

**MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE**

Roland D. Martin, Commissioner

**Wildlife Division**  
**Research & Management Report**  
**2007**





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# INTRODUCTION

***Implementing Successful Wildlife Management*** is “Job 1” for the Wildlife Division. While there are many challenges to achieving success, the opportunities for success are greatly enhanced by the education, experience, professionalism, and dedication of the Division’s biologists and support staff. Throughout these pages, you will read of our efforts to successfully manage and conserve wildlife populations and wildlife habitat. Here, briefly, I would like to tell you of the people who make it happen.

There are fifty-four individuals employed in the Division, who are located across the length and breadth of Maine. Many have more than two decades of experience with the Division; others are younger, and some are just beginning their careers. The younger staff benefit from the experience and knowledge of the “old timers” and the more experienced staff benefit from the new ideas and technological “know how” the younger staff bring with them. All are committed to the conservation of Maine’s wildlife and its habitat and to the people of Maine – and so, working for the Wildlife Division is not just a job, but rather, a way of life. The Division is a team – developing solutions from a diversity of opinion – we care about our mission, we care about each other, and we work together well in our efforts at *Implementing Successful Wildlife Management*.

Much has been made, perhaps too much, of the job knowledge and historical perspective that will be lost throughout the workforce as the baby-boomers retire; but I am optimistic and excited about the future of the Division and our wildlife management programs. Within our ranks there are many capable and dedicated individuals who will guide the Division into the future.

I believe we can all be proud of Maine’s dedicated wildlife professionals, and Maine’s state-of-the-art, scientific wildlife management programs, which are guided by public input.

The members of the Wildlife Division thank you for your interest, support, and participation in the conservation of Maine’s wildlife. We look forward to working with you to meet the challenges of the coming years.

Here’s to informative, and I trust, enjoyable reading!

--G. Mark Stadler  
Director, Wildlife Division



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# Table of Contents

<b>WILDLIFE MANAGEMENT SECTION.....</b>	<b>5</b>
<b>WILDLIFE RESOURCE ASSESSMENT SECTION.....</b>	<b>6</b>
<b>IMPLEMENTING SUCCESSFUL WILDLIFE MANAGEMENT.....</b>	<b>7</b>
<b>SPECIES PLANNING AND MANAGEMENT.....</b>	<b>7</b>
<b>ENDANGERED AND THREATENED SPECIES.....</b>	<b>7</b>
<b>THE WILD TURKEY - A WILDLIFE MANAGEMENT SUCCESS.....</b>	<b>9</b>
<i>History of Restoration * Biology and Hunting Seasons.....</i>	<i>9</i>
<i>Identifying and Resolving Nuisance Wild Turkey Problems.....</i>	<i>12</i>
<i>Wild Turkey Capture and Relocation.....</i>	<i>13</i>
<i>Wild Turkey Hunting Safety and Landowner Relations.....</i>	<i>14</i>
<i>Wild Turkey Habitat Management * Northern Maine Wild Turkey Management Protocol.....</i>	<i>15</i>
<b>OTHER SPECIES MANAGEMENT SUCCESSES.....</b>	<b>17</b>
<i>Bald Eagle.....</i>	<i>17</i>
<i>Protecting Essential Habitat for Bald Eagle Nest Sites in Eastern Maine * Peregrine Falcon.....</i>	<i>21</i>
<i>Piping Plover.....</i>	<i>22</i>
<i>Piping Plover/Least Tern - Implementing Successful Town Agreements.....</i>	<i>23</i>
<i>Common Eider.....</i>	<i>23</i>
<i>Atlantic Puffin.....</i>	<i>24</i>
<i>Island-Nesting Terns * Resident Canada Geese.....</i>	<i>25</i>
<b>IMPLEMENTING SUCCESSFUL HABITAT PROTECTION AND MANAGEMENT.....</b>	<b>27</b>
<i>Beginning with Habitat.....</i>	<i>27</i>
<i>Forest Certification and Wildlife Management Areas.....</i>	<i>28</i>
<i>Implementing Wildlife Guidelines on Bureau of Parks and Lands.....</i>	<i>28</i>
<b>SPECIES PLANNING AND MANAGEMENT.....</b>	<b>29</b>
<b>FUNDING PRIORITY SPECIES MANAGEMENT.....</b>	<b>29</b>
<b>LANDOWNER INCENTIVE PROGRAM.....</b>	<b>30</b>
<b>STATE WILDLIFE GRANT PROGRAM.....</b>	<b>33</b>
<b>BIRD GROUP.....</b>	<b>35</b>
<i>Upland Birds.....</i>	<i>35</i>
<i>Waterfowl Management and Research.....</i>	<i>37</i>
<i>Maine Colonial Waterbird Inventory.....</i>	<i>42</i>
<i>Least Tern * Freshwater Marshbirds.....</i>	<i>43</i>
<i>Rusty Blackbird * Sharp-Tailed Sparrow.....</i>	<i>44</i>
<i>Northeast Coordinated Bird Monitoring Partnership.....</i>	<i>45</i>
<i>Maine's Role in Avian Influenza Surveillance.....</i>	<i>46</i>
<b>MAMMAL GROUP.....</b>	<b>47</b>
<i>Black Bear.....</i>	<i>47</i>
<i>Furbearers and Small Game Mammals.....</i>	<i>51</i>
<i>Moose.....</i>	<i>54</i>
<i>Deer.....</i>	<i>57</i>
<i>New England Cottontail.....</i>	<i>66</i>
<i>Canada Lynx.....</i>	<i>67</i>
<b>REPTILE, AMPHIBIAN AND INVERTEBRATE GROUP.....</b>	<b>69</b>
<i>Partners in Amphibian and Reptile Conservation * Maine Amphibian and Reptile Atlas Project.....</i>	<i>69</i>
<i>Amphibian Monitoring * Rare Snakes.....</i>	<i>70</i>
<i>Blanding's and Spotted Turtles.....</i>	<i>71</i>
<i>Wood Turtles * Rare Dragonflies.....</i>	<i>72</i>
<i>Rare Butterflies.....</i>	<i>73</i>
<i>Clayton's Copper Butterfly * Roaring Brook Mayfly.....</i>	<i>74</i>
<i>Freshwater Mussels.....</i>	<i>75</i>
<i>Pitch Pine Woodlands and Barrens.....</i>	<i>76</i>
<i>Vernal Pools.....</i>	<i>77</i>
<b>WILDLIFE HABITAT GROUP.....</b>	<b>78</b>
<i>Essential Habitat.....</i>	<i>78</i>
<i>Significant Habitat Revisions.....</i>	<i>79</i>
<i>Conserving and Protecting Wildlife Habitats in Northern and Eastern Maine.....</i>	<i>80</i>
<i>Maine's Natural Heritage Program.....</i>	<i>80</i>
<i>Updated Landcover Map * Protecting Wildlife and Their Habitats From Oil Spills.....</i>	<i>81</i>
<i>Using Current Technology to Protect Habitats.....</i>	<i>82</i>

## WILDLIFE MANAGEMENT SECTION

The regional wildlife management staff of biologists is best described as the Wildlife Division's wildlife *generalists* or the "jack of all trades." The eighteen wildlife biologists who staff the Department's seven regional field offices constitute the majority of the Wildlife Management Section (WMS). Their breadth of knowledge, activities, and job responsibilities range far and wide. In essence, the regional wildlife biologist represents the Department in a multitude of arenas and serves as the "state's wildlife expert" within their assigned regional geographic area (Figure 1). They are responsible for ***Implementing the Wildlife Division's Successful Management Programs*** within those regions.

The Regional Wildlife Management Section also employs and assigns a wildlife biologist to the Bureau of Parks and Lands (BP&L). He works with the Bureau's regional managers to implement wildlife habitat management on the state's 482,000 acres of public reserved lands and on an additional 95,000 acres of state park land. He also assists MDIFW with forest management issues on the Department's Wildlife Management Areas (WMAs). The Wildlife Management Section also has a Lands Management Program directed by a Lands Management Biologist, and supported by a Forester. The Lands Management Program assists regional biologists in habitat enhancement planning and implements important habitat work on the Department's WMAs.

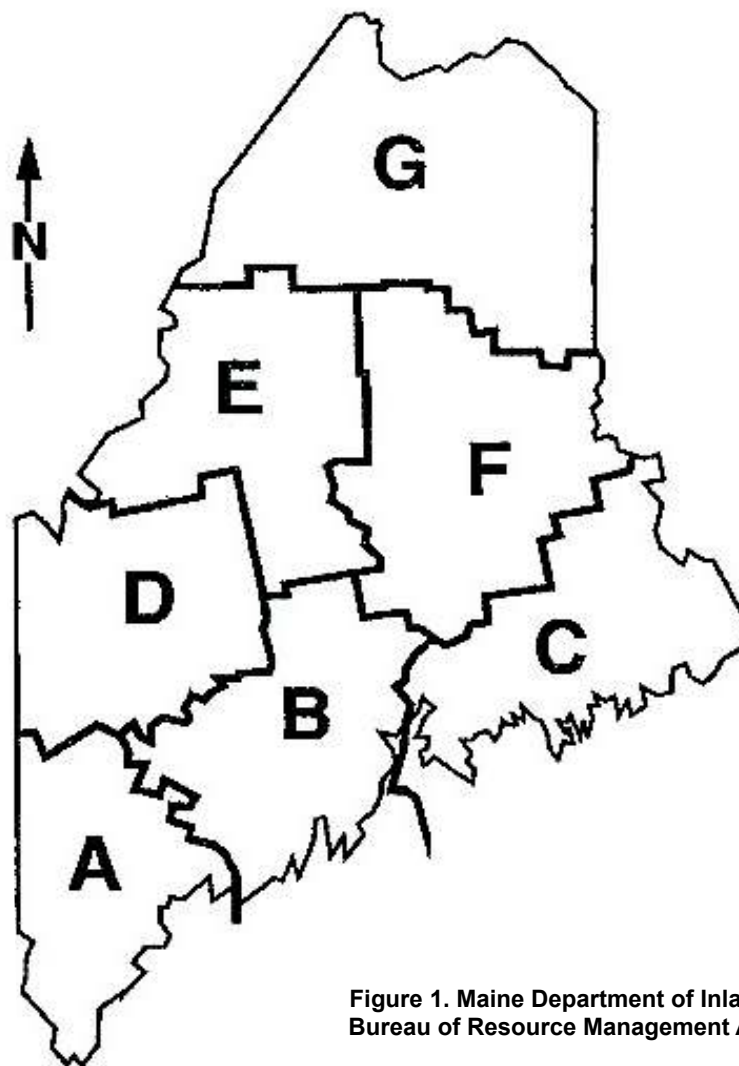


Figure 1. Maine Department of Inland Fisheries and Wildlife  
Bureau of Resource Management Administrative Regions

The majority of this year's WMS report deals with various aspects of **Maine's Successful Wild Turkey Management Program**. Today, we all know how successful the wild turkey restoration program is in Maine and the northeast. The credit, however, goes to many groups and individuals over the last 25 years. Special recognition and thanks should go to the **Maine Chapter of the Wild Turkey Federation** and to retired Regional Wildlife Biologist **Phil Bozenhard**. The



Maine Chapter had the vision and determination to convince the Department to move forward with this program. Phil led the effort from within the agency and trained many of us in the successful techniques to trap and relocate birds. Personally, I was the Regional Wildlife Biologist in central Maine in the 1980s and 90s. I was directly involved with moving birds eastward across Sagadahoc, Lincoln, Kennebec, Knox, and Waldo Counties. At one time in the late 1980s there were some of us within the Department that believed we were too far north with birds that had been released, since their reproduction and occupation of new habitat was very slow. We improved on our protocol especially deciding not to move birds more than 25 miles from existing breeding populations.

This was apparently the breakthrough factor. The rest is history, and a very significant addition to our wildlife resources. Most of the reports from WMS staff are related to our successful Wild Turkey Management program.

--Eugene Dumont  
Wildlife Management Section Supervisor

## WILDLIFE RESOURCE ASSESSMENT SECTION

The Wildlife Resource Assessment Section (WRAS) is instrumental in **Implementing Successful Wildlife Management**. WRAS is comprised of biologists who specialize in specific species, or groups of species, and their habitats. Our work is typically done on a statewide or species range-wide level, compared to the Wildlife Management Section staff assigned to one of seven regions in the state. WRAS is located in Bangor and currently includes 23 full-time wildlife biologists and 2 secretaries. Most of our staff is assigned to one of four groups, each with specific areas of responsibility: Bird Group, Mammal Group, Amphibian, Reptile & Invertebrate Group, or Habitat Group.

Our staff is directly involved in many successful wildlife management efforts from the return of wild turkeys to bringing back the bald eagle populations to the point where this species was recently taken off the Federal Threatened species list. Some of these successes are described in the following report sections. Annually our biologists provide input for successful management of game species and furbearers based on collection and analyses of data and implemented via species management systems. Other biologists focus on nongame species with special emphasis on recovery of Endangered or Threatened species. To make wildlife management successful, we also implement habitat management and conservation measures. This work ranges from providing support staff for the high profile Beginning with Habitat project, to conducting species habitat assessments, to mapping regulatory Essential Habitats for Bald Eagles, Roseate Terns, and Piping Plover/Least Tern, to mapping the Significant Habitats protected under the Natural Resource Protection Act (NRPA) including deer wintering areas, waterfowl and wading bird habitats, shorebird areas, seabird nesting islands, and vernal pools.

Much of our success stems from the state-of-the-art wildlife planning process implemented by the Wildlife Division. WRAS biologists are major contributors to this process by writing species assessments, participating in the public working group process, and developing management systems. **Species assessments** describe the current status of a species (or group of species) and its habitat, and makes predictions as to where the species' population is expected to be in 15 years. Species assessments are used in the species planning process to help the public working groups establish reasonable goals and objectives. Our staff develops **species management systems** to: document how the Department will meet species' goals and objectives recommended by the public working groups; outline how data will be collected, analyzed, and interpreted; and, describe what management actions will be recommended under various scenarios. To implement the management systems, over the past year we continued to conduct wildlife research and surveys, helped collect and analyze harvest data, and provided input to season recommendations, permit reviews, etc. The second part of this report summarizes many of these activities.

In closing, I want to recognize the work of a very dedicated staff of biologists in the Wildlife Resource Assessment Section. Their efforts go largely unnoticed but are the foundation of **Implementing Successful Wildlife Management** through the recommendations carried forward to the Commissioner and species or habitat management activities carried out by the Department. If you have met one of these people, you know that they care deeply about wildlife resources of Maine and work very hard on behalf of the citizens of Maine. In the following pages you will learn about the many successful wildlife management activities of our staff over the past year.

--Richard L. Dressler  
Supervisor, Wildlife Resource Assessment Section

# IMPLEMENTING SUCCESSFUL WILDLIFE MANAGEMENT

## SPECIES PLANNING AND MANAGEMENT

*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, a revised moose assessment has been written and were reviewed in July 2007, and a public working group will be convened in September 2007 to revisit current management goals and objects, which were established in 1999. 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. 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 American marten, fisher, Canada lynx, peregrine falcon, grasshopper sparrow, and ringed boghaunter. We also plan to convene several public working groups to address Moose; American marten and fisher; 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 American Black Bear; Black Racer; freshwater mussels; Island-nesting terns; Leach's Storm-petrel; Least Tern and Piping Plover; Bald Eagle; Golden Eagle; New England Cottontail; and Ringed Boghaunter.

--George J. Matula, Jr.  
*E&T Species Coordinator & Wildlife Planner*

## ENDANGERED AND THREATENED SPECIES

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.

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 (see Figure 2, pg. 8).

**Figure 2. 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 - *LYOBRYCHUS 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 TRANSISTIONALIS*  
 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) - *OPHIOMOPHUS COLUBRINUS*  
 PURPLE LESSER FRITILLARY (BUTTERFLY) - *BOLORIA CHARICLEA GRANDIS*  
 SLEEPY DUSKYWING (BUTTERFLY) - *ERYNNIS BRIZO*  
 TOMAH MAYFLY - *SIPHONISCA AERODROMIA*  
 TIDEWATER MUCKET (FRESHWATER MUSSEL) - *LEPTODEA OCHRACEA*  
 YELLOW LAMPMUSSEL (FRESHWATER MUSSEL) - *LAMPUSILIS 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.**

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.  
 E&T Species Coordinator & Wildlife Planner



# THE WILD TURKEY – A WILDLIFE MANAGEMENT SUCCESS

## ***History of Wild Turkey Restoration in Maine***

The wild turkey is truly an incredible wildlife success story. Prior to the advent of hunting regulations and habitat management, wild turkey populations in the US were exploited nearly to extinction. Thanks to modern conservationists, wild turkeys today number more than 7 million in North America. There seems to be little argument that the wild turkey occupied a part, but never all, of Maine before the time of the European settlers. Just what portion of the State had turkeys is debatable.

In view of this historical information, it appears that significant numbers of wild turkeys occurred in York, Cumberland, and Oxford Counties, and perhaps in reduced densities eastward to Hancock County. Reductions in the amount of forestland due to intensive land clearing for farming and unregulated hunting were probably the two most important factors leading to the elimination of wild turkeys in the northeast, probably in the early 1800s.

Attempts to reintroduce turkeys to Maine began in 1942 when the Department released 24 captive-reared birds on Swan Island, in Sagadahoc County. These birds were supplementally fed in the winter and the last bird was reported seen in 1946 (Anderson 1963). Later, there were attempts by private sportsmen's organizations to establish turkeys in the Bangor and Portland areas in the 1960s. All of these efforts involved the release of captive-reared game farm birds, the best birds available at the time. However, these birds suffer a liability of several generations of artificial incubation whereby the instinct for parental care of the young is diminished and the rate of successful reproduction, and thus range expansion, is reduced. For this reason, and perhaps other unknown reasons, these stockings failed.

The invention of the cannon net in the early 1950s marked the beginning of serious restoration efforts in the Northeast (Healy and Powell 1998). In Maine, we have had the benefit of work done by biologists in other states to reestablish wild turkeys into former and new ranges of suitable habitat. Researchers in these states discovered the key to success was to remove a small number of wild birds from one site and release them as soon as possible into suitable, unoccupied habitat. Reintroduction of wild turkeys from truly wild stock to Maine began in 1977 when Vermont Fish and Game biologists trapped 41 turkeys. These birds were transported to Maine and released in the York County towns of York and Eliot. By the early 1980s, the York County population had become large enough to serve as a source of birds for new release sites in other areas. In the spring of 1982, 33 birds were captured in York County and released in Waldo County in an attempt to establish a turkey population in the mid-coast region. In the winter of 1984, 19 additional birds were captured in York County and released in Hancock County, but poaching was believed to be the demise of these birds. During the winters of 1987 and 1988, MDIFW biologists, with the help of individuals from the Maine Chapter of the National Wild Turkey Federation (NWTFF) and Connecticut Department of Environmental Protection, trapped 70 wild turkeys in Connecticut and released them in Maine to augment our turkey population.

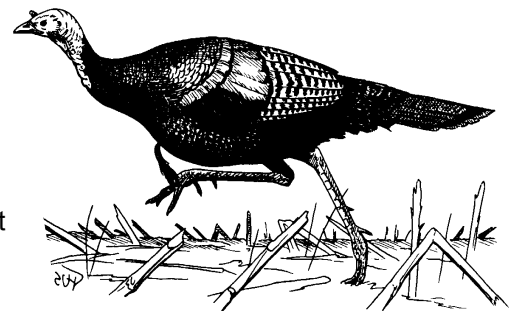
Since 1990, in-state trapping and transfer by regional biologists has expanded the range of the wild turkey in Maine to the east, west, and north. This past winter regional wildlife staff relocated 43 birds to 3 release sites in Maine, two in northern Maine and one downeast. Today, reports of wild turkeys in the northern commercial forests and southern Aroostook County and eastward into Washington County are common.

*--R. Bradford Allen, Bird Group*

## ***Biology and Hunting Seasons***

Because of restoration efforts wild turkeys are now found in every county in Maine. However, the task of monitoring wild turkeys to ensure a healthy population continues. Wild turkey productivity is highly variable and populations are capable of fluctuating by 50% annually. So what causes these large declines and increases in wild turkey populations? Research has found that the answer lies primarily with conditions during the spring hatch.

Wild turkey production is closely tied to spring and early summer weather conditions. Cold and wet weather during the nesting season and shortly after hatching can have negative implications for nest success and poult survival. Nest predators such as raccoons and fox can more easily find a hen wild turkey and her nest by scent during wet and cold periods relative to warm/dry conditions. Similarly, cold and wet conditions greatly increase poult mortality during the first few critical weeks after hatch, before feathers are fully developed. While deep powdery snow for extended periods of time can result in some winter mortality of turkeys, spring and summer weather appear to have a greater impact on turkey populations from year to year.



Wild turkeys are generalists and will eat a wide variety of grasses, seeds, fruits, and insects. Food in the form of insects, soft mast (berries), grasses, and seeds are important throughout summer. With the approach of fall and winter, turkeys begin to consume more hard mast (acorns), waste agricultural grains, and undigested grains in manure. These carbohydrate rich foods help turkeys build valuable fat reserves that may help the birds get through the tough winter months. Turkeys can remain in trees for extended periods when snow limits mobility and availability of food. The deep, powdery snow is the problem, not the cold, as it limits the ability of turkeys to forage on the ground. During these snowy periods, fat reserves obtained in the fall and early winter help the turkey survive. Turkeys can remain in roosting areas for up to two weeks during especially severe weather and can lose up to forty percent of their body weight before dying of starvation. While snow depths could limit turkeys here in the northern edge of their range, the Department's goal is to have a viable wild turkey population wherever suitable wild turkey habitat exists. The Department continues to monitor wild turkey populations and survival as they expand their range north and east. Although turkeys might not be able to thrive in all habitat, only time will tell how adaptable they are to the many faces of Maine.

The Department currently uses harvest data, the May rainfall index and a volunteer based turkey brood survey (initiated in August 2006) to track annual changes in wild turkey populations. To learn more about how to contribute to the volunteer turkey brood survey log on at [www.maine.gov/ifw/hunttrap/turkeyhunting.htm](http://www.maine.gov/ifw/hunttrap/turkeyhunting.htm).

### **Spring Turkey Hunting Seasons**

The restoration of wild turkey populations in North America is truly a modern wildlife management marvel. The wild turkey's adaptability to a variety of climate and habitat conditions has resulted in burgeoning populations capable of supporting considerable spring hunting opportunity. Wild turkeys, like white-tailed deer, are polygynous, meaning that one male may mate with several females; thus, a relatively few dominant males in the population do the majority of the breeding. Male turkeys (toms) are larger and darker plumaged than females (hens), and can be distinguished further from females by the male's spurs and beard, which is a hair-like tuft of modified feathers that protrudes 5-10 inches or more from the center of the breast (5-10% of adult females may have thin beards, too). Courtship activities of wild turkeys in Maine begin in April and last into May. The spring hunting season is timed to begin after most breeding is over, while most hens are sitting on nests; only bearded birds are legal game. Experience has shown that spring turkey hunting provides a quality hunting opportunity without jeopardizing restoration efforts.

By 1986, a sufficient number of wild turkeys occurred in southern Maine to support a limited spring hunting season. Five-hundred hunting permits were issued in York County, resulting in a harvest of 9 male turkeys. As the turkey population has grown and spread into new habitat, both the number of permits and area of the turkey hunting zone have been increased in a conservative manner to assure a safe and high quality hunting opportunity (Table 1). By 1996, the hunting zone was expanded eastward to the Penobscot River. In 1999 and again in 2006, the hunting zone was further expanded, the two-zone concept was dropped, and the hunting zone is now defined by Wildlife Management Districts (WMDs, see Figure 6, page 50).

This past spring (2007), was the third year that hunters did not have to enter a lottery to hunt wild turkeys in Maine, rather wild turkeys have become abundant enough to allow everyone a chance to harvest a spring gobbler. The season consisted of two, over-lapping 3-week seasons. This 2-season concept was instituted to allow greater participation in spring turkey hunting while striving to keep it a safe and enjoyable hunting experience. In 2007, approximately 18,451 turkey hunters harvested 5,984 birds. This year was the fourth year of Maine's Youth Turkey Day, which occurs on the Saturday preceding the opening day of season A of the spring wild turkey hunting season. The date was April 28 in 2007 and 433 turkeys were registered that day. Youths, age 10-15 who possessed a valid spring turkey hunting permit and a junior hunting license were allowed to hunt on Youth Turkey Day if accompanied by a parent, guardian, or adult having a hunting license or hunter safety course certificate.

As interest and participation in turkey hunting increases, hunters must be sensitive to issues of safety and hunter interference. The spring 2002 turkey season was marred by Maine's first-ever turkey hunter shooting incident, in which one hunter allegedly stalked what he thought was a turkey, and accidentally shot two hunters who were calling from a concealed location. Fortunately, the hunters' wounds were not fatal. Remember, hunting a turkey by stalking can be extremely dangerous, and the Department strongly discourages stalking during either season; also, only bearded birds are legal game during a spring hunt – there is no excuse for shooting a beardless bird, a decoy, or another hunter.

We receive input from turkey hunters through MDIFW's annual Turkey Hunter Questionnaire. Results tabulated from these questionnaires give us information on hunting effort, harvests, and trends in turkey populations (Tables 1 and 2). We now have 21 years of wild turkey hunting behind us in Maine. The turkey population continues to increase and expand its range, and interest in turkey hunting continues to increase as well.

**Table 1. Wild turkey spring hunting effort and harvests in maine, 1986 - 2007**

<b>Year</b>	<b>No. of Applicants</b>	<b>No. of Permits</b>	<b>Wild Turkeys Harvested</b>	<b>Season Notes</b>
1986	605	500	9	York County
<b>1987</b>	<b>536</b>	<b>500</b>	<b>8</b>	<b>York County</b>
1988	355	355	16	York County
<b>1989</b>	<b>464</b>	<b>463</b>	<b>19</b>	<b>York County</b>
1990	500	499	15	York County
<b>1991</b>	<b>508</b>	<b>500</b>	<b>21</b>	<b>York County</b>
1992	886	500	53	York/Cumberland County
<b>1993</b>	<b>1,079</b>	<b>500</b>	<b>46</b>	<b>York/Cumberland County</b>
1994	1,185	500	62	York/Cumberland County
<b>1995</b>	<b>1,712</b>	<b>750</b>	<b>117</b>	<b>York/Cumberland County</b>
1996	3,952	1,250	288	North/South hunting zones
<b>1997</b>	<b>5,091</b>	<b>1,750</b>	<b>417</b>	<b>North/South hunting zones</b>
1998	6,449	2,250	594	North/South hunting zones
<b>1999</b>	<b>9,294</b>	<b>3,000</b>	<b>890</b>	<b>1 Zone, WMDs 15-17, 20-26</b>
2000	14,909	4,000	1,559	1 Zone, WMDs 15-17, 20-26
<b>2001</b>	<b>18,685</b>	<b>7,000</b>	<b>2,544</b>	<b>1 Zone, WMDs 12, 15-17, 20-27; 3,500 permits in season A: May 1-5, 21-28; and B: May 7-19</b>
2002	25,954	9,000	3,391	1 Zone, WMDs 12, 15-18, 20-27; 4,500 permits in season A: April 29-May 4, and May 20-June 1; and season B: May 6-18, and May 27-June 1.
<b>2003</b>	<b>26,505</b>	<b>12,000</b>	<b>3,994</b>	<b>1 Zone, WMDs 12, 15-18, 20-27; 6,000 permits in season A: April 28-May 3, and May 19-31; and season B: May 5-17, and May 26-31.</b>
2004	24,040	15,600	4,839	1 Zone, WMDs 12, 13, 15-18, 20-27; 7,800 permits in season A: May 3-8, and May 24-June 5 and season B: May 10-22, and May 31-June 5.
<b>2005</b>	<b>23,951</b>	<b>23,951</b>	<b>6,236</b>	<b>Youth Turkey Day, May 1.</b> <b>1 Zone, WMDs 12, 13, 15-18, 20-27; season A: May 2-7, and May 23-28; season B: May 9-14, and May 16-20 week 5: May 30-June 4.</b> <b>Youth Turkey Day, May 30-June 4.</b>
2006	N/A	20,089	5,931	1 Zone, WMDs 10-18, 20-26; season A: May 1-6, and May 22-27; season B: May 8-13, and May 15-20 week 5: May 29-June 3.
<b>2007</b>	<b>N/A</b>	<b>18,451*</b>	<b>5,984</b>	<b>Youth Turkey Day, April 29</b> <b>1 Zone, WMDs 10-18, 20-26; season A: April 30-May 5, and May 21-26; season B: May 7-12, and May 14-19 week 5: May 28-June 2.</b> <b>Youth Turkey Day, April 28</b>

\*preliminary permit totals

**Table 2. Results of the spring turkey hunter questionnaire, 1995-2007\***

<b>Year</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007*</b>
Permits Issued	750	1,250	1,750	2,250	3,000	4,000	7,000	9,000	12,000	15,600	23,951	20,089	18,451
Questionnaires Rec'd	628	1,075	1,546	1,961	2,517	3,350	5,776	5,451	2,072	2,186	1,652	798	1,994
Success Rate	22%	28%	27%	31%	34%	44%	41%	41%	36%	34%	32%	30%	32%
Avg. Hours Hunted	21.5	20.6	23.4	20.8	21.7	20.8	15.2	16.5	17.0	16.6	16.7	15.7	16.5
Gobblers Seen/hour	0.123	0.196	0.176	0.219	0.235	0.235	0.33	0.44	0.38	0.41	0.37	0.45	0.42
Hens Seen/hour	0.167	0.286	0.228	0.311	0.288	0.290	0.45	0.73	0.57	0.66	0.69	0.68	0.82

\*preliminary results

## Fall Turkey Hunting Seasons

In contrast to spring turkey hunting season when only male turkeys (gobblers) can be legally harvested, during the fall both males and females are legal quarry. Harvesting gobblers during the spring hunt has little influence on the popu-

lation because hens will breed with more than one male in her area. However, fall seasons must be monitored more closely because females, necessary for population growth, of course, can also be harvested. Therefore, the Department has carefully followed the decision-making process outlined in Maine's Wild Turkey Management System when setting fall turkey seasons. One objective of Maine's turkey program was to provide a limited fall hunt by the year 2003. This objective was accomplished in 2002 when a fall archery season was established. The fall turkey hunt can only occur in areas where the wild turkey population can support it, where limited fall harvest will not adversely affecting the primary objective of a quality spring hunt. For this reason, the fall hunt will be monitored and limited to a level so as to not compromise the primary goal and objective of a quality spring hunt. Research has shown that between 5–10% of the total population can be harvested during the fall without compromising the health of the turkey population. As a result of an increasing and expanding wild turkey population increases in fall hunting opportunities were allowable again during fall 2006. In WMD's 21, 22 and 23 (Zone 2), where densities of wild turkeys are highest, the two-week archery season was expanded to four-weeks and coincided with the archery season for white-tailed deer. In WMD's 15, 16, 17, 20, and 24-26 (Zone 1), where densities of wild turkeys are lower, a more conservative two-week archery season remained. Over the past five years hunter interest and participation has grown each year since the fall turkey archery hunt was established with over 2,000 permits sold annually. Archers who took advantage of Maine's fall archery turkey season that occurred between the dates of October 7-2 in Zone 1 and September 28 – October 27 in Zone 2 were successful in bagging 198 turkeys, up 21% from the previous year. A traditional fall turkey hunt consists of; 1) learning the patterns of brood flocks (a hen and nearly fully-grown poults), 2) finding a flock and breaking them up, and 3) calling back in juvenile birds into shooting range using a regrouping call of an adult hen. The season bag limit is 1 bird.

We remain optimistic that our program to increase the size and distribution of the wild turkey population within all suitable habitats in Maine will continue to be realized. We are indeed thankful for the cooperation, financial support, and hands-on participation we've received from the public, especially the State Chapters of the National Wild Turkey Federation, who enthusiastically support Maine's wild turkey program with dollars generated through banquets and other fund-raising activities, and by sponsoring turkey hunter seminars, shotgun patterning days, and habitat improvement projects. Individuals interested in becoming involved in wild turkey management are encouraged to contact the Maine State Chapter of the National Wild Turkey Federation, South Windham, Maine 04082, or one of the local chapters. ***Wild turkey research and management is funded primarily by hunting license and permit revenues and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Michael Schummer, Bird Group

## ***Identifying and Resolving Nuisance Wild Turkey Problems***

Wild Turkeys present a particular challenge when it comes to nuisance situations. They are easily spotted during the day in situations that make people certain they are the reason for damage to their crops or property. At the same time another group of people works to keep them close at hand as they perceive them as objects of curiosity and interest. This love-hate relationship contributes to the problem in determining the truth.

First off, MDIFW recommends that the public not engage in feeding wild turkeys at feeders in and around their homes. We also suggest that folks not encourage turkeys to become accustomed to areas where their presence at some other time of the year will be problematic. For instance, feeding turkeys in the winter near where you're going to have your garden in the summer is creating a problem for yourself.

Studies in several states have shown that there is the perception by the public that turkeys are major nuisance problems. One problem is that farm fields contain insects and waste grains that are enticing to turkeys. Poults (young turkeys less than a year old) need a high protein diet of primarily insects (77%) to achieve the rapid growth they need to survive the following winter. A hen will take her brood to these fields for the insects and dust baths. Any waste grain these turkeys encounter will also be consumed. However, crop damage surveys have shown deer and raccoon are most likely to be the culprits knocking down corn and other grains. The turkeys are then seen feeding on the fallen grain and presumed to have been the reason the crops were damaged in the first place.

So beauty is in the eye of the beholder, one man's excitement at being visited by a flock of wild turkeys can be another's nightmare of turkey droppings or damaged vegetables. Should turkeys be a problem MDIFW's nuisance wildlife policy contains the following advice.

## Prevention and Extension

Measures to avoid or prevent turkey damage are as varied as the sites on which problems may occur. Presence of wild turkeys should not be tolerated at sites where they may pose a problem. The following list includes examples of preventative measures that may apply:

1. Simply chase turkeys away from problem sites, such as a bunker silo, barn, strawberry patch, etc. Hazing with dogs may also prove to be an effective deterrent measure. The longer wild turkeys are allowed to feed on silage or visit barns, the more difficult it will be to prevent it in the future.
2. Keep bunker silos covered (tarps, plastic), out of view of turkeys.
3. Establish manure storage piles early in the winter at sites away from silage silos.
4. Use electric fencing, regular fencing such as plastic snow fencing and/or Mylar strips, around silos, gardens, row crops, fruit trees.
5. Use deterrents, such as screamers, scare-a-ways, cracker shells, etc. At the same time, work with your neighbors to limit any supplemental feeding that may be attracting the birds.
6. Encourage local NWTF chapters or other volunteers to work with farmers to plant winter food plots, or locate spoiled silage dumpsites, far enough away from silos and barns so as to attract turkeys away from these food sources.



Turkeys are a game species, allowing hunters to harvest birds in areas where they can hunt safely can potentially reduce the size of the problem and may encourage the birds to move elsewhere.

*--Jim Connolly, Regional Wildlife Biologist  
Region B, Sidney*

## Wild Turkey Capture and Relocation

Wildlife biologists have been using rocket nets to capture wildlife since the 1950s. It has been the tool of choice in Maine's turkey restoration project since the spring of 1982 when Regional Wildlife Biologist Phil Bozenhard (retired) captured 33 birds in York County and relocated them to Waldo County. The York County population had grown from the 41 wild turkeys captured in Vermont in 1977 and 1978 and released in the towns of York and Elliott. Since then, turkey capture and relocation work by regional wildlife biologists has expanded their range west to Rangeley, east to Washington County, and north to southern Aroostook County.

In some ways capturing wild turkeys is similar to winter waterfowl hunting. Its cold, camo is the clothing of choice, and you can spend long days sitting in a blind. Rocket netting turkeys where they are plentiful and relocating them to where they are scarce has been a successful strategy in establishing a huntable population throughout much of Maine. The key has been to relocate birds within suitable habitat but not too distant from the core population.

Almost all captures begin when a biologist responds to a farmer's complaint of too many turkeys helping themselves to corn silage stored in open bunkers. This is almost exclusively a winter problem when natural food is in short supply or hard to reach in deep snow. The trapping site is located near the silage, where the net can deploy freely and safely. In addition to removing birds from the farm, birds not captured have the very unpleasant experience of being near the explosion and seeing their associates caught in a net. Those birds usually do not return to the silage bunker that winter, easing the problem as much as reducing the number of turkeys.

Biologists pre-bait a site for several days in a row. Some like to pre-bait after the birds roost for the night. The strategy is to get the birds accustomed to coming to the bait soon after coming off their roosts in the morning. Cracked corn

is placed so that birds must crowd together in a circle, heads facing inwards. During pre-baiting a replica net box is placed about 10 feet behind the bait, with an old net in the box so that nothing is different on the day of capture. The replica is replaced with the real box and net, and partially rigged the night before. The net is attached to three rockets perched on a launcher atop the box. The trailing edge of the net is slowed by multiple weights that are free to drag.

Biologists arrive well before daylight to place pre-packaged propellant in each of the three rockets. The propellant is a Class B explosive in cylindrical pellet form, primed with a starter packet of black powder and initiated with an electrical charge by a hard-wired detonator from the blind. The biologist detonates the rockets when the most turkeys are on the bait and facing inwards. Because they are fast and powerful fliers, turkeys not directly on the bait will escape before the net lands. A successful capture is a dozen to 20 birds with 50% or more hens. The record capture in Maine is 29. The birds are banded, aged, sexed, and placed in wax-lined cardboard boxes supplied by The Wild Turkey Federation. After the last bird is handled they are transported and released to pre-approved sites, selected to expand their range in Maine.

--Chuck Hulse, Regional Wildlife Biologist  
Region D, Strong

## **Wild Turkey Hunting Safety and Landowner Regulations**

Hunting safely and respecting the rights of landowners should be among the cornerstones of behavior for those of us who hunt in Maine. Although hunting in autumn has been a long-standing tradition for many Mainer, hunting turkeys in the spring is relatively new for many hunters and non-hunters alike. In light of this, it's important for those of us who venture afield for spring turkeys to remember a few important points to ensure that we will return home safely following each hunt and we will have land to hunt on in the future.

Turkeys have excellent vision so full camouflage including hands and face is a must. Never wear the colors red, white, or blue as they resemble the color of a tom's head and neck area (i.e. the target). Stalking turkeys is often unproductive because of the turkey's keen vision. In addition, this method can be dangerous because you may be moving in on another hunter. Remember, a tom that continues to gobble may be responding to the call of another hunter who you haven't located yet. Make your setup with your back against a tree that is at least as wide as your shoulders and call the tom to you. Make sure you can see at least 40-50 yards in a 180 degree arc in front of you so you can readily see an approaching tom or another hunter. Hunt defensively. If you see another hunter, speak out loud to them until they acknowledge your presence. If you decide to use decoys, remember that these replicas may be mistaken for live birds by another hunter. So keep this mind when you decide the distance and direction of your decoy setup.

If you use a bow in pursuit of your tom, knowing proper shot placement and pinpoint accuracy are critical. Like with any hunting situation, always be absolutely sure of your target and what's beyond it within the range of your shot.

Good landowner relations are as important during the spring turkey season as they are during any time of the year. In fact, they may be more important in the spring because many Mainer aren't accustomed to thinking of May as hunting season. Therefore, it's important to always seek landowner permission before venturing onto someone else's property.

Although green fields and other agriculture areas are magnets for turkeys, remember that April-May often is "mud season" in Maine, so walk rather than drive if you're going to leave a footprint behind.

--Doug Kane, Regional Wildlife Biologist  
Region E, Greenville

### **ASK FIRST! ALWAYS SEEK PERMISSION...**

...before engaging in any form of outdoor recreation on property that belongs to someone else.

**If you know you are welcome to use someone's land, don't abuse the privilege. If you don't know if you are welcome, find out. If the land is posted or you know you are not welcome, find another location.**

**A hunting or trapping license does not give you the right - stated or implied - to go on another person's land against their wishes.**





## **Wild Turkey Habitat Management**

Habitat diversity is the key when considering land management to benefit wild turkeys. Wild turkeys use a variety of habitat types as they grow from young turkeys (poults) into adults. Good turkey habitat includes mature, mast-producing hardwoods (mostly oaks), smaller hardwoods and a mixture of understory plants such as dogwood, cherry and hawthorns. Good habitat also contains insect producing areas – such as small forest openings, agricultural fields, hedgerows, pastures, roadsides and easy access to water (spring seeps are good year round water sources). Large conifers, such as white pine and hemlock are important trees for night roosting sites.

Maintaining mixed forestland provides a variety of food sources and roosting sites for turkeys. Turkeys prefer hard mast-producing species such as oak, beech, chestnuts and shagbark hickory. Since most oaks and other mast-producing hardwoods don't produce significant mast until they are at least 30 years old with the best production usually coming at 50 years or more, maintaining some mature timber habitat (ideally 50% or more) is important. Selective cutting or small block cuts using a 70 to 80 year rotation makes certain that the stand will include a good share of mast-producing trees. Additionally, seeds from other hardwoods such as maple, ash, basswood, birch, and hop hornbeam are good food sources. Food sources that remain above the snow such as sensitive fern, burdocks, or leftover standing corn are important to turkeys during the winter months.

Soft mast species including black cherry, wild grapes, elderberry, high bush blueberry, blackberry, dogwood, high bush cranberry, apple, and crabapple provide nutritional seasonal foods. Pruning, releasing, and fertilizing apple trees can substantially improve fruit production.

As adults, turkeys feed on 90% vegetable matter and 10% animal matter, the inverse is true for young turkeys that primarily feed on insects and other invertebrates. Spring-summer habitat needs include good nesting cover and access to brood range with grasses and legumes for insect and other food production. Turkeys nest on the ground in hardwood or mixed-forest stands, at the base of sizeable trees within dense understory, under a brush pile, in thickets, or downed trees and branches. Brood-rearing areas consist of small openings (several acres or less in size are preferred), but turkeys will use crop and pasture fields, power line right-of-ways, roads, log landings, and old house/farm sites. To better manage these openings, one should maintain the existing ones, and create more openings (up to 10% of the total area or even higher). Such openings can be planted with supplemental foods, a practice that can benefit turkey management. Crops frequently planted for turkeys include rye, wheat, millet, fescue, clover, corn, buckwheat, and chufa.

It is very important to create good interspersed of different habitat types. Suitable foraging, nesting, brood-rearing, and roosting cover and a water source each located within close proximity to one another (juxtaposition) is essential to attract wild turkeys to and maintain existing populations in an area. Lack of diversity of these habitat types within an area could reduce the area's value to wild turkeys.

Whether you own a couple acres or a couple hundred acres there are practices that you can do to benefit turkeys. For more information on managing land for wild turkeys check the National Wild Turkey Federation (NWTF) website or contact your Regional Wildlife Office.

*--Allen Starr, Assistant Regional Wildlife Biologist  
Region F, Enfield*

## **Northern Maine Wild Turkey Management Protocol**

Wild turkey restoration efforts in Maine have been very successful, with wild turkeys now well established throughout all of southern and central Maine. The success of the turkey trap and release program and establishment of turkeys in central Maine has sparked great interest with sportsmen and landowners in northern Maine in hopes of establishing a viable wild turkey population in Aroostook County. The "County" offers excellent habitat in the form of open-space with agriculture, woodlands, and numerous reverting farmland suitable for wild turkeys; however it also has the longest and most severe winters in Maine. Northern Maine Wildlife Biologists once thought turkeys could not survive through these harsh winters, but wild turkeys have shown to be very adaptable, and now are found well north of their historic range. Because of the great interest expressed by sportsmen, and the Maine Department Inland Fisheries and Wildlife wanting to offer additional hunting opportunity, plans were initiated in 2005 to start trapping wild turkeys in southern Maine and releasing them into southern Aroostook County.

The first wild turkey release sites in southern Aroostook County were in the towns of Hersey and Orient. As MDIFW plans were developing to move turkeys further north in to Aroostook County's large farmlands, local landowners, particularly the agricultural community, wanted greater input into the wild turkey trap and release program. To meet the needs and concerns of the agricultural community and also move ahead with the wild turkey management program in

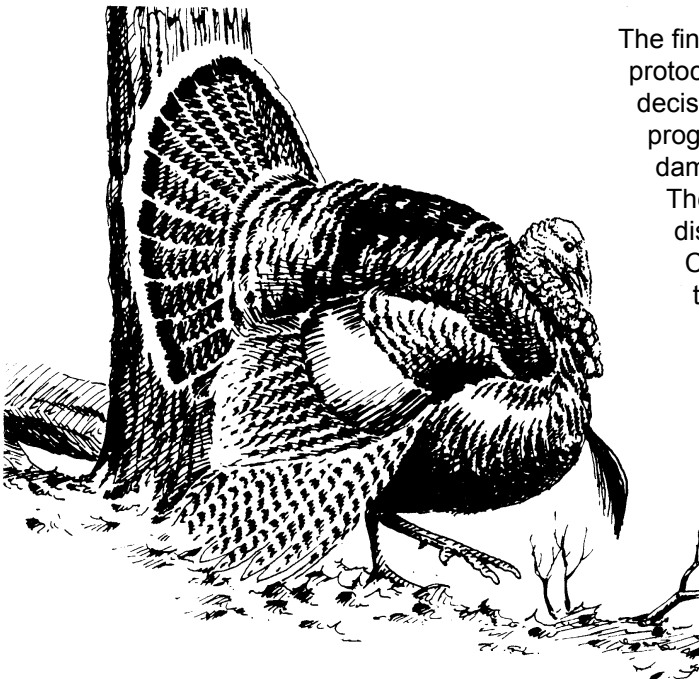
northern Maine, MDIFW formed the Southern Aroostook Wild Turkey Working Group (SAWTWG). This group was made up of representatives from various farming organizations such as Maine Dairy Industry Association, Maine Department of Agriculture, Small Woodlot Owners of Maine, Maine Chapter National Wild Turkey Federation, Maine Legislature, and many other state and federal natural resource agencies and organizations.

The charge given to Southern Aroostook Wild Turkey Working Group was to: (1) outline how MDIFW would proceed with wild turkey releases in southern Aroostook, and how MDIFW will notify landowners of wild turkey releases, (2) establish a protocol for MDIFW and Maine Chapter of NWTF to respond to nuisance wild turkey issues on farms, (3) develop a communication network between the various organizations to both inform and discuss a variety of turkey management issues, and if necessary make adjustments in wild turkey management strategies within Aroostook County.

With these management directives the working group met to establish protocols for MDIFW to follow for both releasing and managing wild turkeys in Aroostook County. These protocols were set up to specifically address concerns and issues specific to each of the management directives, and as a result provide a process that MDIFW must follow for both releasing and managing wild turkeys in Aroostook County. The following information or material highlights the major protocols that MDIFW will follow for each of the three management directives. The protocols primarily revolve around agriculture with the overall objective to establish wild turkeys in Aroostook County while minimizing conflicts with agricultural landowners.

Releasing wild turkeys into new areas is a concern of landowners in the agricultural community, particularly releases in proximity to dairy farms, truck garden farms, and cattle farm operations. In trying to address the working group concerns MDIFW will evaluate potential turkey release sites for possible impacts to local farming operations. The wild turkey trap and release protocol requires all known dairy farms, truck garden farms, and cattle operations within a 20 mile radius of a potential wild turkey release site be contacted by MDIFW Regional staff. If these agricultural farming operations, within a 20 mile radius of a turkey release site, have significant concerns or issues about the wild turkey release, these concerns must be addressed to the satisfaction of each landowner prior to release of wild turkey into the area. During the evaluation phase of the turkey trap and release program if concerns or objections by landowners still remain within the 20 mile radius of a turkey release site, the release site must be moved a minimum of 20 miles from any objectionable landowner. Once a suitable turkey release site is found and accepted by landowners, the members of the SAWTWG will be notified of future turkey release sites and schedules.

The second issue was developing a protocol to address response by MDIFW, NWTF, and landowners to damage or loss of agricultural crops and silage caused by wild turkeys. The primary focus with nuisance turkeys is on protection of stored grass or grain silage, with a secondary focus on resolving nuisance problems in standing agriculture crops. Procedures put in place require a quick or rapid response by both MDIFW and NWTF staff to address landowner complaints of turkey damage. MDIFW must maintain a list of Animal Damage Control agents and NWTF members that have experience in dealing with nuisance turkey complaints and can quickly respond and resolve wild turkey damage issues.



The final issue discussed by the SAWTWG was developing a protocol to keep the group informed on wild turkey management decisions, and in particular, having an adaptive management program allowing feed-back to the SAWTWG on wild turkey damage control issues, and the trap and release program. The protocol requires the SAWTWG to meet annually for a discussion of wild turkey management issues in Aroostook County. This approach for managing wild turkeys in Aroostook County is considered as “work in progress” and will adapt to changes in management strategy as a result of MDIFW responding to both wild turkey management issues and the continued positive involvement from the general public and resource user groups.

-- Arlen Lovewell, Assistant Wildlife Biologist  
Region G, Ashland

## OTHER SPECIES MANAGEMENT SUCCESSES

### ***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](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]

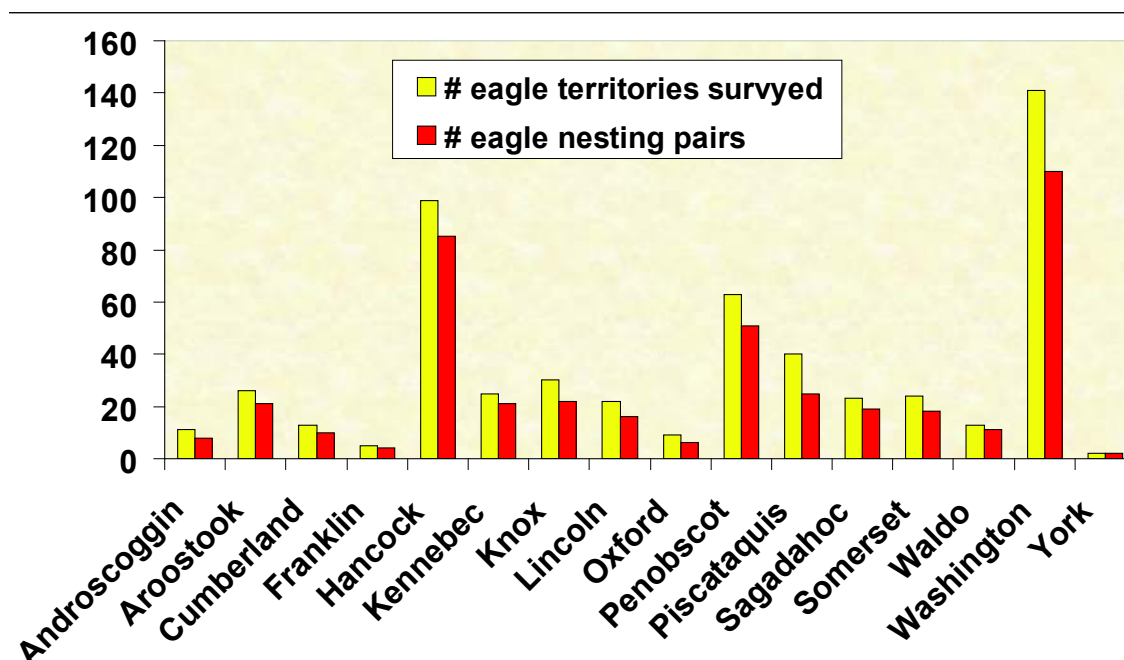
## Essential Habitat Rules Continue Until State Delisting

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.

Figure 3. Statewide monitoring effort and eagle numbers by county in 2007

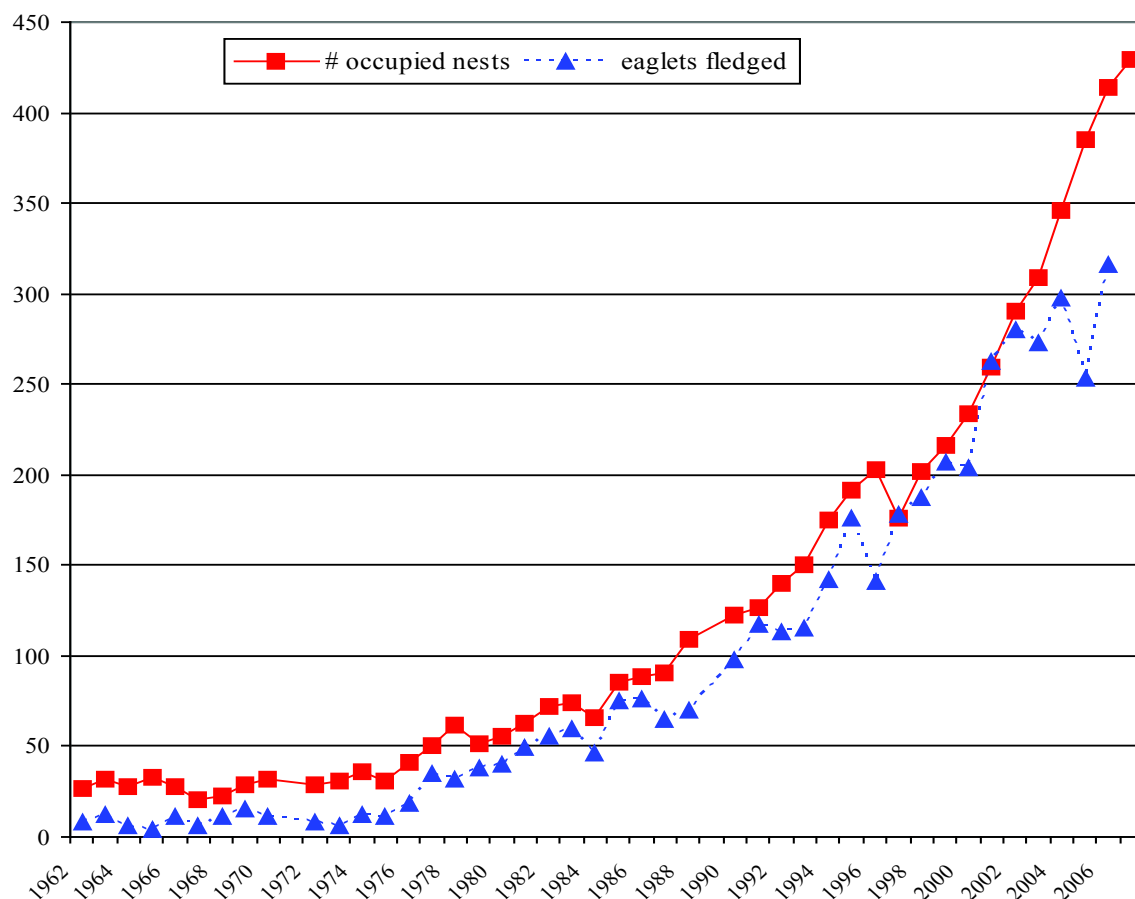
Expanding numbers of nesting eagles are evident statewide, but Maine's eagle stronghold is still "Downeast." Washington, Hancock, and Penobscot Counties still support 57% of the statewide population. The region boasts the highest density of nesting eagles between population centers in the Chesapeake 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 3.

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.

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 4).

**Figure 4. 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.

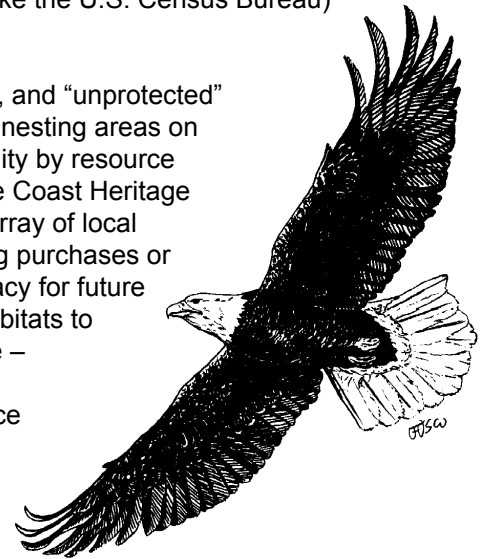
The relationship of these indices with land conservation, private stewardship, and "unprotected" eagle habitats will be examined. Thirty years ago, there were only two eagle nesting areas on conservation land. Now there are 89 eagle pairs on lands secured in perpetuity by resource agencies and private 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, Bird Group





## ***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, Regional Wildlife Biologist  
Region C, Jonesboro*

## ***Peregrine 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, Bird Group*

## ***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, Bird Group

### ***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, Assistant Regional Wildlife Biologist, Region A, Gray

### ***Common Eider - 100 year anniversary of recovery from only 2 pairs!***

Just how numerous past Common Eider populations were, prior to European settlement, is not known. Since colonial times however, the number of eiders on the Maine coast has fluctuated greatly. Eider populations were greatly reduced during late 19th century, mainly from egg collecting and unrestricted year-round shooting. At the beginning of the 20th century (1900), laws were passed to stop the exploitative use of island-nesting birds and many nesting colonies were protected by colony wardens. In 1905, eiders could be found nesting on only one island, Old Man Island, off Cutler. The National Association of Audubon Societies (now the National Audubon Society) leased Old Man Island and established a warden there to protect the sanctuary during the nesting season. In 1907, the warden reported only two pairs of eiders nesting there. None were reported anywhere else on the Maine coast. As a result of protective laws and the availability of suitable nesting conditions on several islands, eider populations grew. Initially, population recovery was slow, but steady. In 1910 there was a substantial increase in numbers of nesting eiders on Old Man Island, presumably from immigrating eiders from remote islands in Canada. By 1915, eiders were reported

nesting on islands westward to Jericho Bay. Eider numbers steadily increased from less than 100 nests in one colony in 1910, to approximately 2,000 pairs on 31 colonies in 1944. By 1970, eider numbers were reported as approximately 20,000 nests in 215 colonies. Today, estimates are closer to 25,000 nests on approximately 300 coastal islands.

In the past, eider populations were influenced by both the exploitative human use of nesting islands and the exploitation of eiders and their eggs. Maine's cultural and economic history is closely linked to the coastal islands, the island resources, and particularly the resources in the marine environment. Native Americans used eiders for food as evidenced by faunal remains preserved in coastal shell heaps. Use and exploitation of insular resources by Europeans began almost 500 years ago when explorers plied the Gulf of Maine in search of fish and other riches. Historical use of eider habitat shaped the nesting conditions that exist today, nearly 400 years after European settlers first established permanent settlements on Maine islands. Writers suggested that every island along the coast that was over 25 acres in size likely housed people or livestock at one time. Many of the smaller islands were used as well. Principle human-induced impacts (both positive and negative) on the nesting habitat included: developing fishing and shipping communities; habitat alteration caused by granite quarrying; building military and lighthouse installations; timber harvesting for lumber, firewood, kiln wood, and pulp; and the more subtle, but important, effect of grazing livestock on the vegetation.

Historical use of and demand for eiders included: subsistence hunting by Native Americans dating back more than 4,000 years; subsistence use of the birds and their eggs by island residents; exploitative market hunting for meat and feathers (eider down because of its superb insulating properties fetched a premium price for quilts and bedding); legal harvest by hunters; and recreational use by bird watchers.

Dr. William Drury summarized numerous historical accounts by suggesting that during the 18th and 19th centuries, seabirds were almost "eaten off" Maine's outer islands. In addition, bird predators, such as dogs, cats, raccoons, and rats, were purposely or inadvertently introduced into many colonies, with damaging results.

Recolonization and population growth by eiders and other seabirds occurred because of changes in the use and demand for seabirds and their habitats, through changes in laws, technology, and failing island economies. The need for humans to live on islands near fish stocks decreased when boats with gasoline engines carried fishermen to offshore waters. Development of concrete lessened the demand for granite. Rails and roads replaced coastal schooners. Commercial fisheries and island forests had been exploited, and most seabirds became legally protected. For these and other reasons, people moved to the mainland. Audubon researcher Dr. Steve Kress stated "this combination of life style changes and protective legislation made the islands suitable for nesting once again." Prior to these events, Maine's seabirds and their habitats were exploited beyond their ability to replace annual losses.

Current use of eiders in Maine has both nonconsumptive and consumptive components. The nonconsumptive users include bird watchers, photographers, and the general public. The Common Eider is a game species, and as such, is subsequently hunted; and Atlantic Flyway hunting regulations for eiders have been liberal since World War II. In Maine, the hunting season generally runs from early October to the end of January. The daily limit for eiders was 7 per day for 50 years. However; in 1999, the bag limit was reduced to 5 per day.

Hunting pressure on eiders increased in the 1980s and 1990s in eastern North America as opportunities to hunt other species, such as Black Ducks and Canada Geese, were reduced or restricted. Hunting of this race of the Common Eider is important in parts of Quebec, Newfoundland, Nova Scotia, Maine, and Massachusetts. The average annual harvest from 1992-96 was estimated at approximately 41,500 (Maine 33%, Massachusetts 28%, Nova Scotia 23%, Newfoundland 8%, and Quebec 4%). Researchers today have launched a multi-agency study to assure that these harvests are sustainable. If warranted, further adjustments in harvest management will be proposed.

*--R. Bradford Allen, Bird Group*

### ***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, Bird Group*

### **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 eggging 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, Bird Group*

### **Resident Canada Geese - 40+ Years of Management**

The Canada goose (*Branta canadensis*) is a magnificent bird, capable of attaining a wing span of nearly 6 feet and a weight of 15 pounds. Their melodious calls and V formations in flight during migration herald the official beginning of spring and fall to those lucky enough to witness this seasonal spectacle. For many, the Canada goose symbolizes nature and wildlife.

Canada geese are long-lived, with some living 20 years or more. Canada geese are monogamous, with life-long pair bonds formed during their second year. But, if one member of the pair dies, the other will find another mate and nest again. They usually begin nesting at three years of age, although a few individuals nest when they are only two. Once a female begins nesting, she will nest every year for the rest of her life. Geese lay an average of 5 eggs per nest. The male does not incubate the eggs but will stand guard by the nest and defend it against intruders. About 50% of the young that hatch will survive to flight stage in late summer. Geese have a strong tendency to return to the area where they were born and will return each spring to nest in the same vicinity year after year.

In the early 1900s, Canada goose populations were nearly eliminated in most parts of North America by unrestricted harvesting of eggs, market hunting, and draining of wetland habitat. Strict harvest regulations, wildlife refuges, and land use changes that favored large-scale crop planting and the creation of large open grassy areas allowed for an astounding recovery. This recovery was supported by their ability to adapt to urban and suburban areas, areas with abundant food (grass) and water and few predators. Canada geese, like Wild Turkeys, are truly a success story in wildlife management.

### **“Resident” Geese, the Distinction!**

Resident geese, as the name implies, spend most of their lives in one area, traveling relatively short distances to feeding and wintering areas. Resident Canada geese are NOT a portion of the traditional migratory population from northern Canada that simply quit migrating north and south. Today's resident birds are descendants of captive geese released by private individuals in the early 1900s. Further, when the use of live decoys for waterfowl hunting became illegal in 1935, captive decoy flocks of geese were released into the wild. Beginning in the 1950s through 1990, state fish and game agencies introduced Canada geese into predominantly rural areas to establish resident breeding populations, with the goal of eventually establishing hunting seasons for these geese.

The key to this trap and transfer program was to capture the adult geese when they are with their downy goslings and undergoing their annual molt of their wing feathers. During this short period (usually around July 1) they are incapable of flight and are relatively easy to capture in large numbers. The key to the success of this program was to identify suitable wetland habitat and transport significant numbers of goslings (with their flightless parents) to suitable wetlands. The goslings would then “imprint” on that wetland (although not born there, they would be raised there) and return to breed on that very same wetland when they attain breeding age. Remember, the adult geese transported to Maine would, eventually, return to their natal wetlands the next spring, most likely somewhere in southern New England. Between 1965 and 1975, 2,341 geese were imported from New York, New Jersey, and Connecticut and released in southern and central Maine. During 1981-85, 1,723 more geese were transplanted from Connecticut to northern Maine. As any Maine resident now knows, this program to reestablish resident geese has become an unqualified success.

The breeding distribution of Canada geese is now statewide, including several offshore coastal islands. Resident geese are present throughout the year. Unfortunately, in some areas, the trap and transfer program has become somewhat too successful. Flocks of locally-nesting geese have now become inhabitants of our parks, waterways, drinking water sources, residential areas and golf courses where they can cause significant problems. In some suburban areas, abundant habitat, lack of natural predators, limited hunting, and supplemental feeding has created an opportunity for an explosion in their numbers. While most people find a few geese welcome and acceptable, problems develop as flocks grow and droppings become excessive. Problems include public health concerns at beaches and drinking water supplies and obvious significant hazards near roads and airports. Very quickly it became apparent that a certain level of control was and continues to be warranted.

Through the 1990s, 50-75 geese per year were moved within the state to relieve nuisance situations. Nuisance complaints received by MDIFW regional biologists averaged about 30 per year during the late 1990s. Most issues in Maine involve geese defecating on lawns or beaches or on or adjacent to public drinking water sources; however, research has shown that Canada goose feces pose relatively little risk to human health. Since this time, hunters have been asked to help with the control.

Currently, about 2 million geese are harvested in the U.S., and approximately 600,000 in Canada. These figures reflect the hunting activities of hunters taking both resident and migratory populations of Canada geese. Total harvests have steadily increased since the 1970s, making the goose the top 2 or 3 species of waterfowl harvested in North America.

### **Resident Canada Goose populations and hunting seasons**

Early (September) goose hunting seasons became operational in Maine in 1996. In response to a burgeoning resident Canada goose population, Maine established a September goose hunting season in 1996. The purpose of this special season is to target the harvest of Maine's abundant resident goose population and provide hunting opportunity, while avoiding overharvest of migrant geese that pass through Maine later in the fall. Evidence suggests that some populations of resident Canada Geese receive relatively heavy hunting pressure while other areas could sustain greater harvest. State-wide harvests of geese during the September season have remained relatively stable at approximately 3,000 birds in recent years. However, annual survival of our resident Canada Geese remains relative high. Given that Canada Geese are long lived birds (up to 20 years); current population projections indicate that Maine's resident flock continues to reproduce at a greater rate than hunters are harvesting birds. Participation in the September goose hunt has increased as well. The 2001 mail survey indicated approximately 18% of waterfowlers may be participating in this special season. The September Canada goose season typically begins the day after Labor Day and runs through September 25 with a relatively liberal daily bag limit.

*--R. Bradford Allen and Michael Schummer, Bird Group*



# IMPLEMENTING SUCCESSFUL HABITAT PROTECTION & MANAGEMENT

Maine's diverse assemblage of wildlife, plants, and natural communities is threatened. Over two-thirds of the state's rare and endangered species are endangered because of habitat loss. Three collaborative programs administered by the Maine Department of Inland Fisheries and Wildlife are working to stem the tide of habitat loss and conserve at-risk species and their habitats.

## ***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](http://www.beginningwithhabitat.org).

--Steve Walker, *Beginning with Habitat* Program Coordinator

## ***Forest Certification and Wildlife Management Areas***

In July of 2003, Governor John E. Baldacci launched the Maine Forest Certification Initiative, the purpose of which was to “help grow Maine’s forest industry by distinguishing Maine products in the marketplace while improving forest management on-the-ground” ([www.maine.gov/doc/mfs/certification/forcert\\_maine.htm](http://www.maine.gov/doc/mfs/certification/forcert_maine.htm)). To further the Governor’s initiative and to document and ensure sustainable management of WMAs (see Figure 1, pg 5), forest certification is being sought by the Department.

Forest certification is a way to ensure that management adheres to all applicable laws and that forests are well managed, can support viable and healthy wildlife populations, offer recreational opportunities and sustain a supply of raw materials now and into the future. In short, the certification process independently verifies that land management is conducted in a socially and economically sustainable way. The Department has chosen to pursue third party forest certification through the Forest Stewardship Council (FSC) certification system, one of several accepted certification systems.

To accomplish this, Lands Management Program personnel have been involved in the first step in certification pursuit; that of identifying and resolving gaps in which the management, policies, and documentation are insufficient for certification under the chosen system. For the Department, this includes the revision and development of policies needed to satisfy the requirements of FSC certification, such as an Integrated Resource Policy (IRP) and enhancement of the Department’s Standard Operating Procedure (SOP). Additionally, data collection and maintenance methods have been developed and documentation procedures established that adhere to the guidelines required for certification.

The second step in certification, a preliminary scoping audit conducted by recognized certification auditors is nearing, with the Department in the process of entering into a contract for those services. This is being conducted with funds from the Maine Outdoor Heritage Fund. This scoping audit will further review policies and procedures and identify discrepancies, if any, between the Department’s management and the principles outlined in the FSC certification process. Upon addressing any discrepancies identified in the scoping audit, a full certification audit will then be conducted to attain the Certification Certificate.

The Department recognizes the benefits inherent in third party forest certification, and is working towards achieving this goal to ensure and document that management practices are carried out in a way that supports its goals and is done in a sustainable manner. Attaining certification will also assist in reaching the Governors goal of 10 million certified acres in the state and further promote the concept that sustainable forest management can be done in a manner that compliments landowner objectives. In the case of the Department, it will be shown that wildlife management objectives can be accomplished in a sustainable and socially acceptable way, as has been done for many years.

*--Ryan Robicheau, Lands Management Program*

## ***Implementing Wildlife Guidelines on Public Lands and State Parks***

The Bureau of Parks and Lands (BP&L) is responsible for the stewardship of 565,000 acres of land throughout Maine. Due to BP&L’s extensive land holdings and active land management program MDIFW’s Wildlife Management Section has assigned a full time wildlife biologist to the BP&L since 1983 under a cooperative agreement between the Department of Inland Fisheries and Wildlife and the Department of Conservation. An early product of this unique arrangement was the publication of Wildlife Guidelines for the Public Reserved Lands of Maine in 1988. This document was intended to be a resource and reference for the BP&L field staff to use to integrate their management activities in a way which enhanced fish and wildlife habitat values. The guidelines are organized by three primary habitat types, upland, wetland, and riparian and set high standards for natural resource protection often exceeding the legal requirements.

New initiatives such as vernal pool protection, beech mast management, wetland delineation and old growth protection guidelines are adopted and appended to the guidelines as standards became available. BP&L field staff is trained annually on current natural resource issues during their spring training. The biologist assigned to BP&L participates in field reviews of proposed timber harvests to insure that the guidelines are implemented and also does post harvest reviews of the effectiveness of the guidelines in accomplishing their objectives.

Having a set of written standards for habitat management was an important consideration of the forest certification review team when all reserved lands were certified as being “sustainably managed” in 2002 by both the Forest Stewardship Council and the Sustainable Forestry Initiative.

In 2000 BP&L revised and updated its Integrated Resource Policies and a decision to do the same with the Wildlife Guidelines was made. That process is ongoing.

*--Joe Wiley, Bureau of Parks and Lands*

# SPECIES PLANNING AND MANAGEMENT

## FUNDING PRIORITY SPECIES MANAGEMENT

**Where does the money currently come from to support this important work?** In addition to the Federal State Wildlife Grants, a recent Federal program based on the Comprehensive Wildlife Conservation Strategy, a large portion of the funds comes from the sale of hunting licenses and permits. Other sources of money include federal Section 6 funds, the Oil Spill Fund, contributions to the **Nongame and Endangered Wildlife Fund** ("Chickadee Check-off"), and purchases of **Conservation License Plates**. Some of these funds are used as match to obtain federal Pittman-Robertson funds, which are derived from excise taxes on sporting firearms, handguns, ammunition, and archery equipment.

### Funding Nongame and Endangered Wildlife Management

Stable funding to address nongame and endangered wildlife programs is desperately needed. Contributions to the Chickadee Check-off, Conservation Registration plates (Loon Plates), and the Maine Outdoor Heritage Fund continue to fall (see Table 3). These voluntary means of contributing provide the core funding for Maine's nongame and endangered species programs. All money donated, whether through the tax check-off, vehicle registrations, grants, or direct gifts, are deposited into the Maine Endangered and Nongame Wildlife Fund - a special, interest-bearing account from which money can only be spent for the conservation of Maine's nongame and endangered species.



Some people are unaware of the contribution hunters and trappers make toward the conservation of endangered and rare wildlife. Many of the salaries, and most of the administrative costs of the Wildlife Division, are funded by hunting and trapping license revenues, which are matched by federal Pittman-Robertson Funds (based on an 11% excise tax on sporting arms, ammunition, and archery equipment, and a 10% excise tax on handguns). Also, you may be surprised to know that many of the financial supporters of the endangered species program are also sportsmen who are committed to the conservation of all Maine's wildlife. Wildlife belongs to all of the people of the state, and sportsmen's dollars can't be expected to do it all.

**Table 3. A history of income derived from the "Chickadee Check-off," Loon Plate, and Maine Outdoor Heritage Fund to benefit nongame and endangered wildlife programs.**

Year	<b><i>Chickadee Check-off</i></b>				<b><i>Loon License Plate</i></b>		<b><i>Maine Outdoor Heritage Fund</i></b>	
	<b>Total Given</b>	<b>No. of Givers</b>	<b>Average Donation</b>	<b>Percent of Taxpayers Giving</b>	<b>Income to MDIFW</b>	<b>No. of Registrations</b>	<b>Income to MDIFW</b>	<b>No. of Projects Funded</b>
1984	\$115,794	25,322	\$4.57	5.3%				
1985	\$129,122	29,200	\$4.42	6.0%				
1986	\$112,319	26,904	\$4.17	5.4%				
1987	\$114,353	26,554	\$4.31	5.2%				
1988	\$103,682	24,972	\$4.15	4.8%				
1989	\$93,803	20,322	\$4.62	3.6%				
1990	\$88,078	18,332	\$4.80	3.2%				
1991	\$92,632	19,247	\$4.81	3.4%				
1992	\$95,533	18,423	\$5.18	3.2%				
1993	\$82,842	15,943	\$5.20	2.8%				
1994	\$84,676	10,863	\$7.79	2.0%	\$335,042	59,829		
1995	\$81,775	10,014	\$8.17	1.8%	\$457,307	81,662		
1996	\$90,939	11,024	\$8.25	2.0%	\$535,679	95,657	\$112,232	3
1997	\$77,511	8,686	\$8.92	1.5%	\$588,364	105,065	\$133,971	5
1998	\$48,189	4,065	\$11.85	0.7%	\$617,484	110,265	\$184,109	7
1999	\$47,908	3,775	\$12.69	0.7%	\$569,610	101,716	\$121,436	5
2000	\$44,496	3,297	\$13.50	0.6%	\$499,486	89,194	\$323,884	11
2001	\$49,348	3,713	\$13.29	0.6%	\$458,057	81,796	\$148,408	5
2002	\$50,412	3,661	\$13.77	0.6%	\$446,342	79,704	\$172,191	8
2003	\$55,348	3,792	\$14.60	0.6%	\$425,147	75,919	\$184,129	5
2004	\$43,158	3,234	\$13.35	0.6%	\$402,695	69,615	\$234,126	10
2005	\$36,769	2,931	\$12.54	0.5%	\$381,948	67,814	\$154,656	7
2006	\$36,865	2,924	\$12.60	0.5%	\$367,791	65,677	\$116,121	6

Given our limited resources, Maine can be proud of the accomplishments made for nongame and endangered wildlife in the last 20 years. We thank those of you who buy a Loon Plate, participate in the Chickadee Check-off, or purchase a Maine Outdoor Heritage Fund lottery ticket. Your voluntary support and generosity deserves a special "thank you." Our success is also attributed to our many willing partners and cooperating organizations, including the U.S. Fish and Wildlife Service (USFWS), National Park Service, U.S. Forest Service, Maine Audubon, University of Maine, The Nature Conservancy, and the Maine Natural Areas Program. Also, it cannot be overemphasized that the entire Wildlife Division, and every bureau of the Maine Department of Inland Fisheries and Wildlife, are deeply committed and involved in nongame, Threatened, and Endangered species conservation. We are all working hard to keep Maine a special place. As you read this, take pride in your accomplishments - and please, as you fill out your tax return next year or register your car, join with us again in conserving Maine's wildlife diversity!



## Other Sources of Funding

To augment the above funding sources, we also vie for other competitive sources of funding. The downside of competing for funds is that we must expend considerable energy developing proposals, and (if a proposal is funded) administering grants and supervising temporary help. Consequently, we spend more of our time as administrators and less time as biologists.

In spite of the funding sources mentioned above, our most pressing need is a stable and adequate source of funding for all of our programs. This need was also recently recognized in the Management Assistance Team report evaluating the Department and the Wildlife Division. Various strategies need to be explored to provide increased funding and staffing to meet our Legislative mandates and the needs of the citizens of Maine. In 2001, the Citizens' Advisory Committee identified several possible sources of funding – here are a few of those ideas to consider:

- That the Constitution of Maine be amended to require that at least 1/8 of one percent of the State Sales Tax be dedicated to fish and wildlife conservation programs to be distributed to the various state agencies that administer those programs.
- That the share of state gas tax revenues distributed to state agencies for operation of boating, ATV and snowmobile and related programs should be at least equal to the portion of the gas tax revenues generated by watercraft and recreational vehicle gas sales.
- MDIFW continue to receive a General Fund appropriation at least sufficient to cover the Department's costs for search and rescue operations required by law and also receive the full costs of collective bargaining agreements covering Department employees.
- That every 4 years hunting and fishing license fees should be reviewed by the Legislature and adjusted as appropriate to reflect the cost of providing hunting and fishing-related services.
- That the Maine Income Tax return be revised to restore the Chickadee Check-off to the main part of the tax form.



What do you think about these ideas? Your support to establish a stable funding source to continue the work of the Wildlife Division is much appreciated.

*--George J. Matula, Jr., E&T Species Coordinator & Wildlife planner*

## 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.

Not so any more. In 2004, the State of Maine was awarded a \$1.3 million grant from the U.S. Fish and Wildlife Service to implement a Landowner Incentive Program (LIP). The Landowner Incentive Program is a competitive grant program that supports collaborative efforts to partner with private landowners to cultivate and fund conservation opportunities for critical habitats in the state. The State was awarded an additional \$655,000 in LIP funds in 2005, \$945,760 in 2006, and a proposal for a 2007 award is currently pending.

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 at-risk species and their habitats.

LIP provides financial incentives to private landowners in return for longterm habitat protection for rare and endangered species. In Maine, the program has five objectives:

**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 oyster-catcher.

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 in Southern and Coastal Maine** - 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. Landowner Incentive Program 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.

A subset of focus areas across Maine was selected as pilot sites for conservation efforts. In the last two years the state has awarded \$881,425 for the purchase of conservation easements within 8 focus areas that will protect more than 2,200 acres of critical habitat for rare, threatened and endangered species in southern, western, central, and mid-coast Maine. An additional \$834,000 will be awarded later in 2007.

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 280 acres within 3 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.

To learn more about Maine's Landowner Incentive Program go to <http://www.mainenaturalareas.org/docs/lip/>.

--Sandy Ritchie, Wildlife Biologist  
Habitat Conservation and Special Projects

# STATE WILDLIFE GRANT PROGRAM

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 received nearly \$3.7 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. Here are several examples of projects in Maine supported, in part, by State Wildlife Grant funds.

***Beginning with Habitat*** - a cooperative effort of agencies and organizations working together to secure Maine’s outdoor legacy by providing communities with mapped information to incorporate into their comprehensive planning efforts to help guide conservation of valuable habitats.

**Seabird Outreach** - informing 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.

**Distribution & Ecology of Purple Sandpipers Wintering in Maine** - enables MDIFW to estimate abundance and distribution of purple sandpipers in Maine, assess movements and site fidelity of individuals at particular sites, and develop a protocol for monitoring purple sandpiper populations in the state.

**Safeguards to Bald Eagle Recovery: Habitat Conservation** - devising statewide strategies and identifying optimal sites for long-term conservation of bald eagle nesting habitat as the fundamental safeguard for a lasting recovery of the species in Maine.

**Enhanced Management of Piping Plovers and Least Terns** – working with Maine Audubon to enhance the management of piping plovers and least terns, including the development of cooperative beach management agreements with Maine municipalities.

**Canada Lynx Ecology** - supporting an ongoing study of Canada lynx in Maine to determine lynx persistence, habitat use, recruitment, and dispersal in response to changing prey densities and/or habitat conditions, and to identify techniques for monitoring lynx populations statewide.

**Stream Survey Databasing/Utilization of Restored Aquatic Habitats** - enhancing MDIFW’s efforts towards managing and conserving flowing water habitats and their respective animal communities.

**Lake Habitat Inventories** - gathering data related to water quality, fish species composition and relative abundance, bathymetry, aquatic habitat types, and macroinvertebrate species composition from hundreds of Maine’s lakes.

**Estimating Moose Density** - developing an accurate and cost-effective model that can be used to estimate the density of Maine’s moose population.

**Lake Whitefish Studies** - identifying the factors involved in the decline of these fisheries, developing and/ or refining management strategies intended to prevent further declines, and beginning the process of restoring lake whitefish sport fisheries.

**Wildlife Park Displays** – construction of a new fisheries display and educational exhibits for moose, deer, coyote, turkeys, and turtles at the Maine Wildlife Park.

**Investigation of Blanding’s Turtle Road Mortality** - helping 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** - working with Maine Audubon to evaluate the abundance and distribution of owls in Maine and to develop a volunteer-based monitoring system.

**Ecoregional Surveys** – working with the Maine Natural Areas Program on a systematic, statewide, 10-year survey of rare and endangered wildlife, plants, and natural communities in Maine to better assess their status and distribution and to design conservation strategies to promote their recovery.

To be eligible for SWG funds and to satisfy requirements for participating in the State Wildlife Grant program, Congress required each state to develop a Wildlife Action Plan, known technically as a Comprehensive Wildlife Conservation Strategy. MDIFW was the agency responsible for developing Maine's plan with input from the Atlantic Salmon Commission, Maine Department of Marine Resources, U.S. Fish and Wildlife Service, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Maine's Native American tribes, and more than 60 conservation partners. These proactive plans examine the health of wildlife and prescribe actions to conserve wildlife and vital habitat before they become too rare and costly to protect.

Maine's Wildlife Action Plan addresses the full array of fish and wildlife and their habitats in the state, including vertebrates and invertebrates, and targets species in greatest need of conservation while keeping "common species common." The plan covers the entire state, from the dramatic coastline to the heights of Mt. Katahdin. It is intended to supplement, not duplicate, existing fish and wildlife programs, because it builds on a species planning effort ongoing for nearly 40 years; a landscape approach to habitat conservation, Beginning with Habitat, initiated in 2000; and a long history of public involvement and collaboration among conservation partners.

To view a copy of Maine's plan, go to <http://www.state.me.us/ifw/wildlife/compwildlifestrategy/index.htm>.

It all begins with habitat – Maine's diverse assemblage of wildlife, plants, and natural communities, and the outdoor experiences we cherish, depends on the availability of suitable habitat. Much is at stake, and much is being accomplished.

*--Sandy Ritchie, Wildlife Biologist  
Habitat Conservation and Special Projects*





## BIRD GROUP

In the mid 1980s, nongame bird management began to be integrated throughout what was then referred to as the Migratory Bird Project. Before this time, the Department's accomplishments in bird conservation focused on waterfowl and American woodcock research and management, and marine wildlife studies. Currently, in addition to their traditional gamebird work, Bird Group biologists spend a significant portion of their time on "all bird" issues, including Endangered and Threatened birds. The breadth of the Bird Group's programmatic responsibilities involve stewardship of 223 bird species that nest in Maine, and many more that migrate through or winter in Maine.

**Brad Allen, Wildlife Biologist and Bird Group Leader** - Coordinates group activities within and outside the agency with numerous partners in bird conservation and management, currently serves as a co-principal investigator on a common eider survival and recruitment study, and an arctic tern investigation. Brad coordinates Department interests in most seabird initiatives.

**Lindsay Tudor, Wildlife Biologist** - Assists in all facets of Bird Group field and office activities, and coordinates the Department's Migratory Shorebird Program, with current emphasis studying the distribution and ecology of purple sandpipers wintering in Maine using radio telemetry and shorebird habitat protection under the Natural Resources Protection Act. Lindsay also works with harlequin ducks, least terns, piping plovers, and black terns.

**Tom Hodgman, Wildlife Biologist** - Works closely with partners to develop and implement programs and surveys to assess the status of nongame birds and conduct priority research. Tom's responsibilities include all passerines (songbirds), hawks, owls, herons, other nongame marshbirds, and loons. Tom's current focus is working with graduate students, studying rusty blackbirds and marshbirds. Tom provides technical assistance to the Regions regarding bird migration and windpower development.

**Mike Schummer, Wildlife Biologist** – Mike coordinates the development and implementation of waterfowl banding programs, surveys, and research to assess the status of gamebird populations in Maine. Other species or groups that Mike is responsible for include grouse, woodcock, wild turkeys, ducks, and geese.

**Charlie Todd, Wildlife Biologist** – Charlie has devoted over 25 years of his professional career to the recovery of bald eagles in Maine, and he serves on the national Bald Eagle Recovery Team. Charlie also leads MDIFW's peregrine and golden eagle recovery programs. Charlie's experience makes him a valuable advisor to other staff on Endangered and Threatened species issues.

**Vacant, Biology Specialist** – Although currently vacant, this position is an essential component of the agency's commitment to protection of Endangered and Threatened species. The person in this position will assist with wildlife management and endangered species recovery efforts; development and implementation of Essential Habitat and other habitat protection strategies; conduct field surveys and biological data collection; review and analyze information and literature regarding wildlife habitat; and provide technical support to the Division's eco-regional inventory project.

### ***Upland Birds***

#### **Ruffed Grouse**

The ruffed grouse, or partridge, is a premier, highly sought upland game bird in Maine. Grouse are most often found in young forests of aspen, birch, and mixed hardwoods where they find protection from avian predators that cannot navigate through the canopy of this dense habitat. Numerous studies show that avian predation accounts for as much as 70% of all grouse mortalities. In contrast, hunting mortality averages less than 15% of all grouse deaths. The remaining percentage is made up of nest predators, disease and parasites. Studies on harvest of ruffed grouse have shown that hunter kill simply replaces other types of mortality such as predation, disease and parasites. That is, if a hunter harvests a grouse, this is simply one less bird that would have been eaten while budding (a grouse behavior of foraging on buds high in treetops) by a hawk in January, removed from a nest in June by a mammalian predator, or afflicted by the many diseases/parasites that kill grouse. Grouse are one of the few species where hunting is considered nearly 100% compensatory mortality, whereby birds shot by hunters would have died of predation, disease or parasites anyway. Overall, a grouse in hand does not mean one less grouse to reproduce in spring, it simply means you have a grouse dinner and a predator does not.

Above all, grouse are a product of the forest and the forest is in a constant flux. Grouse biologists have noted that a population cycle occurs whereby grouse peak and plummet in population nearly 10 years apart. This 10-year cycle has been noted in ruffed grouse in Maine, as well. Since 1994, moose hunters have been asked to report the number

of grouse they and their party saw or harvested during the moose hunting season. Data are compiled by geographic region and MDIFW calculates the number of grouse seen per 100 hours of moose hunting effort (Table 4). Most notable about the last decade plus of data collected is the nearly exact 10-year difference noted between 1995 (the high point of grouse seen/100 hours) and 2005 (the low point in nearly all regions) that depicts the traditional grouse cycle. During the peak in 1995, 107 grouse were seen per 100 hours of moose hunting effort. In 2005, moose hunters reported only seeing 13 grouse per 100 hours which was the lowest number seen for most regions since 1995. In 2006, the number of grouse seen per 100 hours of moose hunting effort increased in all survey areas of Maine.

**Table 4. Grouse seen or harvested/100 hrs of moose hunter effort in Maine, 1994 - 2006.**

Location	WMDs	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Northeast	2, 3, & 6	35	84	15	24	42	41	30	53	23	35	27	11	26
Northwest	1, 4, & 5	38	125	22	33	48	47	50	55	43	50	56	24	45
Eastern Lowlands	10, 11, 18, 19	31	57	16	22	27	30	25	55	29	29	24	8	20
West and Mountains	7-9, 12-14, 17	31	97	23	26	41	29	28	30	25	26	30	13	25
Downeast <sup>1</sup>	27-28 & former 29	-	-	-	-	-	-	-	-	13	21	20	9	22
<b>Statewide Avg.</b>	<b>Moose hunt area</b>	<b>35</b>	<b>107</b>	<b>20</b>	<b>25</b>	<b>43</b>	<b>37</b>	<b>33</b>	<b>48</b>	<b>31</b>	<b>34</b>	<b>33</b>	<b>13</b>	<b>24</b>

<sup>1</sup>No moose hunt was held in this location until 2002

Fortunately, the future looks bright for ruffed grouse. Although, maturation of some forest stands likely represents a decline in quality habitat for ruffed grouse in some portions of Maine, timber harvesting can and does revitalize grouse habitat. Harvest practices, such as clear cutting in small blocks or strips that create an uneven-aged forest composed of small blocks of even-aged stands of aspen, birch and mixed hardwoods will provide the necessary habitat for grouse as the 10-year cycle shifts towards an increasing grouse population. ***Ruffed grouse research and management is funded primarily by hunting license, permit revenues and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Michael Schummer

## Woodcock

### Hunting Seasons

A range-wide decline in woodcock numbers since 1968 resulted in restrictive hunting regulations in the east in 1985, and again in 1997, when all eastern states were required to shorten their woodcock hunting seasons further (to 30 days) and select opening dates no earlier than 6 October. Beginning in 2002, hunting seasons in the Eastern Region could open on October 1 again, as it was prior to 1997. Unfortunately, despite these hunting restrictions, the range-wide woodcock population estimate is still at a relatively low level compared to populations in the 1960s.

Data collected during the 2006 hunting season, using the Migratory Bird Harvest Information Program (HIP) indicated that approximately 7,822 woodcock hunters bagged 15,585 woodcock in Maine last year. This is up substantially from an estimated harvest level of 9,100 woodcock in 2005 and comparable to the 2004 harvest of 15,600 woodcock. This was not likely a result of large changes in numbers of woodcock, but rather, a relatively large number of days afield by Maine hunters 2006 (33,243 days afield), a substantial increase from both 2005 (25,200 days afield) and 2004 (27,000 days afield).

The recruitment index (the ratio of immatures per adult female woodcock) was 1.6; nearly the same as the long-term (1963-05) index of 1.7 immatures per adult female, an indication of normal production in 2006 for woodcock breeding in Maine and eastern Canada. Singing-ground Survey data indicated that the numbers of displaying male woodcock in the Eastern Region in 2007 declined 11.6% from 2006.

### Woodcock Management and Research

Woodcock biologists suspect that losses of woodcock habitat to industrial development and maturation of forests beyond stages suitable to woodcock are the primary causes of the woodcock population decline. The Department is concerned about the status of woodcock and woodcock habitat throughout its range. During the last 30 years, interest in woodcock hunting has remained relatively high, while the amount and quality of woodcock habitat is declining. For these reasons, the USFWS maintains that some type of conservative harvest management strategy is still warranted. Suitable habitat is the key for healthy wildlife populations. Regarding woodcock habitat, biologists in Maine have turned their attention to the industrial timberlands as the bright spot for improvements in woodcock habitat conditions. Although the soils may not be as productive as abandoned farmland, the vast acreage of young forests created by industrial forest activities warrants attention. The Department is currently working cooperatively with other conservation organizations to implement the Northern Forest Initiative which is aimed at producing early succession forests that are key to healthy woodcock populations.

Because indices revealed a long-term decline in Eastern Region woodcock numbers, wildlife biologists in Maine and other northeastern states believed there was an immediate need to determine the effects of hunter harvest on woodcock populations in the east. We partnered with researchers from U.S. Geological Survey (USGS), USFWS, and the state wildlife agencies of New Hampshire, Vermont, and Pennsylvania to investigate the effects of hunting on woodcock survival across 4 states (ME, NH, VT, and PA) in the breeding range of woodcock during 1998-2000. Results indicated that autumn (September-November) survival rates of woodcock on hunted sites averaged 71 percent in 1998 and 70 percent in 1999. Survival rates on nonhunted sites were slightly lower; 69 percent in 1998 and 67 percent in 1999. Mortality on nonhunted sites was due primarily to predation. It appears; at least on the breeding range in the East, where woodcock hunting seasons are conservative, mortality caused by hunters is not limiting woodcock populations. ***We are pleased to have several partners on the woodcock research project. In addition to the government agencies listed above, Champion International, Inc., Ruffed Grouse Society, and Maine's Outdoor Heritage Fund provided either logistical or financial support. Woodcock research and management is funded primarily by hunting license and permit revenues; and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Michael Schummer

## **Waterfowl Management and Research**

In 2006, a Waterfowl Working Group (a citizen group of stakeholders interested in the future of waterfowl and waterfowl hunting in Maine) convened to formulate a new set of wide-ranging goals and objectives that will guide waterfowl management and research in Maine for the next 15 years. Similar to the 1985 waterfowl assessment, maintaining or increasing breeding populations of waterfowl was a common goal of the group. The group also reiterated and strengthened the goal of waterfowl habitat protection and enhancement. Other newly formulated goals related to maintaining the heritage of waterfowl hunting in Maine and increasing access to waterfowl hunting and viewing sights.

Since the late 1970s, waterfowl and waterfowl hunting in Maine has been typified by more restrictive harvest regulations and a corresponding decline in waterfowl hunters. Although season length has been increased to 60 days in recent years, many individual species bag limit restrictions remain. Long, 60-day seasons with restrictions on individuals species allows hunters to take advantage of species that are abundant and can sustain high levels of harvest (e.g., Mallards and green-winged teal) while protecting species that might be more susceptible (e.g., black ducks). Low populations of black ducks caused major changes in regulations regarding waterfowl hunting since 1983. Following harvest restrictions the black duck population stabilized but did not increase as hoped by most waterfowl biologists. More recently data indicate that productivity (number of ducklings produced per hen) of black ducks may be declining and the capability of the population to sustain traditional harvest appears to be in jeopardy. Because declining productivity cannot be explained by hunter harvest, waterfowl biologists are now determining if declines in the quantity and quality of breeding and wintering habitats are reasonable explanations. These data reiterate that habitat protection and enhancement must remain at the forefront of waterfowl management and research.

Revenues generated from the sales of state waterfowl hunting stamps and art prints have, in addition to supporting waterfowl banding activities, been dedicated to acquisition and development of wetland habitat and coastal nesting islands. As our appreciation of migratory birds and our understanding of their role in the natural world grow, it is important to recognize the contributions of sportsmen to migratory bird conservation. For more than 60 years, hunters have provided a steady stream of revenue to build the National Wildlife Refuge System, and to restore waterfowl habitat on millions of acres of public and private lands across the country. These habitat projects also benefit migratory songbirds and other wildlife.

In the early 1930s, with a handful of farsighted conservationists leading the way, organized sportsmen were instrumental in the creation of two programs that changed the course of wildlife conservation. These two programs are the Duck Stamp Program and the Federal Aid in Wildlife Restoration Act, better known as the Pittman-Robertson Act, described in the Wildlife Resource Assessment Section of this publication (page 12). In 1934, Congress passed the Migratory Bird Hunting Stamp Act, popularly known as the Duck Stamp Act. It required all waterfowl hunters 16 years or older to buy a Migratory Bird Hunting and Conservation Stamp. In the years since its enactment, the Federal Duck Stamp Program has generated more that \$671 million that has been used to preserve nearly five million acres of waterfowl habitat in the U.S. Many of the more than 500 national wildlife refuges have been paid for all or in part by Duck Stamp money.

## **Waterfowl Hunting Seasons**

Waterfowl harvests in the United States have declined since 1978, when 15.1 million ducks were recorded in federal harvest surveys. Reduced harvest resulted from declining hunter numbers and lower waterfowl populations during the 1980s. In response to drought conditions on the U.S. and Canadian prairies (the "duck factory" of North America),

season lengths were shortened significantly between 1985 and 1993 (from 50 days to 30 days in the Atlantic Flyway). This, in concert with declining numbers of hunters, led to a plunge in the estimated number of hunter days afield. Since 1994, the federal framework for duck seasons has increased to 40 days in 1994-1995, 50 days in 1996, and 60 days in 1997-2006. Throughout this period of regulatory change waterfowl biologists in the Eastern US noted that Atlantic Coast waterfowl populations were not greatly influenced by changes in conditions on the prairies but rather the majority of ducks harvested were derived from eastern forests and Atlantic Canada where wetland conditions are more stable. Therefore, since 2000, season frameworks for the Atlantic Flyway have been derived using the Eastern Mallard Model and less from prairie population estimates. In conjunction with this regulatory change the USFWS initiated the Eastern Survey Unit (described below) in 1995 to better monitor waterfowl populations and provide data necessary for determining optimal season frameworks for states throughout the Atlantic Flyway (Maine to Florida).

### **Youth Waterfowl Hunt**

Since 1997, Maine has held a Youth Waterfowl Hunt during which hunters between the ages of 10-15, when accompanied by an adult, are now allowed to hunt Canada geese and all duck species (except harlequins and Barrow's goldeneyes). The Youth Waterfowl Hunt affords youth hunters a chance to experience waterfowling early in fall when temperatures are more comfortable and birds are less decoy shy. The one-day hunt takes place on a Saturday in September within two weeks of the start of the regular duck season. The 2001 mail survey indicated that approximately 9% of waterfowl hunters bring a youth hunting on Youth Waterfowl Hunt day. In accordance with the MDIFW goal of retaining the heritage of waterfowl hunting in Maine, all anecdotal evidence suggest that the Youth Waterfowl Hunt continues to be a popular day afield with young hunters.

### **Waterfowl Harvest**

Since 2001 the Harvest Information Program (HIP) has been used to estimate waterfowl harvest (Table 5). State-Federal program requires licensed migratory bird hunters to annually identify themselves to the State licensing authority by providing the State with their name and address, and it asks each hunter a series of screening questions about their hunting success the previous year. The USFWS is then responsible for using these data to annually conduct national hunter activity and harvest surveys for all migratory game birds.

**Table 5. Maine duck harvest estimates based on Harvest Information program, 2001-2006.**

<b>Maine dabbling and diving duck harvest estimates based on Harvest Information Program, 2001-2006.</b>						
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006 (preliminary)</b>
Black Duck	5,868	9,717	5,045	5,765	7,623	5,387
Mallard	7,839	15,744	12,025	12,218	16,855	12,231
Mallard x Black Duck Hybrid	422	861	510	317	979	127
Green-winged Teal	2,723	9,287	5,248	2,750	3,077	4,309
Blue-winged Teal	469	185	459	0	909	317
Northern Shoveler	0	62	0	0	140	0
Northern Pintail	94	554	357	159	350	127
Wigeon	47	185	306	264	70	127
Wood Duck	7,323	7,319	3,822	4,231	6,224	5,577
Greater Scaup	0	123	0	0	0	190
Lesser Scaup	0	123	0	0	0	190
Ring-necked Duck	610	1,845	459	529	699	6,779
Bufflehead	1,925	1,661	764	1,798	1,609	760
Common Goldeneye	704	431	357	1,745	3,777	2,091
Hooded Merganser	1,643	1,415	764	740	629	1,394
Other Mergansers	845	1,292	1,783	264	1,818	2,852
<b>Total dabbling/diving duck harvest:</b>	<b>30,512</b>	<b>51,804</b>	<b>32,000</b>	<b>30,780</b>	<b>44,759</b>	<b>37,458</b>
Seasonal duck harvest per hunter:	4.7	8.1	5.2	5.5	7.2	9.2
Canada Goose	5,165	12,800	9,637	7,000	7,826	9,800
Snow Goose	0	0	463	0	87	0
Seasonal goose harvest per hunter:	1.3 (62%)	2.8 (52%)	2.1 (61%)	1.8 (44%)	2.3	2.5
<b>Maine sea duck harvest estimates based on Harvest Information Program, 2001-2006.</b>						
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006 (preliminary)</b>
Common Eider	17,257	20,600	28,967	14,736	10,842	18,133
Long-tailed Duck	1,371	2,800	2,612	1,754	690	1,779
Scoter Species	5,371	6,400	14,721	4,210	2,168	2,288
<b>Total sea duck harvest:</b>	<b>23,999</b>	<b>29,800</b>	<b>46,300</b>	<b>20,700</b>	<b>13,700</b>	<b>22,220</b>

Of note is the change in composition of the waterfowl harvest in Maine. A 30+ year perspective of the waterfowl species composition in the Maine harvest shows that the relative importance of some ducks has changed over this period. Harvests of mallards have increased from fewer than 1,000 birds per year (1961-65 mean) to nearly 15,000 birds in 2001. The common eider is another bird that has increased substantially in the annual Maine waterfowl kill. Showing sizable declines in the Maine harvest in recent years are black ducks, blue-winged teal, scoters, and common goldeneyes. Reasons for these changes in species composition are variable, and in many cases, different for each species. Some explanations for these changes include duck population increases and decreases, duck population distribution shifts, changes in habitat availability, changes in the number of duck hunters, hunter effort shifts from one waterfowl species group to another, and specific regulatory management designed to restrict harvest opportunity on some species or allow more on others. All of these causes, and others, have resulted in the observed changes in the Maine waterfowl harvest.

### Monitoring Waterfowl Populations, Mid-winter Waterfowl Inventory

Last winter, biologist Michael Schummer and USFWS pilot/biologist John Bidwell (a resident of Hampden, Maine) conducted Maine's annual Mid-winter Waterfowl Survey (Table 6). They surveyed coastal waters and estuaries from Kittery to Eastport during the month of January, 2007. In 2007, a total of 68,860 birds was a substantial decrease from last year's count of 82,365. Most notable was a decrease in the number of Common Eiders (18,041), down 16,000 from 2006 (34,041) and only 801 greater than the last low count in 2004 (17,240). Black duck numbers were greater during 2007 (20,303) than in 2006 (16,631), slightly higher than the 10-year average of 18,419. Buffleheads (8,629) posted the largest number counted since 1998 (9,270) and were substantially above the 10-year average of 5,447. The number of Canada geese counted this year (3,961) was comparable to the 2006 (3,338) and 2005 counts (3,489). The Midwinter Waterfowl Survey is conducted at the same time each winter in each state in the Atlantic Flyway, from Maine to Florida. Overall status of wintering waterfowl populations are determined when Maine's data are pooled with other states' numbers. Therefore, high numbers for some species counted in Maine this January may be offset by lower counts in states farther south, or vice versa. Based on these assumptions and imprecision of the survey, Midwinter Waterfowl Survey data are best used to assess longer trends (5 to 10-year count averages) rather than to determine actual year-to-year changes in waterfowl abundance.

**Table 6. Midwinter Waterfowl Survey**

Species	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Mallard	995	1,849	892	1,162	3,224	2,857	2,055	2,198	4,025	2,960
Black Duck	24,027	32,600	20,666	12,971	21,368	17,283	10,799	14,027	16,631	20,303
<b>Total Dabblers</b>	<b>25,022</b>	<b>34,449</b>	<b>21,558</b>	<b>14,133</b>	<b>24,592</b>	<b>20,140</b>	<b>12,854</b>	<b>16,225</b>	<b>20,656</b>	<b>23,263</b>
Scaup	581	1,830	1,790	1,080	370	450	0	160	73	72
Goldeneyes	4,543	7,416	3,392	2,510	5,777	3,912	6,783	7,374	5,982	4,408
Bufflehead	9,270	7,099	3,252	4,472	6,950	5,104	4,012	4,369	6,770	8,629
Common Mergansers	4,028	5,451	4,948	5,550	7,802	3,600	1,944	2,298	4,114	5,238
<b>Total Diving Ducks</b>	<b>18,422</b>	<b>21,796</b>	<b>13,382</b>	<b>13,612</b>	<b>20,899</b>	<b>13,066</b>	<b>12,739</b>	<b>14,201</b>	<b>16,939</b>	<b>18,347</b>
Common Eider	31,809	38,735	38,351	28,664	46,036	26,347	17,240	34,794	34,041	18,041
Scoter	2,755	3,198	4,611	1,941	2,710	2,857	337	2,702	4,480	1,809
Long-tailed Duck	1,739	2,861	1,120	2,389	2,311	1,759	846	1,995	2,865	3,272
<b>Total Seaducks</b>	<b>36,303</b>	<b>44,794</b>	<b>44,082</b>	<b>32,994</b>	<b>51,057</b>	<b>30,963</b>	<b>18,423</b>	<b>39,491</b>	<b>41,386</b>	<b>23,122</b>
<b>Unidentified Ducks</b>	<b>246</b>	<b>254</b>	<b>210</b>	<b>425</b>	<b>248</b>	<b>18</b>	<b>0</b>	<b>37</b>	<b>16</b>	<b>0</b>
<b>TOTAL DUCKS</b>	<b>79,993</b>	<b>101,293</b>	<b>79,232</b>	<b>61,164</b>	<b>96,796</b>	<b>64,187</b>	<b>44,016</b>	<b>69,954</b>	<b>78,997</b>	<b>64,732</b>
Canada Geese	1,986	3,071	3,139	2,769	3,377	2,603	2,290	3,489	3,338	3,961
<b>GRAND TOTAL</b>	<b>81,979</b>	<b>104,364</b>	<b>82,371</b>	<b>63,933</b>	<b>100,173</b>	<b>66,790</b>	<b>46,306</b>	<b>73,443</b>	<b>82,335</b>	<b>68,693</b>

An increase in the number black ducks and buffleheads this year was likely a result of a relatively mild fall and winter. Conversely, mild conditions can also mean that birds more adapted to cold environments, such as goldeneyes, were able to winter farther north than Maine. This year, during the count period, mallards and goldeneyes seemed abnormally abundant on inland lakes and rivers that continued to remain ice-free. As the Maine Midwinter Waterfowl Survey only covers marine waters, it is likely that lower count numbers were a result of birds remaining in open

freshwater lakes and rivers. Weather did not appear extreme enough to cause birds to move farther down the Atlantic Coast. In a normal year it takes 30 hours of flying to count waterfowl on the coast of Maine. Reduced ice coverage equates to more areas that waterfowl can disperse and this year 42.5 hours was required to cover the same survey area. For example, in 2006 Merrymeeting Bay was nearly entirely frozen. However, this year it took about one hour to survey this area that was nearly entirely ice-free. Here we counted nearly 1,500 ducks and Canada geese where in 2006 we only saw ice.

## Eastern Survey Unit

The Maine section (Stratum 62) of the Eastern Survey Unit was flown throughout May 2007 by USFWS biologist/pilot John Bidwell and breeding waterfowl pairs were counted (Table 7). The Eastern Survey Unit was initiated in 1995 to better determine numbers of breeding waterfowl in the eastern US and Atlantic Canada. Because of detection issues with some species of waterfowl (e.g., wood ducks) and timing of migration of others (e.g. common goldeneyes) certain species are intentionally omitted from Table 6. In 2007, an April snow and melt that occurred throughout much of Maine resulted in sufficient water to produce fair to good wetland conditions for breeding waterfowl. In 2007, the breeding population of black ducks in the Stratum 62 was estimated at 31,165, which is a decrease of 13.3% from 2006. Black ducks also continue to show a declining trend as detected by the Maine Waterfowl Production Index (see below). Since 1995, most other species show little to no trend and breeding populations remain relatively stable over the long-term.

**Table 7. Eastern Survey Unit Breeding Waterfowl Population Estimates, Maine (Stratum 62) 1995 - 2007**

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<b>Black Duck</b>	81,910	32,371	54,356	91,958	22,515	49,721	30,811	47,952	32,343	25,841	22,766	35,956	31,165
<b>Mallard</b>	9,779	9,682	20,534	24,843	12,456	11,468	6,272	8,454	7,955	15,382	5,409	15,591	21,824
<b>Ring-necked Duck</b>	7,998	29,980	87,686	54,897	22,937	23,508	33,808	37,042	15,802	28,325	19,284	26,784	41,874
<b>Teal<sup>1</sup></b>	7,024	11,818	25,529	86,834	30,061	23,008	19,951	99,245	26,828	48,181	18,747	14,222	14,345
<b>Canada Goose</b>	8,166	7,479	9,647	14,109	47,962	9,516	17,952	10,032	8,946	15,383	20,511	6,546	20,468

<sup>1</sup>Green and blue-winged teal combined

## Waterfowl Banding

Banding remains the cornerstone of waterfowl harvest management. Pre-hunting season (i.e., late summer) banding is necessary to provide information on harvest rates, survival rates, and source of harvested ducks and geese, and for evaluating changes in hunting regulations. Reports of bands recovered by waterfowl hunters help inform decision making to ensure that healthy populations of ducks and geese continue to persist in Maine and throughout the Atlantic Flyway. MDIFW continues striving to establish a sound waterfowl banding program that will enable us to adequately monitor harvests of ducks and geese produced in Maine. We are working with colleagues in the USFWS and USGS toward banding sufficient numbers of each species of waterfowl that breed in Maine. In 2006, MDIFW staff and volunteers banded 3,177 ducks and 319 resident Canada geese.

--Michael Schummer

## Sea Duck Management and Conservation Concerns

Common eiders, scoters, and long-tailed ducks (formerly called "oldsquaws") are members of a diverse group of waterfowl known as sea ducks. In comparison to other ducks, the life histories of sea ducks are characterized by: sexually mature at 2 or 3 years (versus 1 year in dabblers), small clutch sizes, low rates of annual recruitment of young-of-the-year-birds into breeding populations, non-breeding of adult females in some years, and high rates of adult survival under natural conditions. As a result, the health of a sea duck population is controlled more by survival rates of adults than by annual production of young. These characteristics make long-lived sea ducks well suited to the northern marine environments they frequent. However, they also make their populations particularly sensitive to slight increases in adult mortality, and their populations slow to recover from declines. Because their life history characteristics differ from those of most other North American ducks, effective management requires specific research and monitoring, and directed conservation programs to collect and assess essential data to maintain healthy populations.

Concern over the status of sea ducks in Maine has increased over the last two decades, as some populations appear to be declining. In Maine, over the last 50 years, sea duck bag limits and season lengths have been considered liberal and relatively unchanged. Historically, hunters tended to pursue inland ducks, and the reported annual harvests of sea ducks were low. Major shifts in hunting effort occurred from the 1960s to the 1980s when populations of inland ducks (particularly black ducks) and Canada geese were low, and hunting seasons for these species were restricted. However, a short time later, concerns over the status of scoters (black, white-winged, and surf) in the Atlantic Flyway led to a reduction in the daily bag for the group from 7 to 4 a day, beginning in 1994. Despite this change, hunting pressure on sea ducks, particularly on common eiders, continued to increase in eastern North America. In Maine,

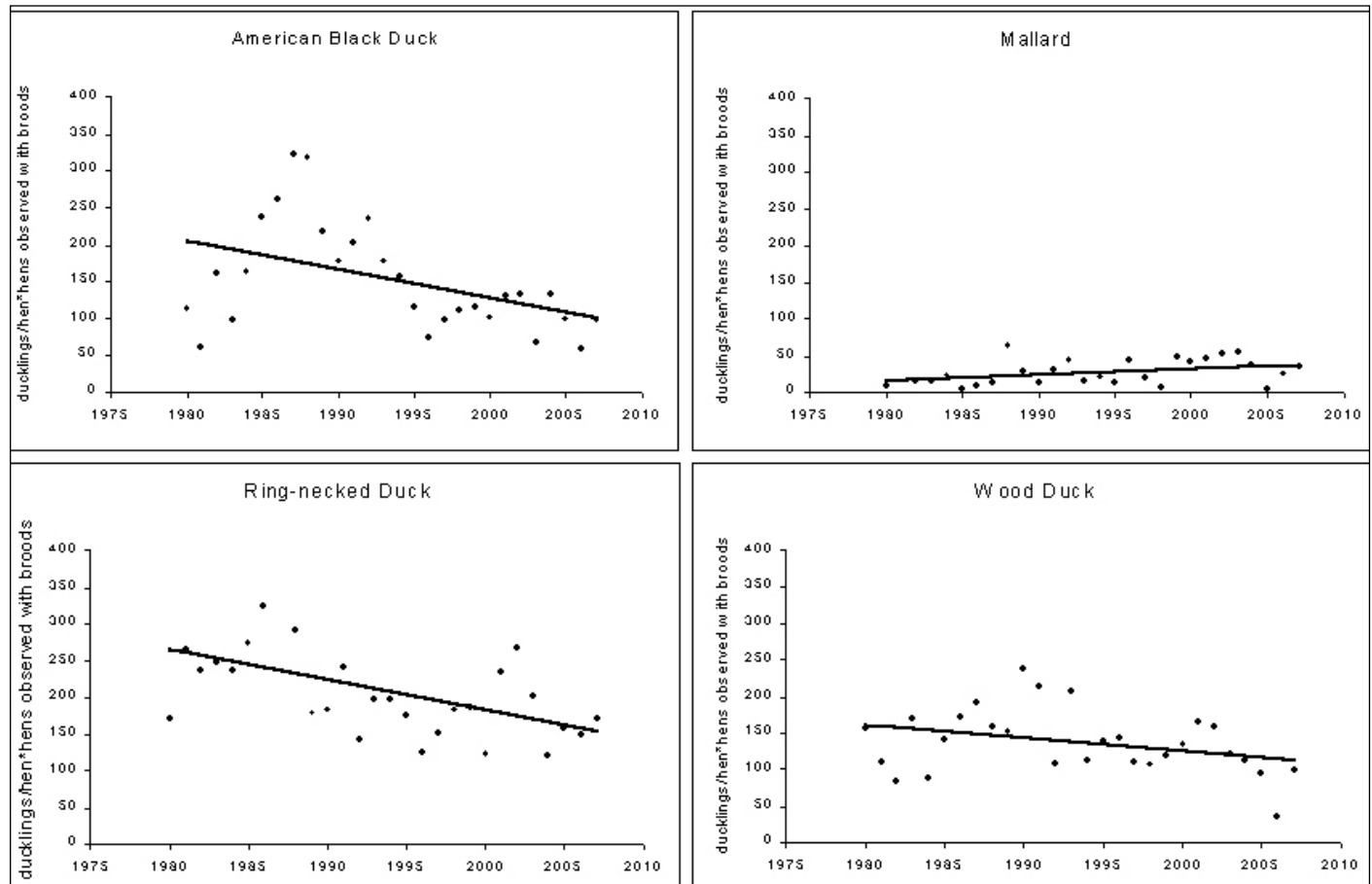
hunter interest in eiders continues to be strong. The percentage of eiders in Maine's waterfowl harvest has increased from 3-4% in the mid-60s, to over 28% in recent years. There are indications that harvests of eiders in Nova Scotia and the New England States had doubled to levels that may no longer be sustainable. For this, and other reasons, Nova Scotia, Newfoundland, and Rhode Island proposed and adopted changes in their 1998 hunting seasons designed to reduce the eider harvest between 15-25%. In 1999, Maine and Massachusetts reduced their daily eider bag limits to 5 and 4, respectively.

--R. Bradford Allen

## Maine Brood Survey and Waterfowl Production Index

In Maine, surveys of duck broods by MDIFW biologists across the state provide an index to production of Maine's waterfowl populations. Since 1980, the Brood Survey has been standardized to include 39 index areas (Figure 5). The Waterfowl Production Index is produced by multiplying the number of broods observed by the average number of ducklings per hen. Here we present only black duck, mallard, wood duck and ring-necked duck production which are considered representative of the health of all waterfowl populations throughout Maine. Most notable is the continued decline in the black duck production index. One of the objectives of the state waterfowl management system is to increase the number of breeding pairs of black ducks by 15%. Brood Survey information provides a snapshot of the hatch and duckling survival and is not a complete count, or census, of all waterfowl in Maine. Therefore, managers consider the survey an index of the state's waterfowl production. An index is of greater value when several years of data are collected. Multiple years of data allows for comparisons to be made on a statewide level so that trends can be detected. The Waterfowl Production Index is an indication of yearly production and helps determine how large of a resource will be available to hunters during the fall migration. Therefore, the Waterfowl Production Index is used in conjunction with information from Stratum 62 of the Eastern Survey Unit (described above) to inform decision-making regarding waterfowl season lengths and bag limits.

**Figure 5. Waterfowl Production index trends, 1980-2007 (ducklings/hen\* hens observed with broods)**



--Michael Schummer

## 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 8.

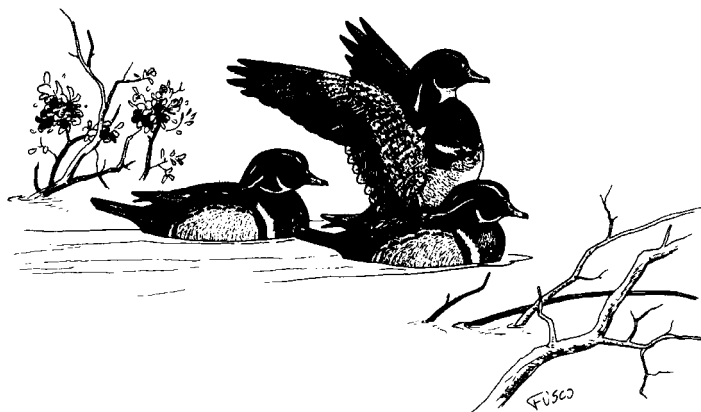
**Table 8. Nesting waterbirds, seabirds, and eider populations and number of colonies occupied, 1976-77 and 1994-2006.**

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





## **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

## **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

## ***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 comparison, 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

## ***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

## ***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](http://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

## **Maine's Role in Avian Influenza Surveillance**

Starting in spring 2006, the Maine Department of Inland Fisheries and Wildlife in cooperation the USDA-Wildlife Services began testing live-captured and hunter-shot birds for Avian Influenza as part of a larger nation-wide early detection effort. Sampling of live-captured birds does not harm the animals. In most cases we capture birds with the same techniques we use during normal banding operations, releasing them at the same location as captured. As well, during hunting season, biologists may ask hunters for permission to collect samples from harvested waterfowl. Collection of samples is quick, easy, and does not affect the bird as table fare.

## **The Facts about Avian Influenza**

Avian influenza is a disease caused by a virus naturally found in certain species of waterfowl and shorebirds. Avian influenza viruses are classified on the basis of two proteins, hemagglutinin (H) and neuraminidase (N) found on the surface of the virus. Sixteen H proteins and 9 different N proteins result in 144 possible combinations or subtypes of avian influenza. Within each of the 144 subtypes numerous combinations of genetic material determine the pathogenicity of the subtype to an infected host. The virus is found only in a small number of birds in the wild and infection typically causes few, if any, symptoms. The virus is shed in fecal droppings, saliva, and nasal discharges. However, during 1995-1996, it is thought that genetic drift (i.e. mutation) occurred in an avian influenza virus of wild birds, allowing the virus to infect chickens in China. This was followed by further genetic re-assortment into the highly pathogenic avian influenza (HPAI) subtype H5N1. Since that time, HPAI H5N1 has been circulating in the Asian poultry and domestic fowl resulting in significant mortality events in these species. Asian H5N1 likely underwent further mutation allowing infection of additional species of birds, mammals, and humans. Most recently, this virus moved back into wild birds resulting in mortality of various waterfowl and other waterbirds.

HPAI H5N1 is of critical concern because: 1) it poses a threat to the domestic poultry industry, especially chickens; 2) it has caused illness in approximately 318 humans since 2003, including the death of at least 192 people as of 11 July 2007; and 3) the emergence of HPAI H5N1 in humans poses a potential global pandemic influenza threat. Currently, human cases are thought to have acquired HPAI H5N1 virus infection by direct handling of infected domestic poultry, consumption of uncooked poultry products or contact with unsanitary virus-contaminated surfaces or materials.

## **Don't Panic, Just Ask a Biologist**

As of the date of this publication, HPAI H5N1 has not been found in the United States and surveillance for the disease in wild birds by wildlife biologists helps ensure the safety of the people and poultry industries of Maine. The USDA has been preparing for and responding to avian influenza outbreaks in commercial poultry for decades. It's our turn to do our part for the betterment of all. So if you see a biologist banding ducks or if you're a duck hunter and meet us at a boat launch looking to collect a sample, ask us some questions, we'd be happy to keep you informed about our Avian Influenza surveillance efforts.

*--R. Bradford Allen and Michael Schummer*



## MAMMAL GROUP

The Mammal Group is one of 4 groups in the Wildlife Resource Assessment Section (WRAS), in the Bangor Office. We develop and oversee implementation of all management systems for Maine's mammals; address public and Departmental information needs through the development of research programs, monitoring protocols, species assessments, and public presentations; and assist in the formulation of harvest regulations by analyzing biological data (as stipulated by management systems), meeting with regional biologists, and making recommendations to the Department's upper administration.

**Wally Jakubas, Mammal Group Leader** – Supervises mammal group personnel, oversees all group activities, coordinates group activities within and outside of the Department, manages the group's budgets, serves as furbearer biologist and Departmental spokesperson on furbearer issues, and serves as lead biologist on wolf and cougar issues.

**Randy Cross, Wildlife Biologist** – Supervises bear field crews, assists in analyzing bear data, oversees the processing and aging of moose, deer, and bear teeth, and assists other biologists in field and office activities.

**Karen Morris, Wildlife Biologist** – Oversees moose management, data collection, and analysis; coordinates monitoring of small mammals (e.g., bats, voles, and New England cottontails); and serves as Departmental spokesperson on moose issues.

**Lee Kantar, Wildlife Biologist** – Oversees the management of Maine's white-tailed deer population including biological data collection and analysis, review of the deer management system, and sampling for Chronic Wasting Disease. Lee is the Departmental spokesperson on deer issues.

**Jennifer Vashon, Wildlife Biologist** – Oversees the bear and lynx programs, including bear and lynx management issues and data analysis, and serves as Departmental spokesperson on lynx and bear topics.

**Scott McLellan, Bio Specialist** – Helps coordinate field activities for the lynx research project, including field camp operations, trapping, and chemical immobilization of research animals, and assists the lynx project leader with data analysis.

**2006-07 Contract Workers & Volunteers** – *Contract Workers:* **Kendall Marden** – Deer and Bear Project; **Mark Martin** - Moose Project and Ecoregional Survey; **Shevenell Mullen** – Lynx Project; **Brad Nichols** - Lynx Project; **Dave Pert** – Lynx, Deer, and Bear Projects; **Eric Rudolph** – Bear Project; **Dan Wagner** – Bear Project; and **Laura Sebastianelli** – Ecoregional Survey. *Volunteers:* **Rick Gray** – Deer Project; **Elizabeth Kehas** – Lynx Project; **Kris MacCabe** – Lynx Project; **Kenneth Mayo** – Bear Project; **Dave Miller** – Furbearers; **Carmen Phillips** – Lynx Project; **Ellen Robertson** – Deer Project; **Andrew Webb** – Lynx Project; **Ben Webb** – Lynx Project; **Beth Welch** – Lynx Project; **Clyde Webb** – Lynx Project.

*We deeply appreciate the dedication and hard work we receive from our contract workers and volunteers!*

We also thank **Rita Seger** for the support she has given to the bear project throughout her doctorate work at the University of Maine.

### **Black Bear**

Maine has a large population of black bears estimated around 23,000 bears. For more than 30 years, MDIFW has been monitoring black bears in 3 areas of the state to ensure our management of bears is based on current and sound scientific information. In 2004, we entered a cooperative research venture with Dr. Rita Seger (M.D.), who is pursuing a doctorate degree in the Wildlife Ecology Department at the University of Maine under the direction of Dr. Fred Servello. Dr. Seger is interested in how bears prevent bone loss during long periods of physical and metabolic inactivity in their winter dens. Since 2004, she has accompanied our field team to some of the winter den sites of radiocollared black bears to collect blood samples and radiograph the bones in the front and back feet of bears. She will compare the bone loss and physiology of hibernating bears to that of bears in the summer and fall when they are mobile and foraging. Her research on bear bone metabolism will not only provide wildlife biologists with more information on the physiology of bear hibernation, but may also lay the groundwork for investigations into the prevention of human bone loss that may occur during the aging process (e.g., osteoporosis) or as a result of injury. We appreciate Dr. Seger's financial support and interest in MDIFW's field research of black bears, which has supplemented our efforts on obtaining current information on the status of Maine's black bear population.

Recent information suggests that bears in Maine are doing well given the plentiful natural foods in 2006, when nearly every type of berry and nut was abundant. This phenomenal crop of natural foods, not only benefited Maine's black bears, but a variety of other wildlife. Our winter den visits on all 3 study sites revealed that most cubs born in 2006 survived and were very healthy during the winter of 2007. Not only were these bears healthy, they had the highest yearling bear weights on record! This spring, our live-trapping efforts on our northern study area provided additional support of the influence of phenomenal natural food crops on black bears, where we again observed record weights. This year is shaping up to be another good natural food year and should benefit bears and other wildlife, but may make hunting bears over bait more difficult, as was observed in 2006.

### The 2006 Black Bear Season

The general hunting season for black bear in 2006 opened August 28 and closed November 25. Hunters were allowed to hunt bears near natural food sources or by still-hunting throughout this 3-month period. Hunting over bait was permitted from August 28 through September 23. The hound season overlapped the bait season, opening September 11 and closing October 27. The bear trapping season opened September 1 and closed October 31.

The 2006 harvest of 2,659 bears is below recent harvest levels (see Table 9). During the previous 5-year period, harvest ranged between 2,873 and 3,921 bears (average 3,622 bears). In 2006, 1,945 bears were taken over bait (73%), 279 bears were taken by hound hunters (11%), 146 bears were taken in traps (6%), 88 were taken by unreported methods (3%), and 201 bears (8%) were harvested by deer hunters. Most bears were taken early in the season, with 2,220 bears (84%) harvested before the end of September. Most notable this year was the abundance of both soft and hard mast crops, which likely influenced the lower bear harvest by decreasing bears' response to baits. Higher weights of adult female and yearling bears and higher cub survival rates provided additional support of the influence of abundant natural foods in 2006. Reports indicate that the beechnut crop was relatively abundant this fall following several years of low to moderate crops. Heavy beechnut crops provide an abundant fall food source for bears, which delays their entry into dens and leads to a higher harvest of bears by deer hunters. Consequently, the harvest of bears by deer hunters doubled this fall.

**Table 9. Number of bears harvested in Maine in 2006 by Wildlife Management District (WMD).**

WMD	Method of Take					Total Harvest	Archery	Guide	Resident	Resident
	Hunting w/bait	While deer hunting	Hunting w/dogs	Trapping	Unknown					
1	112	12	7	2	2	135	12	117	14	121
2	75	5	19	3	1	103	5	90	8	95
3	122	10	22	1	10	165	25	125	46	119
4	171	13	1	1	5	195	14	152	38	157
5	139	15	11	3	1	169	12	148	14	155
6	171	9	9	6	12	207	24	142	61	146
7	60	14	16	12	0	102	11	70	37	65
8	119	12	30	34	8	203	9	141	76	127
9	73	6	2	2	6	89	13	58	27	62
10	113	5	6	3	4	131	12	109	20	111
11	175	13	28	9	8	233	18	165	44	189
12	55	11	36	10	4	116	14	46	63	53
13	25	7	12	2	1	47	2	26	20	27
14	37	7	12	11	4	71	5	39	34	37
15	21	8	3	1	1	34	5	4	27	7
16	1	5	0	0	2	8	0	0	6	2
17	26	12	5	2	5	50	1	9	38	12
18	130	10	3	9	2	154	13	92	57	97
19	84	9	21	7	3	124	8	94	29	95
20	2	2	0	0	1	5	0	1	3	2
21	0	0	1	0	0	1	0	0	1	0
23	2	1	0	0	1	4	0	0	4	0
26	33	7	0	2	2	44	8	6	38	6
27	60	4	7	6	2	79	11	21	57	22
28	138	4	28	16	3	189	13	121	83	106
29	1	0	0	0	0	1	0	0	1	0
State Totals	1,945	201	279	146	88	2,659	235	1,776	846	1,813



Since 1990, hunters that pursue bears prior to the firearm season for deer are required to purchase a bear permit. While, deer hunters continue to enjoy the opportunity to hunt bears without additional permits. Bear permit sales remained relatively stable until 1999 and continued to increase through 2002. Since 2003, permit sales have returned to observed levels in the 1990s (Table 10). The recent decrease in the sale of bear permits is likely influenced by the increase in bear permit fees in 2003, when bear permits increased from \$5.00 to \$25.00 for residents and from \$15.00 to \$65.00 for non-resident hunters. Non-resident hunters (5,762) continue to purchase around 55% of the permits in 2006, while resident hunters (4,594) account for around 45% of the permits sold in 2006.

### ***Geographic Distribution of the Harvest***

Bears were harvested in 26 Wildlife Management Districts (WMDs, see Figure 6). No bears were taken in WMDs 22, 24, 25, and 30. The density of harvest expressed as the number of bears killed per 100 mi<sup>2</sup> of habitat (forested land) was greatest in WMD 28 at 26 bears/100 mi<sup>2</sup> followed closely by WMDs 3, 6, 10, and 11 with 20 to 15 bears harvested/100 mi<sup>2</sup>. In all other WMDs, hunters harvested less than 15 bears/100 mi<sup>2</sup> (statewide average of 8.5 bears/100 mi<sup>2</sup>). Bears were harvested in 12 of the State's 16 counties. Most bears (819) were harvested in Aroostook county accounting for 31% of the harvest. No bears were taken in Androscoggin, Knox, Lincoln, and Sagadahoc counties.

### ***Residence of Successful Hunters***

Maine's reputation for producing high-quality bear hunting is reflected in the harvest distribution by hunter residency. Visitors to Maine killed 1,813 bears (68%) of the 2,659 bears tagged during 2006. Visitors and Maine residents took most of their bears over bait and with the aid of hounds, although most of the bears taken over bait (75%) and with the use of hounds (75%) were taken by non-resident hunters. In contrast, Maine residents accounted for most of the bears harvested by unreported methods (67%), during the deer seasons (63%), and in traps (65%).

### ***Assistance by Registered Maine Guides***

In 2006, guides helped take 85% of bears harvested over hounds, 75% of the bears taken over bait, 42% of trapped bears, 16% of the bears for which method of take was unreported, and 3% of the bears taken by deer hunters. Guides assisted 164 residents (10%) and 1,612 nonresidents (90%) with their successful hunts in 2006.

### ***Sex and Age Distribution of the Harvest***

Males made up 53% (1,407 bears) of the 2006 harvest. Adult bears accounted for 93% (2,464 bears) of the 2006 harvest and sex and age were not reported for an additional 20 bears (<1%).

**Table 10. Hunter participation and harvest levels 1990 - 2006**

Year	No. of Permits	Harvest
1990	11,803	2,088
1991	10,204	1,665
1992	10,133	2,042
1993	10,195	2,055
1994	9,991	2,243
1995	10,929	2,645
1996	10,928	2,246
1997	10,716	2,300
1998	10,871	2,618
1999	12,542	3,483
2000	12,811	3,951
2001	14,036	3,903
2002	15,252	3,512
2003	11,331	3,900
2004	11,740	3,921
2005	10,964	2,873
2006	10,356	2,659

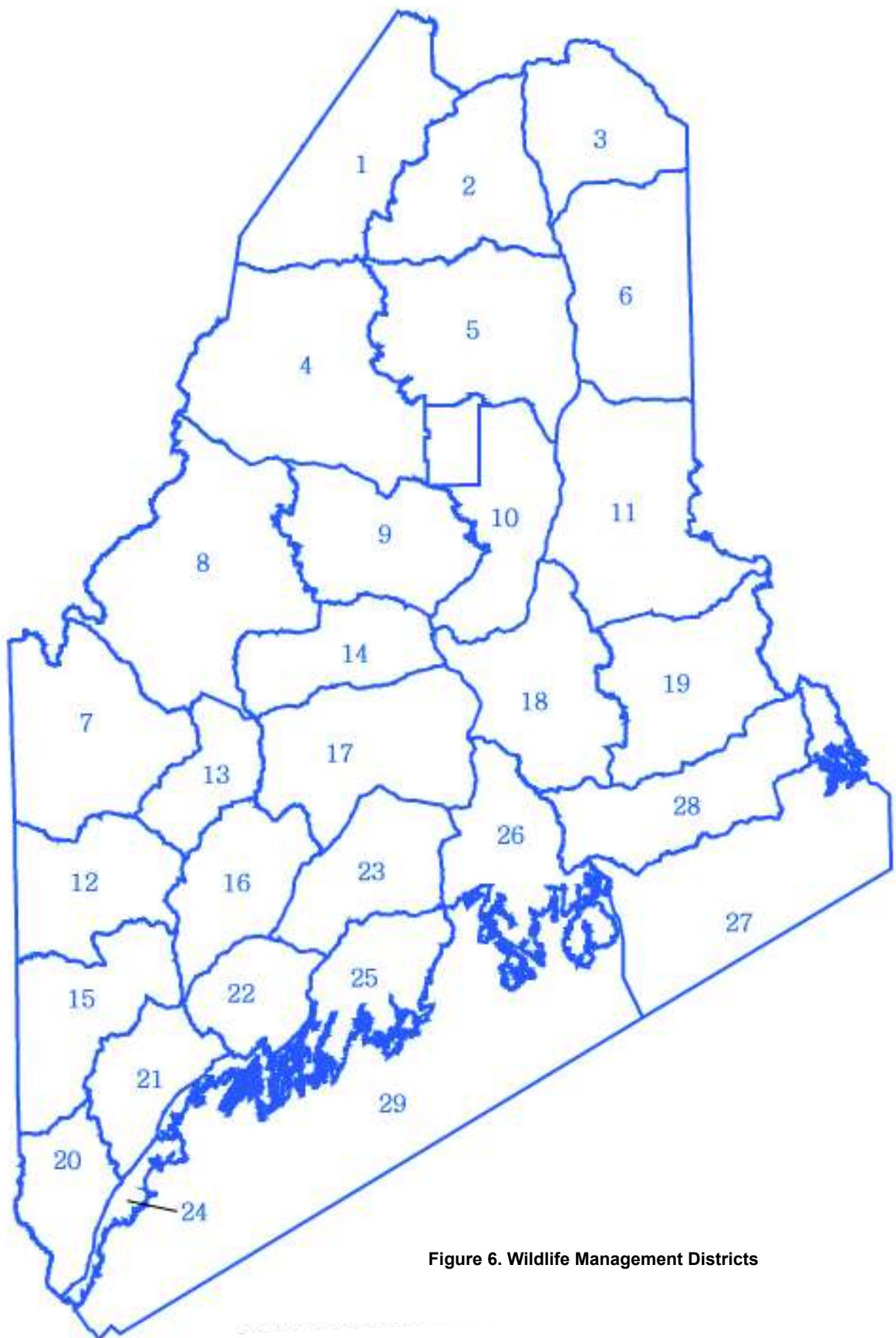


### ***Prospects for the 2007 season***

The Department has adopted a generic bear season framework to maintain consistent hunting periods, unless management concerns require changes to the lengths of hunting or trapping periods. In 2007, the season will remain similar to those in recent years. Under our current bear season framework, the season begins on the last Monday in August and closes on the last Saturday in November, generally a 13-week period (August 27-November 24, 2007). The bag limit remains at 1 bear. Starting in 2007, only cable foot traps and cage traps will be allowed to trap a black bear and each trapper will be limited to 1 trap.

In accordance with our management goal, Maine's bear population estimate remains near 23,000 bears. Thus the current bear season framework and hunter participation rates provide the opportunity to obtain harvest levels of over 3,500 bears in 2007. However as evidenced in recent harvests, hunter success is influenced by additional factors, such as weather and natural foods.

--Jennifer Vashon



**Figure 6. Wildlife Management Districts**



## Furbearers and Small Game Mammals

Furbearers include all mammals harvested primarily for their pelts. In Maine, these include coyote, red and gray fox, bobcat, fisher, marten, raccoon, skunk, short- and long-tailed weasels, mink, otter, beaver, muskrat, and opossum. Although Canada lynx are harvested for their pelts in Canada and Alaska, in the lower-48 states lynx are protected as a federally threatened species. MDIFW agents, or staff, tag the pelts of all furbearers, except weasel, raccoon, muskrat, skunk, and opossum. The annual number of pelts tagged (i.e., the recorded furbearer harvest) is one of the primary population indices used in our furbearer management systems. In addition to trapping, some furbearers and small game mammals can be taken by hunting. Hunted furbearers include fox, coyote, bobcat, raccoon, and skunk. Small game that can be hunted includes snowshoe hare, gray squirrel, woodchuck, porcupine, and red squirrel. New England cottontail can no longer be hunted and are now listed as a state endangered species.

## 2006-2007 Fur Harvest & Hunting Seasons

In 2006, the general trapping season began October 29 and ended December 31. Special trapping seasons exist for muskrat, coyote, and fox. The early muskrat season started October 22 and lasted until October 28. During this period muskrats could only be trapped in WMDs 1, 2, 3, 4, 5, 6, 9, 10, and 11 (see Figure 6 pg. 50). The special fox and coyote trapping season ran from October 15 through October 28 and was open statewide.

Hunting seasons on furbearers include a skunk and opossum season that runs from October 16 through December 31; a raccoon season that started October 1 and continued through December 31; a fox season that lasted from October 16 until February 28; and a bobcat season that runs from December 1 through February 14.

The 2006 beaver season ran from November 1 through April 30 in WMDs 1, 2, 3, 4, 5, and 6; from November 1 through April 15 in WMDs 9, 10, 11, 18, 19, and 28; from December 1 through March 31 for WMDs 7, 8, 13, 14, and 17; December 1 through February 28 for WMDs 12, 15, 16, 23, 25, 26, 27, and 29; December 15 through February 28 for WMDs 20, 21, 22, and 24. The Maine's Trapper Association proposed lengthening the beaver season in Downeast Maine to provide more spring trapping opportunities. The Department reviewed this proposal and forwarded its recommendation for a longer trapping season for beaver in Downeast Maine to the Commissioner's Advisory Council for approval. Season length changed in WMDs 9, 10, 11, 18, 19, 28, and 29, which formerly ran from November 1 to March 31; and WMDs 12, 15, 16, 23, 25, 26, 27, and 30, which formerly ran from December 1 - February 28.

## Overview of Trapping Season and Management Activities

This year's trapping season and furbearer management activities were noteworthy for several reasons. First, trappers enjoyed significantly higher pelt prices this year for all species except otter (Table 11). Otter pelt prices were only half of what they were last year. For the past few years otter pelt prices have been supported by high demand for otter furs from China. This demand collapsed in 2006 after the Dalai Lama appealed to Buddhists to shun the use of animal products in their clothes and personal life. Overall, the higher pelt prices for furbearers offset higher gasoline prices and led to increased harvests for several species.

**Table 11. Average pelt price offered for furs by Maine furbuyers over the last 6 trapping seasons.**

*All prices over \$5.00 are rounded to the nearest dollar. Prices followed by an h superscript were significantly ( $\alpha = 0.10$ ) higher than the mean pelt price the previous 5 years for that species. Prices followed by an L superscript were significantly lower than the mean pelt price for that species the previous 5 years.*

Species	06-07	05-06	04-05	03-04	02-03	01-02
Beaver	\$21.00 <sup>h</sup>	\$18.00 <sup>h</sup>	\$17.00	\$16.00	\$20.00	\$13.00
Red Fox	\$22.00 <sup>h</sup>	\$17.00	\$16.00	\$22.00	\$24.00	\$16.00
Fisher (male)	\$71.00 <sup>h</sup>	\$31.00 <sup>h</sup>	\$27.00	\$25.00	\$24.00	\$20.00
Fisher (female)	\$74.00 <sup>h</sup>	\$27.00 <sup>h</sup>	\$21.00	\$21.00	\$23.00	\$19.00
Muskrat	\$6.00 <sup>h</sup>	\$2.60	\$1.69	\$2.15	\$2.64	\$2.29
Raccoon	\$11.00 <sup>h</sup>	\$8.00 <sup>L</sup>	\$9.00	\$10.00	\$9.00	\$9.00
Weasel	\$3.31 <sup>h</sup>	\$2.21	\$1.96	\$2.00	\$1.97	\$2.43
Bobcat	\$59.00 <sup>h</sup>	\$49.00	\$44.00	\$50.00	\$61.00	\$30.00
Grey Fox	\$24.00 <sup>h</sup>	\$17.00 <sup>h</sup>	\$12.00	\$14.00	\$10.00	\$10.00
Pine Marten	\$45.00 <sup>h</sup>	\$25.00 <sup>h</sup>	\$21.00	\$19.00	\$18.00	\$16.00
Mink (male)	\$22.00 <sup>h</sup>	\$15.00 <sup>h</sup>	\$12.00	\$10.00	\$10.00	\$12.00
Mink (female)	\$13.00 <sup>h</sup>	\$10.00 <sup>h</sup>	\$8.00	\$8.00	\$6.00	\$9.00
Otter	\$45.00 <sup>L</sup>	\$70.00 <sup>h</sup>	\$68.00	\$65.00	\$51.00	\$41.00
Skunk	\$5.00 <sup>h</sup>	\$3.50 <sup>h</sup>	\$2.79	\$2.54	\$2.33	\$3.50

Perhaps the most noteworthy activity affecting our furbearer management program was the lawsuit filed by the Animal Protection Institute against the Department for allowing the incidental trapping of eagles and lynx. Both of these species are federally threatened, and hence, are protected under the federal Endangered Species Act. Even though

the number of lynx and eagles that are incidentally trapped each year are low, and trapping is not impacting the growth of either the lynx or eagle populations, the Animal Protection Institute chose to bring this lawsuit against the Department. If successful, this lawsuit could curtail certain types of trapping throughout the state. In response to this lawsuit, the Department has prepared an application for an Incidental Take Permit and submitted the application to the US Fish and Wildlife Service (USFWS). The preparation of this lengthy document consumed much staff time, and unfortunately, resulted in staff putting aside other management activities for furbearers and other wildlife. If the Incidental Take Permit is approved by the US Fish and Wildlife Service, a certain number of lynx and eagles could be caught each year without violating the Endangered Species Act. If the number of incidentally caught lynx and eagles stays within the prescribed limits, this permit should protect the Department and trappers from lawsuits related to the incidental taking of lynx or eagles.

In order to receive an Incidental Take Permit from the USFWS, the Department has to demonstrate that it has done everything to the maximum extent practical to limit the incidental take of eagles and lynx. After reviewing the circumstances surrounding lynx and bald eagle incidental captures, the Department proposed two modifications to its trapping regulations that may reduce the incidental take of lynx and eagles. To further protect lynx, trappers on upland sites will need to set conibears > 4 ft. off of the ground, and affix these traps to trees or poles that are less than 4" in diameter, and which are positioned at a > 45° angle to the ground. Some exceptions were made for mink trappers wishing to use small conibears in blind sets on the ground. The requirement to use elevated sets when using conibears follows past Departmental recommendations on how to avoid incidental lynx captures while trapping or hunting bobcat and other furbearers. To better protect eagles, the Department proposed prohibiting trapping within 50 yd of exposed bait (i.e., bait that is visible from the air). Trappers wishing to use bait in their trap sets must cover the bait so that it is no longer visible to flying birds. This is one of the toughest exposed bait laws in the country. Both of the proposed trapping regulations were passed by the Commissioner's Advisory Council in June, and should be in effect this next trapping season. In addition to these measures, the Department will continue its informational and educational measures to reduce the incidental trapping rates for lynx and eagles.

### **Beaver**

This was the forth season in a row that the beaver season was modified in an effort to increase trapper participation in beaver trapping and to address requests from the trapping community. The Department's efforts to increase beaver trapping were helped out considerably by beaver pelt prices that were significantly higher than they have been the last 5 years (Table 11). High pelt prices and longer trapping seasons resulted in 12,635 beaver being harvested, which was the most beaver harvested since the 1996-1997 season (Table 12). Beaver management in the state represents a balance between the ecological role beaver play in wetlands, the desire of landowners to limit damage to roads and property, and recreational opportunities for trappers. In addition to beaver being harvested for their fur, they are sometimes shot when they are perceived to be a nuisance by landowners. This practice has become more common since the Department has cut back its animal damage control program because of funding shortfalls, and landowners have had to bear the responsibility and costs of removing nuisance beaver. Most beaver that are shot are not tagged and are not represented in harvest totals.

**Table 12. Harvest of furbearing animals in Maine.**

<b>Species</b>	<b>06-07</b>	<b>05-06</b>	<b>04-05</b>	<b>03-04</b>	<b>02-03</b>	<b>01-02</b>	<b>00-01</b>	<b>99-00</b>
Beaver	12,635	11,094	10,436	8,222	7,809	11,757	9,803	9,850
Bobcat	344	344	376	273	331	269	308	194
Coyote	2,007	2,077	2,175	2,459	2,287	2,741	1,977	1,823
Fisher	1,968	1,810	2,174	2,526	2,630	3,117	2,028	2,578
Red fox	1,245	1,067	1,413	1,535	1,469	2,056	1,272	1,248
Grey fox	107	67	125	196	172	164	89	82
Marten	2,350	3,873	2,248	5,088	2,908	5,529	1,832	4,396
Mink	2,280	1,108	1,224	904	935	2,031	1,606	1,545
Otter	968	1,041	1,113	931	803	1,103	943	737

*Harvest records are from pelt-tagging records collected during the 1999-2000 trapping season to the 2006-2007 season. Pelts may not be tagged when nuisance animals (e.g., coyote and beaver) are lethally removed, thus pelt-tagging records may under-represent the harvest of some species.*

### **Bobcat**

The total number of bobcats harvested in 2006-2007 was identical to the 2005-2006 harvest (Table 12). This is one for the trivia books. Identical back-to-back harvest rates, when there was an open season on a furbearer, have not occurred in recent times in Maine for any furbearer. The 2006-2007 harvest did differ from last year's in that 162 bobcat were trapped as compared to 142 last year. The bobcat population appears to have stabilized the last 5 years. This is good news for bobcat hunters and trappers, since current hunting and trapping rates appear to be sustainable, even with the 2-week extension of the hunting season. Hunters have enjoyed an extra 2 weeks of bobcat hunting for 4 years now. The high number of bobcat in the state is likely being sustained by an abundant snowshoe hare population. However, the habitat that supports snowshoe hare has been at or near optimum levels for some time. As old clearcuts mature past the point they provide good cover for snowshoe hare, these habitats will support fewer hare. Studies being conducted by our Department and the University of Maine indicate that snowshoe hare numbers have declined in the last couple of years. Whether this decline is indicative of a trend, or is just a blip on the screen, remains to be seen.

### **Coyote**

The coyote harvest for the 2006-2007 season came in at a very appropriate number – 2,007. The 2006-2007 harvest was slightly lower than last year's and represents the 6th year in a row that the coyote harvest has declined (Table 12). Reports of mange in coyotes were common in central and Downeast Maine, but it is unknown whether these parasites reduced coyote numbers in any area. Coyote pelt prices were significantly higher this year than they have been the past five years (Table 11). However, high gasoline prices were on many trappers' minds when deciding how long of a trap line they could afford to run, and how far they were willing to drive to set the trap line. The Department's coyote snaring program was suspended in Sept. 2003. The federal Endangered Species Act prohibits the incidental take (i.e., capture, harassment, or killing) of threatened or endangered species. The Canada lynx is a federally threatened species, and was perceived to be at risk to incidental taking by coyote snarers. On the advice of the State's Attorney General's office, and because of threatened lawsuits, the Department suspended the snaring program.

### **Fisher**

Although there was a 9% increase in the statewide fisher harvest in 2006 over 2005 (Table 12) the number of fisher caught per fisher trapper continued to decline on a statewide basis for the 6th year in a row. The increase in the fisher harvest was not surprising since fisher pelt prices more than doubled over last year's price, and pre-season, trappers were anticipating high pelt prices for fisher (Table 11). This resulted in more trappers pursuing fisher than in 2005 and a slightly higher harvest rate.

Since 2001, fisher trapping success (the number of fisher caught per fisher trapper) has declined on a statewide basis. This decline, coupled with decreased harvest rates, prompted a review of Maine's fisher trapping season. This review indicated that when fisher harvest rates were near their highest level (e.g., 2002) there were 191 townships in Maine where the harvest of fisher exceeded 10 fisher / 100 mi<sup>2</sup>. Previous studies indicated that fisher populations may not be able to sustain this level of harvest. However, in 2002 Maine's fisher population appeared to have been increasing for over 10 years and the Department had little evidence that the trapping harvest rate was excessive. However, as the old saying goes, "hindsight is 20/20". It now appears that the harvest rate was too high in many areas of the state, especially in areas near human population centers. After consulting with trappers and reviewing the trapping regulations of other jurisdictions in the Northeast, the Department elected to recommend changes to Maine's fisher trapping season. In spring of 2007, the Department recommended shortening both the fisher and marten trapping seasons to one month (November 15 to December 15) in the fall of 2007. The Department views this as a less restrictive approach than other methods proposed to reduce the fisher harvest. If the shorter trapping season for fisher does not reduce the harvest, other restrictions, such as seasonal bag limits, may be proposed.



### **Red and Grey Fox**

The red and grey fox harvests for the 2006-2007 season were higher than in 2005-2006, but were well within recent norms (Table 12).

### **Marten**

Marten harvest rates are unique, in that they regularly fluctuate from year to year. During even-years, the marten harvest is usually ½ of the harvest during odd-numbered years. Annual fluctuations in the marten harvest in Maine have been occurring since the mid-1800s. For many years, it was believed that fluctuations in the marten harvest were tied to fluctuations in the beechnut crop. Heavy beechnut production occurred on even-numbered years and light production occurred on odd-numbered years. The large amount of food (e.g., small mammals) available to marten when beechnuts were abundant appeared to make them less inclined towards risky behavior -- like entering a trap looking for more food. Hence the marten harvest would

decline during even number years. We recently saw the biennial cycle in beechnut production skip a beat or two, but the alternate year pattern in the marten harvest still persisted (Table 12). We are not sure why marten harvest rates continued with their usual pattern in Maine, while marten harvests in other states (e.g., New York) appeared to follow the changes in beechnut crop production. This year was the first time in 4 years that Maine appeared to have a good beechnut crop, and correspondingly the marten harvest rate was down (Table 12) despite high pelt prices (Table 11).

Maine's marten population currently appears stable. However, research at the University of Maine indicates that Maine's mature forests are quickly becoming fragmented to the point where they may not be able to support the marten population at its current level. The Department will continue to closely monitor this situation and work with the trapping community and forest industry to try to lessen the impact of current forestry practices on marten.

### ***Mink***

The 2006-2007 mink harvest was more than double last year's harvest (Table 12), and was the highest mink harvest since the 1989-1990 season. As with other furbearers, mink pelt prices were substantially higher than last year (Table 11).

### ***Otter***

Maine's 2006-2007 otter harvest was slightly lower than last year (Table 12), which was expected given the low pelt price for otter. There is still concern among some trappers that otters are being over harvested in Maine. The Department has reviewed the otter management system and raised this subject at numerous meetings with trappers. At this time, there is no evidence, other than some anecdotal accounts, that otters are being over trapped. On a statewide basis, the number of otters being trapped was well below the harvest limit in our management system.

### ***Muskrat***

For a number of years we have reported that Maine's muskrat population, and other muskrat populations in the Northeast appeared abnormally low. This eventually led to a region-wide investigation into the status of muskrats in the Northeast. This year it appears that the tide has turned. Numerous trappers have reported an abundance of muskrats. The turnaround in the muskrat population is sure to be a topic of discussion at the annual meeting of furbearer biologists this fall.

***Funds for managing Maine's furbearers primarily come from the sale of hunting and trapping licenses, and from federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), and funds from Loon Conservation Plate funds.***

--Wally Jakubas

## ***Moose***

### **2006 Moose Season**

In 2006, 82% of 2,825 moose permit holders registered a moose (Table 13, pg. 55), which was a slight improvement over the 2005 hunting success rate (77%). However, the total number of permits issued in 2006 was somewhat lower than in 2005 (2,895). In 2006, bull only permits (BOP) were reduced from 290 to 235 and 80 to 50 in WMDs 8 and 9, respectively. These WMDs are being managed for hunting and viewing opportunities, and MDIFW's Moose Management System indicated that the proportion of mature bulls was below target in these management districts. Changes in WMD boundaries in Downeast Maine resulted in more land being open to moose hunting. Consequently, 15 BOP permits were added in this region.

### **2007 Moose Season**

In 2007, 55 more permits will be issued bringing the number of permits to 2,880 (Table 14, pg. 56). Both antlerless only permits (AOP) and BOP are being doubled in WMD 17 (See WMDs, pg 50). The management goal for WMD 17 is to reduce the number of moose/vehicle accidents by reducing the number of moose, and at the same time maintain quality moose hunting and viewing. An additional 10 and 15 AOP will be issued in WMDs 3 and 6, respectively and 5 BOPs will be added to each of WMDs 2 and 5. Ten fewer BOPs will be issued in WMD 13 because there are fewer mature bulls than desired.

## **Future Prospects**

What direction moose management takes in the future is up in the air at this time. The Commissioner convened the Big Game Working Group, which is made up of members of the public, this summer to reevaluate the goals and objectives for moose management. By the time you read this the goals that direct moose management may have changed. This may change the number and type of moose hunting permits that will be issued in the future or their distribution among WMDs.

**Table 13. 2006 Maine moose season permit allocation and registered kill by WMD, season and permit type.**

Season and permit type:				2006 Registrations	
WMD	Season	Permit <sup>1</sup> Type	No. of Permits	Kill	Success %
1	Sept.	BOP	90	79	88
	Sept.	AOP	5	4	80
	Oct.	BOP	30	27	90
	Oct.	AOP	15	11	73
	WMD 1 Subtotals		140	121	86
2	Sept.	BOP	68	65	96
	Oct.	BOP	22	21	95
	WMD 2 Subtotals		90	86	96
3	Sept.	BOP	169	151	89
	Sept.	AOP	55	48	87
	Oct.	BOP	56	51	91
	Oct.	AOP	165	150	91
	WMD 3 Subtotals		445	400	90
4	Sept.	BOP	191	175	92
	Oct.	BOP	64	61	95
	WMD 4 Subtotals		255	236	93
5	Sept.	BOP	90	81	90
	Oct.	BOP	30	29	97
	WMD 5 Subtotals		120	110	92
6	Sept.	BOP	165	150	91
	Sept.	AOP	66	54	82
	Oct.	BOP	55	49	89
	Oct.	AOP	199	154	77
	WMD 6 Subtotals		485	407	84
7	Oct.	BOP	125	118	94
8	Oct.	BOP	235	207	88
9	Oct.	BOP	50	46	92
10	Oct.	BOP	100	80	80
	Oct.	AOP	10	9	90
	WMD 10 Subtotals		110	89	81
11	Sept.	BOP	120	93	78
	Sept.	AOP	30	10	33
	Oct.	BOP	40	31	78
	Oct.	AOP	90	54	60
	WMD 11 Subtotals		280	188	67
12	Oct.	BOP	35	23	66
	Oct.	AOP	20	14	70
	WMD 12 Subtotals		55	37	67
13	Oct.	BOP	45	33	73
	Oct.	AOP	10	6	60
	WMD 13 Subtotals		55	39	71
14	Oct.	BOP	35	32	91
17	Oct.	BOP	15	12	80
	Oct.	AOP	15	11	73
	WMD 17 Subtotals		30	23	77
18	Oct.	BOP	80	43	54
	Oct.	AOP	20	9	45
	WMD 18 Subtotals		100	52	52
19	Sept.	BOP	67	44	66
	Sept.	AOP	4	3	75
	Oct.	BOP	23	21	91
	Oct.	AOP	11	10	91
	WMD 19 Subtotals		105	78	74
28	Oct.	BOP	25	15	60
	Oct.	AOP	5	1	20
	WMD 28 Subtotals		30	16	53
29	Oct.	BOP	60	35	58
	Oct.	AOP	20	9	45
	WMD 29 Subtotals		80	44	55
OVERALL WMD TOTALS			2,825	2,329	82

<sup>1</sup> BOP = Bull Only Permit – The holder may kill one male moose of any age.

AOP = Antlerless Only Permit – The holder may kill a cow, a calf, or a bull with antlers shorter than its ears.



The 2000 population goals and objectives were specific to each WMD and consisted of 3 types:

1. Recreation: Maintain the population at 60% of K to maximize hunting and usually viewing opportunity. (WMDs 1, 2, 4, 5, 7-10, 12-14, 18, 19, 27 and 28)
2. Safety: Reduce the moose population to lower the number of moose/vehicle accidents. (WMDs 20-26)
3. Compromise: Reduce the population by 1/3 to reduce moose/vehicle accidents and maintain some quality recreational opportunities. (WMDs 3, 6, 11 and 15-17)

The working group will examine these goals and objectives to see if they still make sense in light of current public opinion and additional information about moose.

One aspect the group will need to consider is whether or not the current goals reflect public desires for the moose population in the various parts of the state. There is some indication that at least some people would like to have fewer moose in some of the WMDs in the recreation area. Public meetings and other surveys regarding moose hunting in southern Maine suggest that, while most people would support, or at least accept expanding the moose hunt farther south, there does not appear to be a great deal of support for drastically reducing moose numbers there.

Another aspect that has changed is the assumption that food was the primary factor that limited the growth of the moose population. The 2000 population goal and objective for the WMDs in the recreation area were based on this assumption. If this assumption were true, this management objective (60% of K, or 60% the maximum number that could be supported by the available food) should provide a large number of healthy moose for recreational viewing and hunting, and hold the moose population at a level that would cause minimal economic damage to regenerating forests. However, there is increasing evidence that moose densities at the southern edge of their distribution may be limited by factors other than a shortage of food. We are uncertain, at this point, how other factors, such as winter ticks, may limit the growth of the moose population and affect moose viewing and hunting opportunities.

Winter tick is a fact of life for moose and there are few if any moose in Maine that do not harbor these pests every winter. However, in some years, tick numbers are exceptionally high and moose may have incredible numbers of these pests, sometimes more than 20 per square inch. Previous information from other areas suggests that ticks impact moose numbers when moose are in poor condition due to high moose numbers. In a 3-year study in New

**Table 14. Maine Moose hunting permit allocations by season and WMD.**

WMD	(BOPs)		(AOPs)		PERMITS BY SEASON		TOTAL PERMITS
	Sep	Oct	Sep	Oct	Sep	Oct	
1	90	30	5	15	95	45	140
2	71	24	0	0	71	24	95
3	169	56	57	173	226	229	455
4	191	64	0	0	191	64	255
5	94	31	0	0	94	31	125
6	165	55	70	210	235	265	500
7	0	125	0	0	0	125	125
8	0	235	0	0	0	235	235
9	0	50	0	0	0	50	50
10	0	100	0	10	0	110	110
11	120	40	30	90	150	130	280
12	0	35	0	20	0	55	55
13	0	35	0	10	0	45	45
14	0	35	0	0	0	35	35
17	0	30	0	30	0	60	60
18	0	80	0	20	0	100	100
19	67	23	4	11	71	34	105
27	0	25	0	5	0	30	30
28	0	60	0	20	0	80	80
<b>Total</b>	<b>967</b>	<b>1,133</b>	<b>166</b>	<b>614</b>	<b>1,133</b>	<b>1,747</b>	<b>2,880</b>

Hampshire, 1/3 of the calves collared in January succumbed to tick infestations by spring. Although all collared calves in Maine survived their first winter during the 1980s, in subsequent years, we have found high numbers of moose about 11 months old that died due to high tick and often lungworm infestations. The losses experienced in New Hampshire are at a level that could be expected to stabilize and perhaps reduce moose numbers. This evidence, as well as declines in moose numbers in several Maine WMDs (despite very conservative cow harvests and no change in animal condition) leads us to believe that ticks may limit moose population growth before there is evidence of malnutrition. Conditions that allow winter tick to reach numbers that are a problem for moose include high moose densities, mild fall weather, and early springs.

--Karen Morris

AOPs = Antlerless Only Permits

BOPs = Bull Only Permit

## ***Deer***

### **2006 Deer Harvest**

#### ***Season Dates and Structure***

Maine Deer hunters could hunt white-tailed deer for 79 days within the structure of five different hunting seasons during 2006. During the expanded archery season from September 9th to December 9th bowhunters could harvest an unlimited number of deer. The expanded archery season occurred in WMD 29 (see Figure 6, WMDs, pg. 50), part of WMD 24 and 9 other locations that are mostly urban and in central or southern Maine. The special (statewide) archery season ran from September 28th to October 27th (27 days). During this season, deer of either sex were legal. October 21st marked our fifth youth hunt, where hunters 10 to 15 years of age were eligible to hunt statewide for deer of either sex. The regular firearms season opened for Mainers on October 28th and for non-residents, the following Monday the 30th. The firearms season ran until November 25th. Muzzleloaders had a 6-day hunt from November 27th to December 2nd statewide, while an extended season continued from December 4th to December 9th in southern and central WMDs.

#### ***Doe Quotas, Any-Deer Permits, and Applicants***

Every year we estimate the number of does that need to be harvested to achieve deer population objectives in each WMD. Also known as doe quotas, these desired doe harvests are calculated prior to the deer season and include the cumulative harvest of all does older than fawn from each deer hunting season. Since hunters may harvest a doe during both archery seasons and the youth deer season, doe harvests must be closely regulated during the firearms and muzzleloader season using any-deer and bonus any-deer permits. This ensures that the total harvest of does in any given WMD does not exceed the pre-set quota.

Generally, the number of does that can be harvested by hunting without decreasing the population increases following mild winters. Following severe winters we would expect increased mortality and adjust doe quotas accordingly. The effects of a severe winter may affect a deer population for more than one year; therefore, adjustments are also made to doe quotas for the 2nd season after a severe winter. During 2006, doe quotas in eastern, western, and northern WMDs were kept low to encourage deer population growth. In contrast, more liberal quotas were set in central and southern Maine WMDs to stabilize or reduce deer populations.

During 2006, doe quotas ranged from zero in 5 WMDs (districts 1, 3, 19, 27 and 28) to 1,715 in WMD 17. Among the 24 WMDs in which a doe harvest was desired, the doe quota totaled 8,473. Since any-deer permittees and archers can choose to kill a fawn instead of an adult doe (or a buck); we also anticipated a harvest of more than 4,830 fawns (both sexes) during the 2006 deer seasons.

Anywhere from 2.5 to 10 any-deer permits must be issued to achieve a registered harvest of one adult doe, this is referred to as an expansion factor. Some any-deer permittees may choose to take a buck or a fawn instead of an adult doe, while a great many others are not successful in killing a deer. The number of any-deer permits we allocate in a given district is a reflection of that WMDs doe quota. Consequently, WMDs that can sustain only limited doe mortality (e.g., northern, western, eastern WMDs) are allocated relatively few any-deer permits. In contrast, WMDs that can support higher doe mortality (and still meet management objectives) are allocated considerably more any-deer permits (central, southern, and coastal WMDs). Additionally the number of does harvested in our archery and youth hunts count towards our doe quotas and are accounted for in the any-deer permit allocation process. This tends to reduce the number of any-deer permits that can be issued to firearms hunters, in order to meet adult doe quotas. However, firearms season hunters typically account for 85% of total deer hunting effort and harvest.

As deer populations have increased in central and southern Maine, it has become necessary to increase doe harvest rates in order to stabilize, or in some districts, to reduce deer populations. This requires substantial allocations of any-deer permits, sometimes at levels that exceed the number of applicants. Since it is important to meet doe harvest quotas, we have instituted bonus any-deer permits to be issued in WMDs that have insufficient applicants for available any-deer permits. When available any-deer permits exceed the number of applicants, all applicants receive an any-deer permit, and the excess permits are randomly distributed among these applicants as bonus any-deer permits. As with regular any-deer permits, bonus permits are WMD-specific. However, the holder of a bonus any-deer permit can take a second antlerless deer during any open season on deer. Hunters who possess only the any-deer permit can take one deer of either-sex during the regular firearms or muzzleloader season. Beginning in 2002, hunters could apply for an any-deer permit in up to 3 WMDs, in addition to designating one WMD for a bonus any-deer permit, if these become available.

Any-deer and bonus permits are allocated to qualified applicants in a random computer lottery. Both the application and the any-deer permits are free; bonus permits cost \$12. During 2006, we issued 66,031 any-deer and 1,694 bonus

any-deer permits (WMDs 16, 17, 20-24). In addition, and new in 2006, was the SuperPack license. This license enabled hunters to receive an any-deer permit in a WMD where at least 5,000 any-deer permits were allocated. No more than 2.5% of permits in a district can be allocated to the SuperPack licensees. In 2006, 514 SuperPack licenses were assigned. All combined, these 67,725 permits represent a -4% decrease in antlerless deer hunting opportunity compared to 2005 (70,725 permits). Permit allocations ranged from zero in the 6 WMDs with a zero doe quota, to 14,700 permits in WMD 17. The top 5 WMDs receiving any-deer permits on a per 100 mi<sup>2</sup> basis were: WMD 24 (1,241 permits per 100 mi<sup>2</sup>), WMD 23 (1,232 permits), WMD 22 (1,104 permits), WMD 21 (1,035 permits), and WMD 17 (1,007 permits). Maine residents drew 52,551 permits (78%), landowners drew 9,922 permits (15%) and nonresidents drew 5,252 any-deer permits (8%). It is worth noting that less than one-half of our resident deer hunters and less than 30 % of our nonresident hunters apply for an any-deer permit each year. Overall, 80,993 people applied for an any-deer permit during 2006 (72,006 residents; 8,467 nonresidents). In addition 520 SuperPack applicants were received.

### Statewide Statistics for 2006

Overall, 29,918 deer were registered during 2006, of which 1,713, 781, 1,216, 24,862, and 1,307 were taken during the expanded archery, regular archery, youth day (October 21st), regular firearms, and muzzleloader seasons, respectively (39 deer were registered without an associated season [Table 15]). The 2006 harvest was 1,770 more than in 2006 or a 6% increase (28,148 vs. 29,918 deer). The 2006 harvest is above the average number of deer harvested over the 20-year history of any-deer permit regulations (i.e., 28,704). This increase was chiefly due to the increased success during the archery, youth hunt and muzzleloading seasons.

**Table 15. Sex and age composition of the 2006 deer harvest in Maine by season type and week, statewide**

Season	SEX/AGE CLASS				Total Deer	Antlerless Deer	% BY SEASON & WEEK		
	(Adult)		(Fawn)				(Adult)		
	Buck	Doe	Buck	Doe				Total	Buck
Archery	830	1,068	274	322	2,494	1,664	9	5	12
Expanded	482	777	203	251	1,713	1,231	6	3	9
October	348	291	71	71	781	433	3	2	3
Youth Day	343	484	205	184	1,216	873	4	2	6
Regular Firearms	14,241	6,801	2,033	1,787	24,862	10,621	80	87	76
Opening Saturday	757	373	120	109	1,359	602	5	5	4
Oct 30-Nov 5	3,590	1,998	594	516	6,698	3,108	22	22	23
Nov 6-12	3,075	1,324	431	359	5,189	2,114	16	19	15
Nov 13-19	2,893	1,122	312	291	4,618	1,725	14	18	13
Nov 20-26	3,926	1,984	576	512	6,998	3,072	23	23	21
Muzzleloader	667	439	93	108	1,307	640	4	4	4
Nov 27-Dec 3	288	111	23	26	448	160	1	2	1
Dec 4-10	379	328	70	82	859	480	3	2	3
Total	16,081	8,792	2,605	2,401	29,879	13,798	97	98	98

*\*39 records not associated with a method or season due to data errors  
sex/age data were corrected for errors in the deer registrations*

### Buck Harvest

The statewide harvest of antlered bucks (16,149) in 2006 is an increase of 6% from the previous year (15,261) yet remains below the any-deer permit system long term mean (Table 16, pg. 59). The top 5 buck-producing (per mi<sup>2</sup> basis) WMDs in 2006 were (in descending order), districts 24, 21, 22, 23, and 17, all in central and southern Maine. Among the 16,149 antlered bucks taken in 2006, roughly 8,326 (51%) were 1 ½ year-olds (yearlings) sporting their first set of antlers, while more than 1,776 (12%) were mature bucks (4 ½ to 15 ½ years old). Male fawns are reported with antlerless deer. The higher percentage of yearlings in the 2006 statewide harvest may reflect greater than normal overwinter survival from the record mild winter of 2005-06. This in turn may cause an under-representation of older aged deer in the harvest.

Maine is nationally recognized for producing trophy bucks (age 4½ and older). This is possible because Maine's bucks are subjected to relatively light hunting pressure compared to other states. In Maine, a healthy number of bucks annually survive to older (mature) age classes. In more heavily hunted states, yearling bucks comprise as much as 70% - 90% of the available bucks, and in those states, the lifespan of a buck rarely exceeds 3½ years. This effect combined with regulated doe harvest coincides with the principles of "Quality Deer Management" that many states desire to achieve. In Maine, deer populations subjected to hunting are held well below carrying capacity, allowing individual deer to obtain adequate nutrition and reproduction. Harvests are closely regulated, resulting in favorable buck-to-doe ratios. Overall, the statewide yearling buck frequency in the harvest for 2006 was 51% with average buck weights around 121 pounds, signifying relatively high buck escapement, good body condition and ample nutrition.



Finally, hunting effort on bucks remains light enough to allow a significant number of bucks to attain maturity, even old age (4 ½ to 15 ½ years). In 2006, 528 bucks were entered in the “Biggest Bucks in Maine Club” which requires a dressed weight of at least 200 pounds.

**Table 16. Sex and age composition of the 2006 deer harvest in Maine by Wildlife Management District<sup>1</sup>**

WMD	(Adult)		(Fawn)		Total Anter- less	All	Harvest Per 100		Harvest Per 100	
	Buck	Doe	Buck	Doe	Deer	Deer	Adult Does	Bucks Anter- less	Sq. Miles Adult Bucks	Habitat All
1	161	11	0	1	12	173	7	7	11	12
2	88	13	1	4	18	106	15	20	8	9
3	147	24	10	3	37	184	16	25	17	21
4	182	26	9	5	40	222	14	22	9	11
5	238	55	11	10	76	314	23	32	16	21
6	373	101	31	24	156	529	27	42	26	37
7	406	95	27	25	147	553	23	36	29	40
8	374	134	32	29	195	569	36	52	19	29
9	150	48	13	15	76	226	32	51	17	25
10	143	27	10	2	39	182	19	27	15	19
11	545	78	39	19	136	681	14	25	33	41
12	570	196	73	56	325	895	34	57	62	98
13	433	202	63	51	316	749	47	73	77	133
14	427	132	32	31	195	622	31	46	58	85
15	1,100	647	247	206	1,100	2,200	59	100	118	236
16	1,104	770	216	211	1,197	2,301	70	108	143	298
17	2,150	1,551	477	416	2,444	4,594	72	114	161	343
18	396	63	22	22	107	503	16	27	32	41
19	164	11	0	0	11	175	7	7	14	15
20	831	593	154	153	900	1,731	71	108	143	298
21	1,007	771	271	233	1,275	2,282	77	127	209	474
22	851	676	180	185	1,041	1,892	79	122	196	437
23	1,320	995	297	283	1,575	2,895	75	119	169	371
24	467	477	113	134	724	1,191	102	155	213	543
25	699	378	81	86	545	1,244	54	78	100	177
26	1,017	481	115	120	716	1,733	47	70	130	222
27	317	26	7	9	42	359	8	13	43	49
28	196	17	4	4	25	221	9	13	18	20
29	293	201	46	52	299	592	69	102	202	408
<b>Statewide</b>	<b>16,149</b>	<b>8,799</b>	<b>2,581</b>	<b>2,389</b>	<b>13,769</b>	<b>29,918</b>	<b>54</b>	<b>85</b>	<b>56</b>	<b>104</b>

<sup>1</sup>Sex/age data were corrected for errors in the deer registrations

### **Antlerless Deer Harvest**

The magnitude of Maine’s harvest of does and fawns depends on the number and success rate of bowhunters and youth day participants, the number of any-deer permits issued to firearms deer hunters, and also on hunting conditions (e.g., availability of tracking snow). The statewide harvest of adult (older than fawn) does during 2006 was 8,799, or +4% above the pre-set quota (~8,473 adult does). Achieving pre-set doe quotas is critical to maintaining healthy and productive deer herds as well as in southern and central areas of the state, maintaining deer at publicly derived levels of tolerance.

During 2006, any-deer and bonus permittees also tagged 4,970 fawns, while archers and youth day hunters tagged 985 young of the year. Overall, 13,769 antlerless deer were registered by hunters during the 2006 season.

### **Harvest by Season and Week**

Of the five separate deer hunting seasons, Maine’s regular firearms season attracts the most hunters (about 162,000), and accounts for the greatest share of the total harvest. In 2006, 88% of the total deer harvest occurred during the 4-week firearms deer season (Table 17). Within that season, hunter effort and deer harvest varied (14 – 23%), with a lull in the 2nd and 3rd week; mild weather in heavy rains descended on the state during the 2nd to 3rd week and may

have had some effect on reduced harvest during that time period. It is typical that during Thanksgiving week hunters attempt to “cash in” on their any-deer permit after concentrating on trying to kill a buck earlier in the season.

Across methods archery and muzzleloader harvest were up approximately 51% and 31% each from 2005. Both October-regular archers and expanded archery participants increased their success over 2005. Again the mild winter of 05-06 led to increased survival across all cohorts. In addition adult does that over-winter well will birth fawns at higher weights with an overall better chance at surviving the first critical weeks. A stronger fawn crop was represented in the archers harvest with antlerless deer legal game throughout the seasons. While weather and good mast crops can affect deer vulnerability to harvest and/or hunter success, most likely reduced winter mortality and increased survival rates led to availability for the fall harvest.

Typically the muzzleloader harvest comprises a small proportion of the overall harvest (3% of the total deer harvest in 2006). Still blackpowder hunting has become more popular over time and provides additional recreational opportunity to late season hunters. In 2006, the extended muzzleloader season in the south-central districts recorded an increased harvest of 63% over 2005.

We are uncertain how many of the 16,159 youth license holders participated in the fifth youth day on Saturday, October 21. This was an either-sex hunt, and youth hunters capitalized on this as evident by the total antlerless harvest making up 72% of the 1,216 deer harvested. The addition of the youth day to our deer hunting season and associated antlerless harvest is accounted for in our deer management objectives and any-deer permit allocation by adjusting permit levels for overachieved doe harvests. While the youth day kill comprised only 4% of the total Maine deer harvest, in several northern and eastern WMDs, where we are attempting deer population recovery, the youth day and archery harvests put the doe harvest above the desired level (0 does) called for in our harvest management objectives.

### ***Harvest by Hunter Residency***

Among deer hunters, Maine residents outnumbered nonresidents by more than 8 to 1. Not surprisingly, residents tagged 89% (26,717 deer) of the total harvest during 2006 (Table 17). Among seasons, the proportion of the harvest registered by Maine residents was highest for extended muzzleloader (98%), followed by youth day and expanded archery (97%), statewide muzzleloader (94%), regular archery (91%), and regular firearms (88%). During the past decade, Maine residents' share of the deer kill has been increasing. Formerly, residents consistently accounted for about 80% of Maine's deer harvest. Evidently, nonresident participation in deer hunting has declined over the past 10–15 years. This is particularly apparent among Canadians (primarily from Quebec); sales of alien big game licenses have steadily dropped from 2,900 to under 500 since 1990. Despite some declines in non-residents, Maine deer hunting still attracts hunters from over 40 states and Canadian provinces annually.

**Table 17. Deer registrations by season type and residence of successful hunters, statewide in Maine during 2006**

<b>Season &amp; Week</b>	<b>Deer Registrations By:</b>			<b>% by Residents</b>
	<b>Residents</b>	<b>Nonresidents</b>	<b>Total</b>	
<b>Archery</b>	<b>2,378</b>	<b>116</b>	<b>2,494</b>	<b>95</b>
Expanded	1,670	43	1,713	97
October	708	73	781	91
<b>Youth Day</b>	<b>1,182</b>	<b>35</b>	<b>1,217</b>	<b>97</b>
<b>Regular Firearms</b>	<b>21,898</b>	<b>2,954</b>	<b>24,852</b>	<b>88</b>
Opening Saturday	1,349	1	1,359	99
Oct 30-Nov 5	5,950	748	6,698	89
Nov 6-12	4,419	769	5,189	85
Nov 13-19	3,819	799	4,618	83
Nov 20-26	6,361	637	6,998	91
<b>Muzzleloader</b>	<b>1,259</b>	<b>49</b>	<b>1,308</b>	<b>96</b>
Nov 27-Dec 3	419	29	448	94
Dec 4-10	840	20	859	98
<b>Total</b>	<b>26,717</b>	<b>3,154</b>	<b>29,871</b>	<b>89</b>

*Note: 47 records not attributable to season or week*

Regional differences occurred in the distribution of the harvest by residents and visitors to Maine. In the more populous central and southern WMDs, most successful deer hunters were residents. However, in the largely unpopulated "North Woods" of Maine, nonresidents accounted for a much larger share of the deer harvest. At one extreme, 54% of the deer harvested in remote WMD 1, were registered by nonresidents (primarily Canadians from Quebec). At the other end of the spectrum, 99% of the deer killed in heavily populated WMD 21 (south-coastal Maine) were registered by Maine residents (Table 18).

### ***Hunter Participation and Success Rate***

During 2006, 204,388 licenses that permit deer hunting were sold in Maine; of these 84% were bought by residents. License sales in 2006 were again about 1% below sales recorded in 2005 (207,381). Total hunting license sales (211,918) have not changed significantly over the last 10 years. Not all hunters who purchase big game hunting licenses actually pursue deer. According to past surveys (1970 to 1984, and 1988 and 1996), about 15% of these license buyers typically chose not to hunt deer. When these non-participants are subtracted from total sales of deer hunting licenses, the estimated number of hunters who actually pursued deer in Maine during 2006 was approximately 173,730. Hunter density, therefore, averaged about six per square mile, statewide, and these hunters expended an estimated 1.08 million hunter-days effort pursuing deer over the course of our 79-day hunting seasons.

Hunting opportunities and associated pressure has changed over time due to additional season and methods. Prior to 1981 there was no separate black powder season, no youth hunt, no expanded archery season (just the October hunt), and we limited the firearm deer season to 3 weeks in the southern half of the state. Overall, we offered only 48 days of hunting opportunity in the late 1970s vs. 79 days in 2006. Hunter effort is cumulative; adding new deer seasons and more hunting days results in higher overall pressure on the deer herd. This fact has consequences regarding maintenance of trophy buck availability, and it impacts the number of any-deer permits we can allocate.

Deer hunting pressure varies between northern and eastern WMDs vs. central and southern WMDs. With the advent of expanded archery and the any-deer permit system hunters have the ability to pursue deer under different circumstances i.e., urban-suburban vs. remote, big woods hunting. The distribution of deer numbers and pattern of human development has changed over the last 30 years and these patterns strongly shape where hunters hunt and their individual experiences.

In its 10th year, the expanded archery season attracted over 10,000 participants (over 90% residents). During the first three years, hunter participation in the expanded archery season had doubled each year; since 2000, participation seems to have stabilized. As noted earlier, this season is limited to WMDs 24, 29 (former part of 30), and 9 smaller sites in southern Maine.

In 2006, archery license sales (15,069 licenses) rebounded to 2003 levels compared to 2004 (14,295). Over the past 25 years, sales of archery licenses have nearly quadrupled, reflecting a strong trend toward greater participation in the sport of bowhunting for deer. Over the past decade, the Department has increasingly relied on bowhunters to harvest deer in parts of Maine where residential sprawl and other development preclude deer population control using firearms hunting. This transition from purely recreational to management-oriented bowhunting is evident from harvest records. Archery harvests have increased from less than 100 deer in the 1970s to 2,494 deer in 2005.

**Table 18. Deer registrations by Wildlife Management District and hunter residence, 2006**

Deer Registered By:					
WMD	Residents		Nonresidents		Total
	Number	Percent	Number	Percent	
1	80	46	93	54	173
2	82	77	24	23	106
3	174	95	10	5	184
4	117	53	105	47	222
5	214	68	102	32	316
6	489	92	42	8	531
7	367	67	184	33	551
8	381	67	190	33	571
9	165	73	60	27	225
10	131	72	51	28	182
11	559	82	122	18	681
12	797	89	97	11	894
13	629	84	118	16	747
14	456	73	167	27	623
15	1,983	90	217	10	2,200
16	2,189	95	114	5	2,303
17	3,968	86	625	14	4,593
18	432	86	70	14	502
19	144	82	31	18	175
20	1,604	93	127	7	1,731
21	2,251	99	30	1	2,281
22	1,840	97	54	3	1,894
23	2,584	89	310	11	2,894
24	1,169	98	23	2	1,192
25	1,194	96	49	4	1,243
26	1,645	95	88	5	1,733
27	349	97	10	3	359
28	210	95	11	5	221
29	558	94	33	6	591
Statewide	26,761	89	3,157	11	29,918

Compared to the regular firearms season, which attracts nearly 170,000 participants, relatively few deer hunters currently participate in Maine's late black powder deer season. Still, the sale of special muzzleloading season permits has increased substantially over the last 10 years doubling to 19,340 permits in 2006. Late season hunting and improvements and innovations in muzzleloaders may explain the increased interest and participation in muzzle-loader season effort over the last few years. Since its inception in 1981, the black powder season has increased steadily in the number of participants. In its first year (1981), only 415 hunters purchased a muzzleloading permit. The number of deer registered during Maine's muzzleloader season has grown from 7 in 1981 to 1,308 in 2006. This hunting method is expected to continue to grow in popularity.

Deer hunting success in Maine during the regular firearms season was estimated at 16% for residents and 11% for non-residents during 2006. The success rate among hunters who drew an any-deer permit (range 18-43%) is typically higher than among hunters who were restricted to "bucks-only" during the regular firearms season (range 7-12%). Since any-deer permittees could harvest either a doe, fawn, or buck, they would be expected to achieve a higher success rate. We expect success rates among bow hunters to differ markedly between the expanded archery season and the statewide October archery season as well. Deer are very abundant in much of the expanded archery hunt area. This, coupled with no limit on antlerless deer, typically account for the greater degree of success hunters enjoyed during the expanded archery season.

The overall success rate among deer hunters varies among WMDs and is influenced by the number of any-deer permits we issue, availability of deer, hunter pressure, weather and hunting method. Success rates are typically lowest in northern Maine's WMDs (3 to 10%) and above average in central and southern WMDs (15 to 30% success rate).

## **Maine's Deer Strategic Plan**

Since the early 1970s, our deer management program has been guided by a strategic plan developed with considerable public input. The strategic plan is revised every 10 to 15 years to address changes in public attitudes or changing biological factors affecting deer.

The deer plan was most recently updated in 2001; attainment of our new objectives will drive our harvest strategies from 2002 through 2017. The previous deer plan (1985 – 2001) called for increasing deer populations in all parts of the state that are accessible to hunting. We desired deer populations that were about one-half the maximum number of deer the habitat could support. Accomplishing these population objectives called for carefully regulating doe harvests to encourage herd growth, and also managing deer on more local scales.

Over the last 3 decades changes in habitat conditions, hunting participation, and land ownership have provided both challenges and opportunities for deer management in Maine. By harvesting does conservatively, and by taking advantage of mild winters when they occurred, deer populations have increased since the harsh winters of the 1970's from roughly 160,000 to nearly 220,000 wintering deer. Regionally there has been much variation in achieving district population objectives. Management strategies have been most successful in southern and central Maine where winters generally remained favorable, overall habitat was productive, and deer populations were highly responsive to changes in doe harvest rate. In contrast, we have been largely unsuccessful in getting deer populations to increase in the big woods sections of northern, eastern, and western Maine during the past 20 years despite very conservative doe harvests. Reasons for our failure to turn populations around in this half of the state include a progressive loss in the quality and quantity of wintering habitat, frequent severe winters, relatively high natural losses of adult deer, and diminished recruitment of young deer.

## **Deer Wintering Habitat**

In northern and eastern Maine, our ability to increase the abundance of deer populations must involve increasing and restoring some of the deer wintering habitat that was lost during the past 3 decades. To that end, the Department has set a long-term objective to increase the amount and quality of deer wintering habitat in northern and eastern WMDs. Recently public interest and awareness has been raised concerning the current condition of northern yards. Revitalizing efforts to conserve wintering habitat by negotiating long-term management plans, conservation easements, or other conservation measures with large and small landowners will hopefully expand the amount of available wintering habitat and ensure protection of deer during restrictive winter conditions. Cumulatively, we hope to increase wintering habitat from its current 2 to 5% of the land base to 8 to 9% over the next 30 years. With improved wintering habitat to increase survival and productivity this will hopefully enable us to maintain deer populations at 10 to 15 deer/mi<sup>2</sup> compared to the 2 to 8 deer/mi<sup>2</sup> at present.

Until we succeed at increasing the wintering habitat base, we must avoid overpopulating existing winter deeryards. To this end short-term objectives were created to maintain deer in northern and eastern Maine at no more than 50% of

the capacity of the existing deer wintering habitat. All things considered, antlerless deer harvests in eastern, Western Mountain, and northern Maine WMDs will remain limited until over winter survival and productivity increase.

By influencing mortality and fawn production, winter severity exerts a powerful influence on deer populations in Maine. A severe winter in 2001 caused the statewide herd to plummet 18% from 292,000 to 241,000 deer. From 2002-2006 we have seen fluctuations in winter severity from one year to the next with severe winters followed by mild winters. In northern, western and eastern WMDs where important wintering areas have been degraded even a moderate winter can pose limitations to herd increases and potential recruitment.

### **Prospects for the 2007 Deer Season**

In 2007, we will offer 5 separate deer hunting seasons in Maine. The expanded archery season will open September 8th and run until to December 8th (79 days). This season is limited to WMDs 24 and 29 (formerly WMD 30 North-east to Vinalhaven, see WMDs, pg. 50), as well as 9 other locations, primarily in residential-suburban sprawl areas with firearm discharge ordinances. Hunters with a valid archery license may purchase multiple antlerless permits for \$12.00 each and one buck permit for \$32.00. This amount of bowhunting opportunity is aimed at increasing the harvest of does and fawns in order to meet population density objectives for areas that are difficult to access for hunting. In the expanded archery zone, deer populations can only be reduced if the limited number of archers that can gain access to huntable land are each able to harvest substantial numbers of deer.

The regular (statewide) archery season will run from September 27 - October 26 (26 days). Youth day will be Saturday, October 20th, and is reserved for hunters between 10 and 15 years old, who are accompanied by a licensed adult (who is not allowed to carry a hunting weapon). The 25-day regular firearms season opens for Maine residents on Saturday, October 27th, and for nonresidents the following Monday. This season ends the Saturday following Thanksgiving (November 24th). Finally, the muzzleloader season will begin in all WMDs on November 26th, but will end on December 1st (6 days) in WMDs 1 – 11, 14, 19, 27 and 28. Elsewhere, the muzzleloader season will continue until December 8th (12 days). Crossbow Archery season will coincide with modern firearms.

Availability of any-deer permits among our 29 WMDs is directly related to our deer management objectives. Very conservative doe harvests are required in eastern and northern WMDs where we are trying to increase deer densities. In contrast, does must be more heavily harvested in WMDs where current objectives are to stabilize deer populations to the 15 or 20 deer / mi<sup>2</sup> abundance targets we set in the strategic plan.

To accomplish deer management objectives in 2007, we have set doe harvest quotas ranging from zero to 1,295 among our 29 WMDs. Totalling 8,488 statewide, the 2007 doe quota is 3.5% below the doe harvest we achieved in 2006. This reduced doe quota from 2006, reflects cold February temperatures and deep late season snows that increased winter mortality in many northern and central WMDs. A total of 66,275 any-deer permits will be issued statewide ranging from 75 permits in WMD 10 to 11,000 in WMD 17. WMDs 1-5, 19, 27 and 28 will not have any permits allocated.

Again this year, applicants may select up to 3 WMDs to be entered in the any-deer lottery. Hunters who live (and normally hunt) in a part of the state with limited antlerless deer hunting opportunity, now have a better chance to be drawn for an any-deer permit in districts with high permit allocations, but insufficient applicants. Since any-deer permits are WMD-specific, only hunters who are willing to travel to other WMDs are encouraged to select 2nd or 3rd choices for the any-deer permit lottery. Applicants may also select one WMD for entry into the bonus any-deer lottery, should that lottery becomes necessary.

The allocation of 66,275 any-deer permits, along with the archery and youth seasons, should result in the statewide harvest of roughly 8,688 does and an additional 4,952 fawns in 2007. Antlered buck harvests should approximate 15,940 slightly lower than the buck kill of 16,149 in 2006. If normal hunting conditions and hunter effort take place the statewide deer harvest in Maine should be in the vicinity of 29,580 deer. This would be higher than the 20-year average harvest since the any-deer permit regulations were put into effect (28,704) and would be similar to the 2006 harvest of 29,918.

### **Chronic Wasting Disease**

Chronic Wasting Disease (CWD) is a fatal disease of the nervous system of deer, elk, and moose. The disease belongs to a family of diseases known as transmissible spongiform encephalopathies (TSEs). Other TSEs include scrapie in sheep, BSE or “mad cow disease” in cattle, TME in captive mink, TFE in cats, and Creutzfeldt-Jakob disease (CJD) and variant CJD in humans. Although similar in some respects, there is no known causal relationship between chronic wasting disease and any other TSE of animals or people. To date, BSE, TFE, and variant CJD have not been identified in North America.

Current research has identified an infectious, abnormally-shaped protein called a prion that causes certain other brain proteins to change to a diseased form. CWD prions accumulate in the brain and other nervous tissues, where they physically damage affected nerve cells. Although the disease agent mainly targets nervous tissue, it also occurs in most tissues of an infected animal, including muscle tissue. Infected individuals shed CWD prions in urine, feces, saliva, and eye fluids.

CWD transmission among deer and elk are not well understood. CWD prions are persistent and are not easily destroyed by environmental factors, heat, or disinfection. Therefore, CWD prions can remain in contaminated environments for many years. Scientists are not sure if these prions can be passed from mother to offspring during pregnancy. In most cases, CWD prions are most likely ingested by susceptible animals and transmitted by direct contact with infected individuals, or by contact with contaminated soil, leaves, bedding, feed, or water. Practices that concentrate deer and elk in close proximity, such as supplemental feeding and raising deer or elk in fenced enclosures may increase the potential spread of the disease. In addition, sites where CWD-infected cervids have died (or were placed) may become contaminated as tissues decompose. Whether or not predators and scavengers can transmit CWD prions after consuming infectious parts of CWD-infected deer or elk is currently being researched. Once established in an area, CWD may be spread when infected wild deer travel to new locations, or when infected captive/farmed cervids are transported to other farms. Contact between wild and fenced cervids along fence lines can spread CWD in either direction.

Chronic wasting disease is a slowly progressive disease; signs of sickness are usually not seen for 5 to 36 months after the disease agent enters the deer or elk. Individuals showing symptoms of CWD tend to be 18 months of age or older. Current research also suggests that in areas where CWD is found mature bucks have demonstrated a greater prevalence of the disease due to behavioral characteristics and therefore may be a greater factor in transmission. CWD damages the brain of infected animals, causing them to display unusual behavior, lose bodily functions, become emaciated, and inevitably die within 1 to 12 months after symptoms of the illness first appear. Clinical signs identified in captive/farmed deer and elk include excessive drooling and thirst, frequent urination, sluggish behavior, isolation from herd, teeth grinding, holding the head in a lowered position, and drooping ears. It should be noted that some of these symptoms can be seen after a very severe winter in Maine, when deer may appear very thin and weak. Although rare in cervids, rabies may produce some symptoms in common with CWD, such as erratic behavior, and drooling.

To date, chronic wasting disease has been found in mule deer, white-tailed deer, moose, and elk. Based upon molecular similarities, CWD can probably be transmitted to all species in the deer family (cervids), including red deer, fallow deer, sika deer, and caribou. There is no scientific evidence that CWD can be naturally transmitted to species outside the deer family, including cattle, horses, sheep, goats, or swine.

There is currently no scientific evidence that CWD can infect humans. Nevertheless, public health officials recommend avoiding exposure to the CWD disease agents. . Recently, CWD prions were found in the muscle tissue of infected mule deer. Therefore, muscle tissue from an infected animal should be considered a potential source of prion infectivity.

CWD is diagnosed from hunter harvested or road-killed animals. Samples of brain and/or lymph tissue from suspect deer are examined for the presence of CWD prions or for the damage CWD prions cause in brain tissues, using laboratory techniques called immunohistochemistry and histopathology, respectively.

Currently, CWD is known to infect free-ranging deer and elk in portions of Colorado, Illinois, Kansas, Nebraska, New Mexico, New York, South Dakota, Utah, West Virginia, Wisconsin, Wyoming and both Alberta and Saskatchewan, Canada. In addition, CWD has been found in captive/farmed elk or white-tailed deer herds in Colorado, Kansas, Minnesota, Montana, Nebraska, New York, Oklahoma, South Dakota, Wisconsin, Wyoming and Alberta and Saskatchewan, Canada. Free-ranging moose have been detected with CWD in Colorado.

There is no evidence that CWD is present in wild white-tailed deer and moose, or in captive/farmed deer (red, sika, fallow) or elk in Maine. Each year, The Maine Department of Inland Fisheries and Wildlife biologists examine 6,000 to 8,000 hunter-killed deer and 2,000 to 3,000 moose for management purposes. While conducting other fieldwork, wildlife biologists observe hundreds of live deer during a typical year. In addition, biologists respond to hunters who contact us when they kill apparently ill or injured individuals. To date, MDIFW biologists have not observed symptoms consistent with CWD in Maine.

No sick animals that may fit the clinical profile for CWD have ever been brought to the attention of the Department of Agriculture (DOA) or private veterinarians from among Maine's licensed deer farms. Since autumn of 2001, more than 1,900 farmed-raised elk and deer slaughtered in Maine have been tested for CWD. To date, all tests have been negative for CWD.

In a 1999 cooperative study, MDIFW, DOA, and Center for Disease Control officials tested 299 hunter-killed white-tailed deer from the western mountains and foothills of Maine. All deer tested negative for CWD. In 2002, MDIFW biologists tested 831 hunter-killed deer from all areas of the state. All deer tested negative for CWD. Similar negative results were obtained from 810 deer in 2003, 756 deer in 2004, 819 deer in 2005 and 909 deer in 2006.

In theory, prions from CWD-infected deer could be present in commercial deer and elk foods, if they were formulated using rendering products (e.g., meat and bone meal or MBM) containing CWD-infected slaughter and processing wastes. In 1997, the U.S. Food and Drug Administration (FDA) placed a total ban on the use of MBM from cattle, sheep, goats, and cervids as a component in commercial feeds for ruminants (including wild and domestic deer and elk). Assuming all feed companies are complying with the FDA ban, commercial feeds commonly used to supplement the diets of captive/farmed or wild cervids would currently be free of CWD infectivity. We don't know, however, if MBM from CWD-infected deer or elk was ever incorporated into commercial ruminant feeds distributed in Maine prior to 1997. Nor do we know if commercial feeds currently formulated for non-ruminants (horse, swine, poultry, dog, and cat) sometimes contain MBM from CWD-infected deer or elk. If these products are used only commercially available products formulated specifically for ruminants (deer, cattle, sheep, goats), or whole grains (e.g. oats, corn) without supplements are recommended.

If supplemental feeds are free from CWD infectivity, the practice of feeding deer in winter cannot cause a CWD outbreak. However, the close contact and crowding typically seen among deer at winter feeding sites can greatly accelerate the spread of infectious diseases like CWD, if an outbreak occurs from other sources. Because of the long incubation period for CWD, an outbreak among white-tailed deer at feeding sites may spread to a large area long before clinically-ill individuals are observed. This would greatly hamper efforts to control the disease. Discontinuing the practice of winter feeding of deer is a critical step in reducing the potential for the spread of CWD. If you feed wild deer in Maine, please consider phasing out of the practice as soon as possible, as a disease prevention measure.

In most cases, the urine used to formulate commercial "doe-in-heat" or other buck lures is collected from captive deer or elk farms. If CWD prions are passed in the urine of CWD-infected deer and elk, the infective agent may be present in these lures. If present, then CWD prions may inadvertently be placed where susceptible Maine deer may contact and ingest them. Depending upon how the lure is handled, CWD contaminated deer lures could also be a source of exposure (and inadvertent ingestion) by people. In addition researchers are demonstrating that once prions are in the environment they may contaminate the area by remaining in the soils for years to come. At this time, we do not know whether any captive/farmed deer or elk used by the lure industry have ever contracted CWD. To date, deer lures are not being checked for the presence of CWD prions. Until more is known about whether commercial deer lures pose a realistic risk of spreading CWD, we recommend that hunters use caution in spreading urine-based lures in the environment, and avoid placing the lures on their clothing or skin. Avoid placing deer lures on the ground or on vegetation where deer can reach them. Deer lures can be safely placed above deer height, allowing air circulation to disperse the scent. We would also strongly recommend using synthetic, non-urine based lures that have become available on the market until further research can show that deer urine does not pose a risk of containing infectious prions.

Where it occurs, CWD poses serious problems for wildlife managers, and the implications for free-ranging deer are significant. If it emerges in Maine, CWD could seriously reduce infected deer populations by lowering adult survival and de-stabilizing populations. Monitoring and control of CWD is extremely costly and would divert already scarce funding and staff resources away from other much-needed programs. Public concerns and perceptions about human health risks associated with all TSEs may erode hunter willingness to harvest deer, leading to unwanted population growth in areas that remained CWD-free. Major reductions in deer hunting would adversely affect Maine's economy, since deer hunting currently contributes more than \$200 million to the economy of our rural state. Perceptions about the safety of farmed venison as human food could cause the collapse of Maine's \$1 million deer farming industry. Preventing the arrival of CWD in Maine is an urgent state priority. The Departments of Agriculture, Human Services, and Inland Fisheries and Wildlife are coordinating efforts to prevent CWD from entering the state. They are also working closely with other states, the federal government, and private organizations on various CWD-related topics.

The Maine Department of Agriculture has banned imports of live cervids from other states until a fail-safe importation system can be implemented. The Department of Inland Fisheries and Wildlife has issued advisories covering:

1. safe ways to import hunter-killed deer or elk from states harboring CWD;
2. cautious use and placement of urine-based deer hunting lures, while the safety of these products can be evaluated;
3. voluntarily modifying or ending the widespread practice of feeding deer in winter, as a preventive measure.

If you plan to hunt deer, moose or elk in a state/province known or suspected to harbor CWD (see above for list of states and provinces), there are some commonsense precautions you should take to avoid handling, transporting, or consum-

ing potentially CWD-infected specimens. To prevent the introduction of CWD into Maine it is now illegal for hunters who travel to any other states and provinces to hunt deer, elk, or moose to transport any carcass parts that pose a high risk of containing CWD prions. Hunters may return to Maine only with boned-out meat, hardened antlers (with or without skull caps), hides without the head portion, and finished taxidermy mounts; if still attached, skull caps should be cleaned free of brain and other tissues.

At this time, no state or province can claim to be free of CWD - too little monitoring has been conducted to realistically evaluate CWD status. Accordingly, this regulation against importing potentially high-risk carcass parts applies to wild deer, moose or elk taken in any state and province outside Maine, and to cervids killed in commercial hunting preserves everywhere.

More detailed information about CWD can be found on the Department website: [www.mefishwildlife.com](http://www.mefishwildlife.com) or contact us at (207) 287-8000. **Deer research and management is supported primarily by hunting license and permit revenues and from federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).**

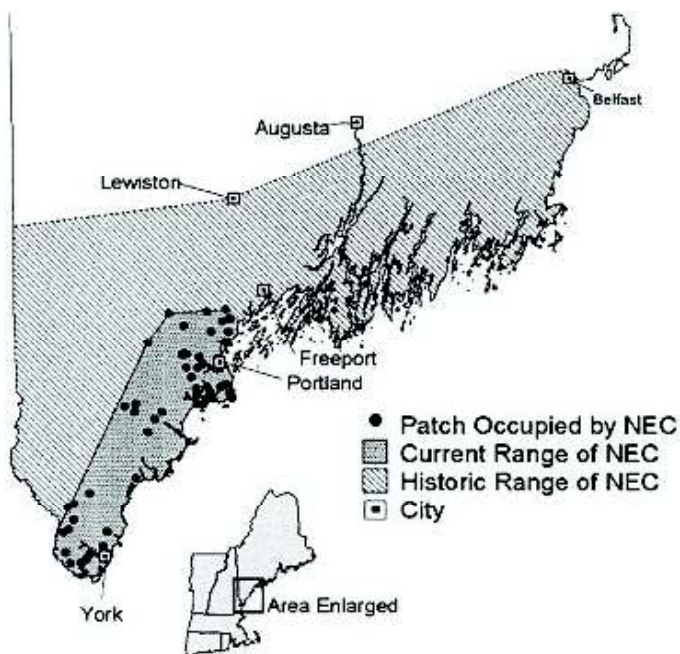
--Lee Kantar

## 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 (*Sylvilagus 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 populated and developed parts of the state (Figure 7).

Figure 7. 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



## **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 mi<sup>2</sup> for males and 12 mi<sup>2</sup> 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 than 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*

## REPTILE, AMPHIBIAN AND INVERTEBRATE GROUP

The Wildlife Division recently expanded its commitment to the conservation of the full diversity of Maine's wildlife with the creation of a Reptile, Amphibian, and Invertebrate Group. Maine is home to 18 species of frogs, toads and salamanders (amphibians), 16 species of turtles and snakes (reptiles), and over 15,000 species of terrestrial and freshwater invertebrates, from beetles and butterflies to mayflies and mussels, to name just a few. Coordinating survey, research and conservation priorities for such a diverse suite of organisms is a challenge! One of the new Group's highest priorities is to address the protection and recovery needs of the large number of reptiles and invertebrates currently represented on the state's official list of Endangered and Threatened species (21 of 45 species). Some state endangered invertebrates, such as the Katahdin Arctic Butterfly, are endemics – found nowhere else in the world but Maine.

**Phillip deMaynadier, Wildlife Biologist and Group Leader** – Supervises Group activities and serves as the Department's lead biologist on issues related to the ecology and conservation of amphibians, vernal pools, butterflies, and dragonflies.

**Beth Swartz, Wildlife Biologist** – Works closely with the Department's Habitat Group and the Maine Natural Areas Program on Natural Heritage methodologies – a system for tracking the state's rare and endangered plants and wildlife. Beth also brings considerable expertise to the area of invertebrate conservation with recent efforts devoted to the survey and conservation of Clayton's Copper butterfly, freshwater mussels, and rare mayflies.

**Jonathan Mays, Wildlife Biologist** – Jonathan is the newest member of the Group and brings professional experience working with a diversity of herptile and invertebrate species. Currently Jonathan serves as the Group's lead contact on reptile issues where as he coordinates survey, conservation and research on several rare turtle and snake species. Jonathan is also coordinating efforts to document the status and distribution of spiders, snails, and tiger beetles.

### ***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 northeastern herptiles. For more information on herptile conservation efforts, or to join the northeastern working group, visit the PARC website at [www.parcplace.org](http://www.parcplace.org). **Funding for this work comes from Loon Conservation Plate and Chickadee Check-off funds.**

--Phillip deMaynadier

### ***Maine Amphibian and Reptile Atlas Project (MARAP)***

From 1986-1990, MDIFW, in cooperation with Maine Audubon and the University of Maine, conducted the Maine Amphibian and Reptile Atlas 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 8, pg. 70). 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

--Jonathan Mays and Phillip deMaynadier

<b><u>Maine Amphibian &amp; Reptile Atlas Project (MARAP) Record Card</u></b>			
<b>SPECIES:</b> _____		<b>DATE:</b> _____	
<b>TOWNSHIP:</b> _____		<b>OBSERVER:</b> _____	
<b>VERIFICATION (Circle)</b> Photo    YES    NO Handled   YES    NO Observed   YES    NO	<b>ID CONFIDANCE (%)</b> _____ _____ _____	<b>CONTACT INFORMATION:</b> _____ _____ _____ _____	
<b>LOCATION (be specific):</b> _____ _____ _____			
<b>HABITAT:</b> _____ _____ _____			
<b>NOTES (Habitat, Behavior, Age, Sex):</b> _____ _____ _____ _____			
<u><b>Return this form and any documentation photos to:</b></u> MARAP: Reptile, Amphibian, & Invertebrate Group <b><u>or email</u></b> jonathan.mays@maine.gov Department of Inland Fisheries & Wildlife <b>or</b> 650 State Street, Bangor, ME 04401     phillip.demaynadier@maine.gov			

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/conservation/citsci/mamp.shtml](http://www.maineaudubon.org/conservation/citsci/mamp.shtml). ***Funding for this work comes from Maine Audubon Society, Loon Conservation Plate, and Chickadee Check-off funds.***

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 Atlas 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](mailto: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

### ***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).

Due to suspected declines throughout the Northeast, a “distinct population segment” of the Blanding’s Turtle may be considered for listing by the U.S. Fish and Wildlife Service. Active habitat protection is critical for the preservation of Blanding’s and Spotted Turtles in southern Maine. MDIFW is committed to working with landowners and towns to help conserve remaining large blocks of habitat needed to sustain viable populations of these rare turtles. Southern Maine’s landscape is rapidly developing, and some of the best remaining populations of Blanding’s and Spotted Turtles can be found on a 35,000 acre area surrounding Mt. Agamenticus in York County. MDIFW is working closely with the Mt. Agamenticus Conservation Coalition – including the U.S. Fish and Wildlife Service, The Nature Conservancy, local land trusts, water districts, and towns – to protect habitat for turtles and other rare species in this area, one of the largest remaining contiguous coastal forest ecosystems between Acadia National Park and the New Jersey Pine Barrens. To learn more about progress on habitat conservation in the Mt. Agamenticus area visit: <http://www.nature.org/wherewework/northamerica/states/maine/preserves/>. **Funding for this work comes from Conservation Plate, Chickadee Check-off funds, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Maine Department of Transportation, The Nature Conservancy, and the Maine Outdoor Heritage Fund.**

-- Jonathan Mays and Phillip deMaynadier

## 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

## 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 atlasng 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 atlasng 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 ( <a href="http://mdds.umf.maine.edu/~odonata/">http://mdds.umf.maine.edu/~odonata/</a> ):	>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 atlas 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

## **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](mailto: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 atlas 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](mailto: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

## **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. Thank you!**

--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. Thank you!***

--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, large-mouth 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* (Neddeau 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. Thank you!**

--Beth Swartz

## ***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](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

## 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](mailto: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

# WILDLIFE HABITAT GROUP

Monitoring, protecting, and managing habitat is essential to conserving Maine's wildlife species. The Habitat Group in the Wildlife Resource Assessment Section is responsible for mapping wildlife habitat and making that information available to MDIFW biologists for managing wildlife species and conducting environmental reviews and to other state agencies, organizations, and the public for a variety of uses related to conserving wildlife and their habitats.

**Don Katnik, Habitat Group Leader** – Supervises Group activities and coordinates habitat-related projects with other Division and Department staff and other State and Federal agencies.

**MaryEllen Wickett, Programmer/Analyst (GIS)** – Develops computer applications to facilitate access to habitat data by IF&W staff and other users. Provides technical support and habitat data analyses for landscape planning efforts (including *Beginning with Habitat*) and development of species habitat models.

**Danielle D'Auria, Wildlife Biologist** – Develops, maintains, and analyzes databases of wildlife observations and habitat. Provides assistance to other Division biologists to assess species habitats on a statewide basis.

**Nicole Munkwitz, Wildlife Biologist** – Coordinates oil spill response planning efforts for the Division, including sensitive area identification and wildlife rehabilitation plan design and implementation.

**Amy Meehan, Wildlife Biologist** – Collects wildlife habitat data from Regional Wildlife Biologists and others. Creates and maintains computer databases. Conducts field inventories of wildlife habitat and provides GIS support for a variety of projects.

**Jordan Bailey, Cartographer** – Supports *Beginning with Habitat* program by generating maps, creating and maintaining GIS data, and assembling packages of habitat information.

## ***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., E&T Species Coordinator & Wildlife Planner

## **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 19<sup>th</sup> 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 interspersed, 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.

### ***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.

### ***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](http://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!

### ***Updated Landcover Map***

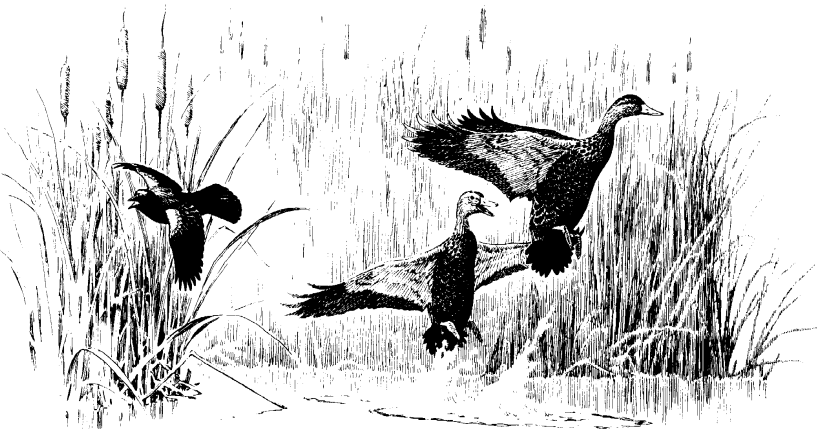
In 2004, MDIFW partnered with Maine's Department of Environmental Protection, State Planning Office, and other agencies to create a new landcover map for the state, replacing the previous map made in 1993. The selected mapping contractor - Sanborn, Inc. - combined Maine's needs with NOAA's (National 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.

### ***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 Department of Inland Fisheries and Wildlife**  
**ATTN: Oil Spill Volunteer**  
**650 State Street**  
**Bangor, ME 04401-5654**

**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.***

## ***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.



# MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

**ROLAND D. MARTIN, COMMISSIONER**  
**PAUL F. JACQUES, DEPUTY COMMISSIONER**

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## **Main Office: #41 State House Station, Augusta, Maine 04333-0041**

For Administration, Fisheries and Wildlife, Warden Service,  
general information about fish and wildlife, licenses, and  
boating and recreational vehicle registration... call (207) 287-8000

Check out our home page on the Internet at <http://www.mefishwildlife.com>

### **Regional Headquarters (Game Wardens and Biologists)**

Ashland -- 435-3231  
Gray -- 657-2345  
Sidney -- 547-5300  
Bangor -- 561-5610  
Greenville -- 695-3756

### **Additional Regional Biologists**

Enfield -- 732-4132  
Jonesboro -- 434-5927  
Strong -- 778-3324

If you cannot locate a Warden at the above numbers,  
contact either the Department office in Augusta (287-2766)  
or the nearest State Police barracks:

### **State Police Toll-free Numbers**

Augusta 1-800-452-4664 / Houlton 1-800-924-2261  
Orono 1-800-432-7381 / Gray 1-800-482-0730  
Cellular Calls - 911

The State Police numbers may  
be used to report a fire  
ONLY if a Warden or Forest  
Ranger cannot be reached.

To report wildfire arson call  
1-800-987-0257  
Maine Forest Service  
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