maine. These Endangered birds nest on the same sandy beaches used by piping plovers in southern Maine. Nesting colonies of least terns in Maine are monitored and protected by biologists from Maine Audubon and Rachel Carson National Wildlife Refuge. During the past 14 years, the statewide population has fluctuated from 39 pairs at 3 sites in 1982, to 157 pairs at 5 nesting beaches in 2004. Since 1979, total productivity in Maine has ranged from 12 to 123 young fledged annually. In 2005, faced with the same challenges experienced by the piping plovers, 109 – 114 least terns attempted to nest at six different locations in Maine but only about 20 fledglings were produced. It is interesting to note that in 2005, least terns nested on Stratton Island in Saco Bay for the first time ever recorded, as well as on Western beach which had been nourished the previous winter from dredge spoils from the Scarborough River. Western beach had not been occupied by least terns since the 1980s.

2006 was not a productive year for least terns nesting in Maine. Terns arrived later than in previous years and predation was high at all mainland sites. Predation from skunks and crows caused least terns to abandon locations bouncing around several southern beaches until the majority of southern Maine least terns ended up nesting on Stratton Island. National Audubon Society biologists on Stratton Island monitored nesting activity and conducted a feeding survey while working toward monitoring productivity. Despite protection efforts by biologists on Stratton Island and the mainland, productivity was poor. An estimated 134 least tern pairs were recorded nesting and only 26 fledglings were observed using dusk surveys.

The erratic productivity of these birds in Maine can be attributed to human-related disturbances such as destruction of nests or young by humans and their pets or from predators such as crows, gulls, foxes, skunks, and raccoons, which are attracted to heavily used beaches because of food items and other bits of garbage left behind by beach-goers. Terns are also faced with challenges from natural events (e.g., tides, storms) and habitat alteration from coastal development. Production of chicks in the last decade likely has not been sufficient to maintain the population. Management of least terns in Maine includes placing fencing and signs around nesting colonies and predator control. Public education, to inform recreational beach-goers and local residents about the conservation needs of least terns, is another important management activity. MDIFW and Maine Audubon have developed management recommendations for each of the nesting beaches to aggressively confront predation and disturbance problems. Funding for this work comes from the Outdoor Heritage Fund; Loon Plate and Chickadee Check-off funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).

--Lindsay Tudor

Piping Plover

Piping plovers are small, sand-colored shorebirds that nest on sandy beaches and dunes along the Atlantic Coast from South Carolina to Newfoundland. Management of piping plovers in Maine is considered a success story because without our efforts piping plovers may be gone from our state. The overall population trend has been one of increase, due largely to intensive management at nesting sites and the

cooperation of private landowners and municipalities (see following article). The piping plover is federally listed as threatened and in Maine is state listed as Endangered because of its extreme rarity and the threats it faces during the nesting season. Habitat loss, lack of undisturbed nest sites, and predation are the primary factors jeopardizing populations of piping plovers. Maine's population of piping plovers has been monitored annually since 1981. During this period, the number of pairs reported has fluctuated between 7 pairs at 4 sites in 1983, to 66 pairs at 20 sites in 2002.

Productivity of piping plovers in Maine, measured as number of chicks fledged per nesting pair, has ranged from 0.9 chicks per pair in 1981 to 2.5 chicks per pair in 1991. Statewide productivity since 1984 has been among the highest documented in any Atlantic Coast state or province. Productivity in Maine has exceeded 1.7 chicks per pair in 11 of the past 15 years. Unfortunately in 2005, only 49 pairs of piping plovers made 82 nesting attempts and produced only 27 fledglings (0.55 chicks fledged per pair). Such low productivity was the result of fewer adults returning to nest, a series of strong spring storms during the prime nest-initiation phase, and widespread predation.

The 2006 nesting season was also disappointing with only 40 pairs returning to nest on Maine's southern beaches. Predation played a major role in 2006 with nine pairs losing entire broods to predation and all other nests lost at least one chick to predation. The 40 pairs of plovers made 53 nesting attempts and fledged only 54 chicks.

Despite the last two year's declines we are hopeful, with continued intensive management, the overall trend will be increasing numbers of piping plovers. MDIFW is grateful for the help of many groups that help monitor and manage piping plovers. They include Maine Audubon, The Nature Conservancy, Maine Bureau of Parks and Lands, Rachel Carson National Wildlife Refuge, U.S. Fish and Wildlife Service, Bates Morse Mountain Association, the towns of Wells and Ogunquit, and many others. Collectively, biologists and volunteers complete annual population surveys, fence and sign nesting areas, and count fledglings. This work is supported by federal Section 6 funds; Loon Plate and Chickadee Check-off funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).

--Lindsay Tudor

Piping Plover/Least Tern – Implementing Successful Town Agreements

Habitat loss and lack of undisturbed nest sites are two of the primary factors jeopardizing populations of piping plovers. Historically, Maine had more than 30 miles of suitable nesting beaches that may have supported up to 200 pairs of piping plovers. However, the construction of seawalls, jetties, piers, homes, parking lots, and other structures along Maine's sand-beaches has dramatically reduced the extent of suitable nesting habitat. The capability of the remaining habitat to support nesting plovers is further reduced by continued development and intense recreational use. Ensuring the availability of this limited habitat is essential for the continued existence of piping plovers and other shorebirds, such as the state-endangered least tern.

In 1997, the Maine Department of Inland Fisheries & Wildlife proposed designating several beaches in southern Maine as Essential Habitat for piping plovers. However, in the face of public opposition to the proposal, MDIFW decided to pursue an alternative to Essential Habitat designation in the Towns of Wells, Ogunquit, and Scarborough. Committees of stakeholders in each Town convened to develop Beach Management Agreements (BMAs) to address the Towns' needs to manage their beaches for both traditional public use and piping plovers. All three of these towns host long, sandy beaches that attract thousands of day visitors, vacationers, and seasonal residents throughout most of the spring and summer. Along with all these people come many associated activities that can negatively impact the nesting success of the piping plover, including roaming dogs, and cats, volleyball and Frisbee games, kite flying, and the public's desire to keep the beach free of debris and seaweed. The BMAs provide simple solutions such as moving volleyball nets and kite flying areas away from plover nesting areas, and enforcing dog ordinances, which can go along way toward ensuring a productive season for the piping plovers. As part of the process to develop the BMAs, all three towns agreed to minimize their beach cleaning, and the amount of heavy equipment and machinery used on the beaches, if any. When use of this equipment is required, the Towns use "spotters" to ensure the vehicles don't impact any piping plovers, their nests, or young, and maintain a setback when a nesting pair is present.

Each year the Public Works Departments, and any lifeguard staff are trained in piping plover biology and management, giving everyone a better understanding of the birds and their need for protection. The Towns of Wells and Ogunquit both employ a piping plover volunteer coordinator, who solicits volunteer plover monitors for their respective beaches. These volunteers are essential; both monitoring plover productivity almost daily and talking to hundreds of beach goers and conducting invaluable outreach and public education.

The development of BMAs has given the Towns the tools and flexibility to manage their beaches while still protecting their valuable wildlife resources. Currently, MDIFW is in the process of updating the BMAs for all three towns for the next three-year period. Through this process, MDIFW, the Towns, and stakeholders have developed excellent working relations that allow all the agencies to work cooperatively and efficiently, which has benefited all involved, especially the piping plovers we are trying to protect.

--Judy Walker

INVERTEBRATES

Clayton's Copper Butterfly

The Clayton's copper (*Lycaena dorcas claytoni*) is a small, orange-brown butterfly known only from a handful of sites in Maine and western New Brunswick. In Maine, most of our occurrences are centered in a ten square mile area around Lee and Springfield in northeastern Penobscot County. Three sites in northern Piscataquis County and two in Aroostook County have also been documented. Only one site, Dwinal Pond flowage in Lee and Winn, is known to support a large population (thousands) of Clayton's copper. This butterfly is believed to be an isolated subspecies of the more widely distributed Dorcas copper (*Lycaena dorcas*), which is found across much of northern and western North America.

Clayton's copper is found only in association with its single larval host plant, the shrubby cinquefoil (*Pentaphylloides floribunda*). This uncommon shrub requires limestone soils and has a scattered distribution throughout Maine. Although not considered rare, it occurs in few stands large enough to support viable Clayton's copper populations. In Maine, shrubby cinquefoil typically occurs along the edge of calcareous wetlands (i.e. rich in calcium carbonate or limestone), which are also uncommon in Maine. It can also be found in old fields, but these stands are typically short-lived as a result of forest succession. All of the currently known occurrences for Clayton's copper are circumneutral fens and bogs, or streamside shrublands and meadows.

Clayton's copper butterflies take one year to complete their life cycle. In late July and August, when shrubby cinquefoil is blooming, females lay their eggs singly on the underside of cinquefoil leaves. Leaves and eggs drop to the ground in autumn, and the eggs overwinter. The pale green larvae hatch in spring and crawl back up the plant to feed on its leaves. After the larvae molt and pupate in early summer, adult butterflies emerge during July and August to start the cycle over again. Throughout the flight period, Clayton's copper remains local to its cinquefoil stands, where the abundant yellow flowers provide its primary nectar source.

Clayton's copper is listed as "endangered" in Maine because of the extremely limited number, size, and distribution of its populations; the limited availability of its habitat, and its near-endemic status in Maine. Forest succession, impoundments, and dewatering of wetlands for irrigation are currently the most serious threats to this butterfly and its habitat. In addition, the longterm viability of such small, isolated populations is uncertain. In 2006, several grants were awarded MDIFW and the University of Maine to investigate two key questions about this rare butterfly. Beginning in 2007, Emily Knurek – a graduate student at UMO – will develop and implement a survey protocol to estimate the size of Maine's Clayton's copper populations. Having a baseline population estimate is critical to assessing a species' true status and recovery potential, as well as establishing management goals and monitoring population trends. Emily will also investigate the butterfly's taxonomic status. While most lepidopterists accept the subspecific status of Clayton's copper, others doubt its validity – especially since the taxonomic distinction between Clayton's and Dorcas Copper has never been quantified. Only detailed morphological and genetic analyses will determine if Clayton's Copper is a true subspecies, thus confirming and further increasing its conservation significance in Maine.

Funding for this work comes from the U.S. Fish & Wildlife Service, State Wildlife Grant Program, Maine Chapter of The Nature Conservancy, American Philosophical Society, Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), Conservation Plate ("Loon Plate") revenues, and "Chickadee Checkoff" contributions on the State income tax form.

--Beth Swartz

Freshwater Mussels

Freshwater mussels are relatively sedentary, bottom-dwelling invertebrates found in most of Maine's lakes, ponds, rivers, and streams. Often referred to as a "clam," the freshwater mussel's inconspicuous and seemingly drab lifestyle belies its importance. As filter-feeders, mussels provide a valuable service to aquatic environments by filtering suspended particles such as algae, bacteria and detritus from the water, and by

returning nutrients to the ecosystem. In turn, mussels provide food for a variety of wildlife such as muskrats, raccoons, and otters.

Freshwater mussels also have a rather unique and interesting life cycle. They start life as free-floating larvae, called "glochidia", which are very different in appearance from the adults. The glochidia of most species must encounter and attach to a very specific fish host in order to mature into the more familiar adult form. Once the tiny mussels have dropped off their mobile nurseries (they do no harm to the fish) and burrowed into the substrate, they often remain in the same spot for their entire lives. For some species, a lifetime can span 100 years or more.

Habitat integrity is an important factor influencing mussel survival. Freshwater mussels are very sensitive to contaminants and changes in their environment - a vulnerability compounded by specific habitat and fish host requirements, and an inability to leave their surroundings. Consequently, freshwater mussels are one of our most valuable indicators of water quality and ecosystem health. They are also one of the most imperiled groups of animals in the country. Of the nearly 300 species of freshwater mussels found in the United States, approximately half have already vanished or are in danger of extinction, and over 75% of North America's freshwater mussel species are listed as endangered, threatened, or special concern on the state level.

These dramatic declines in freshwater mussel populations have been caused largely by the degradation and loss of mussel habitat from pollution, dams, channelization, dredging, and the sedimentation of our once clean, free-flowing rivers and streams. In addition, poaching of shells for sale to the Orient's pearl culture industry, and the recent invasion of a prolific foreign competitor, the zebra mussel, are also jeopardizing many mussel populations. Too late for some species, efforts to maintain habitat quality and prevent further loss have now become a high priority for many state, federal, and private conservation agencies.

In Maine, our freshwater mussel fauna has fared relatively better than that of many states. We have not lost any species, our freshwater habitats are reasonably clean or have improved in water quality, and the zebra mussel has not yet found its way into our waterways. However, we are not immune to the problems of habitat loss and degradation that have eliminated populations and extirpated species in other parts of the country. Of our ten native species, three (yellow lampmussel, tidewater mucket, brook floater) are currently listed as "threatened" under the Maine Endangered Species Act and one (creeper) is considered of "special concern". Fortunately, compared to most states within the range of these species, Maine hosts some of the best remaining populations and may be a last stronghold for these rare mussels.

In 2006, MDIFW continued to investigate the distribution of Maine's four rarest mussel species. Jaime Haskins, an experienced mussel observer who contributed much of the previous statewide survey data, was hired to target survey gaps in the Eastern Lowlands ecoregion. As a result, Jaime was able to find several new occurrences that connect previously known locations and extend known distributions farther up or down a river system. These additional records will help MDIFW more thoroughly document the distribution of these rare species and provide invaluable data for project planning, permit review and other conservation measures.

Also in 2006, MDIFW and the University of Maine completed collaboration on two important freshwater mussel research projects. Graduate student Stephen Kneeland concluded his investigation of the fish host(s) for two of Maine's threatened species - the tidewater mucket and yellow lampmussel. Stephen developed a new molecular key using DNA analysis to identify glochidia found on fish in the wild – sampling over 800 fish throughout the mussels' range in Maine and finding their glochidia on about 10%. As a result, the white perch and yellow perch were confirmed as suitable hosts for both rare mussels. Five additional species (banded killifish, chain pickerel, white sucker, largemouth bass and smallmouth bass) were found to be potential hosts for the yellow lampmussel, and one additional species (banded killifish) was identified as a potential host for the tidewater mucket. For both species, white perch was the most commonly used and heavily infected host fish. Identification of host species is a critical component to understanding the life history and conservation needs of freshwater mussels. Without knowledge of host requirements, resource managers cannot ensure native fish communities provide for the needs of rare mussels.

A second graduate student, Jennifer Kurth, also completed her research on methods of relocation for the yellow lampmussel and tidewater mucket from areas where dam removal is pending. Proposals to remove both small and large hydro-power dams are becoming increasingly common in Maine, and occasionally impact these two threatened species – both of which are found in impoundments. When a dam is removed where rare mussels are present, the only conservation tool available to MDIFW is to move or relocate stranded mussels to new habitat. Until now, we've had no post-monitoring data to let us know if our efforts are successful or if we need to change or improve our mussel relocation techniques. Jennifer's study focused on several key issues for yellow lampmussels and tidewater muckets living in the Fort Halifax Impoundment on the Sebasticook River in Winslow, where a dam is proposed for removal. She began her research with comprehensive surveys to document the distribution and abundance of rare mussels in the project area and help guide relocation efforts. She then conducted an experimental translocation using a common species found in the impoundment to determine the effects of relocation on mussel survival and the suitability of two previously proposed relocation sites (nearby Sandy Stream and Unity Pond). Jennifer also became the first person to successfully use the PIT (Passive Integrated Transponder) tag – a tiny identification chip - to locate and monitor mussels that had been moved: she was able to relocate up to 80% of the mussels using PIT pack searches vs. only 47% using visual searches alone! The second phase of Jennifer's research was an actual relocation of yellow lampmussels and tidewater muckets from the impoundment to the relocation sites. Her recapture rates of the PIT-tagged listed mussels ranged from 57-90% for yellow lampmussels (0-7% mortality) and 30-86% for tidewater muckets (4-6% mortality). The information obtained from Jennifer's research will be invaluable in the recovery, relocation and monitoring of rare mussels affected by the eventual removal of Fort Halifax Dam.

More information on Maine's mussels can be found in *The Freshwater Mussels of Maine* (Nedeau et al. 2000). This book is a comprehensive guide to freshwater mussels, written in non-technical language, and includes species accounts, range maps, distribution tables, and identification guides for all of Maine's freshwater mussel species. It is available through the Department's online store

(*http://www.mefishwildlife.com/*) or Information Center (207-287-8000) and costs $10. Funding for this work comes from the U.S. Fish and Wildlife Service (State Wildlife Grants), Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), University of Maine, U.S. Geological Survey, Conservation Plate ("Loon Plate") revenues, and "Chickadee Check-off" contributions on the State income tax.

--Beth Swartz

Roaring Brook Mayfly

In 1939, T.H. Frison climbed Mt. Katahdin and unknowingly made a discovery that would one day puzzle the experts. Frison, a well-known Illinois entomologist, was collecting mayflies and stoneflies as he and his family hiked to Chimney Pond on a late summer day. Several years later, one of those mayfly specimens would be described as a new species. Aptly named in memory of its collector, *Epeorus frisoni* went largely unnoticed for another half century. But in the early 1990s, MDIFW biologists began updating Maine's Endangered Species List and, for the first time ever, were considering the status of invertebrates. Mayflies were a well-studied group of insects, yet here was a species that had never been found anywhere else in the world since its discovery on Mt. Katahdin in 1939. This long history of a single occurrence, despite extensive collections and surveys of mayflies throughout Maine and North America, ultimately led to *Epeorus frisoni* being listed as endangered in Maine in 1997.

Unofficially dubbed the "Roaring Brook mayfly", this little insect remained a big mystery to MDIFW biologists now responsible for ensuring its conservation. Nothing was known about its life history, habitat requirements, or conservation needs. Its current status and distribution on Katahdin were also unknown, since no one had looked for it there since its original collection at "Roaring Brooks". To complicate matters, the species' taxonomic validity had come under question. Its similarity to a closely related species had led at least one mayfly expert to suggest that the original specimen might be just a variant form of a more common *Epeorus* species found in Maine.

Without additional taxonomic study and an assessment of the species' current status at Roaring Brook, MDIFW could not even begin to understand or address the mayfly's conservation needs. If the same animal could be collected again, a mayfly expert might be able to determine if the original species description was accurate. If *Epeorus frisoni* was not a valid species, it certainly did not belong on the State's Endangered Species List. However, if it was a valid species, Frison's namesake would endure as one of the rarest mayflies in the world.

Recently, with special permission from Baxter State Park, MDIFW surveyed Roaring Brook and two of its tributaries to collect specimens of the Epeorus species that occur there. With the expert help of Dr. Steven Burian, a mayfly taxonomist from Southern Connecticut State University, MDIFW was able to confirm that some of the specimens collected from the two tributaries of Roaring Brook matched the specimen collected by Frison in 1939. By comparing them to other species of *Epeorus* found in Maine, we were also able to confirm that *Epeorus frisoni* was indeed a distinct and valid species!

Since then, Dr. Burian has also located a specimen of *E. frisoni* in a recent collection from Vermont. While it now appears the Roaring Brook Mayfly is not endemic just to Katahdin or to Maine, its status as a "narrow

endemic" (i.e., having an extremely limited distribution) is very rare, and *E. frisoni* is the only mayfly known to be endemic to New England. Its single occurrence in Maine also continues to support the species' listing status as state-endangered – allowing MDIFW to confidently advance an investigation of the mayfly's life history and conservation needs. The more we learn, the more effectively MDIFW can survey for new occurrences statewide and further investigate the species' rarity.

In 2005-2006, MDIFW continued surveys for the Roaring Brook Mayfly as part of ongoing ecoregional surveys for rare species. While high-elevation, headwater streams are not a common habitat type in the targeted Eastern Lowlands and Aroostook Hills and Lowlands ecoregions, streams on several of the highest peaks were sampled. No *Epeorus frisoni* were found. In 2007, MDIFW will begin surveys in the Western and Central Mountains ecoregions – two areas of the state that hold the greatest promise of finding new occurrences of this rare mayfly. Funding for this work comes from the Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), "Loon Plate" revenues, and "Chickadee Check-off" contributions on the State income tax form.

--Beth Swartz

MAMMALS

Canada lynx

The lynx is a medium-sized cat that averages 25 pounds for males and 19 pounds for females. Its general appearance is similar to the bobcat in that it has ear tufts, a short black-tipped tail, and tawny-gray fur. However, the lynx has a completely black-tipped tail, longer ear tufts, and a more prominent facial ruff than bobcats. Lynx tend to be a little lighter in weight than the bobcat, but can appear larger due to their noticeably larger paws and longer legs. The numbers and distribution of their primary prey, snowshoe hare, largely dictate lynx populations. Lynx are capable of moving extremely long distances in search of food or to establish new home ranges. Lynx are associated with boreal environments (northern forests) and are common in Canada and Alaska. In Maine, we are at the edge of lynx range, as the forest transitions from the spruce-fir forest of the north to the hardwood forest of the south.

A History of Lynx in Maine

Based on historical written accounts, it appears that lynx have persisted in low numbers in Maine, and were most common during the 1800s. At the time of European settlement, there were no closed hunting seasons. Lynx, like most predators, were considered vermin, and bounties were offered to encourage eradication. By 1832, a statewide bounty on all wildcats (including lynx) was issued. Because bounty records did not distinguish lynx from bobcat, it is difficult to determine lynx status in Maine based on bounty records. However, Manly Hardy, a trapper and fur buyer in Maine in the 1800s provides insight into the status of lynx in the 1800s. His writings indicate that lynx numbers varied greatly from year-to-year. Typically, several hundred lynx would be taken each year, for several years. This would be followed by several years when not a single lynx was taken in the state. In 1939, Aldous and Mendall surveyed game wardens to document the status of big game and fur animals in Maine. Wardens indicated that lynx were once found statewide, but were common in only one warden district, absent along the coast, and rare in the remaining districts. Follow-up surveys of game wardens for 1950-60 and 1960-70 indicated that lynx were common

in 1-2 warden districts at the western edge of Aroostook County, locally rare in five other districts, and absent from the remainder of the state. A year-round open season and a bounty remained in place until 1967 when the Maine legislature removed the bounty and closed the season due to concern over the rarity of lynx in Maine. In 1974, John Hunt, a wildlife biologist in our Department, wrote that lynx remained scarce and were rarely found south and west of Moosehead Lake, east of the Penobscot River, or east of the upper headwaters of the St. John and Allagash Rivers. At the time, much of northern Maine was classified as a mature forest. However, by the late 1970s to mid 1980s, millions of acres of northern Maine's spruce-fir forest were affected by the spruce budworm outbreak. As a result, large tracts of mature spruce-fir forest were cut (primarily clearcut) to salvage diseased trees and prevent further expansion of the budworm. This cutting led to forest conditions that are favorable for snowshoe hare and lynx today.

Lynx Designated a Threatened Species

In 1997, lynx were considered for state listing as endangered or threatened, but there was insufficient information on their status to warrant listing. As a result, lynx were designated as a species of special concern. In Maine, there are over 100 species designated as a species of special concern. This status does not offer protection under the state endangered species statutes, but identifies species considered vulnerable that could easily become endangered or threatened. In March of 2000, after 10 years of litigation in federal courts, Canada lynx were listed as a federally threatened species in 14 states, including 4 northeastern states: Maine, New Hampshire, Vermont, and New York. Maine is the only northeastern state that currently has a lynx population. The United States Fish and Wildlife Service (USFWS), the agency responsible for the management of federally listed species, recently designated critical habitat areas for lynx. Critical Habitat is a term defined in the Endangered Species act as geographic areas that contain features essential for the conservation of a threatened or endangered species that may require special management considerations or protections. Although lynx occur throughout much of northern Maine, the USFWS did not designate critical habitat in Maine, because most activities on private land would not require a federal permit and review. They believed that imposing ineffective regulation would harm current cooperation among landowners and state and federal agencies that is essential for conserving habitat for lynx and snowshoe hare in northern Maine. Further the USFWS believes management of these lands has created habitat that supports lynx. However, areas that support lynx populations but are outside the critical habitat designation will continue to be subject to federal review if proposed activities require a federal permit, authorization, or funding.

Status of Lynx in Maine – Department Studies Lynx

The status of lynx as a federally threatened species and their broad distribution (Maine to Washington) raised concerns that conservation plans for lynx needed to be developed with regionally specific data. As the USFWS was considering lynx for federal listing, there was limited information on the status of lynx in Maine and the Northeast, as there had been no formal studies of the species. Therefore in 1999, with the pending federal listing and the identification as a species of special concern, our Department and the USFWS initiated a radiotelemetry study of lynx in northern Maine. This study was initiated to determine the status of lynx, better understand their habitat needs, identify factors that may limit lynx, and identify techniques for detecting lynx in Maine and the Northeast. We periodically summarize and report our findings to the

USFWS for consideration as they develop conservation plans and review the status of lynx. We continue to collect and analyze data and have submitted several manuscripts for publication in peer-reviewed scientific journals.

Since 1999, we have captured and radiocollared 64 lynx (32 males : 32 females) and documented the production of 37 litters of kittens. From 2000-05 home range size and productivity and survival rates of lynx in Maine were more similar to lynx in the core of the range, when hares are abundant, than to lynx at the edge of their range. During this period, over 90% of adult female lynx in our study area produced a litter each year, litters averaged just under 3 kittens, and most lynx survived each year (80% of adults and 76% of kittens). Lynx home ranges were small averaging 26 mi2 for males and 12 mi2 for females, suggesting good habitat quality and prey density.

In 2003, the number of lynx kittens produced per adult female reached its highest level, and thereafter, kitten production has declined. Litter production in 2006 and 2007 saw its sharpest decline with 13% and 28% of adult females producing a litter. In 2007, adult lynx survival was low, with only 60% of adult lynx surviving. Snowshoe hare densities on our study site were also lower (based on pellet counts) the last 2 years. Snowshoe hare are the primary prey item for lynx and are also an important prey item for a variety of mammals (coyote, fisher) and birds (e.g. owls, hawks). The recent decline of snowshoe hare in our study site may be related to a variety of factors (e.g., habitat change, increased mortality (predation, disease)) that have contributed to changes in lynx population levels on our study site. For example, most of the spruce-fir forest on our study site was harvested (clearcut) during late 1970's and 1980's and habitat conditions for snowshoe hare may be declining as the forest matures. In addition, winters have been milder which may have increased snowshoe hare vulnerability to predation. We and our partners (University of Maine and USFWS) will collect and analyze additional data in the coming months to further evaluate lynx and snowshoe hare population levels, the extent of the change, and factor(s) contributing to changing hare and lynx levels.

In the winter of 2003, we initiated a statewide snow-track survey to identify the distribution of lynx in northern and western Maine. During the past 5 winters, lynx tracks were encountered in 27 of 66 townships surveyed, with lynx being most rare in areas south and west of Moosehead Lake and most common north of Moosehead Lake and west of Route 11. This information suggests that lynx are more widely distributed today then they were in the past (based on surveys of game wardens) in the 1900s.

This year the Department reviewed the species on the State's threatened and endangered species list to determine whether animals on the list warranted continued listing and whether any other species should be added to the list. Although the lynx is federally listed as threatened in Maine, it did not meet the State's listing requirements for threatened species. Information gathered from snowtrack surveys on the distribution of lynx in Maine, and density estimates from the lynx study area in northern Maine were critical in making this determination. Currently, the lynx is considered a species of special concern, which is a MDIFW classification for species that warrant special attention.

The clearcutting that occurred following the budworm outbreak has created extensive amounts of dense young spruce-fir forest that supports abundant snowshoe hare levels. As a result, lynx are abundant in much of northern Maine. In 1989, Maine's legislature passed the Forest Practice Act that limited the size of clearcuts following public concern over the extensive cutting that occurred following the budworm outbreak. Today, on the industrial forest lands of northern Maine (most of lynx ranges), clearcuts account for less than 5% of the forest harvest operations with most forest cutting operations classified as shelterwood harvest. Shelterwood harvests promote the growth of young trees without complete removal of mature trees; however, once young trees have become established the mature trees can be harvested. We do not fully understand the implications of this harvest strategy for maintaining young spruce/fir forests for lynx and snowshoe hare. Therefore, MDIFW is now working cooperatively with the University of Maine to investigate the relationship between partial harvesting techniques, hare densities, and lynx. We will also consider additional study of lynx and snowshoe hare to identify the current status of lynx in Maine given recent changes on our study site.

This work is supported by federal Section 6 funds, federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), federal funds from the State Wildlife Grant program, hunting and trapping license revenues, the Maine Outdoor Heritage Fund, Loon Conservation Plate funds, the National Fish and Wildlife Foundation, the National Council of the Paper Industry for Air and Stream Improvement, the Wildlife Conservation Society, Davis Conservation Foundation, Fuller Foundation, Sweet Water Trust, Wilma K. Wilensky, Lynx System Developers, Defenders of Wildlife, Clayton Lake Woodlands, Irving Woodland, LLC, Seven Islands Land Co., and the Plum Creek Foundation.

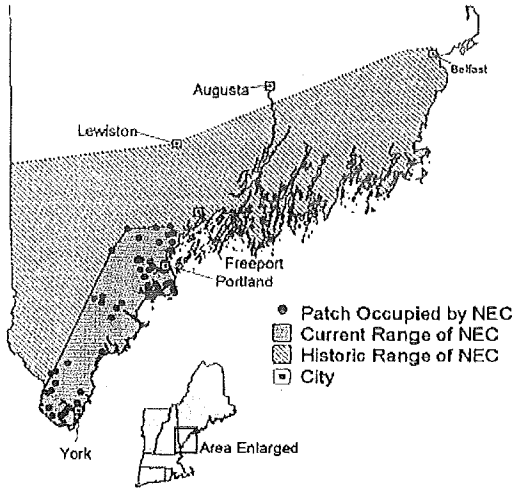
--Jennifer Vashon & Scott McLellan

New England Cottontail

In 2007, the New England cottontail (NEC) rabbit (*Sylvilagus transitionalis*), or cooney, as it is often called was added to Maine's endangered species list. Under Maine's Endangered Species Act, NEC will continue to be protected from hunting, and in addition, will receive habitat protection when areas that they occupy are considered for development. The NEC is also being considered for federal threatened or endangered status. Although federal listing is sometimes a slow process, the rate of habitat loss NEC is currently experiencing outside of Maine may make them a higher priority for federal listing.

While cottontails are common to our south, New England cottontails are not. There are several species of cottontail rabbits in North America and two of them are found in New England. The eastern cottontail (*Sylvaligus floridanus*) was introduced to southern New England and is the common cottontail of farms, woodlots and suburban lawns throughout most of eastern North America. The New England cottontail has a limited distribution, and only occurs from southern Maine to the Hudson River in New York. New England cottontails are Maine's native and only cottontail. In Maine, its range overlaps with some of the most densely populate and developed parts of the state (Figure 3).

Figure 3. Current and historic range of New England cottontail in Maine



The New England cottontail is a habitat specialist and requires thick brushy, areas that provide protection from predators. This type of habitat often develops several years after a disturbance such as a fire, forest cutting, the abandonment of farmland, or when a beaver flowage is drained. These habitats have a short life span; unless another disturbance occurs, brushy species are overgrown by trees and the area will no longer support New England cottontails. In the past, New England cottontails persisted by colonizing new, nearby habitat patches as they were created.

However, the situation has changed. Not only is there less brushy habitat, most suitable habitat occurs in isolated patches that are difficult, if not impossible, for rabbits to colonize. Only 5 or 6 of the patches are large enough to sustain a population without frequent recolonization.

--Karen Morris

OTHER HIGH PRIORITY SPECIES

PERIGRINE FALCON

The peregrine is another species that has benefited greatly from federal / state partnerships in endangered species conservation. Formerly a breeding resident of coastal headlands and cliffs in mountainous regions, the species was extirpated from Maine and the entire eastern U.S. by the early 1960s. Like bald eagles and many other birds of prey, peregrines were the victims of DDE, a persistent by-product of the insecticide DDT. Decreased reproductive rates among peregrines persisted for decades, and worldwide threats of extinction coincided with eggshell thinning caused by this contaminant.

More than 35 nations have since conducted active programs to restore peregrine falcons. A total of 144 young peregrines produced in captive-breeding programs were successfully released at 8 different locations in Maine during the period 1984 through 1997. The Peregrine Fund, U.S. Fish and Wildlife Service, Acadia National Park, and MDIFW jointly conducted this venture using methods based upon traditional falconry techniques. Some peregrines reintroduced in Maine were encountered as breeding birds in New

Hampshire, Massachusetts, and New York. Others have been documented as migrant visitors to points as far away as Cuba and Venezuela!

Despite these dramatic movements, others have returned to breed in Maine. A peregrine from the 1984 release in Baxter State Park found its way back to the same Penobscot County cliff in 1985 and reappeared in 1986 as the first adult peregrine searching for a home (and a mate) in Maine. The first pair of peregrines to reside in Maine for more than 25 years chose a historic eyrie, Mount Kineo in Piscataquis County, as their new home in 1987. In 1988, a second pair appeared at "The Precipice," the Acadia National Park cliff last inhabited by peregrines before their disappearance in the 1960s. Also that year, an Oxford County cliff became the first site of successful breeding by reestablished peregrines. Small gains occurred during 1989 - 2001, but numbers of nesting peregrines did not change appreciably: 5 - 8 eyries were inhabited each year. Biologists were pleased to again have peregrines among the state's resident wildlife, but they were perplexed by the lack of recovery progress. Periodic setbacks are a common hazard in endangered species restorations.

There is no substitute for diligence over time in these endeavors. Major improvements finally occurred in 2002. The statewide breeding count doubled in a single year. Peregrines inhabited 15 eyries in Maine during 2002. Surveys concluded in 2006 reveal the count has risen slightly to 17 nesting pairs. Monitoring is still underway in 2007, but two major April storms may have caused widespread nest failures in eastern Maine. Apparently, peregrines in western Maine did much better.

A closer look reveals considerable instability in the small, recovering population. Peregrines have inhabited a total of 26 different eyries during the last 6 years. Nine vacancies may reflect the loss of an individual adult: an inherent risk from small numbers and special needs typical of endangered species such as the peregrine. Most peregrines breeding in Maine inhabit southern Oxford County near the state's western border. New peregrine eyries were found during 2007 in Cumberland County and Knox County: the first documentation of peregrine nesting in either in at least 50 years!

A record high of 26 young peregrines fledged from ten eyries in 2002. Only 17 young peregrines were tallied in 2004 and 2005, but twenty-two fledged last year. Slight declines help validate the need for annual monitoring and site management in Maine. MDIFW and cooperating agencies manage several settings to mitigate potential recreational disturbances. There is no evidence yet of residual contaminant impacts on Maine's re-established peregrines but the population needs careful attention to monitor this possibility or other related problems if the trend continues.

Many land managers have championed stewardship of peregrines nesting on their property: White Mountain National Forest, Maine Bureau of Parks and Lands, Seven Islands Land Co., Hancock Timberlands, and especially Acadia National Park. Biologists can advise rock climbers where breeding peregrines are present. Hikers and rock climbers have assisted by reported peregrine sightings during their recreational pursuits. Peregrines have proven quite adaptable, and managers have successfully maintained peregrines in some high profile settings with only modest precautions.

Maine and most eastern states are now dependent mostly on state budgets for annual peregrine monitoring and management. Major increases of peregrines in the western U.S. are largely responsible for federal delisting of peregrines in 1999, but they are still recognized as Endangered Species under state jurisdictions in Maine and throughout the eastern U.S. For those who have witnessed the spectacular flight of a peregrine (whether in Baxter State Park or downtown Lewiston), it is an event not readily forgotten. Centuries of mankind's fascination with the peregrine as the fastest-flying bird and an accomplished predator continue on!

--Charlie Todd

RUSTY BLACKBIRD

The Rusty Blackbird (*Euphagus carolinus*) is a wetland-breeding blackbird of the boreal regions of northern North America. Formerly considered common, it has shown dramatic declines in numbers during the past century, with these declines accelerating since 1970. The cause of this continent-wide decline is not clear, although experts suggest several anthropogenic factors, including draining and conversion of wetlands in their wintering range, wetlands acidification leading to declines of invertebrate prey, and disturbance from landscape changes. However, none of these hypotheses clearly account for both the magnitude and prolonged duration of this decline. During the 2001-2002 Ecoregional Surveys, sponsored in part by the Maine Outdoor Heritage Fund, MDIFW conducted roadside surveys of nearly 200 wetland sites in northwestern Maine. They found breeding Rusty Blackbirds at only 18 locations, and some of these were of just single singing males.

In late 2005, we began a study that involves a baseline inventory of the current geographic distribution and abundance of Rusty Blackbirds in Maine. These data will be used to a) examine the validity of state and regional population targets and b) to make recommendations for an effective monitoring program for this species on their breeding grounds. We also will compare current records (2005-2007) with past distributional information to evaluate whether the species' well-documented decline has a) effected its distribution in Maine, and b) if populations show fidelity to known breeding locations. Finally, we will assess a) how habitat selection in Maine differs from that reported from elsewhere in North America, and b) compare habitat features at currently occupied breeding sites with other seemingly suitable potential breeding sites in the state, to test hypotheses on why this species has declined and what habitat management options exist to aid in its recovery.

Overall, we surveyed 327 wetlands in 2006; Rusty Blackbirds were observed in only 19 (5.8%) of these. In com-parison, during 2001-2002 Ecoregional Surveys, 187 wetlands were surveyed for Rusty Blackbirds yielding 18 (10%) observations. Of the 18 observations made during 2001-2002, 14 of those sites were resampled in 2006 producing only a single Rusty Blackbird observation.

Also, in 2006, we thoroughly resampled 21 atlas blocks (the area encompassed by a 7.5' topographic quadrangle), where Rusty Blackbirds had been reported previously by the Maine Breeding Bird Atlas. Only 5 of these 21 blocks produced observations of Rusty Blackbirds in 2006. Results of this resampling effort suggest both a population decline and a range contraction. Further surveys (scheduled for 2007) will be needed to confirm these findings.

An unexpected outcome of our surveys this year, was our ability to locate Rusty Blackbird nests. We found 7 nests among the 19 sites and monitored each nest periodically and confirmed that 100% successfully fledged young. We collected habitat data around each nest to better understand nest site selection by this species in northern Maine. We anticipate a busy field season in 2007 with surveys, nest searches, and habitat measurements, plus if sufficient birds can be captured, we will attach radiotransmitters to a few birds to monitor their movements and better understand their habitat use. This work is being supported by Outdoor Heritage Funds, Loon Conservation Plate Funds, Pittman Robertson Funds, and the University of Maine.

--Thomas P. Hodgman

WOOD TURTLES

A species of Special Concern, the wood turtle is declining throughout its range with Maine hosting some of the largest remaining populations in the U.S. Wood turtles spend most of their time in or near streams or rivers, while becoming partly terrestrial during the summer months when they frequent adjacent forests, fields, and wetlands. Like several of Maine's reptiles, wood turtle population growth is constrained by the cold winters and short growing seasons characteristic of northern latitudes. This, combined with human disturbances to the animals and their habitats, could jeopardize the viability of local wood turtle populations throughout the state. One of the greatest threats to Maine's wood turtles is illegal collection for the pet trade. Collectors can decimate local populations in a short period of time. Several instances of commercial wood turtle collection have been prosecuted by the Maine Warden Service in recent years.

In 1995, Central Maine Power initiated a study of wood turtles in western Maine. By following radio-tagged individuals, they were able to learn much about their movements and habitat use. From 1996-98, these studies were expanded by MDIFW and the University of Maine with the help of an Outdoor Heritage Fund grant. UMaine graduate student Brad Compton tracked 37 radio-tagged turtles, located nests, and documented their movements and habitat use. His study was the first to document nesting ecology of the wood turtle in the state. Brad was able to document how summer temperature influences hatching success of wood turtles - a critical factor influencing population viability at the northern edge of their range. Brad's data also provided valuable information on the nature and extent of riparian habitat used by wood turtles thus informing MDIFW recommendations for buffer zone widths during forestry and development activities.

Dr. Judith Rhymer, a University of Maine faculty member, recently completed work on the conservation genetics of wood turtles. Preliminary results suggest that one of Maine's downeast watersheds, the Narraguagus, hosts unique wood turtle populations that may have been isolated from other populations for thousands of years. Judith also collected tissue samples from wood turtles throughout their range in the hopes that individual states and provinces might have unique genetic markers that could be used as a forensic tool for identifying the origin of animals collected illegally for the pet trade. Results suggest that wood turtles originating from Maine can be distinguished from distant parts of their range with a moderately high probability (80-90%). Funding for this work comes from Loon Conservation Plate, Chickadee Check-off funds, U.S. Fish and Wildlife Service, and the Maine Outdoor Heritage Fund.

--Jonathan Mays and Phillip deMaynadier

AMPHIBIANS AND REPTILES

Amphibian Monitoring

Since 1989, scientists have been concerned that frogs, toads, and salamanders (amphibians) may be declining worldwide. Unfortunately, a recent scientific analysis confirms these suspicions with fully 32% of the world's amphibian species now considered threatened with extinction, a rate exceeding that for birds or mammals. Maine, like many other states, had little data to assess trends in its own amphibian populations. In 1996, MDIFW and Maine Audubon received an Outdoor Heritage Fund grant to initiate a statewide amphibian-monitoring program, which was launched in 1997. Maine's Calling Amphibian Survey is part of a nationwide effort organized by the U.S. Geological Survey. Sixty-one road-monitoring routes were randomly established across the state. Each spring and summer season, volunteers drive their individually assigned route three times, recording the diversity and intensity of calling frogs and toads. Several vacant routes still exist, with new volunteers especially needed in northern Maine. Participants are provided training materials to assist them with the identification of each of Maine's nine species of frogs and toads. With ten years of data collected (through 2006), we anticipate the ability to analyze preliminary population trends for several species of frogs and toads within the next couple years. Currently leopard frogs (a species of Special Concern), pickerel frogs, and mink frogs are among the state's least commonly reported species. Those interested in participating in this citizen-science initiative should contact Maine Audubon's Susan Gallo at 207-781-6180 (ext. 216) or Dr. Aram Calhoun at 207-581-3010, or visit the website at: www.maineaudubon.org/conserve/citsci/mamp.shtml. Funding for this work comes from Maine Audubon Society, Loon Conservation Plate, and Chickadee Check-off funds.

--Phillip deMaynadier

Maine Amphibian and Reptile Atlasing Project (MARAP)

From 1986-1990, MDIFW, in cooperation with Maine Audubon and the University of Maine, conducted the Maine Amphibian and Reptile Atlasing Project (MARAP). During a 4-year period, over 250 volunteers from around the state contributed approximately 1,200 records of observations of amphibians and reptiles. This initiative culminated in the 1992 publication of the book, *The Amphibians and Reptiles of Maine*. The first edition sold out within two years of publication.

By 1998, considerable new data had been compiled since publication of the first edition, and there was increasing demand for updated information on the state's amphibians and reptiles. Editors Malcolm Hunter, Jr., Aram Calhoun, and Mark McCollough revised a second edition, incorporating information from 1,300 new records into updated range maps and species narratives, and added color photographs, and a CD of the calls of the frogs and toads of Maine. Copies of the updated 1999 edition of *Maine Amphibians and Reptiles* can be ordered for $19.95 plus $4.50 S&H from the Information Center, MDIFW (207-287-8000).

MDIFW continues to maintain a comprehensive database on the distribution of Maine's 35 amphibian and reptile species and encourages members of the public to share their sightings by photocopying and completing the MARAP card (see Figure 4).

Figure 4. MARAP Record Card

Maine Amphibian & Reptile Atlasing Project (MARAP) Record Card

SPECIES: _____ DATE: _____

TOWNSHIP: _____ OBSERVER: _____

VERIFICATION (Circle) ID CONFIDANCE (%) CONTACT INFORMATION: _____

Photo YES NO _____

Handled YES NO

Observed YES NO

LOCATION (be specific): _____

HABITAT: _____

NOTES (Habitat, Behavior, Age, Sex): _____

Return this form and any documentation photos to:

MARAP: Reptile, Amphibian, & Invertebrate Group **or email** jonathan.mays@maine.gov

Department of Inland Fisheries & Wildlife **or**

650 State Street, Bangor, ME 04401 phillip.demaynadier@maine.gov

Please submit observations of any of the four state-Listed reptiles – Eastern Box Turtle (Endangered), Blanding's Turtle (Endangered), Spotted Turtle (Threatened), and Black Racer (Endangered) - to MDIFW immediately (*jonathan.mays@maine.gov* or call 207-941-4475). Funding for this work comes from Loon Conservation Plate and Chickadee Check-off funds.

--Jonathan Mays and Phillip deMaynadier

Partners in Amphibian and Reptile Conservation

MDIFW continues to cooperate with an initiative entitled Partners in Amphibian and Reptile Conservation (PARC). Modeled partly after the successful Partners in Flight (PIF) bird conservation program, PARC's mission is to forge partnerships among diverse public and private organizations in an effort to stem recent declines of amphibian and reptile (herptile) populations worldwide. MDIFW often participates in northeastern chapter PARC meetings where discussions focus on conservation initiatives for herptiles and habitats of regional conservation concern. To date, PARC-Northeast has made progress on drafting model state regulations, compiling a list of regional species of conservation concern, and publishing management recommendations for habitats of special importance to north- eastern herptiles. For more information on herptile conservation efforts, or to join the northeastern working group, visit the PARC website at www.parcplace.org. Funding for this work comes from Loon Conservation Plate and Chickadee Check-off funds.

--Phillip deMaynadier

Rare Snakes

Maine is currently home to at least nine species of snake, one of which is state endangered (Northern Black Racer) and one state special concern (Ribbon Snake). A tenth, the Timber Rattlesnake, was historically native but is thought to be extirpated from the state. The Maine Amphibian and Reptile Atlasing Project (MARAP) continues to provide location records for snakes, but more detailed research is needed in order to assess movements, habitat requirements, and potential threats to our rare snakes.

To determine home range size, hibernacula locations (over-wintering sites), and habitats used, MDIFW recently began a two year radio telemetry project studying Northern Black Racers in southern Maine. Racers are long, slender snakes, jet black in color with a white chin/throat and gray belly. At present, less than 30 sites in Maine are known to have black racers and only five of those locations have had racers observed at them within the last five years. With a goal of implanting radio transmitters in approximately 16 snakes over the course of two to three years we hope to learn a great deal more about this elusive snake's habitat use and behavior. Assistance from three dedicated field herpetologists, Jamie Haskins, Trevor Persons, and Mark Ward, along with MDIFW's veterinarian Dr. Russell Danner, has been instrumental in this project. Knowledge gained from this study will assist with the protection and management of Maine's longest and fastest reptile.

The Ribbon Snake is another rare animal in need of further research to better understand its biology and habitat requirements. Leslie Latt, a graduate student from Antioch College, with assistance from MDIFW has begun a study of this reclusive serpent in southern and western Maine. Ribbon snakes are small, slender snakes with three yellow stripes running the length of their bodies. These snakes are almost always found near water but Leslie's research hopes to gain more insight into the specific habitats ribbon snakes are using and the extent of their movements between aquatic and terrestrial ecosystems.

Though the last validated Timber Rattlesnake record was sighted over a century ago in Maine, MDIFW continues to receive reports of "rattlers" each year. Many of these reports turn out to be Eastern Milk Snakes (a non-venomous, shy resident with reddish orange dorsal blotches), but all are taken seriously in the event that a population of rattlesnakes was able to persist into the 21st century. Beginning in 2006, MDIFW contracted with Trevor Persons to conduct Timber Rattlesnake habitat surveys at historic and potential sites in southern and western Maine. To date, Trevor has visited over 15 sites but no rattlesnakes have yet been located. If you observe a rattlesnake in Maine, please contact MDIFW (jonathan.mays@maine.gov or call 207-941-4475).

Historically, snakes have been misunderstood, feared, and even persecuted. Many have stated that snakes are among the least appreciated of Maine's wildlife. While this may be true, snakes fill an important place in the environment and provide balance: preying on small mammals, insects, and other reptiles and amphibians, and providing food for various predatory birds and mammals. Snakes are fascinating creatures and our state is certainly richer with them here. Funding for these projects comes from U.S. Fish and Wildlife Service, Maine Department of Transportation, Conservation Plate, and Chickadee Check-off Funds.

--Jonathan Mays

BIRDS

Freshwater Marshbirds

During 1998-2003, the Maine Outdoor Heritage Fund sponsored a series of marsh bird surveys as part of the Ecoregional Survey Project. A total of 137 wetlands were surveyed for marshbirds in the southern, central, eastern, and northwestern portions of the state. Based on these surveys, MDIFW identified several marshbird species that warranted management concern because they are uncommon, have limited distributions, or show evidence of population decline. Also, three marshbird species support hunting seasons (i.e., Virginia rail, sora, common snipe), and population data are required for harvest management. The least bittern, common moorhen, American coot, and pied-billed grebe were found in relatively few wetlands during these surveys. All are considered rare or uncommon, and the hunting season for the common moorhen was recently closed because of low numbers. Least bittern and American bittern populations also may be declining. Least bitterns were not found recently in a few wetlands where they have been present in the past. American bitterns were encountered less frequently in southern than northern Maine, suggesting that population declines in southern parts of New England also may be occurring in southern Maine. Population trend data are important for managing hunted species, to identify significant population declines in game and nongame species, and to provide a basis for conservation actions.

Information on population trends for marshbirds is sparse throughout the northeastern U. S., because these species are inconspicuous, often widely dispersed, and difficult to routinely monitor. However, we have a unique opportunity to measure long-term population trends in Maine because there are data available from two separate marshbird surveys; the first conducted during 1989-90 and the second from 1998-2000. The 1989-90 surveys intensively sampled marshbirds in 60 wetlands in central, southern, and eastern Maine and searched 13 additional sites for species of special interest (e.g., least bitterns). In 2005, we began a project to resurvey most of these 73 wetlands in 2005-06 to determine 15+-year trends in wetland occupancy and relative abundance of marshbird species. We also will examine short-term trends (approximately 5-8 years) by resurveying about 20 sites in 2005-06 that were originally visited during the 1998-2000 ecoregional surveys. We are focusing our efforts on the least bittern, American bittern, pied-billed grebe, common moorhen, Virginia rail, sora, common snipe, American coot, and marsh wren, but data for other wetland species will be recorded. A graduate student from the University of Maine is leading the fieldwork for this project.

Survey crews revisited 75 wetlands during spring and summer of 2005-2006. Each site was visited on at least 3 occasions. Virginia Rail was the most frequently encountered target species. Based on our preliminary data and comparisons with earlier surveys, we observed a significant increase in the number of wetlands occupied by American Bitterns and Virginia Rails, yet a significant decline in the number of wetlands occupied by Least Bitterns. We found no change in wetland occupancy by Pied-billed Grebes or Soras.

An assessment of habitat use by American Bitterns, Virginia Rails, Soras, Pied-billed Grebes, and Least Bitterns is nearly complete. In brief, based on preliminary data analyses, Least Bitterns, Virginia Rails, and Soras prefer wetlands with substantial components of emergent vegetation, Pied-billed Grebes are strongly

associated with large wetlands that contain a high proportion of open water. American bitterns prefer shrub wetlands, but will nest in wetlands that are dominated by emergent vegetation as well. This work is being supported by Outdoor Heritage Funds, the Loon Conservation Plate Funds, the University of Maine, and the Maine Cooperative Fish and Wildlife Research Unit.

--Thomas P. Hodgman

Maine Colonial Waterbird Inventory

Nineteen species of island-nesting wading birds, seabirds, and common eiders nested on approximately 10% of Maine's coastal islands in 2006. These birds are extremely vulnerable to human disturbance during the spring and early summer nesting season. For these reasons, close monitoring of nesting colonies is warranted. Survey results from 1976-77 (for comparison) and the period between 1994-2006 are provided in Table 2.

Table 2. Nesting waterbirds, seabirds, and eider populations and number of colonies occupied, 1976-77 and 1994-2006.

Species	1976 – 1977		1994 - 2006	
	Pairs	Colonies	Pairs	Colonies
Arctic Tern (ARTE)	1,640	9	3,053	10
Atlantic Puffin (ATPU)	125	1	790	4
Black-crowned Night Heron (BCNH)	117	8	118	7
Black Guillemot (BLGU)*	2,668	115	12,273	166
Cattle Egret (CAEG)	0	-	0	0
Common Eider (COEI)*	22,390	241	25,000	321
Common Tern (COTE)	2,095	24	7,577	22
Double-crested Cormorant (DCCO)*	15,333	103	19,680	125
Glossy Ibis (GLIB)	75	3	182	3
Great Black-backed Gull (GBBG)*	9,847	220	15,800	231
Great Blue Heron (GTBH)	903	18	644	14
Great Cormorant (GRCO)	0	-	101	7
Great Egret (GREG)	0	-	5	1
Herring Gull (HEGU)*	26,037	223	28,290	183
Laughing Gull (LAGU)	231	6	3,541	4
Leach's Storm-petrel (LHSP)	19,131	17	10,370	33
Little Blue Heron (LBHE)	4	2	8	2
Razorbill (RAZO)*	25	2	482	6
Roseate Tern (ROST)	80	3	243	7
Snowy Egret (SNEG)	90	4	213	5
Tricolored Heron (TRHE)	1	1	0	0

**Black Guillemot and Razorbill numbers are total counts of adult birds around nesting islands. Common Eider nesting data are an amalgamation of nesting records collected over several years. Herring and Great Black-backed Gull and Double-crested Cormorant numbers were derived from aerial counts, nest counts on selected islands, and by photo interpretation.*

Colonial Waterbird inventories are supported by hunting license and permit revenues; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund); USFWS Section 6 Funds; and a 1994-95 Colonial Waterbird Grant from the Region 5 USFWS.

--R. Bradford Allen

Northeast Coordinated Bird Monitoring Partnership

In the Northeast, dozens of state, federal, and nongovernmental organizations operate hundreds of bird monitoring programs. Results have been used to guide conservation, research, and management actions throughout the region. Although some effort at alignment has been made in recent years, most programs operate independently. The lack of coordination has resulted in redundant data collection, inconsistent field protocols, and occasionally flawed survey designs. Meanwhile, several high-priority species and habitats receive little or no monitoring attention. A coordinated approach is needed to better address bird conservation and management issues in our region.

In response, state, federal, and non-governmental organizations have teamed up to develop a coordinated approach to monitoring bird abundance, distribution, and demographics in the thirteen states of the Northeast (CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV). The Northeast Coordinated Bird Monitoring Partnership was formed to develop and implement a regional bird monitoring framework that will assist state wildlife departments, federal natural resource agencies, and other organizations in improving the coordination and effectiveness of their monitoring efforts. This initiative will catalogue existing bird surveys, build consensus on monitoring priorities, and develop and implement needed new programs in the northeast. It will draw on bird conservation plans and state wildlife action plans to identify key management issues that can be addressed through monitoring. Annual workshops will afford opportunities for coordination among existing surveys, while enabling program biologists to consult with leading statisticians on matters of survey design and analysis. The project's website (*www.nebirdmonitor.org*) will provide easily accessible resources for coordinating bird surveys across the region, including an innovative data management system. This system, to be administered by the Avian Knowledge Network at the Cornell Lab of Ornithology, will feature a secure data archive, owner-specified access, and several options for data display and analysis. By providing new tools and collaborative opportunities, the partnership will help build the fundamental basis for science-based bird conservation in the Northeast.

Implementation is already underway in Maine. A pilot project begun in New Hampshire to monitor Whip-Poor-Wills has been expanded into Maine and other states in the northeast. Furthermore, Maine's successful owl monitoring program has been modified by adding Northern Saw-whet Owls surveys to the newly implemented Whip-Poor-Will survey. This simple change both expands owl monitoring beyond Maine and more efficiently uses volunteers on both surveys.

Efforts are underway to solidify funding for monitoring mountain birds, begin coordinated monitoring for marshbirds, and design a program for monitoring Rusty Blackbirds. The Northeast Coordinated Bird Monitoring Partnership is made possible by a 3-year multi-state grant of Pittman Robertson Funds. Participation in project implementation is supported with Loon Conservation Plate Funds.

--Thomas P. Hodgman

Sharp-tailed Sparrow

Two species of sharp-tailed sparrows occur in Maine saltmarshes. Saltmarsh Sharp-tailed Sparrows (*Ammodramus caudacutus*) occur from the Penobscot Bay area southward, whereas Nelson's Sharp-tailed Sparrow (*A. nelsoni*) occur coastwide. Partners in Flight lists the Saltmarsh Sharp-tailed Sparrow as a "species of continental importance for the U.S." and among a small number of watch list species in need of immediate conservation action due to multiple threats across their entire range. Saltmarsh Sharp-tailed Sparrows are recognized as a Priority 1 Species of Greatest Conservation Need in Maine's Wildlife Action Plan and are considered a Species of Special Concern in Maine. The *subvirgatus* subspecies of Nelson's Sharp-tailed Sparrow is nearly endemic to Maine and the Maritimes, where their range is disjunct from the two other subspecies in North America. Nelson's Sharp-tailed Sparrow likely warrants Special Concern status in Maine.

Both species complete their entire life cycles within estuaries, nesting just a few centimeters above ground in tidal marshes. Oil spills, therefore, threaten both local populations and their habitats. Additionally, high levels of mercury in the blood of Sharp-tailed Sparrows, rising sea levels, and habitat degradation threaten populations. Despite similar appearance and habitat use, Saltmarsh Sharp-tailed Sparrows have much higher blood mercury levels than Nelson's suggesting differences in food habits. Understanding differences in diet between these species would begin to illuminate differences in habitat use that could be used to help mitigate for habitat damaged during an oil spill and could provide a critical link to understanding the pathways of mercury uptake for sharp-tailed sparrows. Specifically, diet information may help explain why Saltmarsh Sharp-tailed Sparrows accumulate mercury at an alarming rate, while Nelson's, feeding in the same marsh do not.

This project was catalyzed by two significant opportunities. First, 68 dead nestlings were collected during a previous graduate study. Nestlings died as a result of tidal flooding of their nests; the key cause of nest loss among these species. Second, an intern at the Wells National Estuarine Research Reserve has expertise in identification of insects and insect parts and an interest in gut analysis.

The objectives of this study are to 1) determine diet of nestlings of both species of sharp-tailed sparrows, 2) determine intraclutch, age-specific, and temporal differences in diet, 3) examine abundance (i.e., availability) of different insect taxa within habitat types in the high marsh, and 4) examine relationships between adult sparrow habitat use and diet of nestlings. A final report on the diet analyses is expected by mid 2007. This work is being supported by the U. S. Fish and Wildlife Service, the Maine Oil Spill Contingency Fund, and Loon Conservation Plate Funds.

--Thomas P. Hodgman

INVERTEBRATES

Rare Butterflies

Hessel's Hairstreak, Clayton's Copper, Purple Lesser Fritillary, and Crowberry Blue are just some of the state's rarest butterflies that are both colorful in name and on the wing, if you are fortunate enough to see one. In an effort to improve our knowledge of the status and habitat preferences of these and other rare butterflies MDIFW is actively studying the group during statewide regional surveys. Attractive, conspicuous, and

ecologically important, butterflies have garnered increasing attention from scientists and the general public. By documenting the distribution and status of the state's butterfly fauna MDIFW hopes to improve its understanding of the group and prioritize conservation efforts towards those species most vulnerable to state extinction.

Further supporting this goal, MDIFW received a grant from the Outdoor Heritage Fund in 2002 to contract a professional lepidopterist, Dr. Reginald Webster from New Brunswick, to help assemble a comprehensive assessment of the state's butterfly fauna. Drawing from published literature and specimen records located in museums and amateur collections throughout the Northeast, Reggie assembled the first baseline atlas and database of Maine's butterfly fauna – an essential step toward conservation and management of the group by MDIFW and cooperators. The baseline atlas project compiled nearly 9,000 records and added 11 previously undocumented butterflies to the state list, which now stands at 115 species. Of special note is the relatively high proportion (~20%) of Maine butterflies and skippers that are extirpated (5 species) or state-listed as Endangered, Threatened, or Special Concern (18 species), a pattern consistent with global trends elsewhere for the group. Unfortunately, additional endangered and threatened butterfly listings are imminent as a result of the state's recent assessment efforts. Contact MDIFW to receive an updated checklist of the butterflies of Maine (*phillip.demaynadier@maine.gov*) or visit *http://www.state.me.us/ifw/wildlife/wildlife.htm* to download a pdf copy of Maine's first baseline butterfly atlas.

Finally, we are pleased to announce that a statewide butterfly survey is scheduled for flight in 2007. Sponsored by MDIFW, in partnership with the University of Maine at Farmington (Dr. Ron Butler), Colby College (Dr. Herb Wilson), and Dr. Reginald Webster of New Brunswick, the Maine Butterfly Survey (MBS) is a 5-year, statewide, volunteer survey effort. Following in the tradition of previously successful state-sponsored wildlife atlasing projects, including most recently the Maine Damselfly and Dragonfly Survey, data generated from the MBS will come primarily from citizen scientists. The survey will help fill information gaps identified during the baseline assessment (above) on butterfly distribution, flight seasons, and habitat relationships for one of the state's most popular insect groups. Training workshops for new MBS volunteers are currently being scheduled; check the MBS website for further details (*http://mbs.umf.maine.edu*) or contact the volunteer coordinator, Dr. Herb Wilson, at *whwilson@colby.edu* (207-859-5739). Funding for this work comes from Loon Conservation Plate, Chickadee Check-off funds, The Nature Conservancy, Maine Dept. of Conservation, the Maine State Museum, U.S. Fish and Wildlife Service, and the Maine Outdoor Heritage Fund.

--Phillip deMaynadier

Rare Dragonflies

Insects in the order Odonata, damselflies and dragonflies, are a significant and conspicuous component of Maine's wildlife diversity. Presently, 158 species have been documented in the state, comprising nearly 36% of the total North American fauna. Several of Maine's odonate species are of national and global conservation concern. In 1997, at Maine Inland Fisheries and Wildlife's (MDIFW) request, the Legislature designated the ringed boghaunter dragonfly (*Williamsonia lintneri*) as Endangered, and the pygmy snaketail dragonfly (*Ophiogomphus howei*) as Threatened. MDIFW currently lists an additional 25 odonates as species of Special Concern. While several odonates are highly sensitive to freshwater habitat

degradation and experiencing declines nationwide, baseline information for the group has been lacking in Maine, until recently.

In 1998, MDIFW received a grant from the Outdoor Heritage Fund to initiate the Maine Damselfly and Dragonfly Survey (MDDS). MDDS is a multi-year, citizen scientist atlasing initiative designed to improve our knowledge of the distribution, status, and habitat relationships of damselflies and dragonflies statewide. In addition to engaging over 200 of Maine's non-game wildlife constituents and raising public awareness of invertebrate conservation, the MDDS has helped the Department more accurately assess the status of rare, threatened, and endangered odonates. To our knowledge, the MDDS is among the first completely state-sponsored dragonfly atlasing projects of its kind in North America and has received considerable notoriety (see website below). Having recently completed its sixth and final field season, the survey's results have far exceeded expectations and are best summarized by the following:

1. Public Outreach and Involvement:

Volunteer participation statewide:	>200
Volunteers trained in MDDS seminars:	95
Newsletter issues published ("Mainensis"):	4
Major press articles covering the MDDS project:	5
Website hits (http://mdds.umf.maine.edu/~odonata/)	>20,000

2. Scientific Contributions:

Total records submitted (% increase over 1999 baseline):	17,264 (229%)
New Rare, Threatened, and Endangered species records:	297
New state species records:	0
New U.S. species records (Quebec Emerald & Canada Whiteface):	2
Scientific publications completed or in progress:	5

With the volunteer atlasing component of the MDDS project coming to closure, MDIFW has recently contracted Paul M. Brunelle, an accomplished odonate expert and graphic design artist from Nova Scotia, to assist with authoring and designing the project's capstone product: *An Atlas and Conservation Assessment of Acadia's Damselfly and Dragonfly Fauna*. Populated largely with data contributed by MDDS volunteers, this atlas will serve as the first authoritative publication on the distribution and natural history of odonates from Maine and the Canadian Maritime Provinces. Funding for this work comes from Loon Conservation Plate, Chickadee Check-off funds, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the Maine Outdoor Heritage Fund.

--Phillip deMaynadier

HABITAT CONSERVATION

Beginning with Habitat

The vast majority of land use and development decisions in Maine are made at the local level. Under Maine's tradition of municipal home rule, towns are responsible for shaping their own future by directing growth through local planning boards and attracting businesses through local economic development corporations. Few towns, however, have the capacity or expertise to know how their decisions today will affect the plant and animal resources available to future generations 50 years from now. *Beginning with Habitat* was created to fill this niche. *Beginning with Habitat* not only provides organized towns throughout the state with comprehensive fish, wildlife, plant, and natural community information tailored to the specific town, but provides local boards, committees, and planning staff with technical assistance in crafting tools to address local habitat needs and concerns. The intent of this program is not to stop growth so vital to Maine's economy, but to 'do growth better' and in a way that helps to conserve our natural heritage while at the same time conserving our irreplaceable Maine character.

Upon initial contact, *Beginning with Habitat* develops a series of 1:24000 scale maps for each town requesting participation in the program (to date over 180 of Maine's organized towns have received *Beginning with Habitat* maps). These maps include, among other things, a detailed depiction of surface water resources, high value plant and animal habitats, and large undeveloped blocks of habitat. Mylar overlays of tax map parcels are also produced if local data is available. The maps are delivered to local comprehensive planning committees, conservation commissions, or planning boards together with a binder of narrative information covering basic conservation planning and species specific habitat requirements. Initial data delivery typically happens at a pre-arranged and locally advertised *Beginning with Habitat* presentation conducted by a MDIF&W biologist who tailors program messaging and "how to" planning advice to fit the needs of the hosting town. This past year *Beginning with Habitat* presentations were conducted from York to Aroostook Counties in cities, small towns, and even island communities.

As is the case with any government program that promotes societal changes in traditional ways of doing business, incorporating conservation planning into local planning and development decision-making has been a slow process. The benefits, however, are becoming increasingly evident. *Beginning with Habitat* is now well known throughout the state as the place to go to get comprehensive local and regional habitat data. *Beginning with Habitat* data is currently provided to most state and federal regulatory review agencies, and to every regional planning commission, and land trust regional service center in the state. *Beginning with Habitat* data is also used to inform scoring decisions for many land acquisition and habitat management grant programs. Towns conducting comprehensive plans for the first time, or crafting an update are encouraged by the State Planning Office to host a *Beginning with Habitat* presentation, and this year, the *Beginning with Habitat* program was successful in getting its major features incorporated as required elements to be considered by towns completing comprehensive plan natural resource inventories and during the development of corresponding implementation strategies.

Increasingly, towns are turning to *Beginning with Habitat* upon completion of comprehensive plans to better understand options for local implementation of conservation strategies. Towns throughout south,

central, and mid-coast Maine have recently completed open space plans as a follow-up to comprehensive planning efforts. Most of these have utilized *Beginning with Habitat* as the starting point for developing local conservation priorities and to strategically evaluate local land acquisition opportunities. Other towns, especially in York and Cumberland Counties, but increasingly in Sagadahoc, Lincoln, and Knox Counties are turning to *Beginning with Habitat* to assist with developing more effective habitat provisions in local land use and subdivision ordinances.

Beginning with Habitat's success at the local level has been a slow, but steady process. All the time, however, we have been working to improve our data, messaging, and technical assistance capabilities. In the past year, we have completely revised our map products to incorporate more up-to-date data, increase clarity, and to incorporate a more comprehensive depiction of habitat resources. *Beginning with Habitat* staff have been compiling the best approaches to integrating habitat concerns into local plans and ordinances from throughout the state into a "toolbox" document that once completed, will serve as a handy reference for local planning staff, volunteers, and elected officials considering local options. *Beginning with Habitat* is now in the planning stages for an on-line mapping and informational web-service that, once developed, will allow anyone with web-access to pan through the diverse array of known species occurrences and mapped habitat types throughout the state. This past February, *Beginning with Habitat* hosted an all-day workshop for partnering organizations from across the state. Among the priority suggestions received, finding incentives for towns to implement Beginning with Habitat conservation planning objectives was at the top of the list. As a result, the Beginning with Habitat Steering Committee is soon to begin working with state conservation leaders to brainstorm opportunities for further promotion of this invaluable program. For more information on *Beginning with Habitat* go to *www.beginningwithhabitat.org.*

--Steve Walker

Conserving and Protecting Wildlife Habitats in Northern and Eastern Maine

Beginning with Habitat is a landscape planning effort for southern Maine that addresses the need to conserve habitats and natural resources while allowing for continued growth and development. The program emphasizes riparian habitats, high value plant and animal habitats, and large blocks of undeveloped habitat. It is a cooperative, non-regulatory approach working with towns and land trusts.

Landscape planning in northern Maine faces some of these same issues but also has some unique challenges. Southern Maine is characterized by organized townships with numerous owners of relatively small areas of land, whereas northern Maine is mostly unorganized townships with much fewer owners of relatively large areas of land. Several large forest landowners already have initiated efforts to incorporate principals similar to *Beginning with Habitat*, such as protecting riparian habitats and using the marten habitat model developed at University of Maine to guide harvest patterns to create large blocks of mature forest. However, regulation of specific wildlife habitats like deer wintering areas, which has been in place for several years, and other single-species conservation efforts do not address habitat conservation at the landscape scale.

A working group was formed several years ago to develop recommendations for landscape planning in northern Maine. Three goals were identified:

1. Maintain sufficient habitat to support all native plant and animal species currently breeding in Maine (same goal as *Beginning with Habitat* for southern Maine),
2. Maintain healthy, well-distributed populations of native flora and fauna, and
3. Maintain a complete and balanced array of ecosystems.

Seven broad objectives addressing these goals were identified:

1. Maintain and increase number of large blocks of forest,
2. Conserve high value plant and animal habitats,
3. Protect natural communities,
4. Provide adequate early successional habitat for wildlife species,
5. Conserve riparian areas and wetlands,
6. Increase amount and distribution of late-successional habitats, and
7. Minimize negative effects of roads.

The working group developed specific recommendations for achieving these objectives. The working group now needs to address how these recommendations could best be communicated to landowners in northern Maine. *Beginning with Habitat* is a map-based approach that focuses on conserving existing resource features. Some components of the northern Maine effort, however, involve creating habitats like large blocks of forest through timber harvesting patterns. This objective might require a different tool such as a GIS model allowing a landowner to simulate different cutting patterns and evaluate long-term effects relative to the spatial habitat needs of different species. Further, many landowners already possess much of the baseline information like riparian areas that are part of the core *Beginning with Habitat* map package.

--Don Katnik

Essential Habitat

In 1988, the Legislature amended Maine's Endangered and Threatened Species Act by adding habitat protection provisions in recognition of two issues: 1) the effect habitat loss has on Endangered and Threatened Species in Maine, and 2) the confusion and sometimes costly problems that arise in the absence of consistent, predictable land use decision-making processes for Endangered and Threatened Species. As a result, the Commissioner of MDIFW may designate areas as "Essential Habitat" and develop protection guidelines for these Essential Habitats.

What are Essential Habitats?

Essential Habitats are areas currently or historically providing physical or biological features essential to the conservation of an Endangered or Threatened Species in Maine, and which may require special management considerations. Examples of areas that could qualify for designation are nest sites or important feeding areas. For some species, protection of these kinds of habitats is vital to preventing further declines or achieving recovery goals. This habitat protection tool is used only when habitat loss has

been identified as a major factor limiting a species' recovery. Before an area can be designated as Essential Habitat, it must be identified and mapped by MDIFW and adopted through public rule-making procedures, following Maine's Administrative Procedures Act. Essential Habitats have been designated for Bald Eagle nest sites; Piping Plover and Least Tern nesting, feeding, and brood-rearing areas; and Roseate Tern nesting areas.

What Does Essential Habitat Designation Mean?

Designation of Essential Habitat simply establishes a standardized review process within existing state and municipal permitting processes. It ensures landowners of consistent reviews on land use permit applications where Endangered and Threatened Species are involved, and eliminates the confusion, delays, and sometimes-costly problems that can arise in the absence of standardized, predictable decision-making.

Any project that is wholly or partly within an Essential Habitat and is permitted, licensed, funded, or carried out by a state agency or municipal government, requires an evaluation by the Commissioner of MDIFW. Some examples of projects that require MDIFW evaluation are:

- Subdivision of Land
- Construction or alteration of buildings, waste-water systems, or utilities
- Exemption to minimum lot size requirements
- Construction or relocation of roads
- Dredging, bulldozing, or removing or displacing soil, sand, vegetation, or other materials
- Alterations to wetlands, submerged bottomlands or shoreland zones
- Installation of docks, moorings, or aquaculture facilities
- Beach nourishment or dune restoration

It is important to note that:

- **Essential Habitat designation affects only projects involving state or municipal permits or actions.** The activities of a private landowner are not subject to review unless the project requires a state or municipal permit or license, or is funded or carried out by a state or municipal agency.
- **No additional permits or fees are required as a result of Essential Habitat designation.** It simply establishes a standard, objective review for existing state and municipal permitting functions.

Because Maine's Endangered Species Act allows that no state agency or municipality may permit, license, fund, or carry out a project that will significantly alter an Essential Habitat, it's very important for landowners, project planners, or town/state officials to contact an MDIFW Regional Wildlife Biologist when considering a project proposal in or near an Essential Habitat. Early consultations with MDIFW will help resolve potential conflicts, unexpected delays, frustrations, and economic pitfalls that might otherwise arise during the final project review.

Essential Habitat regulations are both an effective mechanism to safeguard the habitats of Endangered and Threatened Species, and a flexible process to address the needs of property owners, municipalities, and agencies. Working together with project applicants and permitting officials, the Department has been able to approve all but one of more than 200 formal reviews during the 16-year history of this regulation. The single denial occurred after a landowner altered the landscape in violation of other land-use regulations before seeking our approval.

--George Matula, Jr.

Maine's Natural Heritage Program

The Natural Heritage Network represents 74 independent Natural Heritage Programs that collect and analyze data about the plants, animals, and ecological communities of the Western Hemisphere. These programs operate in all 50 U.S. states, in 11 provinces and territories of Canada, and in many countries and territories of Latin America and the Caribbean. Consistent standards for collecting, interpreting, and managing data allow information from different programs to be shared and combined regionally, nationally, and internationally. Natural Heritage biologists conduct extensive field inventories to locate and verify species populations and to assess their current conservation status. Each program maintains and continuously updates a sophisticated computer database that tracks the relative rarity of each species or community and the precise location and status of each known population. Representing more than 25 years of continuous ecological inventory and database development, these are the most complete and up-to-date conservation databases available. These databases are a powerful conservation tool for planners, landowners, natural resource managers, and others. Conservation groups use Natural Heritage data to identify the most important natural areas and to set conservation priorities. Local governments use the information to aid in land use planning. Developers and businesses rely on Natural Heritage data to comply with environmental laws and to improve the environmental sensitivity of development projects. Public agencies use it to manage public resources better and help guide natural resource decisions.

Maine's Natural Heritage Program has two components; the Natural Areas Program in the Department of Conservation, which tracks and maintains data on plants and natural communities, and the Wildlife Resource Assessment Section in MDIFW, which tracks and maintains data on rare, threatened, and endangered wildlife. The Wildlife Habitat Group uses GIS tools to assist WRAS species specialists with delineating polygons representing the areas occupied by these wildlife populations, the inferred extents of their important habitats, and any associated environmental review or regulatory zones. We currently are tracking data for 21 species of moths, 26 butterflies, 30 dragonflies, 22 mayflies, 20 mussels and snails, 2 salamanders, 60 birds, 3 fish, 7 mammals, and 9 turtles and snakes.

To learn more about the Natural Heritage Network and "NatureServe," the parent organization that coordinates state, national, and global data for rare species, visit NatureServe's website at *www.natureserve.org*. This website also provides a wealth of information on the biology, state, and management needs of thousands of plant and animal species, including all of Maine's rare species. It's one of the best places to start if you're looking for information on rare species!

--Don Katnik

Pitch Pine Woodlands and Barrens

Pitch Pine woodlands and barrens are lightly forested upland areas with dry, acidic, often sandy soils. Pitch pine, red pine, scrub oak, blueberry, huckleberry, and/or bluestem grasses are commonly among the sparse vegetation of this unique natural community. It's thought that over half of the state's original pine barren acreage has been lost to residential development, agriculture, and gravel mining. Many dry woodlands and barrens also require periodic fire to prevent succession to a more common, closed canopy white pine-oak system, a natural disturbance that is now short-circuited by habitat fragmentation and fire suppression.

Once viewed as unproductive "wastelands", Maine's few remaining pine woodlands and barrens are now recognized as areas of exceptional wildlife value, providing habitat for a variety of highly specialized plants and animals. Several rare and endangered species are relegated to the states few remaining intact barren communities, mainly in the towns of Kennebunk, Wells, Waterboro, Shapleigh, Hollis, and Fryeburg. These unique habitats are especially rich in rare lepidoptera (butterflies and moths), hosting species that feed on the specialized barrens vegetation, such as Edward's Hairstreak (Endangered), Sleepy Duskywing (Threatened), Cobweb Skipper (Special Concern), and Barrens Buck Moth (Special Concern). Other rare species associated with Maine's barrens include Black Racers (Endangered), Grasshopper Sparrows (Endangered), Upland Sandpipers (Threatened), Short-eared Owls (Threatened), and Northern Blazing Star (a Threatened plant). To learn more about two barrens of statewide ecological significance visit "Focus Area Descriptions" on the Maine Natural Areas Program website (*http://www.mainenaturalareas.org/docs/program_activities/land_trust_descriptions.php#York_County*), and select "Kennebunk Plains and Wells Barrens" or "Waterboro and Shapleigh Barrens". Funding for barrens research and management comes from the Loon Conservation Plate, the Chickadee Check-off, and the Maine Chapter of The Nature Conservancy.

--Phillip deMaynadier

Protecting Wildlife and their Habitats From Oil Spills

Maine's long coastline and numerous islands - which provide habitat for seabirds, waterfowl, and shorebirds - are extremely vulnerable to damage from oil. Over 6 billion gallons of petroleum products are shipped into Maine annually. Much more travels along our coast between refineries and terminals and on our highways. Recent, large spills include:

- *Julie N* – Portland Harbor, Cumberland County, 1996 (200,000 gallons)
- Tanker truck – Fore River, South Portland, Cumberland County, 2003 (10,000 gallons)
- Tanker truck – Sanborn Pond, Waldo County, 2001 (5,000 gallons)
- *Aaron & Sarah* – Boothbay Harbor, Lincoln County, 2002 (2,600 gallons)
- *Viking Lady* – Portland, Cumberland County
- *Pete Tug* – Portland, Cumberland County (1,000 gallons)

Spills of less than 1,000 gallons are more common—about 2,500 per year. Many of these are residential, but between 75 and 100 per year affect coastal areas. The cumulative effect of these small incidents is unknown.

In April 2007, a relatively small oil spill occurred in Kennebec County at the north end of Annabessacook Lake, a Significant Wildlife Habitat for inland waterfowl and wading birds. Waterfowl normally use the lake extensively in early spring because it is one of the first areas to be free of ice and suitable for foraging. Fortunately, the spill seemed to have little to no effect on migratory birds using the lake because few birds were there during the spill. However, MDIFW staff did recover, clean, and release 83 painted turtles that had been oiled. Avian Haven, a local wildlife rehabilitator, housed and monitored the cleaned turtles before their release. Follow-up trapping is being conducted to monitor for additional oiled turtles and to determine whether those that had been cleaned are being re-oiled.

MDIFW has several roles in any oil spill that affects wildlife or habitat. These include recovering oiled wildlife, preventing un-oiled wildlife and habitats from becoming oiled, assessing damage to natural resources, and working with the responsible party to either restore the damaged natural resources or mitigate for the loss. We work closely with DEP, DOC, and DMR (the other state natural resource trustee agencies) to update and improve a natural resource damage assessment plan for coastal spills. Being well prepared is critical to accomplishing these tasks and minimizing damage. We coordinate oil spill response planning with numerous state and federal agencies:

- Maine Department of Environmental Protection (DEP)
- Maine Department of Marine Resources (DMR)
- Maine Department of Conservation (DOC)
- Comparable agencies in neighboring states
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Coast Guard
- Environmental Protection Agency
- National Oceanic and Atmospheric Administration (NOAA)
- Canadian counterparts

Training is essential for assessing how well response plans work and for improving them. In May 2007, several MDIFW staff attended a two-day field exercise on Shoreline Cleanup & Assessment Team (SCAT) training. During a spill, SCAT teams survey and catalog the amount of oiling of different parts of the shoreline and make recommendations for the best way to do cleanup. Potential impacts on wildlife are an important part of making those decisions. In September 2007, MDIFW will be participating in the CANUSLANT (Joint U.S.-Canada Atlantic) exercise to test the cross-border wildlife response plan that MDIFW has been developing in cooperation with other state, federal, and provincial agencies.

Baseline information on areas used by wildlife and on critical habitat is essential for assessing vulnerability to a spill and determining loss after a spill occurs. Nicole Munkwitz, MDIFW's oil spill biologist, worked with Maine DEP to finalize an updated set of Environmental Vulnerability Index (EVI) maps. Habitat Group maintains several GIS layers of coastal data:

- Tidal Waterfowl/Wading Bird Habitats (TWWH)
- Shorebird Areas
- Seabird Nesting Islands

- Rare, Threatened, & Endangered Species (RTE) observations.

Keeping this information current and accurate is a large task. Our previous TWWH layer was based on National Wetlands Inventory maps and Coastal Marine Geologic Environments data. Both of these sources of information are now outdated. The state of Maine now has high-resolution, color aerial imagery for much of the coast. Additionally, the Department of Marine Resources has low-tide imagery, which is critical for mapping mudflats used by shorebirds. Shorebird Areas and Seabird Nesting Islands both are updated annually to incorporate new survey data. Previously, our RTE observations were mapped as points. We now are mapping the habitats associated with the wildlife species for each observation, which will provide a much better estimate of where vulnerable habitats are located and what habitats were lost because of a spill. Using the information gathered for the EVI maps, MDIFW currently is working with the Port Area Committee and coastal oil terminals to improve and prioritize Geographic Response Plans to create response strategies reflecting protection (minimizing damage) of our natural resources.

We contract with the International Bird Rescue Research Center to assist us during oil spills and to provide training for our staff and volunteers. If you are interested in volunteering to help rehabilitate oiled birds and wildlife during a marine oil spill, please mail your name, address, and daytime phone number to: Maine Dept. of Inland Fisheries and Wildlife, Attn: Oil Spill Volunteer, 650 State Street, Bangor, ME 04401.

Note: Our oil spill program is funded by the Inland and Coastal Surface Oil Spill Clean Up Fund, which is a dedicated fund maintained by a per-barrel fee assessed on all petroleum products entering the state and is administered by the Department of Environmental Protection.

--Don Katnik

Significant Habitat Revisions

Significant wildlife habitats are defined by the Natural Resources Protection Act (NRPA), 38 M.R.S.A. Section 480-A. This Act seeks to balance conserving and protecting important wildlife habitats while minimizing restrictions on the land uses around them, particularly activities related to development. Because both needs are critical to Maine's economic and environmental health, NRPA is under frequent scrutiny and revision. The Act was amended in April 2006 to clarify the definitions of Significant Wildlife Habitats. It is being amended again to address concerns about how close certain activities that would affect wildlife should be allowed relative to these habitats. Mapping these habitats is a critical role of the Wildlife habitat Group. NRPA defines the following Significant Wildlife Habitats:

Seabird Nesting Islands – Seabirds live over the open ocean, returning to land only once a year to nest. Seabirds include colonial nesting waterbirds such as Leach's storm-petrel, great cormorant, double-crested cormorant, laughing gull, herring gull, great black-backed gull, common tern, arctic tern, roseate tern, razorbill, black guillemot, Atlantic puffin, and common eider. Their survival depends on undisturbed nesting habitat. Small, unforested, rocky islands such as those off the coast of Maine provide a setting free of mammalian predators such as foxes, coyotes, and raccoons. Flying distance from the mainland discourages avian predators such as great horned owls. Many seabird species nearly eradicated in Maine by the end of the 19th century have recovered dramatically, thanks to the passage of state and federal

conservation laws and the restoration efforts of dedicated scientists. In 1998, 234 seabird nesting Islands in Maine were afforded protection as Significant Wildlife Habitat under the Natural Resource Protection Act.

Significant Vernal Pools - The Act was amended in April 2006 to include, beginning in 2007, these natural, temporary to semi-permanent bodies of water occurring in shallow depressions that typically fill during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubranchipus* sp.), as well as valuable habitat for other plants and wildlife, including several rare, threatened, and endangered species. Vernal pools intentionally created for the purposes of compensatory mitigation are included as Significant Wildlife Habitats. Whether a vernal pool is a "significant" depends on the number and type of pool-breeding amphibian egg masses it, the presence of fairy shrimp, or use by threatened or endangered species. The habitat consists of a vernal pool depression and a portion of the critical terrestrial habitat within a 250 foot radius of the spring or fall high-water mark.

Waterfowl and Wading Bird Habitat - Waterfowl are members of the family Anatidae including but not limited to brant, wild ducks, geese, and swans. Wading birds include but are not limited to herons, glossy ibis, bitterns, rails, coots, common moorhens, and sandhill cranes. Inland waterfowl/wading bird habitats are wetland complexes, including a 250 foot upland habitat zone, with documented outstanding use by waterfowl or wading birds or a combination of dominant wetland type, diversity, size, habitat interspersion, and percent open water that meets IF&W guidelines. Tidal waterfowl/wading bird habitat includes four classes: eelgrass (*Zostera marina*) beds currently mapped by Maine Department of Marine Resources, mussel bars or beds, emergent wetlands, and mudflats.

Shorebird Nesting, Feeding, and Staging Areas - Shorebird species include the members of the families Scolopacidae, Charadriidae, and Haematopodidae, including, but not limited to, sandpipers and plovers. Maine feeding and staging areas provide migrating shorebirds with the food resources to acquire the large fat reserves necessary to fuel their transoceanic migration to wintering areas. Shorebird staging habitats include both feeding areas where shorebirds congregate to feed and roosting areas used by shorebirds to rest during high water when feeding areas are unavailable.
Deer Wintering Areas – forested areas used by deer during periods of deep snow.

The Wildlife Habitat Group maintains spatial databases for all of these Significant Wildlife Habitats. We update them annually based on new information from field observations and other sources. We currently are working with Maine's Department of Environmental Protection, which administers NRPA, to use new aerial imagery to improve mapping of waterfowl and wading bird habitats.

--Don Katnik

Using Current Technology to Protect Habitats

The Wildlife Habitat Group makes extensive use of geospatial technology, especially Geographic Information Systems (GIS). We use GIS to map wildlife habitats, primarily from aerial photographs and other GIS data maintained by the state GeoLibrary, such as streams and ponds. We also use GIS for more complex modeling, such as predicting important areas for wildlife habitat connectivity. All of the Beginning with Habitat maps are created by the Wildlife Habitat Group cartographer using GIS. We currently are exploring the potential for using mobile devices such as a Global Positioning System (GPS) connecting to a hand-held GIS unit for collecting field data more accurately and efficiently. We also are considering developing Internet Web Services for providing easier access to wildlife habitat data for other state and federal agencies and the general public.

--Don Katnik

Updated Landcover Map

In 2004, MDIFW partnered with Maine's Department of Environmental Protection, State Planning Office, and other agencies to create a new landcover map for the state, replacing the previous map made in 1993. The selected mapping contractor - Sanborn, Inc. - combined Maine's needs with NOAA's (National Oceanic & Atmospheric Administration) and USGS's efforts towards the National Landcover Dataset (NLCD), allowing Maine to partner with those federal agencies and share the costs. Habitat Group staff assisted with collecting field data to construct the new map and additional field data to test its accuracy. Habitat Group staff also assisted with reviewing draft maps and participated in periodic meetings with the contractor. The final landcover map was delivered in May 2006. The package also included a map of impervious surfaces. The state Remote Sensing Committee, comprised of representatives of the agencies that partnered to create the landcover map, met again in Spring 2007 to discuss needs for updating the landcover data at regular intervals. The Committee decided that, because most landcover change in Maine is due to development, the most important piece of the map to update is the impervious surfaces component. Between 2007 and 2010, MDIFW will be working from a grant with the U.S. Environmental Protection Agency to update that data.

--Don Katnik

Vernal Pools

Vernal pools are small, forested wetlands that frequently fill with water from early spring snowmelt and rains and then dry partly or completely by mid to late summer. Many of Maine's amphibians use vernal pools as breeding or foraging habitat. Some, like spotted salamanders, blue spotted salamanders, and wood frogs, breed more successfully in these fishless habitats than in any other wetland type. Additionally, vernal pools provide habitat for a variety of small mammals, wading birds, waterfowl, aquatic invertebrates, and several state-listed animal species including Blanding's turtles (Endangered), spotted turtles (Threatened), wood turtles (Special Concern), ribbon snakes (Special Concern) and ringed boghaunter dragonflies (Endangered).

We still have more to learn about why some vernal pools receive greater wildlife use than others. To this end, grants from the Outdoor Heritage Fund and the U.S. Environmental Protection Agency helped support a recently completed University of Maine study by Dr. Robert Baldwin and Dr. Aram Calhoun, to research the wildlife use and characteristics of vernal pools in four southern townships – Falmouth, Biddeford, Kennebunkport, and North Berwick. Rob and Aram's results suggest that wood frogs and other pool-

breeding amphibians range widely in the forested landscape following breeding and that surrounding upland forests and forested swamps provide important habitat outside of the brief pool-breeding season. Rob also developed a landscape model that highlights the vulnerability of vernal pools to habitat loss and fragmentation from insufficient conservation lands and wetland regulations in southern Maine.

MDIFW is currently cooperating with the Department's of Environmental Protection and Conservation, Maine Audubon Society, and the University of Maine to identify potential strategies for protecting the unique values provided by smaller wetlands that "fall through the cracks" of current wetland regulations. Workshops on vernal pools continue to be held throughout the state for landowners and land managers, and several new publications designed to offer voluntary techniques for protecting vernal pools and their wildlife are now available. A vernal pool fact sheet, describing threats and management considerations, is available upon request from MDIFW for use by landowners, municipalities, land trusts, and other cooperators. The *Maine Citizen's Guide to Locating and Documenting Vernal Pools* provides a comprehensive introduction to recognizing and monitoring vernal pools, including color photographs of the indicator species. Also recently available to the public are two complementary guide-books for protecting vernal pool habitat during timber management (*Forestry Habitat Management Guidelines for Vernal Pool Wildlife*) and development (*Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*). Together, these publications provide recommendations designed to help maintain functioning vernal pool landscapes throughout Maine. All of the guides can be obtained by contacting Becca Wilson at Maine Audubon Society (207-781-6180 ext. 222; *bwilson@maineaudubon.org*).

Finally, the Department of Inland Fisheries and Wildlife and the Department of Environmental Protection recently developed a definition of *Significant Vernal Pools*, a new Significant Wildlife Habitat under the state's Natural Resource Protection Act, recently approved by the state legislature. Criteria for designating "significant" pools include a) the presence of a state Endangered or Threatened species, or b) evidence of exceptional breeding abundance by amphibian indicator species. Recognizing a subset of vernal pools as "significant" will help state biologists provide guidance on development activities within a critical upland buffer zone surrounding one of the state's highest value wildlife habitats. Funding for MDIFW's efforts at research and protection of vernal pools comes from the Loon Conservation Plate, the Chickadee Check-off, the U.S. Environmental Protection Agency, and the Maine Outdoor Heritage Fund.

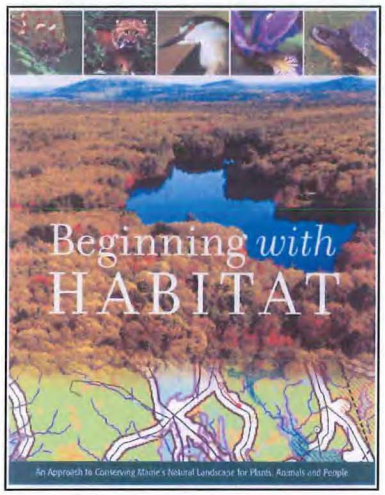
--Phillip deMaynadier

APPENDIX B -- An overview of the projects undertaken by the Maine Dept. of Inland Fisheries & Wildlife under the State Wildlife Grant Program.

Maine's State Wildlife Grant Program

Congress created the State Wildlife Grant (SWG) Program in 2001 to help state and tribal fish and wildlife agencies address the unmet needs of fish and wildlife and associated habitats, especially species of greatest conservation need. Funds appropriated under the State Wildlife Grants program are allocated to states according to a formula that takes into account each state's size and population. To date, Maine has received nearly $4.8 million in SWG funds. Here are several examples of projects that State Wildlife Grant monies support.

- **Beginning with Habitat**



Beginning with Habitat is a cooperative effort of agencies and organizations working together to secure Maine's outdoor legacy. The goal of the program is to maintain sufficient habitat to support all native plant and animal species currently breeding in Maine by providing each Maine town with a collection of maps and accompanying information depicting and describing various habitats of statewide and national significance in the town. *Beginning with Habitat* partners can then work with communities to design a landscape that accommodates the growth they need with the highest resource conservation.

- **Seabird Outreach**

The principal objective of this project is to inform Maine students and the general public about seabird biology and marine conservation by providing insight into the lives of Maine seabirds (puffins and terns) through a web-based school curriculum and Internet access that features live-streaming video from Eastern Egg Rock, a state-owned 7-acre sanctuary managed by National Audubon Society.

- **Distribution & Ecology of Purple Sandpipers Wintering in Maine**

The northeast Atlantic coast is recognized by the U.S. Shorebird Conservation Council as an area that is extremely important to the survival of wintering purple sandpipers in the Western Hemisphere. In fact, there is strong evidence that Maine supports a large percentage of the wintering population. With threats from catastrophic oil spills and consequent damage to shorebird habitats or shorebirds themselves, the Maine Department of Inland Fisheries and Wildlife (MDIFW) has identified the need to locate and map important purple sandpiper habitats and determine population abundance, distribution, and limiting factors. This project will enable the Department to 1) estimate abundance and distribution of purple sandpipers in Maine; 2) assess movements and site fidelity of individuals at particular sites; and 3) develop a protocol for monitoring purple sandpiper populations in Maine.

- **Bald Eagle Survey and Essential Habitat**

Bald eagles continue their dramatic comeback in Maine. Presently, the State is home to more than 300 nesting pairs, a remarkable 10-fold increase from the 30 nesting pairs reported in the late-1970s. Despite this accomplishment, our ultimate challenge is to provide suitable habitat for eagles in the future. Nesting eagles need mature trees and wooded buffers in shorelands, a niche that will always be at risk to land development and recreational pressures. The purpose of this project is to devise statewide strategies and identify optimal sites for long-term conservation of bald eagle nesting habitat as the fundamental safeguard for a lasting recovery of the species in Maine. This "safety net" concept is the last pending objective for state reclassification of bald eagles from the current status of Threatened.

- **Enhance Management of Piping Plovers and Least Terns**

Piping plovers and least terns are designated as endangered species in Maine and are known to nest on a handful of beaches in the State. To successfully raise young, these birds need sand beaches free from human disturbance and predators. This project will enable MDIFW, working in cooperation with the Maine Audubon Society, to conduct the planning and data gathering necessary to enhance the management of piping plovers and least terns, including the development of cooperative beach management agreements with Maine municipalities.

- **Aroostook Hills and Lowlands Inventory**

Since 1997, MDIFW and the Maine Natural Areas Program have been working on a systematic, statewide, 10-year survey of rare and endangered wildlife, plants, and natural communities. This survey is designed to document new locations of rare species to better assess their status and distribution and design conservation strategies to promote their recovery. The objective of this project is to conduct a wildlife inventory of the Aroostook Hills and Lowlands ecoregions (~2.5 million acres) in northern Maine. The inventory will focus on high value habitats supporting rare, threatened and endangered animals and high value habitat. Data gathered will support voluntary land protection by large and small private landowners.

- **Canada Lynx Ecology**

The Canada lynx has long been a rare carnivore in northern and western Maine. Until recently, its status was largely unknown and was based on anecdotal reports or a track in the snow. SWG funds help support an ongoing study of Canada lynx in Maine to 1) determine if there is a viable, self-supporting population of lynx in the State; 2) document mortality factors affecting lynx; 3) identify habitats used by lynx and how they relate to snowshoe hare distribution and abundance; 4) investigate how lynx distribution in Maine is affected by populations of bobcats, coyotes, fishers, and

fox; and 5) test the efficacy of various survey methods used to determine status of lynx.

- **Stream Survey Databasing/Utilization of Restored Aquatic Habitats**

The Maine Department of Inland Fisheries and Wildlife is enhancing its efforts towards managing and conserving flowing water habitats and their respective animal communities. Although the Department currently holds extensive survey information regarding these ecosystems, most data exists in a multitude of formats and physical locations. This project will compile existing stream habitat and fish community data into a computerized Geographic Information System (GIS) database for easier use, analysis, and visualization within landscapes.

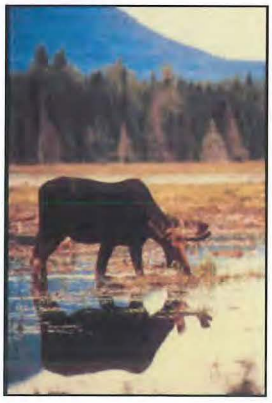
- **Lake Habitat Inventories**

One of the primary responsibilities of the Department of Inland Fisheries and Wildlife is to conduct habitat surveys of the aquatic resources in the State. These surveys include gathering data related to water quality, fish species composition and relative abundance, bathymetry, aquatic habitat types, and macroinvertebrate species composition. These surveys are important to present and future management of Maine's lakes and ponds. To date, there are roughly 3,800 ponds that have never been inventoried by MDIFW staff and many that have been completed need to be updated. The purpose of this project is to utilize various fisheries techniques to collect data to properly plan for the future management of lacustrine habitat in Maine.

- **Aquatic Biodiversity Project**

Effective resource management depends on ready access to existing data resources and on the ability to design and implement future data collection efforts in a rational and cost effective manner. This project will enable the Department to ensure that all priority freshwater fisheries data are in a format that will permit electronic mapping and analyses of this information.

- **Estimating Moose Density**



Moose are one of the most sought after species for viewing, and moose viewing is important to the tourism industry of Maine. Accurate assessments of the moose population are needed to meet the moose management goals of maximizing hunting opportunity, to the extent possible, while maintaining high numbers of mature bulls to provide high quality viewing. The principal objective of this project is to develop an accurate and cost-effective model that can be used to estimate the density of Maine's moose population.

- **Unique Aquatic Ecosystems**

Fishless Ponds are believed to be rare in the Maine landscape. Many of these ponds occur in mountainous terrain where fish access is limited because of local topography. These sites

have sometimes been targeted for introductions of sport fish, but they may have unique ecological attributes, especially for invertebrates and amphibians. Introduction of predatory fish could permanently alter their ecology. The objective of this study is to document the ecology of fishless ponds in Maine and conduct a landscape analysis to predict and evaluate the presence of these potentially unique natural communities.

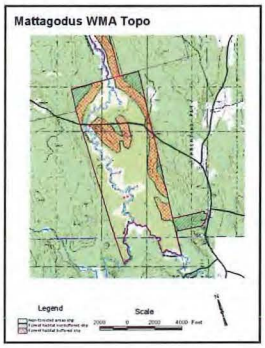
- **Wildlife Park Displays**

The Maine Wildlife Park receives more than 80,000 visitors annually, including a large number of school children on field trips. These visitors come to the park to learn more about Maine's fish and wildlife resources and management. This project will enable the Department to construct a new fisheries display and to complete educational exhibits for moose, deer, coyote, turkeys, and turtles.

- **Fish and Wildlife Education**

This project will provide educational materials to every fourth grade classroom in the State to increase students' awareness and understanding of fish and wildlife resources. The materials will consist of posters, activity guides for teachers, animal and fish guides, and management reports.

- **Wildlife Management Areas, Planning and Habitat Management for the Future**



Two-thirds of MDIFW's 52 Wildlife Management Areas (WMAs) contain habitats that support federal or state-listed threatened or endangered wildlife, species of special concern, and species identified of greatest conservation need or contain special habitats or communities. The purpose of this project is to develop and populate a statewide WMA database, update WMA management plans, develop a WMA schedule of development and maintenance treatments, and implement a schedule of habitat treatments across all Wildlife Management Areas to benefit a diversity of featured wildlife species and species of greatest conservation need.

- **An Investigation of Blanding's Turtle Road Mortality**

There is increasing emphasis on the part of federal and state transportation authorities to minimize and mitigate impacts to wildlife passage and mortality from road construction projects. This project will help the Maine Departments of Inland Fisheries and Wildlife and Transportation identify the location and extent of road impacts on endangered turtles in Maine as a precursor towards designing strategic mitigation measures.

- **Status and Monitoring of Maine Owls**

In 2001, MDIFW began working with Maine Audubon to evaluate the abundance and distribution of owls in Maine and to develop a volunteer-based monitoring system. Both Partners in Flight and recent initiatives directed at integrated bird conservation have identified monitoring of nocturnal birds as a high priority research and management need in the northeast.

For more information on Maine's State Wildlife Grant Program, please visit http://www.maine.gov/ifw/wildlife/compwildlifestrategy/index.htm or contact:

Sandy Ritchie, Maine SWG Coordinator
Maine Department of Inland Fisheries and Wildlife
41 SHS, 284 State Street,
Augusta, ME 04333
Phone: 207-287-5265
Email: sandy.ritchie@maine.gov

APPENDIX C –An overview of the projects undertaken by the Maine Dept. of Inland Fisheries & Wildlife and the Maine Natural Areas Program, Dept. of Conservation under the Landowner Incentive Program.

MAINE LANDOWNER INCENTIVE PROGRAM

Habitat conservation for Maine's rare, threatened, and endangered wildlife, plants, and natural communities is largely provided by the voluntary stewardship of the private landowner, who rarely is compensated for protecting his or her land as habitat for these rare species.

Landowners choose conservation for a variety of reasons. Some want to share the beautiful places they have enjoyed. Some fear that estate taxes may prevent them from keeping land in the family. Others seek relief from rising property taxes. All of them share an abiding concern and love for the land.

Private landowners are integral to the conservation of our wildlife heritage and natural resources and are often committed in principle to stewardship of endangered or threatened species, but the lack of financial and technical incentives has limited the scale of long-term conservation.

What is the Landowner Incentive Program?

The Landowner Incentive Program (LIP) is a competitive grant program funded by the U.S. Fish and Wildlife Service that provides technical or financial assistance to private landowners for the protection, restoration, and management of habitat to benefit at-risk plant and animal species.

The State of Maine was awarded a $1.3 million Landowner Incentive Program grant from the U.S. Fish and Wildlife Service in 2004 and an additional $655,000, $945,760 and $707,607 in 2005, 2006 and 2007 respectively to focus conservation efforts on privately owned habitat that supports Maine's rarest species.

Why is LIP Important?

Over two-thirds of the state's rare and endangered species occur in southern and coastal Maine and are declining or threatened due to habitat loss from development. Maine's private landowners own more than 95% of these lands and are integral to the conservation of our wildlife heritage and natural resources. LIP's primary intent is to provide financial incentives to private landowners for conservation easements, cooperative management agreements, and habitat management initiatives that conserve habitat for rare and endangered plant and animal species.

Who Administers the LIP Program in Maine?

The Department of Inland Fisheries and Wildlife provides administrative oversight of Maine's LIP program, and the Maine Natural Areas Program provides LIP outreach. A Steering Committee, comprised of state and federal agencies and conservation partners, is responsible for

generating competitive criteria for distributing LIP funds fairly and equitably, delivery of technical and financial assistance to landowners, administrative and coordination functions, and establishing goals and measurable objectives for the conservation of Maine's species-at-risk and their habitats.

How Are LIP Funds Being Used?

Beginning with Habitat, the innovative habitat planning conservation partnership effort under way in Maine, guides Maine's LIP program. LIP funding is being used to implement conservation measures critical to five initiatives.

Bald Eagle Nesting Habitat Protection - Maine is one of the primary strongholds of bald eagles along the Atlantic coast; the state's population accounts for more than 75% of eagle numbers resident in the northeastern U.S. Although statewide numbers are now at recovery levels established for Maine in 1989, bald eagles remain a rarity in all but a few localities.

LIP funds are being used to enhance stewardship of privately owned lands strategic to conservation efforts for bald eagle nesting habitat by soliciting management agreements and/or conservation easements for at least 30 nesting areas (more than 4,500 acres) across Maine.

Piping Plover and Least Tern Nesting Habitat Protection - Approximately 75% of the 60 - 70 pairs of piping plovers nesting in Maine nest on 17 privately-owned beaches in the state. Many of these beaches are highly developed, and management of these endangered birds requires careful negotiations with landowners.

LIP funds are being used to increase the capacity to better manage piping plover and least tern habitat on privately owned land, provide support for sand dune restoration, and supply landowners with wooden walkways.

Furbish Lousewort Habitat Protection - Furbish's lousewort, Maine's only federally listed endangered plant, is a perennial wildflower endemic to the St. John River in northern Maine with a few small populations in adjacent New Brunswick. Its limited range allows us to focus our conservation efforts with a higher likelihood of success. Its natural rarity has been exacerbated by human impacts.

Funds from the Landowner Incentive Program are being used to evaluate opportunities for obtaining cooperative management agreements on parcels that support populations of Furbish's lousewort. By protecting river shore that supports Furbish's lousewort we will also be protecting some of the most diverse and unique habitat found in the state. Over 30 other rare plant species including some of Maine's rarest (six endangered and 14 threatened species) are found growing along the same stretches of the St. John River as Furbish's lousewort.

Restoring Seabird Nesting Habitat on Stratton Island - Stratton and Bluff Islands have the greatest diversity of nesting seabirds in Maine. These islands support the largest population of endangered roseate terns in Maine. More than 1,000 pairs of common and arctic terns (state listed special concern and threatened respectively) also nest here. A diverse assemblage of wading birds including a colony of black-crowned night herons occur on the islands, as does Maine's only nesting colonies of glossy ibis, great egret, little blue heron, tri-colored herons, and American oystercatcher.

LIP funds are being used to help support National Audubon's seabird and wading bird research and management, provide for a meaningful education experience for the public (wildlife viewing areas, observation blinds, and guided programs for island visitors), conduct annual bird censuses, and complete detailed studies of nesting ecology and productivity of common and roseate terns to better manage these rare species.

Species-at-Risk Focus Areas as Identified through Beginning with Habitat - Southern and coastal Maine have the highest level of plant and wildlife species diversity in the state including the highest numbers of populations of rare plant and animal species. Unfortunately, this area is one of the most desirable for development, and increasing development is leading to habitat fragmentation and loss. Within this area the State of Maine has been working hard to identify at risk plant and animal populations and the habitats they need to remain viable. The result of this effort is a mapped suite of species-at-risk focus areas. These areas include assemblages of the best examples of rare species populations and high quality natural habitats in Maine. LIP funds are being used to acquire easements and/or cooperative management agreements to preserve viable populations of rare plant and animal populations within species-at-risk focus areas.

In the last three years, the state has awarded $1,593,425 for the purchase of conservation easements within 10 focus areas that will protect more than 2,843 acres of critical habitat for rare, threatened, and endangered species in southern, western, central, and mid-coastal Maine. Landowner Incentive Program funds will contribute to the conservation of the following areas:

Beaver Dam Heath, Berwick
Part of a 1,000-acre wetland interspersed with upland forests and 125 acres of wetland, including a state rare Atlantic white cedar swamp, will be conserved with LIP funds. This tract is especially important habitat for Blanding's and spotted turtles (state listed endangered and threatened respectively).

Chopps Creek, Woolwich
This project will permanently protect high value tidal freshwater marshes, riparian habitat, and associated upland buffer on Chopps Creek, a subsite of Merrymeeting Bay and the Lower Kennebec River Estuary. Merrymeeting Bay has long been recognized for its exceptional productivity. Broad fertile mudflats, formed by the deposition of sediments at the mouths of the six rivers entering the bay, support a dense and diverse vegetative complex that provides breeding, feeding, and roosting cover for a variety of waterfowl and other wetland-dependent species.

Gerrish Island, Kittery
Located in the southern tip of Maine, this 350-acre project comprises a major portion of the largest undeveloped block on Gerrish Island in Kittery. Funds will be used to protect over a mile of ocean frontage, upland forests, freshwater wetlands and vernal pools, and management of invasive plant species.

Mt. Agamenticus, Berwick
Three properties in the Mt. Agamenticus Focus Area will be conserved. All parcels are rich with vernal pools and when combined, will create a corridor between two large areas of conserved lands known to be important habitat to both Blanding's and spotted turtles.

Sheepscot River, Alna and Newcastle
Centrally located within a 2,450-acre roadless area in mid-coast Maine, two properties totaling nearly 350 acres and covering 2.5 miles of frontage on the Sheepscot River will be conserved

with LIP funds. Home to federally listed Atlantic salmon and bald eagles, the Sheepscot River also provides habitat for several other globally and state rare species.

St. George River, Warren
A 72-acre parcel of a diverse mix of mature forests, fertile agricultural lands, and an extensive salt marsh ecosystem on the western shore of the St. George River will be conserved. In addition, as the only remaining land grant parcel in Warren and the oldest family estate in the community, the property is steeped in historic and cultural values.

Unity Wetlands, Unity
Complementing a Land for Maine's Future award, LIP funds will contribute to conservation of 510 acres within 4 parcels in an ongoing land conservation initiative. The Unity Wetlands complex includes a large expanse of wetlands and uplands and hosts an array of unique natural features that collectively contribute to an area identified as one of statewide conservation significance. Notably, several rare wetland and riparian species and habitats, from wood turtles to wild garlic, occur in the complex.

Upper Saco River, Fryeburg
The Upper Saco River Watershed is recognized as one of the largest unfragmented, natural tracts of low floodplain forest in New England. It is characterized by an abundance of unique natural communities and habitat supporting the globally rare Long's bulrush, endemic Hudsonia beach community, the state endangered Blanding's turtle, and three globally rare dragonflies. LIP funds will contribute to conservation of 12 tracts of land, creating a largely unfragmented 558-acre of forest floodplain habitat while keeping the land in responsible forest management.

Balch Head Heath, Trescott
This project involves the purchase of a conservation easement on a 118-acre raised bog parcel that lies in the heart of an ecologically rich stretch of Maine's Downeast coast. The property is an excellent example of a "Coastal Plateau Bog Ecosystem", a landscape feature identified as an Exemplary Natural Community by the Maine Natural Areas Program (MNAP). The land consists primarily of raised peatlands, and is one of the largest heaths along the Bold Coast.

Cranberry Marsh, Biddeford
A 150-acre parcel of land consisting of upland forest and forested wetlands within the Biddeford-Kennebunkport Vernal Pool Complex Focus Area will be conserved with LIP funds. This is one of several unprotected properties in a block of more than 500 undeveloped acres and is home to a population of spotted turtles. The property is entirely forested with numerous granite knolls and ledges and is dotted with several vernal pools. These wetlands, scattered within a matrix of upland forest, may support Blanding's turtles, ringed boghaunter dragonflies, ribbon snakes and possibly black racers. A 500-acre undeveloped block of land this close to the coast is quite unusual, and most of the block is under a single ownership.

Norkin – Pleasant Pond, Denmark
This project involves the purchase of a conservation easement on 73 acres of land containing 1,000 feet of shoreline on Pleasant Pond and 4,500 feet on Black Brook Bog located in the Saco River watershed. Norkin-Pleasant Pond is part of a watershed which supports a rich and unique ecosystem comprised of silver maple dominated floodplain forest, vernal pools, oxbow ponds, acidic fens, backwater sloughs, grassy swales, outwash plain pond shores, and several lakes and ponds all supporting a diverse array of flora and fauna.

For more information on Maine's Landowner Incentive Program please visit:
http://www.mainenaturalareas.org/docs/lip/ or contact:

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