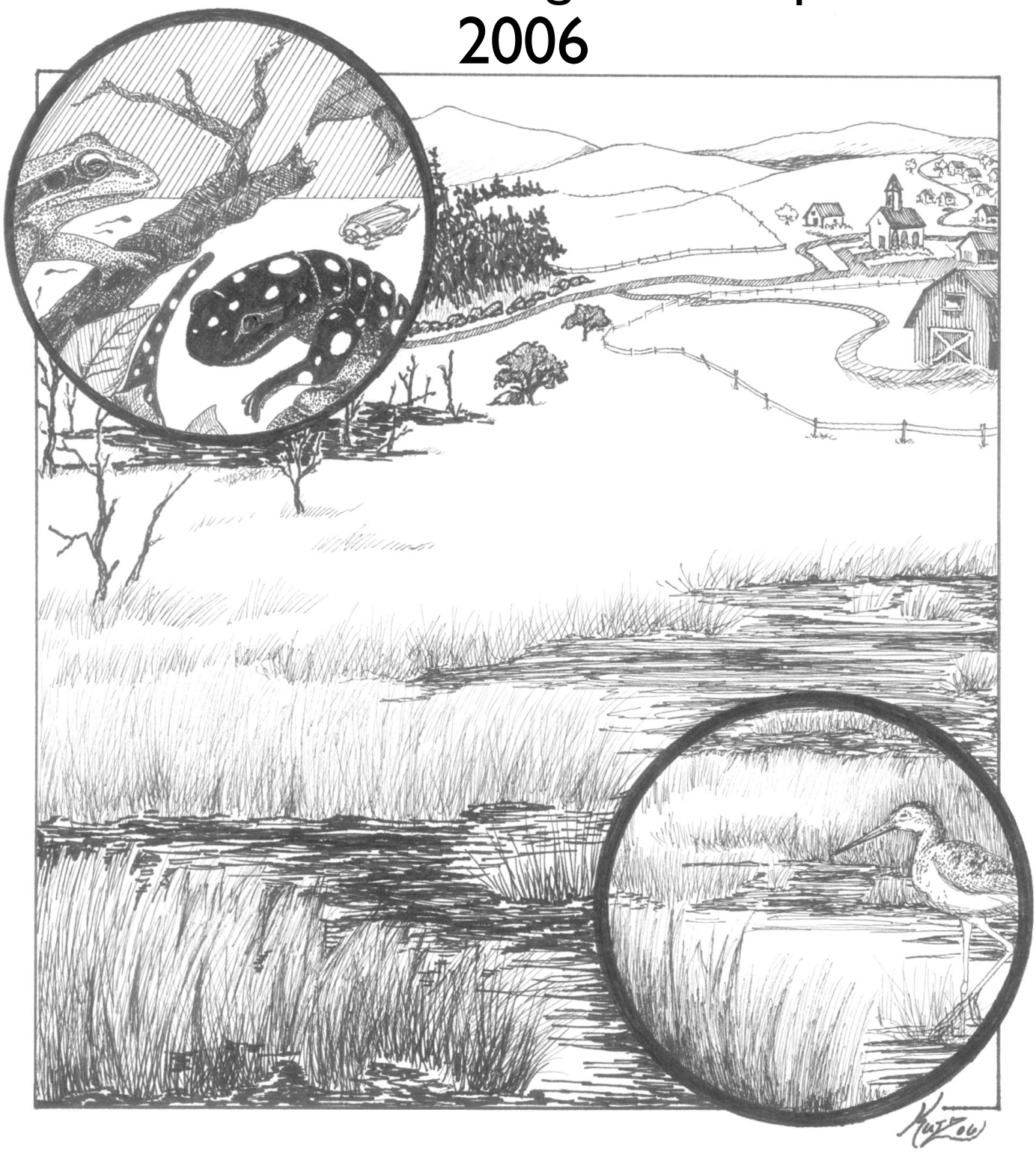
Maine Department of Inland Fisheries and Wildlife

Roland D. Martin, Commissioner

Wildlife Division

Research & Management Report

2006



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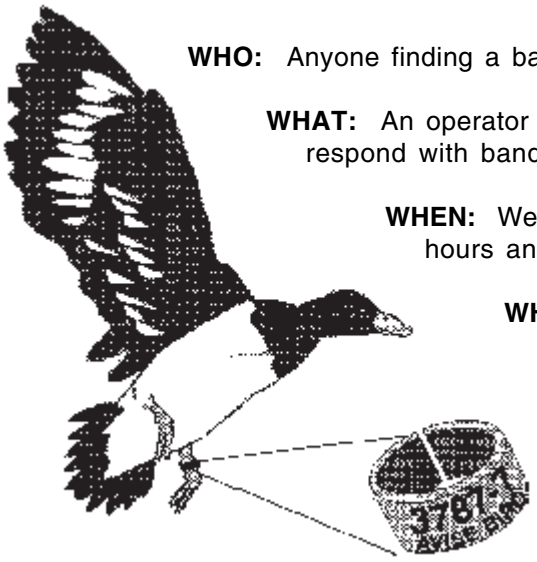

WHO: Anyone finding a band or recovering one while hunting.

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WHEN: Weekdays between 7:00 a.m. and 5:00 p.m. Eastern Time. After hours and weekend calls will be handled by voice mail services.

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WHY: Studies have proven this method significantly improves the reporting rate over previous methods. Results will provide better estimates of survival and harvest rates and will reduce high costs associated with banding studies.

Supported by state fish and wildlife agencies, the United States Fish and Wildlife Service, and the United States National Biological Service.

INTRODUCTION

We can all recall places that have disappeared. The grove of oaks on the ridge above town where partridge and deer gorged themselves on nuts and where hikers shuffled loudly through the leaves in the fall... is now a housing development. The stream hidden in ferns and delicate flowers, where in the spring children caught salamanders and in the winter slid on trays... was flooded and destroyed by runoff from a parking lot. The beach where teenagers exchanged perfect sand dollars while ospreys argued overhead... is covered by a private pier and "no trespassing" signs. The overgrown logging road where bird hunters could always find partridge dusting themselves in the late, warm sun... was absorbed into the school's athletic fields. These places, with the animals and plants that defined them, and many thousands of other special places, have disappeared.

It is simplistic to say that development of land is the cause of habitat loss and the decline of species. More accurately, the pattern of our unplanned development is causing these problems. Historically, Maine's development pattern was based on the town center with homes nearby so that it was practical to walk to the town hall, store, and post office. Farms were thinly scattered on rural roads. Forests for hunting and wood gathering, and lakes and streams for fishing, were not far from the town centers. Today's development, sprawled across the landscape, is contributing to the loss of habitat and outdoor experiences. Habitat loss may be swift, as in the case of a large subdivision, or it may be incremental through development of individual lots. Either way, it is altering our very special Maine outdoor legacy.

Wildlife and plant habitats are part of a rich, complex web of natural cycles. High quality habitat preserves biological diversity; it provides protection from flooding; and pollination, seed dispersal, and the cycling of nutrients that replenish the soil, air and water depend on the ability of various species to interact successfully with one another and their necessary habitats – and animal and plant communities preserve the appeal and character of the human community as well.

If we are not wise in our "habitat" decisions, many common native species will decline, as will our already rare, threatened, or endangered wildlife. Maine residents also use these habitats for outdoor enjoyment, and they will see fewer opportunities for recreation. Large blocks of habitat necessary to maintain populations of larger animals will become scarce. Fishing, hunting, walking in the woods or along the beach, wildlife watching, cross-country skiing, snowmobiling and other outdoor activities will continue to be squeezed into smaller, less accessible areas. In some communities, these opportunities will disappear altogether.

Until recently, abundant habitat and open space were a fortunate accident of Maine's development patterns. The fortunate accident is ending — there is no guarantee that habitat and open space will continue to endure in our communities.

Against this backdrop, the pages of ***2006 Research & Management Report*** are dedicated to the many ways the Department is working to conserve and manage wildlife habitat – from the challenge of addressing the effects of "urban sprawl," to the solid success we've had working with landowners to provide nesting habitat for Maine's bald eagles. I believe we can all be proud of Maine's state-of-the-art, scientific wildlife management programs, which are guided by public input.

In closing, I thank you for your interest, support, and participation in the conservation of Maine's wildlife. The Wildlife Division looks 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

Adapted from Beginning with Habitat: An Approach to Conserving Maine's Natural Landscape for Plants, Animals, and People. Maine Dept. of Inland Fisheries & Wildlife / Maine Natural Areas Program, January 2003, 52 pp.

These studies are financed in part through Federal Aid in Wildlife Restoration Funds under Projects 81D, 82R, and 83C, and through the Endangered Species Conservation Act.

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WILDLIFE HABITAT PROTECTION AND CONSERVATION

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
A Landscape Approach to Habitat Conservation in Maine

The Problem: Development in Maine is spreading out, sprawling across our landscape, contributing to the loss of habitat and outdoor experiences. The Maine State Planning Office reports in its 1997 report, *The Cost of Sprawl* that "…the fastest growing towns in Maine have been 'new suburbs' 10-25 miles distant from metropolitan areas." Sprawl, the conversion of rural lands for urban or suburban purposes, has ecological consequences. Two to ten-acre house lots in fields and forests are common. Increasing development pressures are creating a checker-board of non-contiguous habitat for wildlife. In its final report dated January 1996, the Maine Environmental Priorities Project concluded, "patterns of development throughout southern and coastal Maine and in riparian zones statewide seriously threaten some species and some rare and critical habitats as well as the overall productivity of Maine's terrestrial ecosystems."

In a 2001 report, The Brookings Institute found that sprawl in the greater Portland, Maine area is occurring at one of the fastest rates in the country. From 1982-97 the greater Portland metropolitan region grew 17.4% in population with a shocking 108.4% increase in urbanized land. It ranked as the 9th fastest growing metropolitan area in the country.

Much is at risk. Maine is a large state by eastern standards — as large as the remaining New England states combined. The state has enormous natural variety and owes its biological wealth to its 17.5 million acres of vast forests, rugged mountains, more than 5,600 lakes and ponds, 5,000,000 acres of wetlands, 31,800 miles of rivers and streams, 4,100 miles of bold coastline, and 4,613 coastal islands and ledges. Maine is the most heavily forested state in the nation, but also contains some of the most significant grassland and agricultural lands in the Northeast.

This mosaic of diverse physical settings supports a wide diversity of wildlife that can be equaled in few other states. Maine has the largest population of bald eagles in the Northeast. The state's islands support one of the most diverse nesting seabird populations on the East Coast, including habitat for rare species such as the Roseate and Arctic Tern, Atlantic Puffin, and Razorbill Auk. Maine's relatively clean, free-flowing rivers sustain some of the best remaining populations of rare freshwater mussels and dragonflies in the East, host globally rare endemics, such as the Tomah mayfly, Roaring Brook mayfly, and Furbish's lousewort, and support the recently listed Atlantic salmon DPS (Distinct Population Segment) found in eight mid-coast and downeast rivers. Maine's mountains and forested habitats contribute significantly to the global breeding habitat of neotropical migrants such as Bicknell's Thrush and Blackthroated-blue Warbler. The state has some of the best examples of pitch pine-scrub oak forest remaining in New England, hosting a suite of globally rare plants and invertebrates.[1]

Maine's private landowners own over 95% of these lands. Corporate forest landowners own nearly half the state; small woodlot owners, farmers, and residential landowners own much of the remainder. Thus, private landowners are integral to the conservation of our wildlife heritage and natural resources.

The Solution is *Beginning with Habitat*: *Beginning with Habitat* (*BwH*) embodies a fundamental change in the way that state and federal agencies approach wildlife habitat conservation. It is a habitat-based model that provides the information to cooperatively create a landscape with local decision-makers that will support all breeding species of wildlife occurring in Maine into the future. Too often, the ability of the landscape to support wildlife is eroded by the impacts of unplanned, sprawling development. If continued development of Maine is done thoughtfully, it will be located in appropriate areas, and open space will be maintained for fish, wildlife, and plant habitat; farming and forestry opportunities; as well as outdoor recreation.

Beginning with Habitat is not a regulatory, land-use zoning mechanism. The success of *Beginning with Habitat* depends largely on voluntary land conservation efforts by landowners, particularly private landowners. Habitat conservation efforts will involve conservation easements, cooperative management agreements, and other tools. The availability of meaningful incentives is critical to long-term stewardship by the private landowner.

[1]Development sprawl's deleterious effect on habitat also undermines important economic benefits to Maine communities. In 1996, the economic impact of wildlife recreation in Maine totaled over 1.1 billion dollars. Hunting, trapping, fishing, and wildlife watching combined, have dwarfed Maine's other recreation industries. Wildlife recreation has a larger economic impact than all skiing, whitewater rafting, snowmobiling, windjammer cruises, or other recreational attractions, combined. Wildlife-generated revenues even surpass the economic value of Maine's commercial fishing industry.

Collaboration: The most important first step to protecting habitat is knowledge. This program brings together the expertise and resources of the Maine Department of Inland Fisheries and Wildlife, Maine Department of Conservation's Natural Areas Program, U.S. Fish and Wildlife Service, The Nature Conservancy, Maine State Planning Office, Maine Audubon, Maine Coast Heritage Trust, and 13 Regional Planning Commissions.

Beginning with Habitat seeks to conserve and maintain sufficient habitat to support all native plant and wildlife species currently breeding in Maine. It does this by taking habitat data from multiple sources, integrating it into one package, and providing each Maine town with a series of maps and accompanying information depicting and describing various habitats of statewide and national significance, including rare and endangered species, found in the town. These maps provide information to communities that can help guide conservation of valuable habitats as well as recommendations that can be used to build a system of interconnected and conserved lands. It is hoped that the data, maps, written material, and suggestions for local conservation strategies will help inform and guide each town's growth in such a way that 100 years from now Maine will retain its rich and diverse outdoor heritage.

The Maine Department of Inland Fisheries and Wildlife (MDIFW) and the Maine Natural Areas Program (MNAP) also provide *Beginning with Habitat* data to various land conservation partners: local and regional land trusts, Maine Coast Heritage Trust, The Nature Conservancy, and Maine Audubon.

The *Beginning with Habitat* Model: The habitat model for *Beginning with Habitat* was initially developed by the University of Maine's Cooperative Fish and Wildlife Research Unit (CFWRU) under the direction of the Department of Inland Fisheries and Wildlife. Data on plants and wildlife habitats of federal interest were later added by the Maine Natural Areas Program and the U.S. Fish and Wildlife Service.

By overlaying maps of the habitat needs of all of Maine's vertebrate species with Maine's primary land cover types (forests, fields, wetlands) in a geographic information system, the CFWRU was able to determine that 80-95% of all of Maine's vertebrate species would likely be present if riparian habitats, high value animal habitats, and large habitat blocks are protected.

The *Beginning with Habitat* program provides municipalities, land trusts, and other organizations engaged in habitat conservation with maps of habitat data and conservation recommendations in three primary areas that are used to build a functional wildlife landscape based on a system of interconnected and conserved lands to promote habitat conservation for Maine's diverse assemblage of wildlife and plants, including rare and endangered species.

√ **Riparian Habitat** provides habitat for many species that use the transition zone between aquatic and terrestrial habitats. It includes all areas adjacent to streams, rivers, wetlands, lakes and ponds, and can function also as travel corridors linking areas together on the landscape.

√ **High Value Plant and Animal Habitats** that are special habitats required by wildlife, such as nesting sites, special vegetation communities, deer wintering areas, locations of endangered, threatened, or rare species – any location or habitat that may require special consideration.

√ **Large Habitat Blocks** are relatively unbroken areas of habitat including forest, grasslands, and agricultural lands that are crossed by few roads and have relatively little development and human habitation. These areas are essential for wildlife species with large spatial requirements or that are sensitive to human disturbance.

Accomplishments: Since its inception in 2000, the *Beginning with Habitat* program has met with and provided information to more than 140 cities and towns in Maine and 35 land trusts and regional planning commissions. Many towns have incorporated the information they have received from *BwH* into their comprehensive plans. Improved scientific understanding by local planners is reflected in better planning for habitat conservation and land use decisions. By educating local decision-makers about the link between wildlife habitat and other resource functions such as water and air quality, flood flow control, and aesthetics and recreational opportunities provided by open space, communities are better prepared to plan. In 2003, an interactive website was developed www.beginningwithhabitat.org to provide quick, efficient access to all of the *BwH* information.

Replication: *Beginning with Habitat* is a model for the way government agencies can cooperate with non-profit conservation organizations and local communities across the country and is fast becoming a national model. Maine has been approached by several states that would like to develop a similar landscape approach to habitat conservation.

Recognition: The New England Office of the U.S. Environmental Protection Agency recognized *Beginning with Habitat* with an Environmental Merit Award at a special Earth Day ceremony held at Faneuil Hall in Boston in 2004. The EPA's Environmental Merit Award is an annual award that recognizes outstanding environmental advocates who have made significant contributions toward preserving and protecting our natural resources.

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, and a proposal for a 2006 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:

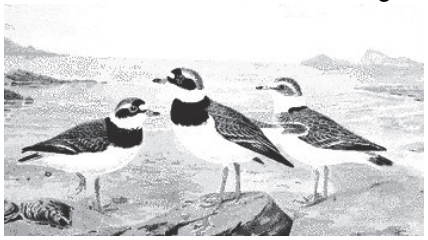
Bald Eagle Nesting Habitat Protection

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 oystercatcher.

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

Species-at-Risk Focus Areas 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 $1,006,425 for the purchase of conservation easements within 9 focus areas that will protect more than 4,200 acres of critical habitat for rare, threatened and endangered species in southern, western, central, and mid-coast Maine.

Landowner Incentive Program funds will contribute to the conservation of the following areas:

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

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

Corea Heath/Grand Marsh, Gouldsboro - LIP funds will conserve a 590-acre mosaic of community types in the Northern Corea Heath, including a large wetland complex comprised of bogs, fens, forested wetland, and non-peatland shrubby wetlands and several hundred acres of upland forests. The property hosts several rare plants and is adjacent to 400 acres recently acquired by the U.S. Fish and Wildlife Service as part of the Maine Coastal Islands National Wildlife Refuge.

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.

State Wildlife Grants Program

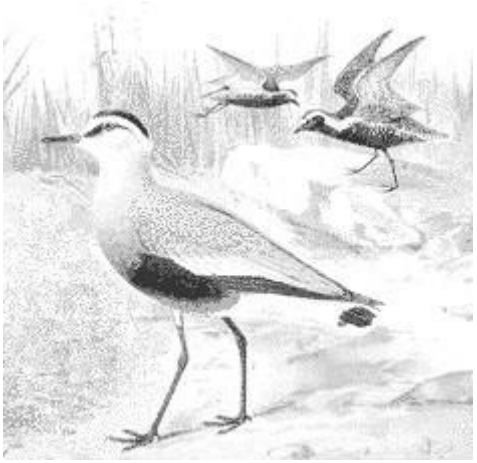
In 2001, Congress created the State Wildlife Grant Program (SWG) to help state and tribal fish and wildlife agencies address species of greatest conservation need. This funding was a direct result of "Teaming with Wildlife" efforts sustained for more than a decade by fish and wildlife conservation interests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



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.

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.

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 50 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

Wildlife Habitat Group

Conservation and management of wildlife habitat is a high priority for MDIFW Wildlife Biologists. The Habitat Group in the Wildlife Resource Assessment Section is responsible for mapping wildlife habitat, using Geographic Information System (GIS) software to model habitat needs of individual species, and creating/maintaining wildlife habitat databases.

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.

Significant Wildlife Habitat

Significant wildlife habitats are defined under the Natural Resources Protection Act (NRPA), 38 M.R.S.A. Section 480-A (and as amended in April 2006) and include the following habitats:

Seabird Nesting Islands – Seabirds live over the open ocean, returning to land only once a year to nest. Seabirds include colonial nesting waterbirds such as Leach's storm-petrel, great cormorant, double-crested cormorant, laughing gull, herring gull, great black-backed gull, common tern, arctic tern, roseate tern, razorbill, black guillemot, Atlantic puffin, and common eider. Their survival depends on undisturbed nesting habitat. Small, unforested, rocky islands such as those off the coast of Maine provide a setting free of mammalian predators such as foxes, coyotes, and raccoons. Flying distance from the mainland discourages avian predators such as great horned owls. Many seabird species nearly eradicated in Maine by the end of the 19th century have recovered dramatically, thanks to the passage of state and federal conservation laws and the restoration efforts of dedicated scientists. In 1998, 234 seabird nesting Islands in Maine were afforded protection as Significant Wildlife Habitat under the Natural Resource Protection Act.

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

Waterfowl and Wading Bird Habitat - Waterfowl are members of the family Anatidae including but not limited to brant, wild ducks, geese, and swans. Wading birds include but are not limited to herons, glossy ibis, bitterns, rails, coots, common moorhens, and sandhill cranes. Inland waterfowl/wading bird habitats are wetland complexes, including a 250 foot upland habitat zone, with documented outstanding use by waterfowl or wading birds

or a combination of dominant wetland type, diversity, size, habitat interspersion, and percent open water that meets IF&W guidelines. Tidal waterfowl/wading bird habitat includes four classes: eelgrass (*Zostera marina*) beds currently mapped by Maine Department of Marine Resources, mussel bars or beds, emergent wetlands, and mudflats.

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

Deer Wintering Areas – forested areas used by deer during periods of deep snow.

The Habitat Group maintains GIS databases for all of these Significant Wildlife Habitats. As new information from field observations, aerial photographs, and other sources becomes available, we update these databases to provide the best representation of these habitats under the definitions described in the NRPA.

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 (see page 6).

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 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 Habitat Group uses GIS tools to assist WRAS species specialists with delineating polygons representing the areas occupied by these wildlife populations, the inferred extents of their important habitats, and any associated environmental review or regulatory zones. We currently are tracking data for 21 species of moths, 26 butterflies, 30 dragonflies, 22 mayflies, 20 mussels and snails, 2 salamanders, 60 birds, 3 fish, 7 mammals, and 9 turtles and snakes.

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

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 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.

Protecting Wildlife and Habitat 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.

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. 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
- Maine Department of Conservation
- 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 April 2006, MDIFW staff attended a two-day field exercise at Schoodic Point. Shoreline crews searched for and recovered simulated oiled birds. Their efforts were coordinated by the Incident Command Post, which also was responsible for directing Natural Resource Damage Assessment activities, public relations, and oil recovery. Staff from NOAA, U.S. Park Service, USFWS, and The International Bird Rescue Research Center also participated.

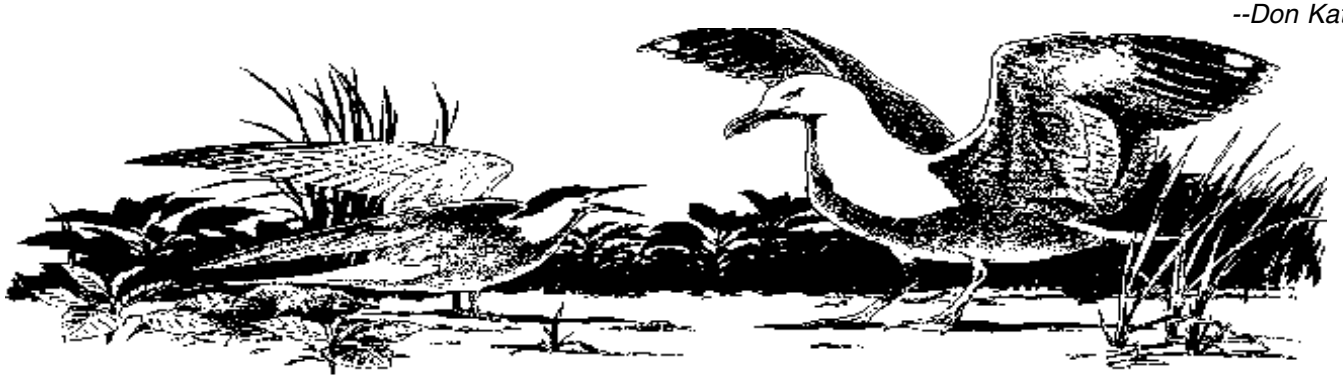
Baseline information on areas used by wildlife and on critical habitat is essential for assessing vulnerability to a spill and determining loss after a spill occurs. Nicole Munkwitz, MDIFW's oil spill biologist, has been working with Maine DEP to update their Environmental Vulnerability Index (EVI) maps. 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. Nicole is updating the TWWH layer to reflect the revised NRPA definition and to incorporate new information. 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. 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. ***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.***

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**

--Don Katnik



Essential Habitat

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

What are Essential Habitats?

Essential Habitats are areas currently or historically providing physical or biological features essential to the conservation of an Endangered or Threatened Species in Maine, and which may require special management considerations. Examples of areas that could qualify for designation are nest sites or important feeding areas. For some species, protection of these kinds of habitats is vital to preventing further declines or achieving recovery goals. This habitat protection tool is used only when habitat loss has been identified as a major factor limiting a species' recovery. Before an area can be designated as Essential Habitat, it must be identified and mapped by MDIFW and adopted through public rule-making procedures, following Maine's Administrative Procedures Act. Essential Habitats have been designated for Bald Eagle nest sites; Piping Plover and Least Tern nesting, feeding, and brood-rearing areas; and Roseate Tern nesting areas.

What Does Essential Habitat Designation Mean?

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

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

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

It is important to note that:

- **Essential Habitat designation affects only projects involving state or municipal permits or actions.** The activities of a private landowner are **not** subject to review unless the project requires a state or municipal permit or license, or is funded or carried out by a state or municipal agency.

- **No additional permits or fees are required as a result of Essential Habitat designation**. It simply establishes a standard, objective review for existing state and municipal permitting functions.

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

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

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

Special Habitats

In this section are presented a sample of the "special habitats" MDIFW is monitoring and managing for specific species or species groups. These habitats range from pitch pine barrens to New England Cottontail habitat to seabird nesting islands. Each of these habitats supports a unique suite of species or provides special features that meet the needs of species in decline. This is by no means all of the habitats of conservation concern that Department staff are addressing. ***Partial funding for these efforts comes from one or more of the following sources: Maine's Conservation Plate, Chickadee Checkoff, or Outdoor Heritage Fund; the Maine Chapter of the Nature Conservancy, as well as the U.S. Fish and Wildlife Service, Natural Resource Conservation Service, and Environmental Protection Agency.***

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

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 restricted to the states few remaining intact barren communities, mainly in Kennebunk, Wells, Waterboro, Shapleigh, Hollis, and Fryeburg. The barrens 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 (Proposed 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 (Proposed Threatened), and Northern Blazing Star (a Threatened plant). To learn more about two barrens of statewide ecological significance visit "Focus Area Descriptions" on the Maine Natural Areas Program website (*http://www.mainenaturalareas.org/docs/program_activities/land_trust_descriptions.php#York_County*), and select "Kennebunk Plains and Wells Barrens" or "Waterboro and Shapleigh Barrens".

--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), four-toed salamanders (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 Dept'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 guidebooks for protecting vernal pool habitat during timber management (*Forestry Habitat Management Guidelines for Vernal Pool Wildlife*) and development (*Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*). Together, these publications provide recommendations designed to help maintain functioning vernal pool landscapes throughout Maine. All of the guides can be obtained by contacting Becca Wilson at Maine Audubon Society (207-781-6180 ext. 222; *bwilson@maineaudubon.org*).

Finally, the Dept's of Inland Fisheries and Wildlife and Environmental Protection recently developed a definition of *Significant Vernal Pools*, a new Significant Wildlife Habitat under the state's Natural Resource Protection Act, approved by the state legislature in 2006. Criteria for designating "significant" vernal pools include a) the presence of a state Endangered or Threatened species, or b) evidence of exceptional breeding abundance by amphibian indicator species. Designating a subset of vernal pools as "significant" will help state agencies provide regulatory guidance on development activities within a critical upland buffer zone surrounding one of the state's highest value wildlife habitats.

--Phillip deMaynadier

Rabbit Habitat – More Than Just for Rabbits

When people think of rabbits, they do not usually associate them with critically important habitats or endangered or threatened species. Rabbits are supposed to be numerous and occur just about everywhere. Right? Below, we discuss the links between rabbit habitat, endangered and threatened animals, rabbit predators, and people.

Maine has two species of rabbits: one of which is commonly seen, and another that is becoming increasingly rare. Our most common rabbit, technically, isn't a rabbit at all, although it often has been referred to as one. It is the snowshoe hare, and is found in most areas of the state. Hares are distinguished from rabbits by their larger size, longer ears, longer legs, and skull morphology. Hares are born fully furred with open eyes, while rabbits are born in a much more vulnerable state without fur and their eyes closed. Snowshoe hare are important because just about every predator in the state, including man, likes to eat them. Without snowshoe hare, Maine's bobcat, lynx, fisher, marten, coyote, fox, and great horned owl populations would be considerably reduced. Although snowshoe hare make up a substantial portion of the diet of many of these species, the Canada lynx is the predator that is most dependent on them. Canada lynx are a federally threatened species, and the recent increase in their population in Maine has been attributed the abundance of snowshoe hare that currently exists in the state. Considerable effort has gone into studying the relationships between snowshoe hare, lynx, and their habitats. Basically, it comes down to snowshoe hare. If the habitat can support high densities of snowshoe hare, lynx will likely do well in that habitat.

Maine's other rabbit is the New England cottontail. New England cottontails are Maine's only true rabbit and occur in the southernmost reaches of the state. Unfortunately, suitable habitat for New England cottontail has decreased by more than 70% since 1970 and is very fragmented (occurs in small patches less than 5 acres in size). This loss of habitat, and the accompanying decline in the New England cottontail population, has led to the Department proposing cottontails for state endangered species status. This is quite a change for a species that in the past was much more abundant, frequently hunted by humans, and a major prey item for bobcat.

In general, the type of habitat needed by snowshoe hare and New England cottontail is early successional habitat. Early successional habitat can be regenerating forests, old fields, shrublands, or grasslands. The term "early successional" refers to the group of plants that first grow in an area after a major disturbance, such as a fire, windstorm, or forest cutting. Many species of wildlife such as moose, deer, woodcock, ruffed grouse, songbirds, and black racer snakes use early successional habitat to find food and cover. Unfortunately, it is a habitat type that has become increasingly scarce in the Northeast.

The principal habitat feature needed by both snowshoe hare and New England cottontail is cover from predators. Although cover is important for both species, the type of cover preferred by each species is different. Cover for snowshoe hare becomes suitable when vegetation is so thick that it obstructs 40% of what a person, or predator, can see. Cover becomes optimal when it obstructs 90% of vision. In terms of small trees or bushes, at least 20,000 stems per acre are needed to provide good cover for snowshoe hare, and the best cover is produced by coniferous trees, such as balsam fir. In the winter, coniferous trees provide about 3 times the amount of cover as deciduous trees. A regenerating coniferous forest usually provides adequate cover for snowshoe hare after it is 10 years old, and may continue to provide high quality cover for another 20 years in Maine. Although coniferous trees proved the best cover for snowshoe hare, they are not the preferred cover type for New England cottontail. New England cottontails prefer old fields with lots of deciduous shrubs and green plants (forbs). These shrubs and plants not only provide cover for New England cottontail but also an abundant food source. Although a young coniferous forest could

provide New England cottontails with cover, it usually does not have the quality and quantity of food needed by these rabbits. Snowshoe hare, on the other hand, appear to do fine in dense conifers with occasional openings where edible plants can be found.

Maintaining sufficient habitat for New England cottontail in the future will be challenging. In the past, suitable habitat for New England cottontail in Maine was created when farms were abandoned, forests were cleared, or when storms blew down trees. Today, there are fewer farms in Maine than there were 50 years ago, and any land that is abandoned, usually reverts to mature forests or is developed. The Department will be working with environmental organizations, land trusts, and landowners to try to set aside land for New England cottontail throughout its former range in Maine and populate these areas with cottontails. Our hope is to set aside enough habitat for New England cottontail to allow the population in Maine to become self-sufficient, stabilize, and eventually increase in size.

Maintaining sufficient habitat for snowshoe hare may be easier in northern Maine where large-scale forestry operations are ongoing, than in southern Maine where there is more residential development. Currently, snowshoe hare habitat in northern Maine is near optimal levels as the result of clearcutting and forest salvage operations that occurred in the late-1970s to mid-1980s. The question is whether current forestry practices, such as shelterwood cuts and other forms of partial harvesting, can provide the dense understory needed by snowshoe hare. We know from recent studies that pre-commercial thinning of forests reduces a stand's suitability for snowshoe hare. Currently, our Department is cooperating with researchers at the University of Maine to investigate the effects of various forest harvesting techniques on snowshoe hare and lynx. We hope to offer habitat management recommendations for maintaining snowshoe hare and lynx habitat to landowners in the near future. Hopefully, with the cooperation of landowners, we will be able to ensure the well being of snowshoe hare and all of the predators that depend on this species for their survival.

--Wally Jakubas

Important Bird Areas

Identifying areas of importance to birds stems from an international project begun in the 1990s by BirdLife International in Great Britain. In 2001, Maine Audubon, with the assistance of staff from the Maine Department of Inland Fisheries and Wildlife (MDIFW), set out to identify the most important areas for bird conservation in Maine. This project follows others throughout the U.S. that set forth similar objectives, each with a slightly different approach. In Maine, we created a steering committee that we informed of the project and its status, and more importantly, a technical committee to advise us on establishing numeric criteria for assessing importance of areas.

An Important Bird Area (IBA) is a location that provides important habitat for one or more species of breeding, wintering or migrating birds. IBAs generally support birds of conservation concern, including Threatened and Endangered Species, large concentrations of birds, or birds associated with unique or exceptional habitats. Furthermore, an IBA may be an area, which has historically been the location of a significant amount of avian research. In Maine, we typically identified "sites" which met certain numeric thresholds for abundance and diversity then assembled groups of these "sites" into "areas" (i.e., IBAs) based on their proximity to one another or thematically, typically based on the ecosystem within which they occur.

At the outset of the project, we thought we could simply identify 100 places in Maine that are important for birds. However, the magnitude and complexity of the project have been at times overwhelming. Analyses to date have identified over two dozen areas of high importance to bird conservation. We feel we have reached a "critical mass" and anticipate releasing a report, featuring site descriptions for each site and IBA. Each description will include, a discussion of bird populations there, as well as conservation issues affecting the site.

--Thomas P. Hodgman

Seabird Nesting Islands

There are 3,000 to 4,000 islands and exposed ledges off the Maine coast. Prior to the last ice age, these exposed features were actually the tops of ancient mountains. Many islands consist only of bare rock and are completely devoid of soil and vegetation. Vegetated islands range from small grassy islands to large islands dominated by spruce and fir trees. While seabirds and eider ducks spend a majority of their lives at sea, nesting islands are essential for their survival. Each spring and early summer, the birds return to these special places to nest and raise their young. The smaller islands with the grass/forb/shrub component receive the greatest use by nesting seabirds and waterfowl. Today, approximately 500 islands are documented as seabird nesting islands. Along with the right component of nesting habitat, from rock crevices to fields of raspberry bushes and tall grasses, the best islands used by seabirds all lack mammalian predators (i.e. raccoons, foxes, and mink) and human disturbance during the nesting season.

We are indeed fortunate that many of Maine's important nesting islands are owned by public and private conservation agencies. Individuals from and represented by these agencies deserve much praise for their wisdom and efforts in

protecting these special places for the wildlife and for all of us to enjoy. In addition, seabirds nesting on several privately-owned islands have benefited from the generosity of landowners who are good stewards themselves. There are numerous examples of private individuals who have donated or sold their islands to conservation groups or have conferred conservation easements on their properties.

Maine's islands provide nesting space for 13 species of seabirds whose population status, distribution, and nesting habitat needs vary greatly. Some species occur in relative abundance on numerous coastal islands, (common eiders, great black-backed and herring gulls and double-crested cormorants), and these populations appear healthy. Populations of common, arctic, and roseate terns declined during the last century but have begun to improve over the last 3 decades due to management programs and habitat protection. The other six species using our coastal islands include Atlantic puffins, razorbills, black guillemots, Leach's storm-petrels, great cormorants, and laughing gulls. Populations of these birds may be secure, but each requires unique management and long-term population monitoring. Maine's coastal islands are also home to numerous species of shorebirds, bald eagles, great blue herons, harbor seals, and more.These wildlife species are truly Maine's island treasures!

--R. Bradford Allen

Shorebird Areas

Shorebirds represented in Maine include sandpipers, plovers, turnstones, godwits, curlews, dowitchers, and phalaropes. Thirty-six species of shorebirds have been reported along the coast of Maine. Most of these species nest in the Canadian arctic and sub arctic regions and begin their migration to southern wintering areas in July. Along with the Bay of Fundy, the Maine coast is recognized as a critical staging area for migrating shorebirds, these long distance travelers depend on coastal staging areas to accumulate the fat necessary to fly a nonstop, transoceanic flight to their South American wintering areas.

Shorebird staging habitats range from intertidal mudflats, to sandy beaches, to rocky intertidal areas. Food resources, consisting of intertidal invertebrates, and suitable roosting sites in close proximity to feeding areas, are the two most critical factors determining shorebird distribution. Each species has preferred feeding and roosting habitats. Species requiring sand and gravel beaches and saltmarsh (e.g. yellowlegs, willet, sanderling, and others) are more commonly found in Saco Bay, Casco Bay, and Penobscot Bay. Eastern Maine offers highly productive intertidal mudflats attractive to semipalmated sandpipers, semipalmated plovers, black-bellied plovers, whimbrels, dowitchers and others. Feeding habitats such as inter tidal mudflats and saltmarsh panes provide shorebirds with high concentrations of invertebrates. Roosting habitats such as sand spits, gravel bars, beaches and rock jetties, are located

above the high water mark providing migrating shorebirds a place to sleep and preen during high tide when feeding areas are inundated, thus reducing energetic costs and maintaining a positive energy flow. Coastal staging areas are susceptible to degradation from development and environmental contaminants. Human related disturbances such as ATV traffic and beachgoers disrupts foraging and resting time and causes birds to expend their energy reserves fleeing or traveling to alternative sites. Predation by foxes, raccoons, domestic cats and dogs can be especially limiting in areas of high human use and development.

To achieve management goals and objectives developed by a public working group, the Coastal Migratory Shorebird Management System was updated and reviewed by the Wildlife Division in April 2003. This document outlines criteria used to select a subset of shorebird feeding and roosting areas that is critical to migratory shorebirds in Maine. Presently, 96 roosting areas and 120 feeding areas qualify as "Areas of Management Concern." These areas are designated as Significant Wildlife Habitat under the Natural Resources Protection Act (NRPA) of 1988. This legislation recognizes Significant Wildlife Habitat as a state natural resource worthy of protection. Maine Department of Inland Fisheries and Wildlife is responsible for defining and mapping shorebird staging areas for protection under this law. The Coastal Migratory Shorebird Management System also outlines recommendations to assist biologists and landowners cooperatively protect and enhance shorebird habitats and meet the goals and objectives developed by the public working group.

--Lindsay Tudor

Grassland Bird Habitat

Grassland habitats, including pastures, hayfields, and abandoned fields provide habitat for several birds in Maine such as upland sandpiper (*Bartramia longicauda*, state-listed endangered), eastern meadowlark (*Sturnella magna*, special concern), horned lark (*Eremophila alpestris*), bobolink (*Dolichonyx oryzivorus*), grasshopper sparrow (*Ammodramus savannarum*, endangered), vesper sparrow (*Pooecetes gramineus*, special concern), savannah sparrow (*Passerculus sandwichensis*), northern harrier (*Circus cyaneus hudsonius*), and short-eared owl (Asio *flammeus flammeus*, special concern). In 1997, MDIFW surveyed 243 grassland/barren sites. In 1998, 127 additional sites were surveyed. Since those surveys were conducted, we have digitized habitat polygons around the sites as a preliminary step to mapping important grassland habitats in the state of Maine. In 2005-06, the U.S. Natural Resource Conservation Service (NRCS) provided funds to support revisits to the surveyed sites to confirm whether or not those areas still provide good habitat for grassland birds. The NRCS is interested in this data for assessing whether projects submitted for Farm Bill funding will benefit Maine wildlife. Staff from Habitat Group and a field technician hired with the NRCS funding have been re-surveying those sites in central, southern, and northern Maine. In addition to revisiting the previous sites, we also used the recently completed, updated landcover map to identify other potential sites and are conducting surveys of those sites. This project will continue in 2007 in downeast Maine with the intent of having a completed grassland habitats layer by the end of 2007.

--Don Katnik and Thomas P. Hodgman

Rusty Blackbird Status, Ecology, and Habitat

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 biologists 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 will involve field work during spring and summer of 2006 and 2007. This research 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. A graduate student from the University of Maine will be fieldwork for this project. ***This work is being supported by Outdoor Heritage Funds, Conservation Plate Funds, Pittman Robertson Funds, and the University of Maine.***

--Thomas P. Hodgman

WILDLIFE MANAGEMENT SECTION

Wildlife Management Areas and Habitat Management

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 (see Figure 1). They are responsible for implementing the Wildlife Division's management program 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.

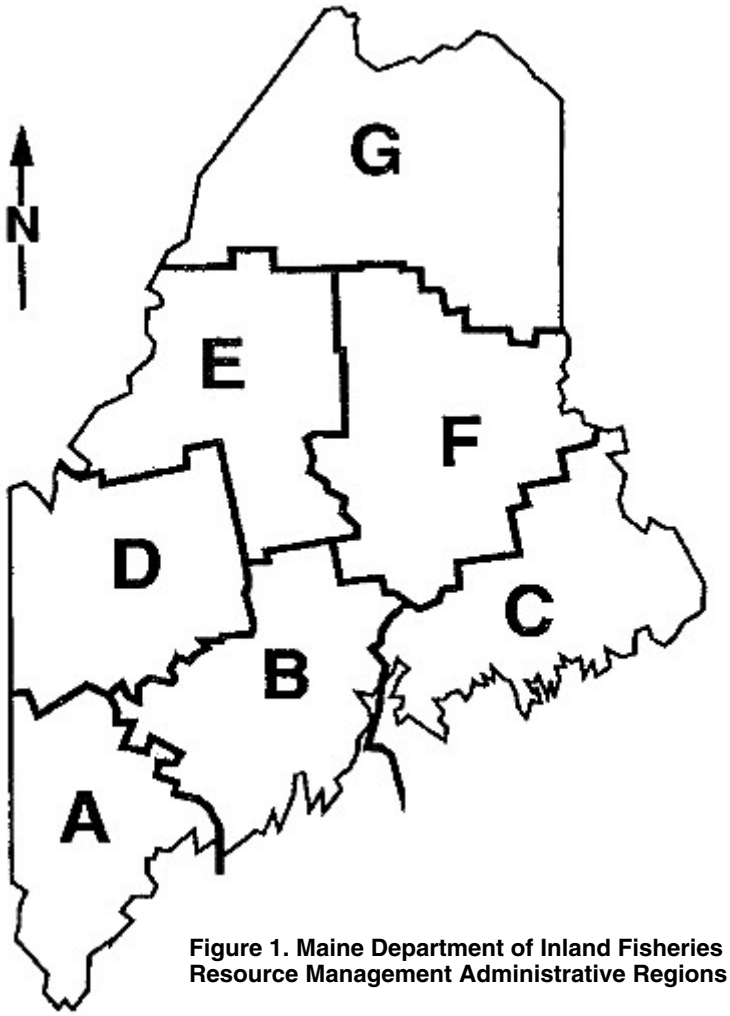


Figure 1. Maine Department of Inland Fisheries and Wildlife Bureau of Resource Management Administrative Regions

The Wildlife Management Section of the MDIFW has management responsibility for all of the Wildlife Division's real property, which consists of over 60 WMAs statewide. Since 1980, the Department's land holdings have doubled to about 100,000 acres. These acquisitions have targeted expansions of existing WMAs and the establishment of new WMAs in all regions of the state.

MDIFW owns and manages public land for three primary objectives, including 1) to maintain or create the highest quality upland or wetland wildlife habitats possible, 2) to provide recreational opportunities when these opportunities are not in conflict with wildlife management objectives, and 3) to demonstrate wildlife management techniques and practices to the public.

The Department's WMAs represent some of the "gems" of special habitats in Maine and support habitat for:

- 45 Rare Plants (8 Endangered, 14 Threatened, and 23 Special Concern)
- 68 Natural Communities
- 36 Rare Animals (9 Endangered, 7 Threatened, and 20 Special Concern)

Additionally, many of our WMAs contain some of the best upland and waterfowl hunting opportunities that can be found anywhere in Maine. Please check our website to find more information about these important public lands. (*http://www.state.me.us/ifw/wma/index.htm*) The following reports from WMS staff are examples of regional habitat management projects many of which are associated with the Department's WMAs.

--Eugene Dumont, Wildlife Management Section Supervisor

Region A — Gray

Scarborough Marsh WMA Restoration

Located just 9 miles south of Portland and amidst the rapidly growing town of Scarborough is the largest, most ecologically diverse saltmarsh in the state. The estuary is the meeting place of five rivers and the Atlantic Ocean. This exceptional wetland, totaling over 3,100 acres is owned by the Department and managed as the Scarborough Marsh Wildlife Management Area (WMA). MDIFW surveys indicate the marsh provides habitat for the highest number of water dependent birds in the state, including resident and migratory waterfowl and wading birds. Though this WMA was largely acquired and managed for waterfowl such as the black duck, blue-winged teal and wood duck, the marsh provides habitat for many other wetland species, including at least seven state and federally listed birds. Today, as in the past, the marsh provides many recreational opportunities such as waterfowl hunting, trapping, striped bass fishing, shellfish harvesting, canoeing and bird watching. The Nature Center, managed by Maine Audubon Society in partnership with MDIFW, welcomes over 10,000 visitors annually for educational programs.

Much like the state's vast inland forests, salt marshes, including Scarborough, have a long history of human use. Prior to European settlement, the Sokokis Indians maintained a settlement on Winnock's Neck, where they harvested shellfish, fish, seal and waterfowl. European settlement beginning in the 1600's brought livestock to the area. The marsh then became a source of hay, with the cordgrasses (*Spartina spp.*) and blackgrasses (*Juncus spp.*) considered most valuable. The shorter the hydroperiod on the marsh, the higher the yield of hay, so marshes throughout the east coast were parallel ditched to drain the tidal water. In addition, large earthen dikes were built and sluice gates were installed to reduce the influence of the tides on the marsh. This type of farming was physically demanding and technically challenging, yet the marshes were extensive, productive, required no cultivation and could be quite profitable. The harvesting declined in the early 20th century due to competition with larger farms inland. Later, in the early 1920's, the marshes endured another phase of ditching for the purposes of controlling mosquitoes. Additional alteration of the marsh has resulted from the establishment of three major transportation corridors, two railroad lines and U.S. Route 1. These practices were done at a time when the ecological value of a salt marsh was not fully realized. These values were compromised through changes in hydrology, soils and vegetation types, including the spread of invasive plants. The state acquired Scarborough Marsh largely between the years 1957 and 1978, and smaller acquisitions continue today through funding from Pittman-Robinson funds, state bond monies and private donations. Former MDIFW Biologist Russell Degarmo was instrumental in the acquisition of the marsh in the early days. Much of the initiative for restoring the marsh can be attributed to the work of MDIFW's Region A Wildlife Biologist, Phil Bozenhard. A group of citizens and conservation groups concerned about the future of the marsh established the Friends of Scarborough Marsh. They have been an important liaison to the community and are fully invested in the planning and restoration of the marsh.

Large-scale restoration of the marsh requires extensive resources, community support and technical expertise from natural resource professionals in a developing new science. MDIFW has collaborated with many dedicated partners in this effort including the USDA Natural Resource Conservation Service, USFWS Gulf of Maine Program, Friends of Scarborough Marsh, Ducks Unlimited and Maine Audubon. Restoration projects begin with baseline data from a pre-construction monitoring plan. Based upon this data, a restoration plan tailored to the specific site is developed. Another important component of this work is a period of post-construction monitoring, during which the effectiveness of the plan can be evaluated. The salt marsh is restored largely through the plugging of ditches, removal of berms, lowering of marsh elevation, creation of saltwater pannes, modification of tidal restrictions and removal of stands of phragmites; a prolific invasive aquatic plant that compromises waterfowl habitat and vegetative diversity. Completed

project sites include Seavey Landing, Mill Brook and Cascade Brook. The Seavey Landing project restored 38 acres of marsh through plugging and excavation of pools so attractive to waterfowl and wading birds. The restoration of Cascade Brook was required after a culvert on Old Blue Point Rd. was washed out after 19" of rain fell in October of 1996. Nearly 3,000 cubic yards of spoil material and riprap that was deposited was carefully removed from over 2 acres of the marsh surface. The Mill Brook project has restored 380 acres of marsh functions through plugging ditches, breeching a berm and removing invasive plants. A site walk along Mill Brook, post-restoration, will reveal more functional, shallow pools holding water at low tide.

Ongoing projects include resolving an issue of tidal restriction at an undersized culvert along the Libby River. Increasing tidal flow at this site will allow greater salinity upstream and along with herbicide treatments, discourage the establishment of phragmites. The Libby River has 27 acres of this invasive plant. The Nonesuch River project will begin in June of 2006. Restoration of this 247-acre marsh will entail the plugging of ditches, removal of berms and removal of phragmites. The 135-acre Dunstan River Marsh, bisected by U.S. Route 1, is considered by many to be the most degraded part of Scarborough Marsh. This site has been chosen as the recipient of mitigation funds resulting from the 1996 Julie N oil spill occurring in Casco Bay. These funds will partly cover the cost of restoration, which will include reducing the elevation of the marsh north of U.S. Route 1, dredging existing channels to increase the flow of salt water upstream of the highway, create a perimeter ditch to reduce fresh water intrusion from the uplands, create 15 shallow pools and eradicate over 30 acres of phragmites that has colonized the upstream side of the marsh.

The ultimate goal of the restoration is to return the marsh to a more functional ecosystem that provides diverse habitats of native vegetation and hydrology. There is still much to learn about the complexities of salt marsh restoration, but two guiding principles are well accepted by resource professionals; provide conditions permitting salt water to do the work nature intended and minimize anthropogenic pollution such as chemical contaminants, excess sedimentation and freshwater runoff. These two principles are especially significant considering the extent of tidal flow barriers and the rapidly developed uplands immediately adjacent to Scarborough Marsh.

--Scott Lindsay, Assistant Regional Wildlife Biologist

Region B — Sidney

James Dorso Wildlife Management Area

In April 2006 one of the best wildlife habitats to be found in central Maine, Ruffingham Meadow Wildlife Management Area, was renamed in honor of James Dorso. The newly signed James Dorso Wildlife Management Area is located in Searsmont just off of Rt. 3 between Augusta and Belfast.

Jim Dorso served as a wildlife technician for the MDIFW for over twenty years before retiring in 1989. Jim became known as the father of Maine's waterfowl nesting box program. Jim began making nesting boxes after seeing the idea and illustrations in a Popular Mechanics magazine. He built several, placed them near his house, and was amazed at their success when he found eggs in them that nesting season. Within a few years, he had built and was maintaining 150 of them.

In 1965, Jim was laid off from his job at the S.D. Warren Paper Mill in Gardiner, but was quickly presented with an opportunity from the Maine Department of Inland Fisheries and Wildlife to oversee the nesting box program. He accepted, and began a program that was modeled after his earlier private success with nesting boxes. Jim's program demonstrated a level of success that was unrivaled through out the country and contributed measurably to local waterfowl populations.

Ruffingham Meadow was one of Jim's favorite wetland habitats where he banded females in the spring and conducted nest box maintenance each winter. Jim was successful in establishing a viable breeding population of common goldeneyes at Ruffingham Meadow by transplanting them from other areas farther north. Common Goldeneyes continue to nest at Ruffingham each spring.

Originally, Ruffingham Meadow consisted of an old lake basin that was transected by Thompson Brook and Bartlett Stream. The basin was overgrown with sedges, grasses, sweet gale, willow, dogwood and alder. The wildlife management area was formed through the acquisition of approximately 30 privately owned tracts. These parcels received limited use for the production of wild hay and grazing. Acquisition began in 1946 and was completed during the early 1950's when the water control structure was constructed. Water levels are managed to provide stable water levels during the waterfowl-nesting season and provide maximum amounts of brood cover

Ruffingham Meadow is approximately 610 acres in size and consists of 386 acres of inland wetland and some 224 acres of upland habitat. The upland portion is predominantly mixed forestland with an additional five acres of field and alders. The WMA is part of a 17 square mile watershed originating from two streams (Bartlett Stream and

Thompson Brook) on Frye Mountain in Montville. The wetland portion of this area is a shallow and deep fresh marsh - shrub swamp association bordered by bog, flooded woodland and forested upland. The upper reaches of the wetland are routinely flowed by beaver creating additional wetland habitat for wildlife.

Ruffingham Meadow offers outstanding waterfowl hunting and deer hunting in the uplands. Centrally located between Augusta and Belfast, it is an ideal place to canoe, bird-watch and enjoy wildlife. Make a point to check out the new James Dorso Wildlife Management Area.

--Keel Kemper, Assistant Regional Wildlife Biologist

Region C — Jonesboro

Downeast Deer Habitat Management

Despite more than 20 years of conservative hunting regulations, downeast deer populations continue at a depressed level from the benchmark period of the 1950's. While it is probably not realistic to expect a full return to those days of yesteryear, which were characterized by the peak period of farm abandonment that produced ideal habitat conditions against a backdrop of relatively small scale logging operations, limited access, and the post-World War II era, the general lack of population response has been a source of concern for the public and the Department alike. It should be noted that lower deer populations are not exclusive to the downeast region. Much of the northeastern fringe of deer range including northern Maine and the Maritime Provinces, an area generally characterized by northern spruce-fir forest type, have experienced deer population declines over this same period. It would seem, then, that habitat is a major, underlying factor in addressing this issue.

Many potential causes have been targeted by a frustrated public including commercial timber harvesting, chemical spraying by the blueberry and forestry industries, poaching of one form or another, predation by coyotes, black bear, and other predators, lack of fawns, unprecedented back road development and the resulting access, and the list goes on. Certainly, some of these issues have an impact and were closely examined by two different Department committees that explored alternative management strategies. But habitat, both quantity and quality, is the common thread which incorporates most of these concerns.

As a result of the second committee's deliberations in 1995, the downeast Regional Wildlife staff developed a proposal at the request of then Commissioner Bucky Owen, to help "jumpstart" the deer herd in eastern Maine. This strategy was focused on habitat management and enhancement over fairly large land areas termed "habitat focus areas." The core of these focus areas were based on historical locations of deer wintering areas (DWA) … a critical, softwood shelter based, habitat component, which directly affects deer survival during harsh winter periods. Given that a high percentage of DWA normally occur in upland habitats along watercourses (riparian), the skeletal framework of these habitat focus areas were historically documented river and stream corridors that would be managed to provide contiguous softwood shelter for wintering deer and connectivity. Additional uplands were added to the proposal sufficient to meet the size and requirements of a deer's home range. Various management techniques were identified for discussion that would enhance these upland habitats for deer while maintaining commercial operations flexibility. Five focus areas were taken to industrial forest landowners for their consideration. Unfortunately, none were ever implemented.

Only remnants remain of historical deer yards in the unorganized towns of central and northern Washington and Hancock Counties, as these areas failed to meet final zoning criteria of the Land Use Regulation Commission (LURC) back in the early 1980's. This was due primarily to a combination of the effects of the spruce-budworm epidemic which devastated many thousands of acres of maturing softwood stands downeast and the related lack of sufficient densities of wintering deer. The budworm epidemic resulted in extensive salvage harvesting operations and a corresponding, unprecedented level of road development, which produced dramatic changes to the forest landscape. The effects continue as now regenerated, maturing stands have been influenced by subsequent events which include contemporary, mechanical harvesting methods, outbreaks of balsam wooly adelgid (an insect pest which has produced significant mortality in balsam fir), and the wave of recent, investment-based land acquisitions that have resulted in renewal of wide scale, intensive timber harvesting.

Due to both private and publicly funded efforts, the ability to manage core habitat areas across the downeast region for the benefit of not only deer, but also a wide array of wildlife, appears to be taking shape. Acquired under various resource initiatives, certain lands under conservation ownership by private, non-governmental, and government interests are providing some of the skeletal framework of riparian habitats targeted originally by the habitat focus area proposal (Figure 2). As an example, a community led effort to sustain a resource-based economy resulted in the recent acquisition of two townships totaling over 27,000 acres owned by the Downeast Lakes Land Trust (DLLT). Region C Wildlife Biologists provided the DLLT with historical locations of deer wintering areas and advocated for a riparian-based approach to habitat management, which has been successfully incorporated into a comprehensive forest management plan. This land includes much of what was one of the original habitat focus area proposals focused on the upper Machias watershed.

To the west, the DLLT purchase abuts another 27,000 acres of public reserved lands of the Duck Lake Unit where DWA and riparian habitats have received priority management through the efforts of a Department wildlife biologist assigned to the Department of Conservation's Bureau of Parks and Lands (BPL), their district forester, and Region F Regional Wildlife Biologists. Foresters and biologists met several times this winter to examine and coordinate management efforts targeted at perpetuating DWA, travel corridors, and other upland habitats on both the Duck Lake Unit and DLLT lands. This evolving partnership is seeking to coordinate management efforts with the Passamaquoddy Nation with adjacent lands to the north, as well as with other conservation lands on the watershed.

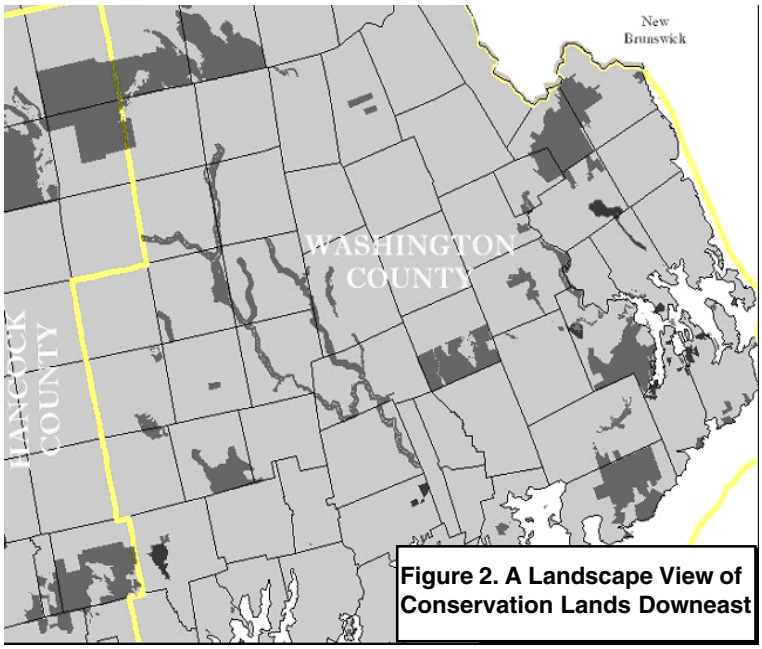


Figure 2. A Landscape View of Conservation Lands Downeast

An initiative targeted at restoration of the endangered Atlantic salmon and involving partners such as The Nature Conservancy, U.S. Fish &Wildlife Service, National Fish & Wildlife Foundation, and the Land for Maine's Future Board, resulted in the fee and easement acquisition of 25,000 acres along a 1000 foot corridor on each side of the Machias River, and six major tributaries, to the south of the DLLT purchase. This area includes the core of another one of the habitat focus areas, which was historically utilized by wintering deer. Under BPL management, Regional Wildlife Biologists will promote actions to perpetuate DWA and travel corridor stand characteristics during the Bureau's development of a management plan. Soon to be completed, a third phase of this land acquisition project will provide similar management oversight to 83% of the upper Machias watershed, and will link approximately 450,000 acres of conservation lands.

Another purchase focused on salmon restoration along the Dennys River resulted in the acquisition of 4,600 acres of riparian and upland habitats. This area was also identified in the Department's habitat focus area proposal, and historically was a very large, well-known DWA in the downeast area.

Other conservation lands, such as Department-owned Wildlife Management Areas, prioritize the management and maintenance of key habitat features including substantial, riparian buffers. When viewed collectively then, conservation lands are forming a landscape framework of core habitats, which will undoubtedly have significant, long-term benefits to wildlife including wintering white-tailed deer. Department wildlife biologists will continue to work cooperatively with various landowners to support these efforts and implement appropriate management strategies.

--Tom Schaeffer, Regional Wildlife Biologist

Region D — Strong

Woodcock Habitat Management

MDIFW maintains Wildlife Management Areas (WMAs) throughout the state with the intent of providing high quality wildlife habitat, allowing recreation for the public, and to demonstrate the benefits of specific habitat management techniques. The western mountain Region is home to six WMAs, and all but the Strong WMA are dominated by wetland habitats. Management activities on those areas focus on the maintenance of a diverse complex of wetland habitats, providing important nesting and staging areas for waterfowl and wading birds.

The landscape at the 90-acre Strong WMA is much different, containing a mixture of upland hardwoods, old fields, and low-lying alder patches. This combination of habitats offers the regional staff the opportunity to actively manage for woodcock, a migratory species that spends the spring, summer and fall in Maine. In order to prosper, woodcock require a diversity of young, vigorously growing habitats, which are most often located on moist soil. We use habitat management techniques that focus on retarding forest succession to provide woodcock with the right combinations of these habitats. This land management strategy also benefits ruffed grouse, as well as a suite of species relying on early-successional habitats.

Management for woodcock at the Strong WMA began in 1983, when the old fields leftover from a long history of farming were reclaimed. Open fields are a key component in woodcock management because they are utilized

during courtship (for singing grounds) as well as for roosting areas at night. In order to prevent these areas from reverting to forests, the fields are mowed a minimum of once in a 3-year period. Woodcock also need habitats that provide food and cover, which is achieved by periodically thinning the low-lying hardwood and alder stands located adjacent to these open fields. A matrix of habitat blocks have been delineated and mapped throughout the alder and low-lying hardwood stands in order to systematically select 1/20th of these blocks to be cut every year. Each block, typically 40 feet wide by 100 feet long, is cut once in a 20-year period, which overtime creates a patchwork of alder and hardwood stands in a variety of age classes (0 to 20 years old). Maintaining this diversity of stand-types supplies woodcock with a continuous source of vigorous, young growth. Research has shown that young, open hardwood stands in proximity to open fields are important to woodcock for nesting and raising their young. Likewise, young and vigorously growing alder stands readily supply nitrogen to the soil, growing plenty of earthworms, which are a very important food source for woodcock.

These management techniques are borrowed ideas, adapted from strategies illustrated in the publication, *A Landowner's Guide to Woodcock Management in The Northeast*, developed at the Moosehorn National Wildlife Refuge located in Calais, Maine. This publication is available online at: *http://www.umaine.edu/mafes/elec_pubs/miscrepts/ne_woodcock.pdf.* The work associated with woodcock management at the Strong WMA could not have been completed without the assistance of a variety of volunteers including forestry students from the Foster Regional Vocational Center.

If you are traveling through the western mountains and are interested in woodcock, take some time and visit the Strong WMA.

--Robert Cordes, Assistant Regional Wildlife Biologist

Region E — Greenville

Beech Management

As the days begin to shorten and the greens of summer transform into the brilliant shades of autumn, many of our species of wildlife are busy locating, consuming, or stashing ample food in preparation for another Maine winter. One such food which is tiny in stature but certainly not in importance, is the small nut produced by the American Beech tree (*Fagus grandifolia*). Every other autumn just like clockwork, many of the mature beech trees in the Moosehead Lake Region release thousands of these small food packets from their spiny armor to fall to the ground. Although the bulk of these nuts are expelled from the canopy in October, insect damage or extremes in weather can start this process early in September and continue as late as November.

During that special time of year when the nuts hit the ground, northern hardwood stands containing beech become magnets to a variety of wildlife including white-tailed deer, black bear, ruffed grouse, blue jay, red squirrel, chipmunk and other small mammals. In addition, mammalian predators such as pine marten and fisher frequent these areas to capitalize on the concentrated prey as well as the nuts themselves. But, among all the "critters" that seek out this important food source in the north, none appear to be so closely linked to the frequency of beechnut production as our black bears. Thirty plus years of research conducted by our Department on transmitter-equipped bears have clearly shown that nearly all of the reproductive-aged female black bears produce cubs during the winter following an abundant autumn nut crop. Conversely, almost no female bears produce cubs during the off year.

The future of the American Beech, however, may be less certain these days, especially in the Moosehead Lake Region. Beech bark disease has caused significant mortality in some stands. In addition, the development in the pulp market for hardwood during the last ten or so years has allowed forest managers to sell a greater percentage of the beech stems than ever before. Strictly from a silvicultural standpoint, it appears to make sense to cut the beech to favor the more highly valued maples and birches. Unfortunately, in some cases nearly all of the merchantable beech trees are removed.

Region E's wildlife staff continue to work with forest managers in an attempt to ensure that some mature beech trees will always be available to produce mast for our wildlife. Although some beech tress infected with beech bark disease will succumb, many will survive for years. In addition, diseased trees are stressed, so they frequently produce large nut crops.

Our recommendation to land managers is to always keep some mature (i.e. at least 8 inches dbh, or about 10-12 inches butt diameter) beech stems in the northern hardwood stands. If possible shoot for about one third of each of the sapling, pole and saw log – sized classes comprised of beech. This would apply equally on industrial lands as well as small woodlots. As mentioned above, the presence of beech bark disease should not be the only guideline to dictate harvest. Instead, look at crown characteristics. A large, live crown is a good indication pf overall tree health

as well as a measure of the tree's ability to produce nuts. In most cases, a light thinning that allows sunlight to get to the tree's crown is a good way to promote tree health and nut production.

--Doug Kane, Regional Wildlife Biologist

Rregion F — Enfield

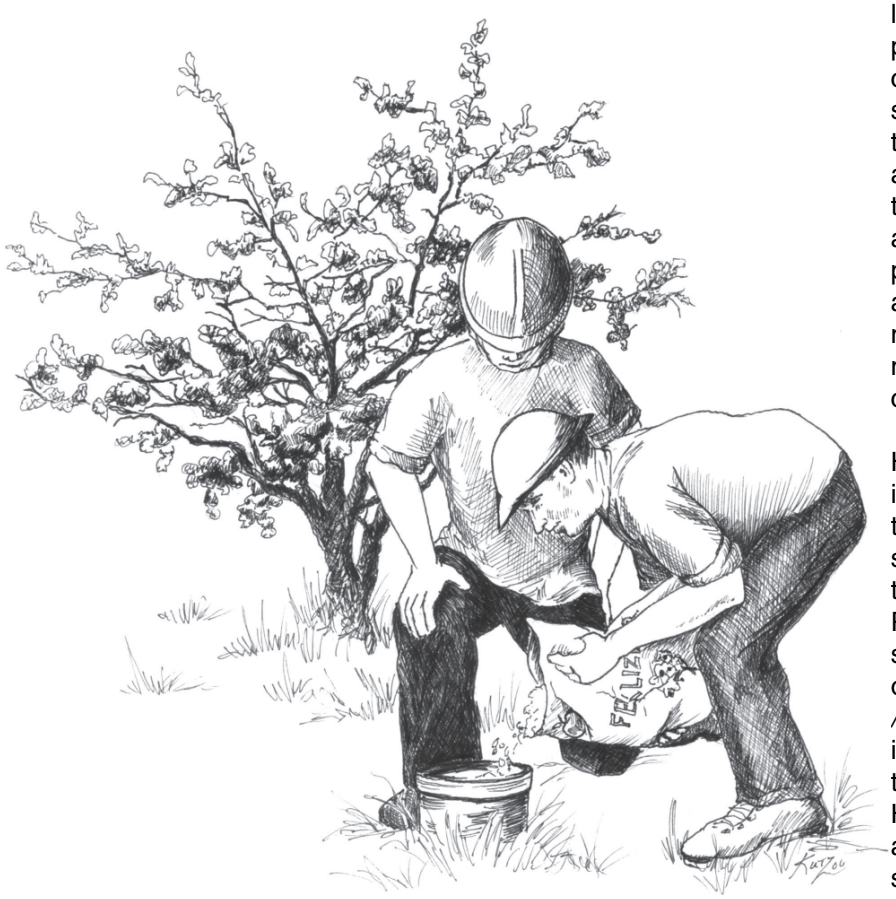
National Wild Turkey Federation Super Fund Project at Page Farm Parcel

Wild Turkey habitat management is a popular activity for landowners in this region of the state. Recognizing the winter bottleneck for wild turkeys at the edge of their known range, landowners in this region of the state of Maine have turned to conservation organizations like the National Wild Turkey Federation and the Regional Wildlife Biologists of Maine Department of Inland Fisheries and Wildlife, (MDIFW), for technical advise to enhance their property for wild turkeys.

The Maine Chapter of the National Wild turkey Federation has spent over $63,000 on habitat improvements in the state of Maine. These projects have consisted of:

- maintenance and development of brood habitat
- wildlife openings
- prescribed fire
- tree planting
- riparian restoration
- water development projects
- control of invasive plant species
- support for seed subsidy and conservation seed programs

Currently, MDIFW and the Maine Chapter of the National Wild Turkey Federation have an ongoing project at the MDIFW-owned Page Farm parcel, part of the Mattawamkeag River System Wildlife Management Area, located in Drew Plantation. Located on this parcel are two abandoned farmsteads and their associated reverting fields. After reviewing the area with representatives of the local Penobscot Valley Chapter of the National Wild Turkey Federation, (NWTF), a superfund project was co-developed to restore some of the reverting fields through mowing and herbaceous seeding. Additionally the project will rejuvenate the apple trees through pruning, fertilizing, and liming, nurture some of the soft-mast producing shrubs such as high bush cranberry by liming and fertilizing, and supplement the hard-mast producing trees by planting additional trees such as red oak and American Chestnut throughout the hardwood stands on appropriate soils. The superfund program provides funding from NWTF acquired through the local membership at banquets, raffles, and membership dues to assist in completing selected projects.



Habitat restoration and enhancement implemented by landowners throughout the state can benefit many species of upland wildlife. Proven techniques such as those employed at Page Farm parcel can be used on smaller or larger parcels of privately owned land. The NWTF website, *http://www.nwtf.org/* has a wealth of information for the landowner wishing to actively manage their property. Habitat improvement information is also available through workshops sponsored by NWTF and other conservation groups, as well as through your Regional Wildlife Office.

With the ongoing partnering of NWTF and MDIFW, and habitat improvement projects on private land, Maine now has Wild Turkeys occupying areas of the state once believed not capable of supporting Wild Turkey flocks. Coupled with habitat conservation efforts, the restoration of the Wild Turkey is an extremely successful wildlife management effort.

--Vasco "Buster" Carter, Assistant Regional Wildlife Biologist

Region G — Ashland

Lt. Gordon Manuel Wildlife Management Area

One of the five state wildlife management areas within this region is the Lt. Gordon Manuel Wildlife Management Area, in the towns of Hodgdon, Cary, and Linneus, in Southern Aroostook County. The Lt. Gordon Manuel WMA encompasses 6,488 acres and is composed of forested land (85 %), fields (2%), and wetlands (13%). The initial acquisition centered around an existing dam site on the South Branch of the Meduxnedeag River in the town of Hodgdon Mills and the associated wetlands that were to be restored when the dam was replaced. The majority of the uplands are located west of the wetlands associated with the South Branch of the Meduxnekeag River. The uplands consist of active agricultural land; abandoned, reverting old fields; cedar lowlands; spruce-fir flats; and hardwood stands.

The Lt. Gordon Manuel WMA was primarily purchased for the management of waterfowl, with secondary management directed toward Ruffed Grouse and Woodcock. Many of our other wildlife species (consumptive and non-consumptive) are direct beneficiaries of management toward these species. A timber harvest operation on the Lt. Gordon Manuel WMA was initiated for wildlife management in the fall of 2003, focusing on Ruffed Grouse and Woodcock as our two "featured species". Three types of harvests were completed. The first was "Grouse Management Blocks". Two grouse management areas equivalent to 80 acres of 4-acre clear-cut blocks in predominant poplar forest types were harvested to create interspersed, early successional stages. Poplar is a very fast growing species and is a critical food source for grouse during late fall and winter. These clear-cut blocks adjacent to residual mixed-wood create an age class diversity offering ideal, brood rearing, and loafing habitat within the first 3-6 years. Blocks of more mature poplar adjacent to these clear-cut blocks offer ideal feeding, and escape cover and create a mosaic of habitats necessary for the life stages of this bird. Another wildlife advantage with this type of harvest in poplar stands is the creation of excellent early critical habitat for woodcock the first fifteen years in the form of feeding, nesting, brood, and escape cover.

The second type of harvest completed on the management area was "Strip Clear-cuts". A system of progressive strip clear-cuts was initiated on the management area in 1983. The system that was set up at this time was continued. The areas were divided into strips 100 feet wide and numbered sequentially 1-8. The "1"s and the "2"s were harvested in the first entry with the "3"s and the "4"s scheduled for the 2003 entry. Approximately 20 acres of strips were clear-cut as a result of this prescription. The clear-cuts were not forest-type specific, thereby creating interspersed age classes of trees of different seral stages of hardwood, mixed-wood, and softwood benefiting a variety of wildlife species. Potential den and cavity trees along with any fruit and nut producing trees were left standing for the benefit of wildlife. Vertical structure was accomplished through new tree growth in the understory of residual strips through the increase of sunlight, and horizontal diversity was accomplished through the initiation of different seral stages by creating new strip clear-cuts on a 20-year interval.

The third and final harvest on the management area was a "Three-stage Shelterwood". A shelterwood harvest is the removal of all trees from an area except for several large trees that provide shade for developing seedlings. A 3-stage shelterwood is used to open up an area much slower, with entry every 10-15 years for development of regeneration, and perhaps to maintain wind firmness within the stand by allowing regeneration to increase in height. For this initial entry, overmature Balsam Fir was harvested in the shelterwood area. Within the shelterwood section of the harvest, special wildlife consideration was directed toward cedar stands and riparian zones. Cedar stands are critical winter habitat for white-tailed deer in Northern Maine. All cedar stands within these shelterwood sections were blocked off for retention. Riparian zones (intermittent and seasonal streams) were protected to maintain these very unique habitats. Riparian areas are some of the most important wildlife habitats supporting the life stages of more wildlife species then any other single habitat. All den trees and potential den trees (snags) were retained within these zones.

State wildlife management areas are not only for the management of wildlife but also for the enjoyment of the public as a multiple-use facility. Through these harvests the public can be educated on ways to manage wildlife, and over time see a direct influence on species richness. For additional information pertaining to the Lt. Gordon Manuel WMA, on recreational uses and map, please refer to the web site *http://www.maine.gov/ifw/wma/office/regg.htm.*

--Rich Hoppe, Regional Wildlife Biologist

Lands Management Program

Cover Type and Photo Project

Over the last 15 months, the Lands Management Program has been working with James W. Sewall Co. to have 78,310 acres of Wildlife Management Areas (WMAs, see Figure 1, pg. 22) classified into forest and wetland cover types using aerial photography taken specifically for the mapping project. The following report details the typing and photography work the Department had completed and reviews some of the planned uses for the new cover types and photos obtained.

Using color infrared aerial photography taken in 2004 at a scale of 1:15840, the Lands Management Program had the WMAs in Table 1 classified into forest and wetland cover types. The classification system specifies the three most prevalent species or species groups, a numerical height class of the overstory vegetation, a numerical identifier specifying a diameter range of the dominant vegetation and a third identifier (alphabetical) specifying a density, or crown closure class. Any non-forested wetlands were classified using the National Wetland Inventory (NWI) system. A road classification system was also employed based on road width and intended use. In addition, the developed forest and wetland cover types were associated with the respective Maine Natural Areas Program (MNAP) natural communities. The cover types, as well as the associated orthophotos were developed for use with ArcGIS, a powerful spatial database. High quality paper copies of the completed management areas were received earlier this year and it is hoped that copies can be kept on file at the regional offices for easy reference.

Table 1. WMAs by Region

WMA Name	Region	WMA Name	Region
Brownfield Bog	A	Cobscook Bay	C
Cold Rain Pond	A	Daugherty Property	C
Kennebunk Plains	A	Egypt Bay	C
Killick Pond	A	Great Works	C
Little Ossippee River	A	Jonesboro	C
Morgan Meadow	A	Lyle Frost	C
Steep Falls	A	Narraguagus	C
Vern Walker	A	Chesterville	D
Alonzo H. Garcelon	B	Flagg Lot	D
Back River	B	Strong	D
Cambridge	B	Delano Lot	E
Caesar Pond	B	Bud Leavitt	F
Earle R. Kelley	B	Dwinal Pond	F
Frye Mountain	B	Forest City	F
Gawler	B	Mattagodus Stream	F
George Bucknam	B	Mattawamkeag	F
Jaime Pond	B	Old Pond Farm	F
Martin Stream	B	Page Property	F
Merrymeeting Bay	B	Bev Chapman	G
Muddy River	B	Dickwood	G
R. Waldo Tyler	B	Lt. Gordon Manuel	G
Ruffingham Meadow	B	Sutherland Property	G
Sandy Point	B		
Sherman Lake	B		
St. Albans	B		
Steve Powell	B		
Tolla Wolla	B		

Currently, the cover type information is being used in ArcGIS for the development and implementation of habitat enhancement operations such as those currently underway at Brownfield Bog WMA and Frye Mountain WMA. The high resolution of the orthophotos enables Department staff to review habitat types, wetland resources and other features relatively quickly and accurately.

Using the MNAP natural community classifications will allow Department staff to estimate specific habitat characteristics that may be of value to management whether it be for endangered or threatened species, a featured species, or biodiversity. The aggregation of the cover types into natural communities will also allow the development of forest growth rate estimations to ensure Department goals are being met at the stand and landscape level, and that Department lands are being managed at a sustainable level.

The use of the cover types developed under this project in ArcGIS allows Department personnel the opportunity to quickly assess habitat types present on the WMAs. For example, a simple query could specify the total number of stands on a WMA that currently have the characteristics associated with Deer Wintering Areas (DWAs). In addition, because ArcGIS is a spatial database, personnel would know where on the management area those stands were, adjacent stands that might provide travel corridors, browse, or any wetland and riparian resources nearby.

These are just some of the current and planned uses for the cover type mapping and photography project recently completed by James W. Sewall Co. for the Department. The information gained in the typing project will help guide and facilitate the management on WMAs by the Lands Management Program and Regional Staff, as well as provide a base of ecological and stand condition data for the effort currently being undertaken by the Department to gain third party forest certification.

--Ryan Robicheau, Lands Management Biologist

Bureau of Parks and Lands

Bureau of Parks and Lands Wildlife Guidelines

The Maine Department of Conservation, Bureau of Parks and Lands (BP&L) manages 570,000 acres of publicly owned land, located mostly in the northern half of the state, for multiple uses. The Bureau adopted a document called *Wildlife Guidelines for the Public Reserved Lands of Maine* in March of 1988. An advisory committee developed the Guidelines over several years with extensive wildlife expertise chaired by the MDIFW biologist assigned to BP&L. The Guidelines provide a handy desk reference for the forestry field staff of the Bureau of Parks and Lands and others to assist them in integrating forestry and wildlife habitat enhancement.

During the 10-year update of the Bureau's Integrated Resource Policy (IRP) in 2000 it was decided that the *Wildlife Guidelines* would also be updated and reorganized. This effort is currently underway. The following is excerpted from the IRP 2000.

Policy

The Bureau of Parks and Lands' habitat management goal for both fish and wildlife is to provide a diversity of natural habitats on appropriate sites at both coarse and fine scales. The following list provides examples of habitat types to be managed (this is a representative list, subject to additions and deletions, as new information is acquired, or relevant laws and regulations are amended):

- Essential habitats (as defined by Dept. of Inland Fisheries & Wildlife) are regulated by law and currently consist of bald eagle, roseate tern, piping plover, and least tern nest sites.
- Significant habitats (as defined by Natural Resources Protection Act)
  - Habitat for endangered and threatened species
  - Deer wintering areas
  - Seabird nesting islands
  - Waterfowl and wading bird habitats
  - Shorebird nesting, feeding, and staging areas
  - Atlantic salmon habitat
  - Vernal pools
- Fragile ecosystems and habitats
  - Habitats ranked S1 and S2 by Maine Natural Areas Program[1]
  - Alpine areas
  - Folist sites
  - Grasslands
  - Sedge meadows
- Specialized habitat areas and features
  - Rare and exemplary natural communities (other than S1 and S2)
  - Riparian areas
  - Aquatic areas and submerged habitats
  - Wetlands of all types
  - Wildlife trees
    - Mast producing hardwood stands (oak and beech)
    - Snags (dead trees)
    - Den trees (live trees with cavities)
    - Large woody debris (on the ground)
    - Apple trees
    - Raptor nest trees
  - Herbaceous seeding
  - Seeps
  - Old fields
  - Forest openings

The Wildlife Guidelines are being updated and revised to incorporate the final structure and habitat types contained in IRP 2000. An ad hoc advisory committee will be utilized to assist the Bureau's staff Wildlife Specialist with this task.

[1]S1- Critically imperiled in Maine because of extreme rarity (5 or fewer occurrences)
S2 - Imperiled in Maine because of rarity (6 to 20 occurrences)

--Joe Wiley, BPL Wildlife Biologist

Species Planning and Management

Species Planning

Species planning activities were reduced this past year to focus on Maine's Comprehensive Wildlife Conservation Strategy, a 1,600+ page document submitted to the U.S. Fish & Wildlife Service in September 2005 to fulfill our obligations under the State Wildlife Grant Program. Nevertheless, some species planning was accomplished.

Two public working groups were established, one for the New England cottontail and the other for waterfowl, to recommend management goals and objectives for theses species for the next 15 years. In response to the recommended goals and objectives, species specialists Michael Schummer, Karen Morris, and Walter Jakubas responded with feasibility, desirability, capability of the habitat, and potential consequences statements, and 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 on June 23, 2006.

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, Tom Hodgman completed a management system for swallows, which was reviewed and approved by the Wildlife Division on December 15, 2005.

During the coming year, we expect to complete species assessments for American Marten, Fisher, Canada lynx, Black Racer, Peregrine Falcon, Grasshopper Sparrow, and Freshwater Mussels. We also plan to convene three or four public working groups to address American Marten and Fisher; Canada lynx; Black Racer; Freshwater Mussels; and Grasshopper Sparrow and Upland Sandpiper. Also, management systems are scheduled to be developed for American Black Bear; Snowshoe Hare, Atlantic Puffin and Razorbill; Bald Eagle; Piping Plover and Least Tern; and Ringed Boghaunter.

Endangered Species Listing

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) is currently in the process of recommending updates to the State's Endangered and Threatened Species list. These proposed changes include a) 12 new listings, b) 1 delisting, c) a change of status from Endangered to Threatened for 1 currently listed species, and d) adding the qualifier of "breeding population only" to 2 species currently listed as Endangered. If approved by the Legislature, this will be the first update to Maine's list since 1997.

The current 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 the reviewer's comments, each listing committee made final modifications to their recommendations, if appropriate. Following the public hearing and comment period in June 2006, the Commissioner of MDIFW will make 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 the state's Endangered and Threatened marine species. The Maine Legislature has given The Maine Department of Marine Resources responsibility for maintaining and updating that list.

Funding Wildlife 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 CWCS, 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 Conveyance 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 2). These voluntary means of contributing provide the core funding for Maine's nongame and endangered species programs. All money donated, whether through the tax checkoff, 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 2. 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	Total Given	Chickadee Check-off			Loon License Plate		Maine Outdoor Heritage Fund	
		Number of Givers	Average Donation	Percent of Taxpayers Giving	Income to MDIFW	Number of Registrations	Income to MDIFW	Number of Projects Funded
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

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.

- That 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

A greater commitment is needed to adequately fund fish and wildlife conservation programs across all involved state agencies or the State of Maine is in grave danger of losing its valued outdoor recreation tradition – a heritage that provides great economic benefits to the State as well as other benefits to its citizens.

CITIZENS' ADVISORY COMMITTEE TO SECURE THE FUTURE OF MAINE'S WILDLIFE AND FISH - 2001

WILDLIFE RESOURCE ASSESSMENT SECTION

The Wildlife Resource Assessment Section (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, Habitat Group, Mammal Group, or the Amphibian, Reptile and Invertebrate Group.

The overall theme of the 2006 Wildlife Division Research and Management Report is wildlife habitat. All of our staff is involved in wildlife habitat related tasks throughout the year. The tasks assigned addressing habitat issues varies from staff member to staff member, but the bottom line is that wildlife habitat-related activities comprise a major effort of the Section, and the Wildlife Division. Our 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, high or moderate value waterfowl and wading bird habitats, shorebird areas, seabird nesting islands, and vernal pools. Our Habitat Group is integral to many of these efforts, providing habitat assessment support and computer mapping tools for the high profile Beginning with Habitat Project. Many of these activities are discussed in more detail in the early sections of this document.

Over the past year, WRAS staff were major contributors toward the completion of the Comprehensive Wildlife Conservation Strategy (CWCS) to document species of greatest conservation need and develop a plan to prioritize need for funds from the federally funded State Wildlife Grants. This effort included identifying key habitats for each species of greatest conservation need. This was a major effort on the part of our staff to review species lists and develop supporting data for the document. We are hopeful that Federal State Wildlife Grants will become a reliable source of funds to address species and habitat management over the coming years.

We also continue to support the wildlife planning 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, we also continued to conduct wildlife research and surveys, helped collect and analyze harvest data, and provided input to season recommendations, permit reviews, etc. The rest 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 all 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. The beginning of this document outlined many of the wildlife habitat conservation efforts being conducted by the Wildlife Division. In the following pages you will learn about the many species management activities of our staff over the past year.

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

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 group of organisms is an important challenge. One of the new Group's highest priorities is to address the protection and recovery needs of the large number of rare reptiles and invertebrates currently represented on the state's official list of Endangered and Threatened species (16 of 33 species). Some state endangered invertebrates, such as the Katahdin Arctic Butterfly, are endemics – found nowhere else in the world but Maine. The following biologists are experienced nongame professionals assigned to the new Reptile, Amphibian, and Invertebrate Group:

Phillip deMaynadier, Wildlife Biologist and Group Leader – Supervises Group activities and serves as the Department's expert on amphibians, reptiles, and vernal pool habitat issues. Phillip is also coordinating statewide atlasing and conservation efforts for damselflies, dragonflies, and butterflies.

Beth Swartz, Wildlife Biologist – Works closely with the Department's Habitat Group and the Maine Natural Areas Program to maintain the Natural Heritage database – a compilation of the state's rare and endangered wildlife, plant, and natural community data. 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.

Amphibians and Reptiles

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. MDIFW will attend the 2006 meeting of the Northeast PARC in Connecticut (August 15-17th) where a presentation will be given on Maine's recently published "*Forestry Habitat Management Guidelines for Vernal Pool Wildlife*". For more information on herptile conservation efforts, or to join the northeastern working group, visit the PARC website at *www.parcplace.org.* ***Funding for this work comes from Conservation Plate and Chickadee Check-off funds.***

--Phillip deMaynadier

Maine Amphibian and Reptile Atlasing Project (MARAP)

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

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

MDIFW continues to maintain a comprehensive database on the distribution of Maine's 35 amphibian and reptile species and encourages members of the public who possess a copy of *Maine Amphibians and Reptiles* to submit new township records by mailing the blank record sheet at the end of the book to MDIFW's Bangor office (Attn. MARAP). As always, observations of any of the four state-listed reptiles – eastern box turtle (Endangered), Blanding's turtle (Endangered), spotted turtle (Threatened), and black racer (Endangered) — should be submitted to MDIFW immediately (*phillip.demaynadier@maine.gov* or call 207-941-4239). ***Funding for this work comes from Conservation Plate and Chickadee Check-off funds.***

--Phillip deMaynadier

Amphibian Monitoring

Since 1989, scientists have been concerned that frogs, toads, and salamanders (amphibians) may be declining worldwide. Unfortunately, a recent scientific analysis confirms these suspicions with fully 32% of the world's amphibian species now considered threatened with extinction, a rate exceeding that for birds or mammals. Maine, like many other states, had little data to assess trends in its own amphibian populations. In 1996, MDIFW and Maine Audubon received an Outdoor Heritage Fund grant to initiate a statewide amphibian-monitoring program that 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 nine years of data collected (through 2005), we anticipate the ability to analyze preliminary population trends for several species of frogs and toads within the next couple years. Currently leopard frogs (a species of Special Concern), pickerel frogs, and mink frogs are among the state's least commonly reported species. Those interested in participating in this citizen-science initiative should contact Maine Audubon's Susan Gallo at 207-781-6180 (ext. 216) or Dr. Aram Calhoun at 207-581-3010, or visit the website at: *www.maineaudubon.org/conserve/citsci/mamp.shtml.* ***Funding for this work comes from Maine Audubon Society, Conservation Plate, and Chickadee Check-off funds.***

--Phillip deMaynadier

Blanding's and Spotted Turtles

Two of Maine's rarest reptiles, the spotted and Blanding's turtles, are semi-aquatic species preferring small, shallow wetlands in southern Maine. Spotted turtles (Threatened) are small (5 to 6 inches long), have yellow spots on the head, tail, and legs and a somewhat flat, yellow-spotted upper shell. Blanding's turtles (Endangered) are larger (7 to 10 inches long) with a yellow throat and light-colored flecking on a domed, helmet-shaped shell. Little was known about either of these species until the Maine Amphibian and Reptile Atlasing Project (MARAP) was conducted in the 1980s. With financial support from the U.S. Fish and Wildlife Service and the Environmental Protection Agency, MDIFW has intensified efforts to learn more about the distribution of these rare turtles over the past 16 years.

In the early 1990's MDIFW worked with University of Maine graduate student Lisa Joyal to complete a study of both species in the Mt. Agamenticus area of southern York County. More than 80 turtles were marked or radio-tagged to gather information on nesting and hibernation sites, movements, and the types of wetlands used. Most significantly, her work demonstrated the importance of small pocket swamps and vernal pools as productive foraging and breeding habitats, with individual turtles often requiring multiple wetlands within a single activity area. Furthermore, the undeveloped upland forests and fields surrounding these wetlands provided habitat for nesting, estivating (a period of summer inactivity), and inter-wetland migration movements.

In addition to habitat loss, Maine's Blanding's and spotted turtles regularly face the threat of road mortality during their nesting and inter-wetland movements. While road-killed wildlife is a common sight on our back roads and highways, there is probably no group of organisms in Maine for which roads represent a more serious threat to long-term population viability than turtles, and no place more threatening than southern York County where road density and traffic volumes reach their peak. For millions of years the turtle's shell has proven to be a successful adaptation, conveying high adult survivorship by offering a deterrent to would be predators. Unfortunately, a strategy of freezing and withdrawing into a shell is not successful against vehicle tires. 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 short, the attrition of just a few breeding adult turtles every year to road-kill has no natural precedent, and may rank among the most important factors threatening the extinction of Blanding's and spotted turtle populations in Maine. In light of this issue, 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 has radio-tagged over 90 spotted and Blanding's turtles, over three years, and is using information from their nesting and wetland movements to assess population viability in Maine. MDIFW hopes to work with cooperators – including Maine Dept of Transportation, The Nature Conservancy, and local towns — to apply results from this research toward designing mitigation measures for problem road sections (e.g. "turtle crossing" signage, barrier fencing, and turtle underpasses). In addition, Fred's research will help identify those remaining roadless remnants of the southern Maine landscape where turtle population viability remains strongest and where active habitat protection is critical.

--Phillip deMaynadier

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 spotted and Blanding's 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.***

--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, is now completing 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 Conservation Plate, Chickadee Check-off funds, U.S. Fish and Wildlife Service, and the Maine Outdoor Heritage Fund.***

--Phillip deMaynadier

Invertebrates

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 North American fauna. Several of Maine's odonate species are of national and global conservation concern. In 1997, at Maine Inland Fisheries and Wildlife's (MDIFW) request, the Legislature designated the ringed boghaunter dragonfly (*Williamsonia lintneri*) as Endangered, and the pygmy snaketail dragonfly (*Ophiogomphus howei*) as Threatened. MDIFW currently lists an additional 25 odonates as species of Special Concern. While several odonates are highly sensitive to freshwater habitat degradation and experiencing declines nationwide, baseline information for the group has been lacking in Maine, until recently.

In 1998, MDIFW received a grant from the Outdoor Heritage Fund to initiate the Maine Damselfly and Dragonfly Survey (MDDS). MDDS is a multi-year, citizen scientist atlasing initiative designed to improve our knowledge of the distribution, status, and habitat relationships of damselflies and dragonflies statewide. In addition to engaging over 200 of Maine's non-game wildlife constituents and raising public awareness of invertebrate conservation, the MDDS has helped the Department more accurately assess the status of rare, threatened, and endangered odonates. To our knowledge, the MDDS is among the first completely state-sponsored dragonfly atlasing projects of its kind in North

America and has received considerable notoriety (see website below). Having recently completed its sixth and final field season, the survey's results have far exceeded expectations and are best summarized by the following:

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

2. Scientific Contributions:
   - Total records submitted (% increase over 1999 baseline): 17,264 (229%)
   - New Rare, Threatened, and Endangered species records: 297
   - New state species records: 10
   - New U.S. species records (Quebec Emerald & Canada Whiteface) 2
   - Scientific publications completed or in progress: 5

With the volunteer atlasing component of the MDDS project coming to closure, MDIFW has recently contracted Paul M. Brunelle, an accomplished odonate expert and graphic design artist from Nova Scotia, to assist with authoring and designing the project's capstone product: "An Atlas and Conservation Assessment of Acadia's Damselfly and Dragonfly Fauna". Populated largely with data contributed by MDDS volunteers, this atlas will serve as the first authoritative publication on the distribution and natural history of odonates from Maine and the Canadian Maritime Provinces. ***Funding for this work comes from 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, Bog Fritillary, and Crowberry Blue are just some of the state's rarest butterflies that are both colorful in name and on the wing, if you are fortunate enough to see one. In an effort to improve our knowledge of the status and habitat preferences of these and other rare butterflies MDIFW is actively studying the group during statewide regional surveys. Attractive, conspicuous, and ecologically important, butterflies have garnered increasing attention from scientists and the general public. By documenting the distribution and status of the state's butterfly fauna MDIFW hopes to improve its understanding of the group and prioritize conservation efforts towards those species most vulnerable to state extinction.

Further supporting this goal, MDIFW received a grant from the Outdoor Heritage Fund in 2002 to contract a professional lepidopterist, Dr. Reginald Webster from New Brunswick, to help assemble a comprehensive assessment of the state's butterfly fauna. Drawing from published literature and specimen records located in museums and amateur collections throughout the Northeast, Reggie assembled the first baseline atlas and database of Maine's butterfly fauna – an essential step toward conservation and management of the group by MDIFW and cooperators. The baseline atlas project compiled nearly 9,000 records and added 11 previously undocumented butterflies to the state list, which now stands at 115 species. Of special note is the relatively high proportion (~20%) of Maine butterflies and skippers that are extirpated (5 species) or state-listed as Endangered, Threatened, or Special Concern (18 species), a pattern consistent with global trends elsewhere for the group. Unfortunately, additional endangered and threatened butterfly listings are imminent as a result of the state's recent assessment efforts. Contact MDIFW to receive an updated checklist of the butterflies of Maine (*phillip.demaynadier@maine.gov* or call 207-941-4239) or visit *http://www.state.me.us/ifw/wildlife/wildlife.htm* to download a pdf copy of Maine's first baseline butterfly atlas. ***Funding for this work comes from Conservation Plate, Chickadee Checkoff funds, The Nature Conservancy, Maine Dept. of Conservation, and the Maine Outdoor Heritage Fund.***

--Phillip deMaynadier

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 life-style belies its importance. As filter feeders, mussels provide a valuable service to aquatic environments by filtering impurities from the water as they feed, and by returning nutrients to the ecosystem. In turn, mussels provide food for a variety of larger predators 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 vastly 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 their 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, as well as 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 only 25% are thought to be maintaining stable populations. Thirty-five species (12%) are believed to be extinct, and 69 (23%) are currently listed as endangered or threatened under the federal Endangered Species Act. Most states also have their own endangered species lists, 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 degradation and loss of mussel habitat from pollution, dams and other water control structures, 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, two are currently listed as "threatened" under the Maine Endangered Species Act and three are considered of "special concern". Fortunately, compared to most states within the range of these five species, Maine seems to have some of the best remaining populations and may be a last stronghold for these rare mussels.

In 2005, MDIFW continued collaboration on two research projects with Dr. Judith Rhymer of the University of Maine and Dr. Cyndy Loftin of the Maine Cooperative Fish and Wildlife Research Unit to advance the understanding and conservation of Maine's two rarest freshwater mussel species – the yellow lampmussel (*Lampsilis cariosa*) and tidewater mucket (*Leptodea ochracea*). Graduate student Stephen Kneeland continued his research to document the fish host(s) for both species by using genetic analysis to identify glochidia found on fish in the wild. Stephen sampled over 800 fish throughout the mussels' range in Maine and found their glochidia on about 10%. His research has so far determined that the white perch (*Morone americana*) may be the primary host for both rare mussels, with several other species potentially also serving as hosts. Identification of host species is a critical component to understanding the life history and conservation needs of freshwater mussels. Without access to the appropriate hosts, most freshwater mussels cannot successfully reproduce. 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 continued her research to study the effects of dam removal and mussel relocation on yellow lampmussels and tidewater muckets. Proposals to remove both small and large hydropower dams are becoming increasingly common in Maine, yet we have no way of knowing what the long-term effects will be on these two 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 biologists at this time is to move or relocate the stranded mussels to new habitat. However, 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 is focusing 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. During the summer of 2005, Jennifer conducted transect surveys in a portion of the impoundment to estimate the numbers of both rare species present, and also completed experimental translocations to a nearby watershed using a more common species found in impoundment. She also became the first person to investigate the use of the PIT (Passive Integrated Transponder) tag – a tiny identification chip - to relocate and monitor mussels. In 2006, Jennifer will continue to monitor the survival of the mussels that she moved. The results of her study will help MDIFW increase the success of relocations for these rare mussels following dam removals or other potentially detrimental events.

More information on Maine's mussels can be found in *The Freshwater Mussels of Maine* by Ethan Nedeau, Mark McCollough, and Beth Swartz. 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 Information Center at MDIFW headquarters in Augusta 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, and "Chickadee Check-off" contributions on the State income tax. 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, 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 2006, 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), Conservation Plate, and "Chickadee Check-off" contributions on the State income tax form. Thank you!***

--Beth Swartz

Mammal Group

The Mammal Group is one of 4 groups in the Wildlife Resource Assessment Section in the Bangor Office. We

- assess the population status of Maine's mammals,
- develop and oversee the implementation of management systems for key mammal species,
- conduct research in cooperation with Universities and other government agencies,
- develop protocols to monitor wildlife populations and the use of these wildlife by the public,
- participate in environmental education,
- formulate harvest regulations, and
- advise and assist Department staff who are working on policy or biological issues dealing with mammals.

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 and New England cottontail 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.

Shannon Crowley, Bio Specialist – Helps coordinate field activities for the lynx research project, and assists the lynx project leader with grant writing and data analysis.

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.

2005-06 Contract Workers & Volunteers – *Contract Workers*: **Kendall Marden** - Deer and Bear Project; **Jordan Perkins** - New England cottontail Project; **David Pert** - Deer, Moose, and Bear Projects; **Eric Rudolph** - Bear Project; **Dan Wagner** - Bear Project; and **Chris West** - Deer Project - CWD. *Volunteers*: **Lisa Bates** - Bear Project; **Curtis Johnson** - Bear Project; **Alexej Siren** - Bear Project; **Braden Burkholder** - Lynx Project; **Elyssa Collins** - Lynx Project; **Dan Kaminski** - Lynx Project; **Kristy McLellan** - Lynx Project; **Bradley Nichols** - Lynx Project; and **Daniel Hartford** - Deer Project.

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

Black Bear

The 2005 Black Bear Season

The general hunting season for black bear in 2005 opened August 29 and closed November 26. 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 29 through September 24. The hound season overlapped the bait season, opening September 12 and closing October 28. The bear trapping season opened September 1 and closed October 31.

The 2005 harvest of 2,873 bears is below recent harvest levels (Table 3). During the previous 5-year bear seasons between 3,500-3,951 bears were harvest (average 3,837 bears). In 2005, 2,247 bears were taken over bait (78%), 318 bears were taken by hound hunters (11%), 130 bears were taken in traps (4.5%), and 68 were taken by unreported methods (2.5%). During November, only 110 bears (4%) were harvested by approximately 175,000 deer hunters. Most bears were taken early in the season, with 2,596 bears (90%) harvested before the end of September. Heavy beechnut crops, in alternate years, provide an abundant food source for bears, which delays their entry into

dens and leads to a higher harvest of bears by deer hunters. However in recent years, beechnut crops have been at low to moderate levels and appear to have lost the alternate year fluctuation. Reports indicate that the beechnut crop was poor this year. Early den entry dates observed during our telemetry studies and the low harvest by deer hunters support this observation.

Table 3. Number of bears harvested in Maine in 2005 by Wildlife Management District (WMD)

	Method of Take									
WMD	Hunting w/Bait	While Deer Hunting	Hunting w/Dogs	Trapping	Unknown	Total Harvest	Archery	Assisted by Guide	Resident	Non-Resident
1	159	2	8	2	6	177	17	170	16	161
2	97	0	20	4	2	123	12	113	14	109
3	151	1	11	2	8	173	23	118	52	121
4	232	1	2	0	10	245	17	198	45	200
5	121	0	17	2	0	140	10	138	12	128
6	166	5	14	4	9	198	28	132	65	133
7	72	5	19	8	4	108	11	74	31	77
8	149	4	31	41	6	231	15	147	94	137
9	86	0	1	1	1	89	9	57	35	54
10	147	2	11	0	5	165	13	137	28	137
11	195	3	19	3	3	223	26	169	38	185
12	74	9	39	5	1	128	13	59	72	56
13	19	10	18	6	0	53	3	32	19	34
14	70	3	17	8	0	98	5	71	34	64
15	23	19	5	7	3	57	3	8	47	10
16	0	6	0	2	0	8	0	0	7	1
17	33	12	6	3	1	55	4	14	37	18
18	154	5	7	7	1	174	17	93	76	98
19	104	0	33	7	0	144	16	110	26	118
20	4	3	0	0	1	8	0	2	6	2
23	2	3	0	1	0	6	0	2	6	0
26	20	3	0	0	1	24	4	3	21	3
27	59	6	2	2	2	71	11	16	52	19
28	73	5	29	9	1	117	7	73	51	66
29	37	3	9	6	3	58	8	32	30	28
State Totals	**2,247**	**110**	**318**	**130**	**68**	**2,873**	**272**	**1,968**	**914**	**1,959**

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. In 2003 and 2004 permit sales returned to previous levels (Table 4). We have not documented the reason for the recent decrease in the sale of bear permits, but note that the fee for bear permits also increased in 2003 from $5.00 to $25.00 for resident and from $15.00 to $65.00 for non-resident hunters. Prior to 2003, there had been a modest increase in fees, with no effect on hunter participation. Non-resident hunters (6,474) continue to purchase around 55% of the permits in 2004, while resident hunters (5,299) account for around 45% of the permits sold in 2004.

Table 4. Hunter participation and harvest levels 1990 - 2005

Year	Number 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	**10,881***	**3,921**

** Preliminary estimate of permit sales*

Geographic Distribution of the Harvest

Bears were harvested in 25 Wildlife Management Districts (WMDs – see Figure 3, pg. 44). No bears were taken in WMDs 21, 22, 24, 25, and 30. The density of harvest expressed as the number of bears killed per 100 square miles of habitat (forested land) was greatest in WMD 3 at 21 bears/100 mi^2 followed closely by WMDs 10, 6, and 28 with 20 bears/100 mi^2, to 16 bears/100 mi^2. In all other WMDs, hunters harvested less than 15 bears/100 mi^2 (statewide average of 10/100 mi^2). Bears were harvested in 13 of the State's 16 counties. Most bears (882) were harvested in Aroostook county accounting for 31% of the harvest. No bears were taken in Knox, Lincoln, and Sagadahoc counties.

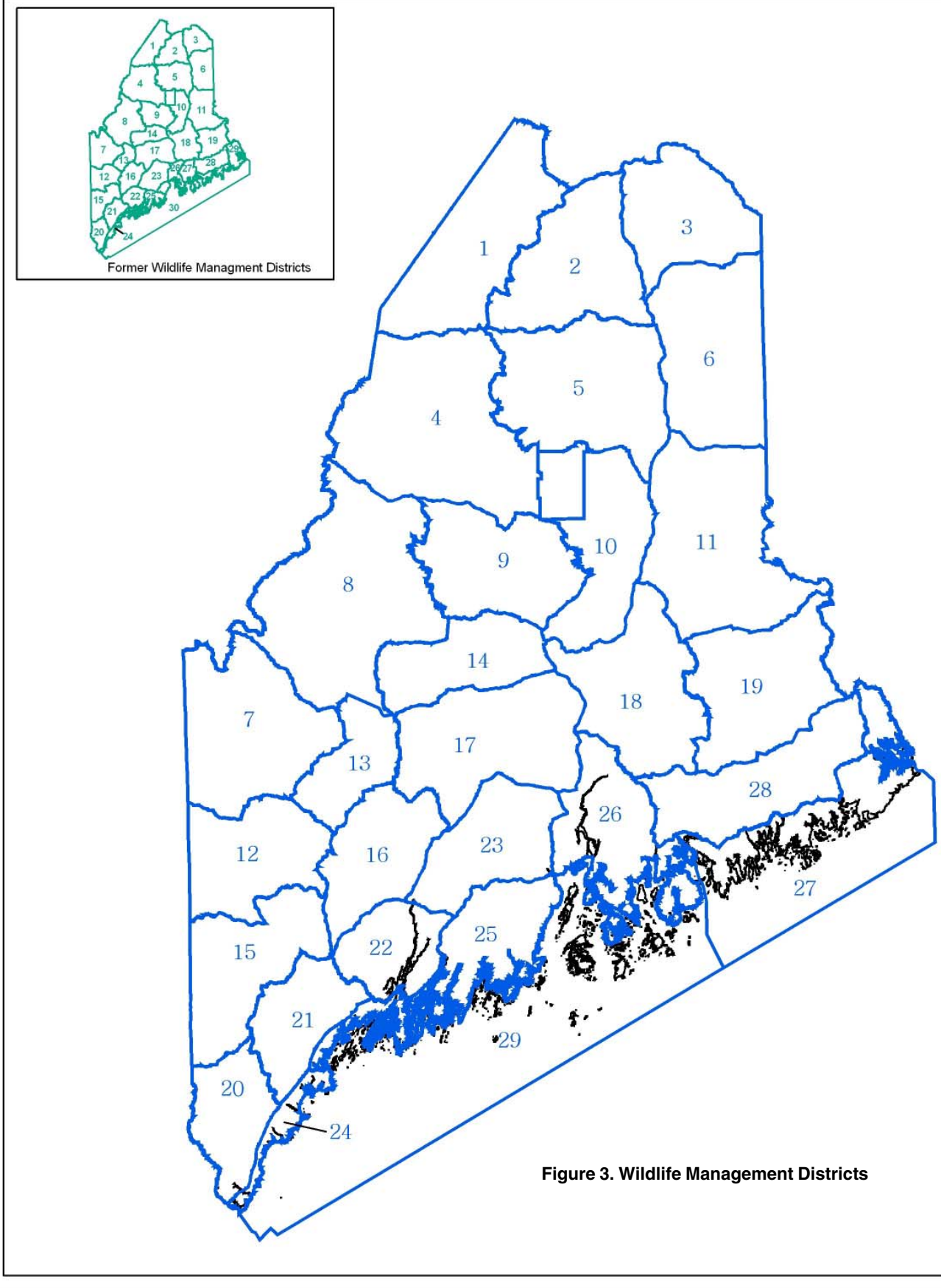


Figure 3. Wildlife Management Districts

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 1,959 bears (68%) of the 2,873 bears tagged during 2005. Visitors and Maine residents took most of their bears over bait and with the aid of hounds. Visitors accounted for most of the bears taken over bait (73%) and with the use of hounds (72%), whereas Maine residents accounted for most of the bears harvested by unreported methods (68%), during the deer seasons (83%), and in traps (57%). However in recent years there has been an increased interest in bear trapping by non-resident hunters and trappers.

Assistance by Registered Maine Guides

In 2005, guides helped take 83% of bears shot with hounds, 73% of the bears taken over bait, 46% of trapped bears, 18% of the bears for which method of take was unreported, and 2% of the bears taken by deer hunters. Guides assisted 209 residents (23%) and 1,759 nonresidents (91%) with their successful hunts in 2005.

Sex and Age Distribution of the Harvest

Males made up 54% (1,543 bears) of the 2005 harvest. Adult bears accounted for 91% (2,615 bears) of the 2005 harvest and sex and age were not reported for an additional 10 bears (<1%).

Prospects for the 2006 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 2006, 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. In 2006, the general bear hunting season will open on August 28 and close on November 25.

Maine's spring 2006 bear population estimate remains near 23,000 bears. In accordance with our management goal, the harvest levels experienced since 1999 appear to have stabilized the bear population. We are monitoring the survival of adult female bears closely; if survival of adult females declines, restrictions to harvests may be required. Given the recent changes in annual beechnut production, it is difficult to know whether beechnuts will be scarce or abundant this fall. If beechnuts are scarce, bears should enter their dens early, which would result in another low late season harvest. Current bear season framework should result in harvest between 3,500 and 4,000 bears in 2006.

Research and Management

Since 1975, the Department has been studying black bears to gather information on the status of Maine's black bear population. This information is a key element in insuring that Maine's bear population is being effectively managed. Our management strives to balance the biological needs of the species with the needs of society by maintaining bear populations at levels that minimize conflicts between bears and people and provides both hunting and viewing opportunities while assuring future conservation of bears.

Since 1975, we've studied black bears just west of Ashland and in the Stacyville area. In 1982, we opened a third study area just north of Bangor. Our study areas were selected to represent the range of bear habitats and human use patterns in Maine, allowing us to gauge the status of Maine's bear population in similar habitats. Over the last 15 years, we have been phasing out the Stacyville study area in favor of opening a study area in downeast Maine that better represents today's range of bear habitat and human use patterns. In 2003, we officially closed the Stacyville study area and in 2004 we initiated a long-term study in downeast Maine. The other 2 study sites remain open.

In each study area, we maintain a sample of 20-30 radiocollared bears to document reproductive and survival rates of Maine's bears. By tracking radiocollared females to their winter dens, we can learn about the productivity of Maine's bear population based on the number of females that produced a litter in a given year and the number of cubs being born. We can also document what percentage of cubs from the previous year survived, since yearling bears remain with their mother the following winter. This information, in conjunction with harvest rates and an assessment of the amount of suitable habitat for bears in Maine, is used to estimate Maine's bear population — conservatively estimated at around 23,000 bears.

In addition to our research and monitoring efforts, we solicit input from the public to help direct our bear management program. In 1999, a public working group was convened to develop recommendations for future bear management based on the Department's reassessment of the past, present, and future status of bears, their habitat, and demands on the bear resource. This assessment provided the scientific basis for the public working group's deliberation of bear management goals and objectives. A bear management goal of providing continued hunting, trapping, and

viewing opportunity for bears in nearly all of the State's bear range was established. Associated with this goal were 3 objectives: 1) stabilizing the bear population's growth by 2005 at no less than current (1999: 23,000 bears) levels, 2) creating information and education programs to promote traditional hunting and trapping methods as preferred and valid tools to manage the State's black bear population, and 3) creating information and education programs to promote public tolerance of bears.

We have a large and productive bear population; as a result a variety of hunting methods and a liberal hunting season are needed to maintain our bear population at desirable levels. However, if the bear population does not remain at biologically and socially acceptable levels, we can modify the bear hunting regulations (e.g. adjust season length, harvest methods, and bag limits).

Current Issues

We are reviewing the feasibility of new techniques and technologies to improve our statewide bear density estimate and evaluate the importance of beech trees (nut production) and other food sources to bears. One promising technology is global positioning system (GPS) collars. Last year, we tested this technology in one of our study areas and the technique shows promise, however additional funding sources are needed to incorporate GPS collars into our current research program. As a result, we will be looking at alternate options, as well as, the possibility of outside funding sources to meet this research need.

Public outreach continues to be a management priority, with the black bear hunting referendum in the fall of 2004 illustrating the need of educational and outreach efforts. Unfortunately, limited staff time and funding does not allow us to meet all of the public's needs for educational programs.

--Jennifer Vashon

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 indices used in our furbearer management systems. 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.

2005-2006 Fur Harvest & Hunting Seasons

In 2005, the general trapping season began October 30 and ended December 31. Special trapping seasons exist for muskrat, coyote, and fox. The early muskrat season started October 23 and lasted until October 29. During this period muskrats could only be trapped in WMDs 1, 2, 3, 4, 5, 6, 9, 10, and 11 (Figure 3, pg. 44). The special fox and coyote trapping season ran from October 16 through October 29 and was open statewide.

In 2005, the beaver season was revised to allow trappers to begin trapping one month earlier in WMDs 9, 10, 11, 18, 19, 28, and 29. The trapping season also closed one month earlier in these WMDs. In WMDs 20, 21, 22, and 24, the beaver season opened two weeks earlier than last year. Last year's beaver season ran from November 1 through April 30 in WMDs 1, 2, 3, 4, 5, and 6; from November 1 through March 31 in WMDs 9, 10, 11, 18, 19, 28, and 29; 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 30; December 15 through February 28 for WMDs 20, 21, 22 and 24 (Figure 3, pg. 44).

Unfortunately, because of a poor return rate on fur-tagging records, we are not able to provide fur harvest information from the 2005-2006 trapping season. The following is an update of the harvest from the 2004-2005 trapping season. Current (2005-2006) information on pelt prices is provided.

Beaver

In an effort to increase trapper participation in beaver trapping, the Department modified the 2004-2005 beaver season. This was the second season in a row that the beaver season had been modified. Although the beaver harvest was higher then it has been the last couple years, it was well within the harvest levels of the last 10 years (Table 5). Slightly higher pelt prices (Table 6) were offset by higher gasoline prices, which discouraged some trappers from setting as many traps as usual. There is some question as to whether the new extended beaver seasons are having an impact on the beaver harvest. Most trappers only have so many days that they can devote to trapping. While a longer season may give a trapper more flexibility of when he or she traps, it may not result in more days of actual trapping. The Department will continue to explore other methods of increasing the beaver harvest in areas where it is warranted. Even though the

Department is interested in increasing the beaver harvest in some areas, we also recognize that beaver play an important role in maintaining wetland and early successional habitats, and thereby benefit many species of wildlife.

Table 5. Harvest of furbearing animals from Maine's pelt-tagging records — Fall 1999 to Spring 2005. 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.

	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Beaver	9,850	9,803	11,757	7,809	8,222	10,436
Bobcat	194	308	269	331	273	376
Coyote	1,823	1,977	2,741	2,287	2,459	2,175
Fisher	2,578	2,028	3,117	2,630	2,526	2,174
Red Fox	1,248	1,272	2,056	1,469	1,535	1,413
Grey Fox	82	89	164	172	196	125
Marten	4,396	1,832	5,529	2,908	5,088	2,248
Mink	1,545	1,606	2,031	935	904	1,224
Otter	737	943	1,103	803	931	1,113

Bobcat

The number of bobcats harvested during the 2004-2005 trapping and hunting seasons (Table 5) was the second highest harvest ever and the highest harvest since the 1980-1981 season. Last year, the Department lengthened the hunting season by 2 weeks. The longer season and excellent hunting conditions likely contributed to this high harvest. While this high harvest is of concern to the Department, we also recognize that the bobcat population has done very well as the number of snowshoe hare has increased in the state. At this time, it looks as if the number of bobcats that were harvested in 2004-2005 was not detrimental to the bobcat population.

Table 6. Average annual 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 (a = 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	2005-2006	2004-2005	2003-2004	2002-2003	2001-2002	2000-2001
Beaver	$18.00^{h}	$17.00	$16.00	$14.00	$18.00	$19.00
Coyote	$17.00	$16.00	$21.00	$20.00	$13.00	$14.00
Red Fox	$17.00	$16.00	$22.00	$24.00	$16.00	$15.00
Fisher (Male)	$31.00^{h}	$27.00	$25.00	$24.00	$20.00	$16.00
Fisher (Female)	$27.00^{h}	$21.00	$21.00	$23.00	$19.00	$16.00
Muskrat	$2.60	$1.69	$2.15	$2.64	$2.29	$2.27
Raccoon	$7.80^{L}	$8.78	$10.24	$8.92	$9.02	$8.12
Weasel	$2.21	$1.96	$2.00	$1.97	$2.43	$2.33
Bobcat	$49.00	$44.00	$50.00	$61.00	$30.00	$60.00
Grey Fox	$17.00^{h}	$12.00	$14.00	$10.00	$10.00	$8.00
Pine Marten	$25.00^{h}	$21.00	$19.00	$18.00	$16.00	$17.00
Mink (Male)	$15.00^{h}	$12.00	$10.00	$10.00	$12.00	$12.00
Mink (Female)	$10.00^{h}	$8.00	$8.00	$6.00	$9.00	$8.00
Otter	$70.00^{h}	$68.00	$65.00	$51.00	$41.00	$49.00
Skunk	$3.50^{h}	$2.79	$2.54	$2.33	$3.50	$2.67

A total of 2,175 coyote pelts were tagged during the 2004-2005 season. The number of coyotes tagged was fewer than the number of pelts tagged during the last three trapping seasons (Table 5). The decline in the number of coyotes harvested may be due, in part, to higher gasoline prices and the amount of driving it takes to tend a long trap line. This was the second year, coyote snaring has been suspended out of concern of possible conflicts between the state's coyote snaring program and federal laws that address the incidental take of threatened species (i.e., Canada lynx). Our Department is continuing to work with the US Fish and Wildlife Service to determine under what structure our snaring program can continue.

Fisher

The decline in the fisher harvest is of particular concern (Table 5) and may require management action if this trend continues. The 2004-2005 trapping season was the fourth season in a row that Maine's fisher harvest has declined. Along with a decline in the number of fisher harvested, the number of fisher caught per fisher trapper has also declined. While increasing gasoline prices may explain lower harvest and trapping success levels (i.e., fewer fisher per fisher trapper because they did not set out as many traps), trapping success and harvest did not drop for other terrestrial species (e.g., marten and bobcat). Fisher harvest levels dropped in northern and southern Maine. In the south, the scarcity of land to trap on may have resulted in the over-trapping of fisher on these parcels. Fisher are still

commonly seen in southern Maine, but they may be more prevalent in areas near residential housing where recreational trapping is not permitted or in areas posted as off-limits to trapping. We are not sure why fisher harvest and trapping success rates are lower in northern Maine. Interestingly, the decrease in the fisher harvest in 2004 occurred when pelt prices for male fisher were significantly higher than the mean pelt price for the last 5 seasons (Table 6). Pelt prices for fisher were very high (e.g., $83) in the spring of 2006. The increase in the pelt price was sudden and is not reflected in the annual pelt price table. If pelt prices remain high and trapping success for fisher continues to drop, the department may have to consider limiting the number of fisher that can be taken in a given year.

Red and Grey Fox

The red and grey fox harvest for the 2004-2005 season was lower than the preceding year but well within recent norms (Table 5).

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. Biologists noted that beechnut crops also have annual fluctuations. For over 20 years in the Northeast, 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. However, it now appears that this is not the case. Marten harvest rates continue to fluctuate in their normal alternate year pattern despite three consecutive years of poor beechnut crops. We do not know why the marten harvest continues to show this alternate year pattern. Nevertheless, the marten population in Maine is stable, and current harvest rates appear to be sustainable.

Mink

The mink harvest increased from last year's record low harvest of 904 animals to 1,224 (Table 5). Pelt prices for mink in 2004 & 2005 were slightly above their 5-year average, and while these prices probably did not attract any additional trappers, they likely did not discourage more trappers than normal from trapping mink (Table 6).

Muskrat

The Department continues to get reports on the scarcity of muskrats compared to past years. Unfortunately, we do not collect any trapping data on muskrat. We are concerned about the prevalence of these reports in Maine and other states in the Northeast, and we hope to start more formal investigations into this apparent decline in muskrats. In Maine, muskrat trapping is allowed anywhere the beaver trapping season is open. The extension of the beaver season into April, in some WMDs, has raised concerns about what effect, if any, that spring muskrat trapping has on the muskrat population.

Otter

Surprisingly, Maine's otter harvest only increased modestly from previous years (Table 5) despite the strong pelt price for otter the last 2 years (Table 6). In Downeast Maine, trappers were concerned that too many otter were being trapped by trappers trying to take advantage of the high pelt price. Although over-harvesting of otter may have occurred locally, over-harvesting was not evident at the WMD level. On a statewide basis, the number of otter being trapped was well below the harvest limit in our management system.

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 from Conservation Plate funds.

--Wally Jakubas

Moose

2005 Moose Season

The 2005 season was very similar to the 2004 season. The same number and type of permits were issued for the same 19 WMDs (see Figure 3, pg. 44), (Table 7). Like last year, the first season was held the last week of September (September 26 –October 1) and the second season was held the second week of October (October 10-15). The only notable change in season structure was that, in addition to the 7 WMDs that had split seasons in 2004, WMD 4 also had a split season. A total of 43 possible hunting combinations were available for moose hunting, with permit holders assigned to 1 of 19 open WMDs, 1 of 2 permit types, and 1 of 2 hunting weeks (Figure 4, Table 7). A hunter with a bull-only permit (BOP) could shoot 1 male moose of any age. A hunter with an antlerless-only permit (AOP) could shoot a cow, a calf, or a bull with antlers shorter than its ears. All of the 19 WMDs were open to hunting during the October season. In the WMDs that also had a September season, an individual hunter could hunt during only one of the weeks.

Overall, 77% of the permittees were successful in killing a moose in 2005, with hunting success ranging from 20% for October AOP hunters in WMD 29 to 100% for BOP hunters in WMDs 2, 4 and 9; and October AOP hunters in WMD 18 (Table 7).

2006 Moose Season

Both the number of permits and the area open to hunting will change in 2006. What was WMDs 28 and 29 will have boundary changes and be renamed WMDs 27 and 28. This will result in a slight increase in the area open to moose hunting in eastern Maine and 15 permits will be added to WMD 28. There will be a few other boundary changes in the Bangor area, but because the area is virtually unhunted for moose, no adjustments in permit numbers will be needed (Figure 3, pg. 44). From 2002 to 2004, WMDs 8, 9, and 13 had low numbers of mature bulls (based on a combination of the sex ratio of moose sightings by deer hunter and age structure of the harvest). The number of BOPs will be reduced from 290 to 235 in WMD 8 and from 80 to 50 in WMD 9 in 2006. Because mature bulls were only slightly lower than the management objective in WMD 13, no reduction in the bull harvest was initiated there.

Future Prospects

Most of the WMDs that are open to moose hunting are in the recreation management area (Figure 5). In 1999, a public working group proposed a population objective for the recreation management area, which stated that the moose population should be maintained near 60% of the carrying capacity of the habitat. Moose densities in the recreation management areas are currently below this objective. When moose sighting rates in the mid to late 1990s indicated that the moose population was declining the number of moose hunting permits was reduced in recreation management WMDs and AOPs were replaced with BOPs to reduce the cow harvest without having to reduce the number of permits by a greater amount. Although a harvest skewed toward bulls should allow the population to grow with less reduction in hunting opportunity, the skewed harvest could result in a population with relatively few bulls in the age classes likely to produce large antlers. This would be unacceptable to both hunters and moose watchers.

Expanding the Moose Hunt Area

In 2000, the Department was given the goal to reduce moose numbers in southern Maine. Because of the controversial nature of this proposal, a plan has not been implemented to reduce moose numbers in this area of the state nor has it been open to moose hunting. The area includes 2 WMDs in the compromise management area (15 and 16), where the objective is to reduce moose numbers by 1/3, and 8 WMDs (20-27) in the safety management area (i.e., the entire safety area), where the objective calls for reducing the number of moose to a very low number. During the past year, the Department used several means of gauging public sentiment about moose numbers, moose hunting and possible season frameworks for this region. Five public informational meetings were held, one in each of WMDs 15, 16, 23, 26 and 27 (new). Attendees were invited to provide oral comment and to complete a survey. The same informational presentation and survey were available on the Departments web site. Unfortunately, responses were very limited as only 26 people attended the meetings and only 2 responded via the Web. In addition, about 70 people participated in an informal survey at the open house at the Wildlife Park in conjunction with a display on moose biology and management.

Peoples' opinions on moose numbers in the WMDs 15, 16, 23, 26 and 27 (new) are split: 20 % think there are too few, 36 % think there are about the right number and 32% think there are too many moose. Less than half (38%) of the respondents at the public meetings felt that moose posed an unacceptable traffic risk but if the survey is representative of the population as a whole, this is still a substantial number of people. Although most (6 of 10) of the people who felt that moose pose an unacceptable traffic hazard support reducing the number of moose; few people (2 of 10) support the idea of reducing the number of moose to near zero.

The best timing of the moose season has always been debated based on bull weight, weather, conflicts with other activities, and timing of the rut. As seasons are opened in the more developed areas of the state, an additional issue

Table 7. 2004 and 2005 Maine moose season registered kill by WMD, season, and permit type. (Note that some totals include moose that could not be assigned to a specific season, WMD, sex or age class.)

		Permit[1]	No. of	2004 Registrations		2005 Registrations	
WMD	Season	Type	Permits	Kill	Success %	Kill	Success %
1	Sept.	BOP	90	79	88	72	80
	Sept.	AOP	5	4	80	4	80
	Oct.	BOP	30	28	93	24	80
	Oct.	AOP	15	13	87	14	93
WMD 1 Subtotals			**140**	**124**	**89**	**114**	**81**
2	Sept.	BOP	68	68	100	62	91
	Oct.	BOP	22	22	100	22	100
WMD 2 Subtotals			**90**	**90**	**100**	**84**	**93**
3	Sept.	BOP	169	145	86	136	80
	Sept.	AOP	55	39	71	39	71
	Oct.	BOP	56	47	84	48	86
	Oct.	AOP	165	142	86	137	83
WMD 3 Subtotals			**445**	**373**	**84**	**360**	**81**
4 [2]	Sept.	BOP	191			167	87
	Oct.	BOP	64			51	80
WMD 4 Subtotals			**255**	**188**	**74**	**218**	**85**
5	Sept.	BOP	90	84	93	80	89
	Oct.	BOP	30	28	93	31	100
WMD 5 Subtotals			**120**	**112**	**93**	**111**	**92**
6	Sept.	BOP	165	144	87	150	91
	Sept.	AOP	66	54	82	40	61
	Oct.	BOP	55	46	84	48	87
	Oct.	AOP	199	162	81	146	73
WMD 6 Subtotals			**485**	**406**	**84**	**384**	**79**
7	Oct.	BOP	125	112	90	108	86
8	Oct.	BOP	290	248	86	236	81
9	Oct.	BOP	80	80	100	80	100
10	Oct.	BOP	100	82	82	76	76
	Oct.	AOP	10	9	90	7	70
WMD 10 Subtotals			**110**	**91**	**83**	**83**	**75**
11	Sept.	BOP	120	86	72	79	66
	Sept.	AOP	30	15	50	16	53
	Oct.	BOP	40	26	65	27	68
	Oct.	AOP	90	49	54	52	58
WMD 11 Subtotals			**280**	**176**	**63**	**174**	**62**
12	Oct.	BOP	35	29	83	19	54
	Oct.	AOP	20	16	80	14	70
WMD 12 Subtotals			**55**	**45**	**82**	**33**	**60**
13	Oct.	BOP	45	29	64	25	56
	Oct.	AOP	10	6	60	4	40
WMD 13 Subtotals			**55**	**35**	**64**	**29**	**53**
14	Oct.	BOP	35	31	89	29	83
17	Oct.	BOP	15	12	80	11	73
	Oct.	AOP	15	11	73	10	67
WMD 17 Subtotals			**30**	**23**	**77**	**21**	**70**
18	Oct.	BOP	80	39	49	50	62
	Oct.	AOP	20	12	60	10	50
WMD 18 Subtotals			**100**	**51**	**51**	**60**	**60**
19	Sept.	BOP	67	46	69	40	60
	Sept.	AOP	4	3	75	2	50
	Oct.	BOP	23	17	74	16	70
	Oct.	AOP	11	11	100	11	100
WMD 19 Subtotals			**105**	**77**	**74**	**69**	**66**
28	Oct.	BOP	45	35	78	22	49
	Oct.	AOP	20	9	45	7	35
WMD 28 Subtotals			**65**	**44**	**68**	**29**	**45**
29	Oct.	BOP	25	9	36	11	44
	Oct.	AOP	5	0	0	1	20
WMD 29 Subtotals			**30**	**9**	**30**	**12**	**40**
Overall WMD Totals			**2,895**	**2,317**	**80**	**2,226**	**77**

[1] 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.

[2] In 2004 all permits for WMD 4 were issued for October. In 2005 the season was split between September and October.

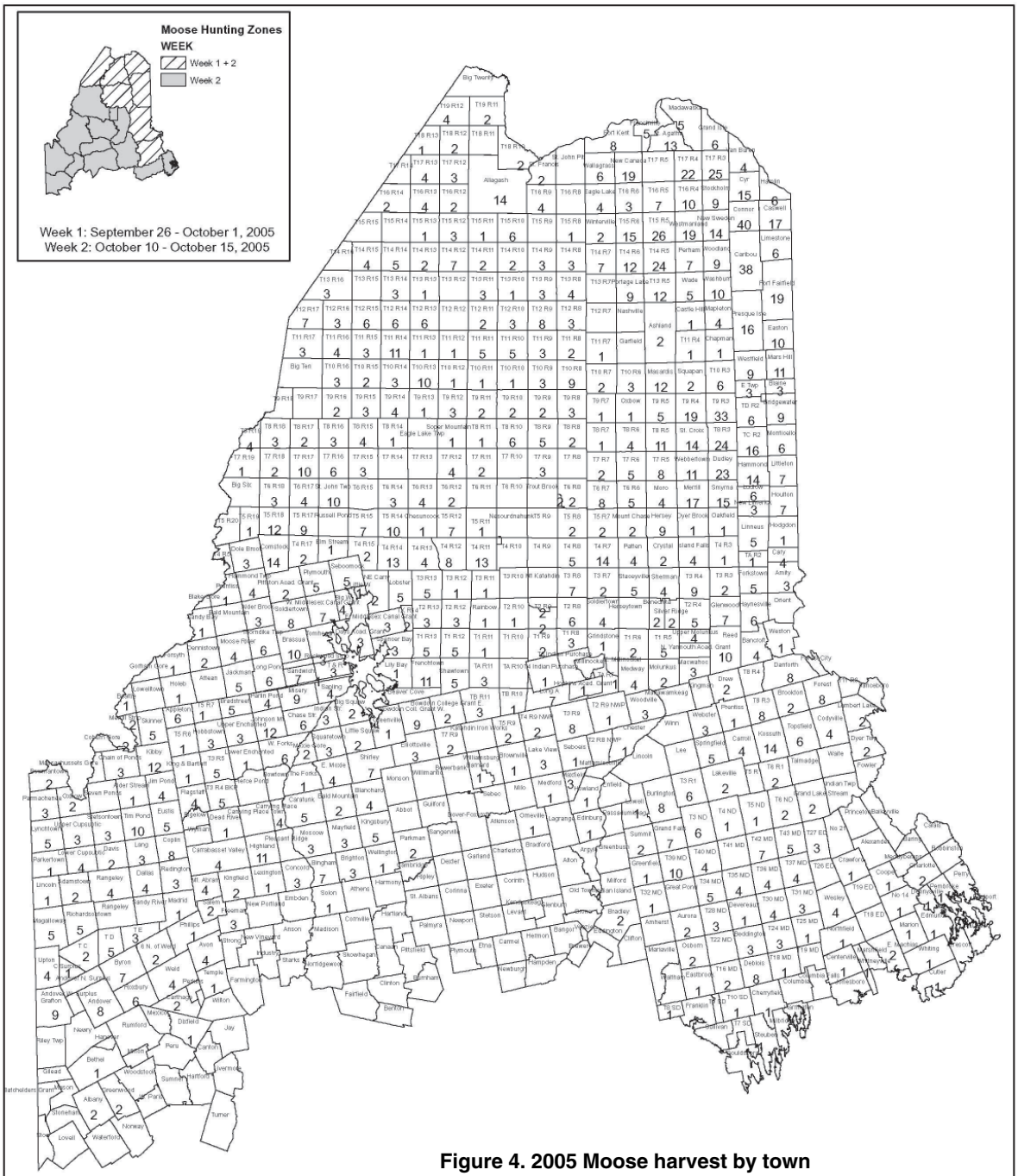
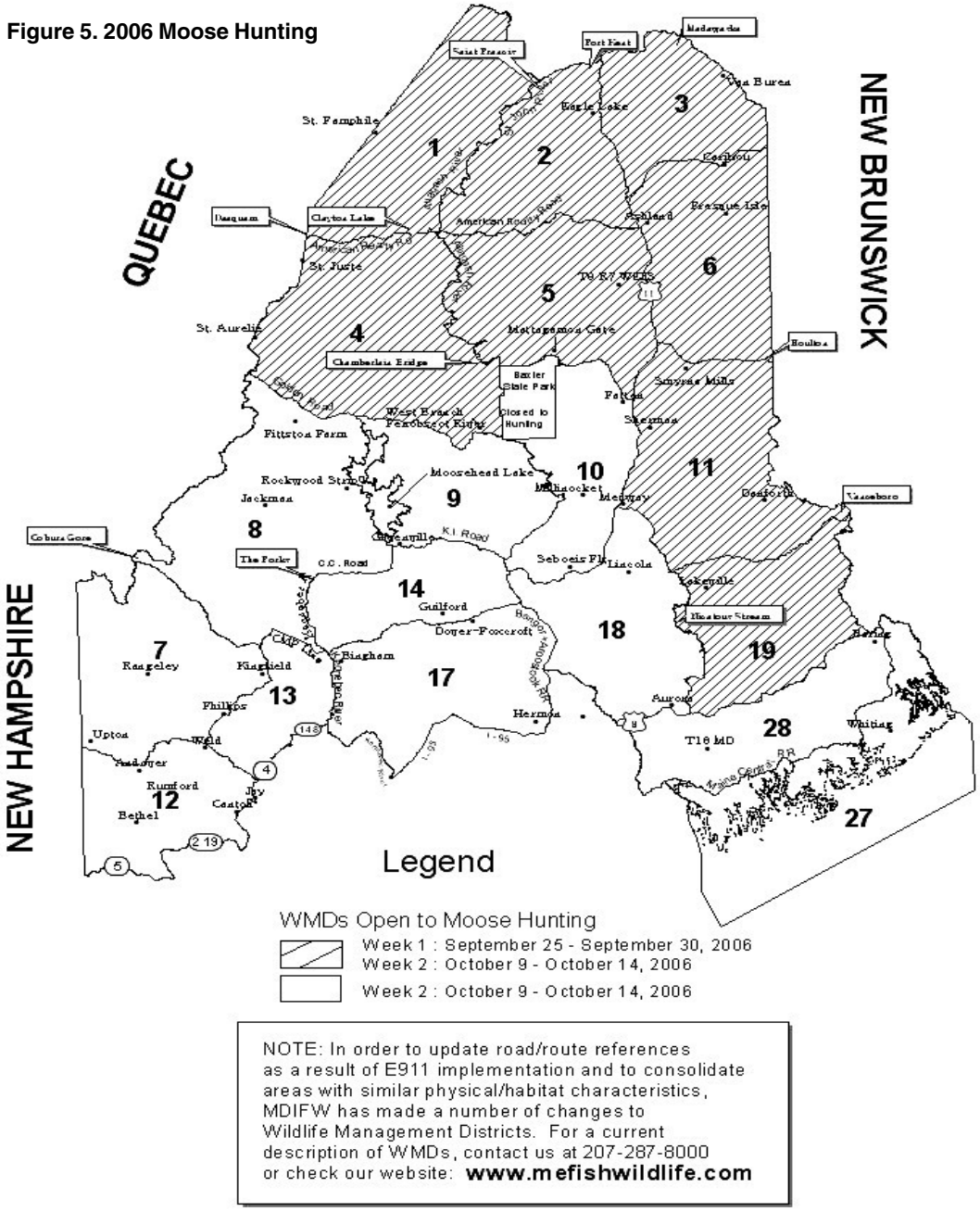


Figure 4. 2005 Moose harvest by town

Figure 5. 2006 Moose Hunting



is added because the hunting activity will increasingly take place on individually owned parcels of land. Participants at the meeting discussed concerns about season timing including the likelihood of different success rates at different times of year, when bulls would loose their antlers, and if a moose season during muzzleloader season would increase deer poaching or make law enforcement difficult. A representative from the Small Woodlot Owners Association of Maine thought that most land-owners would prefer a November season. Some hunters also liked the idea of a November moose season because they felt that a season outside of November would result in more landowner resistance to hunting and ultimately more posted land. On the other hand, several people thought that a November season would result in interference between deer and moose hunters. Of the 24 people who expressed a preference, 29% favored an October season, 46% preferred November, 21% preferred December, and 4% preferred the season in either November or December. The same preferences held for the 15 land-owners with 33, 47, 13 and 7 % preferring that the hunt be held in October, November, December or either November or December respectively. While far from unanimous, this does support the original recommendation to the Department — that the southern moose seasons be held during the firearm season on deer.

As part of a display about moose, visitors at the 2005 Open House at the Gray Wildlife Park were asked to indicate their opinions regarding moose and moose hunting in the safety management area in. Although 49% worried that they would be involved in a moose/vehicle collision in southern Maine (40 % not worried, 11 % not sure), only 25% felt that the moose population should be reduced. The majority of people surveyed (63%)were not in favor of reducing the number of moose in southern Maine, and 12 % were not sure. However, 62% of the people surveyed said they would support a moose season in southern Maine while 31% would not (7% not sure).

Response to the proposal to open southern Maine to moose hunting has been limited. Based on very small samples it appears that while most people would support or accept expanding the moose season farther south, there is not a strong desire to have the number of moose reduced. While opinions vary, a moose season during the November firearm deer season seems to be preferred. With this in mind, the tentative recommendation is to open the moose season in WMDs 15, 16, 23, 26 and 27 (new) in November 2008 with a conservative number of permits.

--Karen Morris

Deer

2005 Season Dates and Structure

Maine Deer hunters could hunt white-tailed deer for 79 days subsequent to the structure of five different hunting seasons during 2005. During the expanded archery season from September 10th to December 10th bowhunters could harvest an unlimited number of deer. The expanded archery season occurred in WMD 30, 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 29th to October 28th (27 days). During this season, deer of either sex were legal. October 22nd marked our fourth 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 29th and for non-residents, the following Monday the 31st. The firearms season ran until November 26th. Muzzleloaders had a 6-day hunt from November 28th to December 3rd statewide, while an extended season continued from December 5th to December 10th in southern and central WMDs (see Figure 3, pg. 44).

Doe Quotas, Any-Deer Permits, and Applicants

Each year, we estimate the number of does that need to be harvested to achieve deer population objectives in each WMD. Called 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 2005, doe quotas in eastern, western, and northern WMDs were kept conservative to allow deer populations to continue to rebuild. In contrast, more liberal quotas were set in central and southern Maine WMDs to stabilize or reduce deer populations.

During 2005, doe quotas ranged from zero in 6 WMDs (see Figure 3, pg. 44, Districts 1-3, 19, 28, and 29) to 1,838 in WMD 17. Among the 24 WMDs in which a doe harvest was desired, the doe quota totaled 9,189. 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 5,238 fawns (both sexes) during the 2005 deer seasons.

Anywhere from 2 to 9 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 WMD's 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 $13. During 2005, we issued 68,685 any-deer and 2,040 bonus any-deer permits (WMDs 23, 24 and 25). Combined, these 70,725 permits represent a -7% decrease in antlerless

deer hunting opportunity, compared to 2004 (76,150 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 square mile basis were: WMD 23 (1,347 permits per 100 sq. mi.), WMD 24 (1,196 permits), WMD 22 (1,152 permits), WMD 17 (1,079 permits), and WMD 21 (1,004 permits). Maine residents drew 52,815 permits (77%), landowners drew 10,383 permits (15%) and nonresidents drew 5,487 any-deer permits (10%). 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, 83,720 people applied for an any-deer permit during 2005 (74,930 residents; 8,790 nonresidents).

Statewide Statistics for 2005

Overall, 28,148 deer were registered during 2005, of which 1,268, 384, 672, 24,682, and 994 were taken during the expanded archery, regular archery, youth day (October 22nd), regular firearms, and muzzleloader seasons respectively (148 deer were registered without an associated season, Table 8). The 2005 harvest was 2,778 deer less than in 2004 equating to a 9% decrease (30,926 vs. 28,148 deer). The 2005 harvest is just under the average (28,704) number of deer harvested in the 20-year history of any-deer permit regulations. Reasons for the decreased deer harvest are difficult to determine, but a good acorn crop in south and central districts, higher gas prices, warm and rainy weather, and reduced hunter effort may each have been a factor.

Table 8. Sex and age composition of the 2005 deer harvest in Maine by season type and week, statewide.

	Sex/Age Class					Total	Percent by Season & Week		
	Adult		Fawn		Total	Antlerless	Adult		
Season	Buck	Doe	Buck	Doe	Deer	Deer	Total	Buck	Antlerless
Archery	**543**	**725**	**195**	**189**	**1,652**	**1,109**	**6**	**3**	**9**
Expanded	378	578	160	152	1,268	890	5	2	7
October	165	147	35	37	384	219	1	1	2
Youth Day	**198**	**273**	**108**	**93**	**672**	**474**	**2**	**1**	**4**
Regular Firearms	**13,998**	**6,946**	**1,994**	**1,744**	**24,682**	**10,684**	**86**	**92**	**82**
Opening Saturday	1,379	845	237	198	2,659	1,280	9	9	10
Oct. 31 - Nov. 6	2,573	1,348	413	347	4,681	2,108	17	17	16
November 7 - 12	3,317	1,291	425	342	5,375	2,058	18	22	16
November 14 - 19	3,443	1,210	360	302	5,315	1,872	18	23	15
November 21 - 26	3,286	2,252	559	555	6,652	3,366	24	21	25
Muzzleloader	**426**	**401**	**77**	**90**	**994**	**568**	**4**	**3**	**5**
Nov. 28 - Dec. 3	252	152	32	31	467	215	2	2	2
December 5 - 10	174	249	45	59	527	353	2	1	3
Total	**15,165**	**8,345**	**2,374**	**2,116**	**28,000**	**12,835**	**98**	**99**	**100**

**Sex/age data were corrected for errors in the deer registrations*
***148 deer were registered w/ no associated season identified at station*

Buck Harvest

The statewide harvest of antlered bucks (15,261) in 2005 represents a decrease of 13% from the previous year (17,426) and the third lowest buck harvest since the beginning of the any-deer permit system 20 years ago (Table 9). The top 5 buck-producing (per mi^2 basis) WMDs in 2005 were (in descending order), districts 24, 17, 21, 22, and 23, all in central and southern Maine. Among the 15,251 antlered bucks taken in 2005, roughly 6,405 (42%) were 1 ½ year-olds (yearlings) sporting their first set of antlers, while more than 3,052 (20%) were mature bucks (4 ½ to 15 ½ years old). Male fawns are reported with antlerless deer.

Maine is nationally known for producing trophy bucks (age 4½ and older). This is possible because, unlike the situation in many other states, Maine's bucks are subjected to relatively light hunting pressure. In our state, 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, bucks rarely survive beyond 3½ years! In this manner, deer management in Maine mirrors the principles of "Quality Deer Management" that so many other 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 2005 was 41% and average buck weights were 118 pounds, signifying relatively high buck escapement, good body condition and sufficient 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 2005, 517 bucks were entered in the "Biggest Bucks in Maine Club" which requires a dressed weight of at least 200 pounds.

Table 9. Sex and age composition of the 2005 deer harvest in Maine by Wildlife Management District.

WMD	Adult		Fawn		Total Antlerless	Total All	Harvest Per 100 Adult Bucks		Harvest Per 100 mi² Habitat	
	Buck	Doe	Buck	Doe	Deer	Deer	Adult Does	Antlerless	Adult Bucks	All
1	258	5	3	0	8	266	2	3	18	19
2	114	4	1	3	8	122	4	7	10	10
3	131	17	4	5	26	157	13	20	14	17
4	172	32	10	5	47	219	19	27	9	11
5	235	37	11	9	57	292	16	24	15	19
6	391	107	19	23	149	540	27	38	28	39
7	345	103	30	29	162	507	30	47	25	37
8	429	139	33	30	202	631	32	47	21	31
9	158	49	9	11	69	227	31	44	17	24
10	146	29	6	8	43	189	20	29	16	21
11	424	52	24	17	93	517	12	22	25	31
12	498	194	55	48	297	795	39	60	53	85
13	450	256	70	65	391	841	57	87	80	149
14	325	82	25	19	126	451	25	39	41	57
15	969	513	151	131	795	1,764	53	82	97	177
16	961	702	182	168	1,052	2,013	73	109	134	280
17	2,328	1,735	559	502	2,796	5,124	75	120	171	376
18	375	92	22	19	133	508	25	35	29	39
19	127	4	2	0	6	133	3	5	11	11
20	727	461	115	95	671	1,398	63	92	121	233
21	789	543	168	145	856	1,645	69	108	162	337
22	797	583	174	135	892	1,689	73	112	153	324
23	1,391	1,101	314	301	1,716	3,107	79	123	152	340
24	569	511	161	124	796	1,365	90	140	206	495
25	458	316	66	70	452	910	69	99	95	188
26	756	474	104	96	674	1,430	63	89	122	231
27	457	58	7	5	70	527	13	15	56	65
28	133	14	2	4	20	153	11	15	16	18
29	125	8	1	0	9	134	6	7	26	28
30	223	188	39	44	271	494	84	122		
Statewide	**15,261**	**8,409**	**2,367**	**2,111**	**12,887**	**28,148**	**56**	**84**	**52**	**96**

**Sex/age data were corrected for errors in the deer registrations*
***Area of deer habitat in WMD 30 has not been determined*

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 2005 was 8,409, or -8% below the pre-set quota (~9,189 does). With fewer does killed than desired, we carried about 800 more does into the winter than we initially wanted. In addition excellent winter survival in 2005-6, will help to enhance deer population recovery in our northern and eastern WMDs as well as in half (6 of 12) of the WMDs where we did not achieve the desired doe harvest but look to increase the population. However, in the other half of these WMDs in the southern and central districts, these additional does may hamper our efforts to reduce or stabilize deer populations, unless we achieve higher doe harvests in 2006.

It is noteworthy that harvests of antlerless deer under the any-deer permit system now routinely exceed harvests we achieved during the 1960s and 1970s under either-sex hunting regulations in most central and southern Maine WMDs. This is particularly significant, since there were more deer hunters available during earlier decades and antlerless deer harvests were not restricted, except for the 1 deer bag limit.

During 2005, any-deer and bonus permittees also tagged 3,905 fawns, while archers and youth day hunters tagged 585 young of the year. Overall, 12,887 antlerless deer were registered by hunters during the 2005 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 2005, 88% of the total deer harvest occurred during the 4-week firearms deer season (Table 10). Within that season, hunter effort and deer harvest remained fairly stable during the first 3 weeks (17–19%); effort may have been higher during the final (Thanksgiving) week as evidenced by an additional 5% increase in harvest. Many hunters attempt to "cash in" on their any-deer permit during this final firearms week after concentrating on trying to kill a buck earlier in the season.

Across weapon choices archery and muzzleloader harvest were down approximately 20% from 2004, while the first week of firearms was 30% down. The first week of firearms season was characterized as having low hunter effort due to unsettled weather. The early part of the week had mild and warm weather followed by a day of high winds towards the end of the week; this may have contributed to poor hunting conditions. Higher gas prices were also thought to have some impact on travel throughout the state. In Maine the special archery season had the lowest harvest across the board since 1997. The combination of good acorn crops and heavy rains throughout the month may have had some implications for the low harvest affecting hunter effort, success and deer mobility. Overall the muzzleloader harvest comprised less than 4% of the total deer harvest. Still it is interesting to note that during the extended muzzleloader season there was a significant decline in buck harvest (down by 42% from 2004) without an associated increase in doe harvest for the week. Typically during this week buck harvest remains steady while doe harvest increases suggesting that muzzleloaders may readily fill their any-deer tags versus holding out for a buck.

We are uncertain how many of the 16,881 youth license holders participated in our fourth-ever youth deer hunting season on Saturday, October 22. This was an either-sex hunt, and youth hunters capitalized on this as evident by the total antlerless harvest making up 71% of the 672 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 2% 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 did put the doe harvest above the desired level (0 does) called for by the management system.

Table 10. Deer Registrations by Season Type and Residence of Successful Hunters, Statewide in Maine 2005.

Season & Week	Deer Registrations By: Residents	Nonresidents	Total	Percent by Residents
Archery	**1,562**	**90**	**1,652**	**95**
Expanded	1,217	51	1,268	96
October	345	39	384	90
Youth Day	**650**	**22**	**672**	**97**
Regular Firearms	**21,594**	**3,085**	**24,682**	**87**
Opening Saturday	2,657	2	2,659	100
Oct 31-Nov 5	4,006	675	4,681	86
November 7-12	4,573	799	5,375	85
November 14-19	4,333	982	5,315	82
November 21-26	6,025	627	6,652	91
Muzzleloader	**942**	**52**	**994**	**95**
Nov 28-Dec 3	428	39	467	92
December 5-10	514	13	527	98
Total	**24,751**	**3,249**	**28,000**	**88**

**148 deer were registered w/no associated season identified at station*

Harvest By Hunter Residency

Among deer hunters, Maine residents outnumbered nonresidents by more than 8 to 1. Not surprisingly, residents tagged 88% (24,751 deer) of the total harvest during 2005 (Table 10). Among seasons, the proportion of the harvest registered by Maine residents was highest for youth day (97%), followed by expanded archery (96%), muzzleloader (95%), regular archery (90%), and regular firearms (87%). 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 "out-of-staters", Maine deer hunting still attracts hunters from over 40 states and Canadian provinces annually.

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, 58% of the deer harvested in remote WMD 1, were registered by nonresidents (primarily Canadians from Quebec). At the other end of the spectrum, 98% of the deer killed in heavily populated WMDs 21, 22, 24, and 25 (south-coastal Maine) were registered by Maine residents (Table 11).

Hunter Participation and Success Rate

During 2005, 207,381 licenses that permit deer hunting were sold in Maine; of these 82% were bought by residents. License sales in 2005 were again about 1% below sales recorded in 2004 (210,188). Total hunting license sales (212,579) 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 2005 was approximately 180,692. Hunter density, therefore, averaged fewer than six per square mile, statewide, and these hunters expended an estimated 1.62 million hunter-days effort pursuing deer over the course of our 79-day hunting seasons.

Table 11. Deer registrations by Wildlife Management District and hunter residence, 2005.

	Deer Registered By:				
	Residents		Nonresidents		
WMD	Number	Percent	Number	Percent	Total
1	113	42	153	58	266
2	78	64	44	36	122
3	142	90	15	10	157
4	114	52	105	48	219
5	163	56	129	44	292
6	487	90	53	10	540
7	333	66	174	34	507
8	401	64	230	36	631
9	164	72	63	28	227
10	152	80	37	20	189
11	381	74	136	26	517
12	711	89	84	11	795
13	689	82	152	18	841
14	332	74	119	26	451
15	1,580	90	184	10	1,764
16	1,880	93	133	7	2,013
17	4,425	86	699	14	5,124
18	443	87	65	13	508
19	113	85	20	15	133
20	1,300	93	98	7	1,398
21	1,620	98	25	2	1,645
22	1,655	98	34	2	1,689
23	2,793	90	314	10	3,107
24	1,336	98	29	2	1,365
25	889	98	21	2	910
26	1,375	96	55	4	1,430
27	507	96	20	4	527
28	145	95	8	5	153
29	132	99	2	1	134
30	438	89	56	11	494
Statewide	**24,891**	**88**	**3,257**	**12**	**28,148**

Hunting pressure on deer has steadily increased since the 1970s, when deer of either-sex seasons were the norm. During 1976-82, deer hunting effort averaged 1.57 million hunter-days, statewide. In contrast, effort during 1997-03 has averaged 2.07 million hunter-days, despite a marked drop in hunter numbers (about 172,000 deer hunters today vs. 207,000 hunters in the late 70s to early 80s). Individual hunters today spend 3 to 4 more days pursuing deer than they did 20 years ago. 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 2005. 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 dramatically between northern and eastern WMDs vs. central and southern WMDs. The more lightly hunted northern and eastern WMDs have only 3 to 5 hunters per square mile over Maine's 79-day deer seasons. Hunters there expend only 14 to 31 hunter-days per square mile of effort on the deer herd. In central and southern WMDs, hunter density ranges from 10 to 18 hunters per square mile, and hunting pressure ranges from 80 to nearly 225 hunter-days per square mile on the herd. Since there is 5 to 10 times more hunting pressure on central and southern Maine deer populations, hunting there exerts a much greater influence on deer population dynamics than in the North Woods or Downeast.

In its 9th 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.

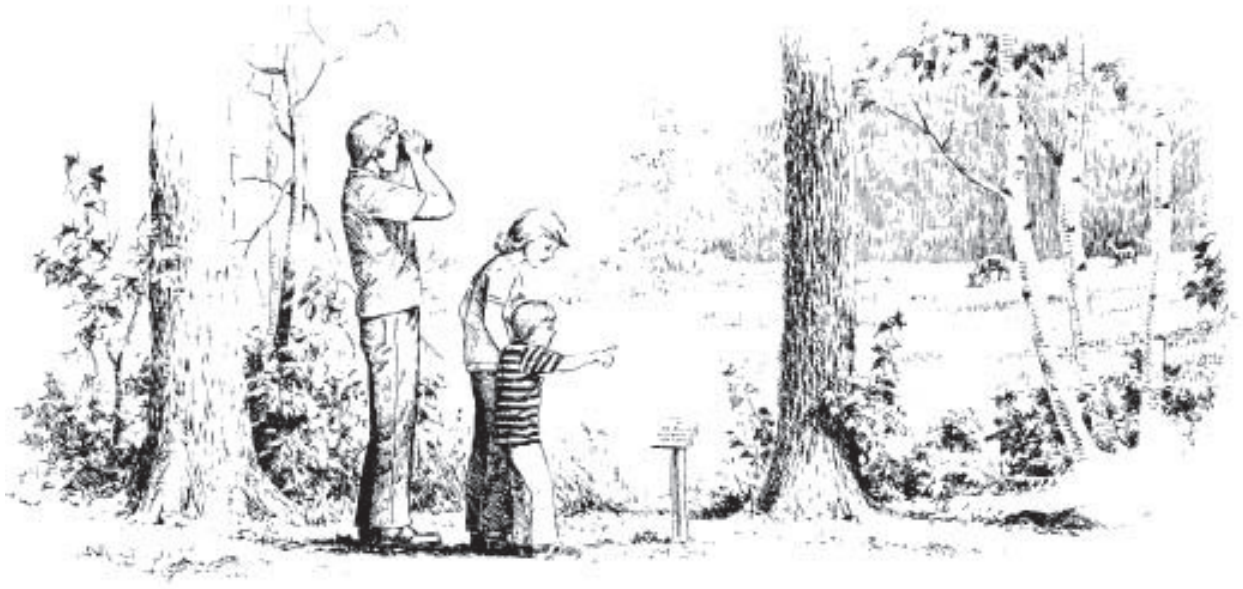
In 2005, archery license sales (15,341 licenses) jumped back up to 2003 levels compared to 2004 (14,295). Over the past 25 years, sales of archery licenses have nearly quadrupled, reflecting a strong trend toward greater participation in the sport of bowhunting for deer. Over the past decade, the Department 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 1,652 deer in 2005.

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, sales of special muzzleloading season permits has increased substantially over the last 10 years doubling to 18,470 permits in 2005.

Late season hunting and improvements and innovations in muzzleloaders may explain the increased interest and participation in muzzleloader 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 994 in 2005. This hunting method is expected to continue to grow in popularity.

Deer hunting success in Maine during the regular firearms season was estimated at 18% for residents and 11% for non-residents during 2005. The success rate among hunters who drew an any-deer permit is typically higher than among hunters who were restricted to "bucks-only" during the regular firearms season. Since any-deer permittees could harvest either a doe, a fawn, or a 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. 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, as well as availability of deer. 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 Population and 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. Consequently, we implemented the any-deer permit system to regulate doe harvests, and divided Maine initially into 18 Deer Management Districts

(1986 to 1997), then into 30 Wildlife Management Districts (1998-2005). In 2006 the department made changes to the WMD configuration affecting WMDs 25, 26, 27, 28, 29, and 30 resulting in the reduction of WMDs from 30 to 29 (see Figure 3, pg. 44). This consolidation, to areas with similar habitat characteristics and deer densities, will better represent the overall herd structure, physical attributes of these districts, and improve management for each WMD.

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.

In the current planning cycle (2002-17), we recognize that central and southern Maine deer populations are capable of increasing well above levels tolerated by people who share the land with deer and other wildlife. When deer populations exceed 25 deer/mi^2 deer impact plant diversity, farm crops and ornamental plantings, and they increase the risk of motor vehicle collisions and human Lyme disease. Therefore, we have set population objectives of 15 or 20 deer/mi^2 for each central and southern Maine WMD. Currently, deer populations range between 13 and 22 deer/mi^2 in central and southern Maine WMDs that are open to hunting. In those parts of towns that are closed to hunting due to widespread land posting, residential sprawl, and/or firearms discharge bans, deer densities range between 30 and > 100 deer/mi^2.

Attaining our new population objectives in central and southern Maine will require substantial deer harvests, often involving innovative deer hunting strategies. Where hunting access is restricted, we will need to work closely with landowners and municipalities to resolve perceived landowner/hunter conflicts. This will lead to greater reliance upon special deer seasons and intensive deer reduction efforts in some of our more heavily developed towns.

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. We will accomplish this by intensifying current efforts to safeguard wintering habitat by negotiating long-term management plans, conservation easements, and possibly other measures, with large and small landowners. Cumulatively, we intend 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 productivity this will hopefully enable us to maintain deer populations at 10 to 15 deer/mi^2 compared to the 2 to 8 deer/mi^2 at present.

Until we succeed at increasing the wintering habitat base, we must avoid overpopulating existing winter deeryards. With that in mind, we have set a short-term objective to always 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 have to remain rather limited for the foreseeable future.

Over time, if we succeed at reducing and stabilizing central and southern Maine's deer herd while simultaneously improving wintering habitat in eastern and northern Maine, we'll have succeeded at increasing hunting opportunity, while minimizing conflicts between deer and people who share the habitat. When all objectives are accomplished, there will be 380,000 wintering deer (more in the north, less in the south) vs. <250,000 currently. Also, maintaining this population would require deer harvests in the neighborhood of 50,000 deer annually vs. 30,000 today.

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 2002-2005 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. In southern and central WMDs liberal any-deer permit allotments to meet population objectives appear to be bringing us closer to our short-term goals. The end result is that our wintering deer population has probably remained fairly stable at 7.5-8 deer per mi^2 statewide over the last 5 years.

Prospects for the 2006 Deer Season

In 2006, we will offer 5 separate deer hunting seasons in Maine. The expanded archery season will open September 9th and run until to December 9th (79 days). This season is limited to WMDs 24 and 29 (formerly WMD 30 Northeast to Vinalhaven), 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 $13.00 each and one buck permit for $33.00. 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.

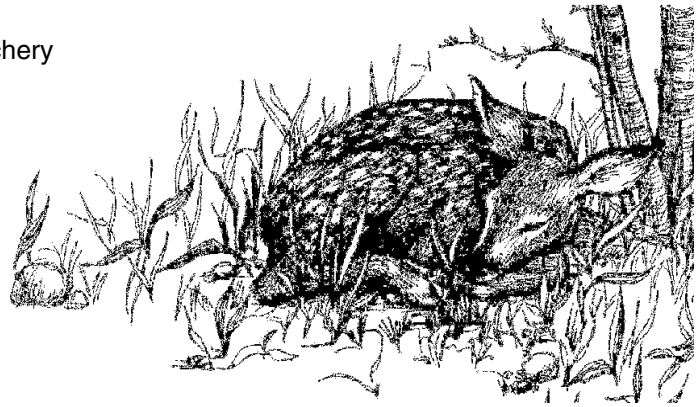
The regular (statewide) archery season will run from September 28 - October 27 (26 days). Youth day will be Saturday, October 21st, and is reserved for hunters between 10 and 15 years old, who are accompanied by a licensed adult (who is not allowed to carry a hunting weapon). The 25-day regular firearms season opens for Maine residents on Saturday, October 28th, and for nonresidents the following Monday. This season ends the Saturday following Thanksgiving (November 25th). Finally, the muzzleloader season will begin in all WMDs on November 27th, but will end on December 2nd (6 days) in WMDs 1–11, 14, 19, 27 and 28. Elsewhere, the muzzleloader season will continue until December 9th (12 days). New this year will be the Crossbow Archery season. To be eligible to purchase a crossbow hunting license, the customer must hold a valid license to hunt big game (either a big game hunting license or an archery license). Customers must submit proof of having successfully completed an archery hunting education course and a crossbow hunting course or satisfactory evidence of having previously held adult archery and crossbow hunting licenses in this State or any other state, province or country in any year after 1979. When proof or evidence cannot be provided, the applicant may substitute a signed affidavit. A resident or nonresident 10 years of age or older and under 16 years of age may hunt with a crossbow if that person holds a valid junior hunting license (no crossbow license required). With a valid crossbow hunting license, a person may hunt bear with a crossbow during the open season on bear and may hunt deer with a crossbow during the open firearm season on deer. The crossbow hunting license may not be used to hunt deer during the archery season, muzzleloading season, or expanded archery season.

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 per sq. mi. abundance targets we set in the strategic plan.

To accomplish deer management objectives in 2005, we have set doe harvest quotas ranging from zero to 1,715 among our 29 WMDs. Totaling 8,433 statewide, the 2006 doe quota is 1% above the doe harvest we achieved in 2005. This reduced doe quota from 2005, in spite of an extremely mild winter, reflects continued stagnation of northern and eastern WMDs as well as meeting deer density objectives in some of the larger south and central WMDs. A total of 67,725 any-deer permits will be issued statewide ranging from 25 permits in WMD 2 to 13,725 in WMD 17. WMDs 1, 3, 19, 27 (new WMD-coastal downeast region) and 28 (newly configured WMD includes old 29) 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. This year, applicants may also select one WMD for entry into the bonus any-deer lottery, should that lottery becomes necessary.

The allocation of 67,725 any-deer permits, along with the archery and youth seasons, should result in the statewide harvest of roughly 8,433 does and an additional 4,877 fawns in 2006. Antlered buck harvests should approximate 15,950 slightly higher than the buck kill of 15,165 in 2005. If normal hunting conditions and hunter effort prevail, the statewide deer harvest in Maine should be in the vicinity of 29,406 deer. This would be slightly higher than the 20-year average harvest since the any-deer permit regulations were put into effect (28,704) and would be an improvement over the 28,148 deer harvested in 2005.



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.

An infectious, abnormally-shaped protein called a prion 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. The disease agent mainly targets nervous tissue, but also occurs in most tissues of an infected animal, including muscle tissue. Infected CWD prions are found 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 1-12 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 also produce symptoms 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 no current scientific evidence that CWD can infect humans; however, public health officials recommend avoiding exposure to the CWD disease agents. CWD prions were recently found in muscle tissue of an 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, Department of Inland Fisheries and Wildlife (DIFW) 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, DIFW 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, DIFW, 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, DIFW 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, and 819 deer in 2005.

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, 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 consuming 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*, 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

The New England cottontail (NEC) rabbit (*Sylvilagus transitionalis*), or cooney, as it is often called, has been recommended for Maine endangered status and is being considered for federal threatened or endangered status. Cottontails may be in short supply in Maine, but how can a cottontail rabbit be considered threatened or endangered? After all, they're common just to the south of Maine, aren't they? While cottontails may be common, New England cottontails are not. There are several species of cottontail rabbits in North America and two of them are found in New England. The eastern cottontail (*Sylvaligus floridanus*) was introduced to southern New England and is the common cottontail of farms, woodlots and suburban lawns throughout most of eastern North America. The New England cottontail has a limited distribution, and only occurs from southern Maine to the Hudson River in New York. New England cottontails are Maine's native and only cottontail.

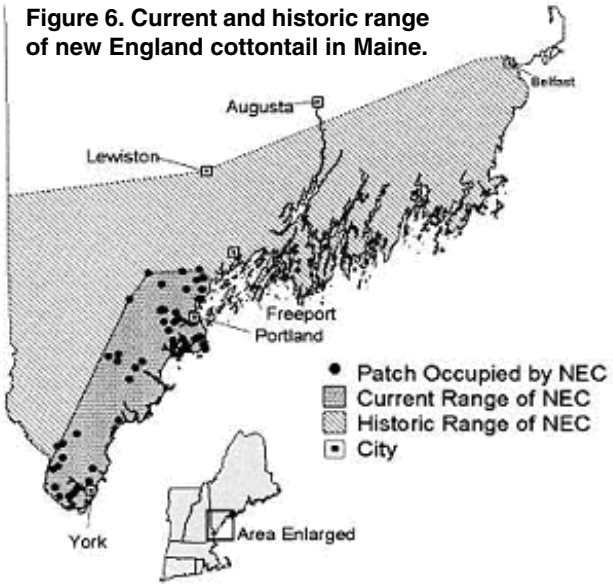
New England cottontails and eastern cottontails are very similar in appearance. The differences are difficult to distinguish, sometimes even when the rabbit is in hand. New England cottontails tend to be a little darker with a dark patch between the ears and no white star on the forehead, as is common in eastern cottontails. In addition, New England cottontails average a little smaller and have slightly smaller eyes than easterns.

This last, seemingly insignificant, difference appears to be the reason for the success of eastern cottontails and the decline of New England cottontails in our modern landscape. Although both species depend on brushy habitat to evade predators, easterns can spot a potential predator from farther away than a New England cottontail can. Thus, they can venture farther from cover to feed without becoming dinner themselves. New England cottontails are reluctant to leave thick cover to forage, often foregoing more nutritious food in favor of security. Those that do venture out suffer high mortality from the many avian and mammalian predators with rabbit on their menu. Eastern cottontails are able to take advantage of small patches of cover in the suburban lawns and golf courses that are now common in the northeastern United States. New England cottontails do not thrive in this type of area.

The New England cottontail is a habitat specialist and lives in brushy, areas that provide adequate cover. 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 habitat becomes unsuitable for New England cottontails. In addition, little new habitat is being created: fires are suppressed, clear cutting is less common, and beavers are prevented from flooding many areas. When agricultural activities cease, the land is rarely left to revert to brushy habitat but is more likely to become a housing development or mall. Even if the land is left as "open space" it is unlikely to become suitable rabbit cover. Most people seem to think of good rabbit cover as unattractive or unproductive. It is certainly not much fun to walk through and provides few opportunities for human recreation. As a result, undeveloped areas are frequently mowed to keep the area in grass or planted to encourage tree growth as rapidly as possible.

The loss and fragmentation of the type of habitat this rabbit requires has led to a sharp decline in New England cottontail numbers in Maine and throughout its range. In the 1950s, New England cottontail was common in Maine and was reported as far north as Fryeburg, Lewiston, and Belfast. However, during recent surveys in Maine, New England cottontail were only found in only 61 patches of habitat in just 19 towns (Figure 6). Although this may seem like a substantial number, only 5 or 6 of these are large enough (25 acres or more) that they could be expected to support rabbits over the long term. Twenty-four of these patches are so small that they will likely have only 1 or 2 rabbits by spring and another 16 are unlikely to have more than 4. In these small patches, even a few animals are crowded into a small area so they are forced to compete for the food available within the patch or venture farther from cover where mortality is high. Rabbits living in small patches tend to be smaller, indicating poorer nutrition, than rabbits living in large patches. In addition, with so few animals there is no guarantee that both sexes will be present during the breeding season. Under these circumstances, even rabbits find it difficult to produce enough young to offset mortality. A small patch is unlikely to maintain rabbits for long unless more rabbits can move in from nearby, larger patches.

Figure 6. Current and historic range of new England cottontail in Maine.



Because patches of suitable habitat are often isolated from each other, it is difficult for NEC to safely move to other areas of good habitat if the patch becomes unsuitable for NEC or for rabbits to colonize a new habitat patch or repopulate one that has lost its rabbits. To move from one patch to another, a rabbit must often cross areas with poor cover where the risk of predation is high. The journey becomes even more perilous when busy roads separate habitat patches. It appears unlikely that the New England cottontail will survive unless we take measures to accommodate it in our rapidly developing landscape.

Last winter, a public working group developed goals and objectives to guide New England cottontail management. These goals and objectives reflect the fact that we no longer have a landscape where rabbits can exist by moving from patches of early successional habitat that disappear (due to forest maturation) to new, readily colonized patches of habitat. It proposes establishing areas to be managed for NEC in perpetuity, rather than attempting to recreate conditions that allowed them to thrive in the past. In summary, the proposed goals and objectives call for establishing 18 areas to be managed for New England cottontail. Each New England cottontail management area is to include:

- one patch of early successional habitat that is large enough ($\geq$ 25 acres) to sustain rabbits by itself (this may be 25 acres that is permanently managed in thick early successional habitat or it may be a larger area that is managed in some type of rotation so that there is always at least 25 acres in NEC cover);
- at least 2 smaller patches of early successional habitat within ½ mile of the 25^{+} acre patch (these may be 2 areas that are permanently maintained or several areas managed in succession); and
- travel corridors that allow rabbits to move between habitat patches.

At least 4 of these New England cottontail management areas are to be located beyond the currently occupied range but within the former occupied range (Figure 6). At least 12 of them are to be under some form of conservation management such as a conservation easement or ownership by a conservation agency or organization.

Creating and maintaining suitable habitat will be the key to keeping New England cottontail as a part of Maine's fauna. However, because the habitat is fragmented, it will not be enough to simply establish areas with habitat for rabbits. Most of these management areas will need to be populated by releasing rabbits from other sites. ***Funding for this work comes from Conservation Plate and the U.S. Fish and Wildlife Service.***

--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, is in the final stages of developing a map of critical habitat and a recovery plan for lynx as required by the federal Endangered Species Act.

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. This information would be provided to the USFWS as they developed critical habitat and recovery plans, so conservation plans would be relevant to lynx in the Northeast.

We have summarized and reported our findings to the USFWS for consideration as they develop critical habitat and recovery plans for lynx. We continue to analyze the data and are in the process of submitting manuscripts for publication in peer-reviewed scientific journals.

Productivity and survival rates of lynx in Maine are more similar to lynx in the core of the range, when hares are abundant, than to lynx at the edge of their range. In the past, over 90% of adult female lynx in our study area produced a litter each year. This year (2006) was an exception to the norm. Only 1 of 8 reproductive age females initiated a den by July 1. We are not sure why most of the female lynx did not den this year on our study site. One reason may be that snowshoe hare densities were lower (approximately 24% based on pellet counts) this spring following one of the mildest winters on record. Low snow depths may have made lynx more vulnerable to predation. Although fewer snowshoe hare might make it difficult for females to successfully rear kittens, it does not fully explain why lynx did not initiate dens. At this point, we can only speculate on the cause of the low productivity of female lynx in 2006. We will continue to monitor snowshoe hare densities and lynx productivity.

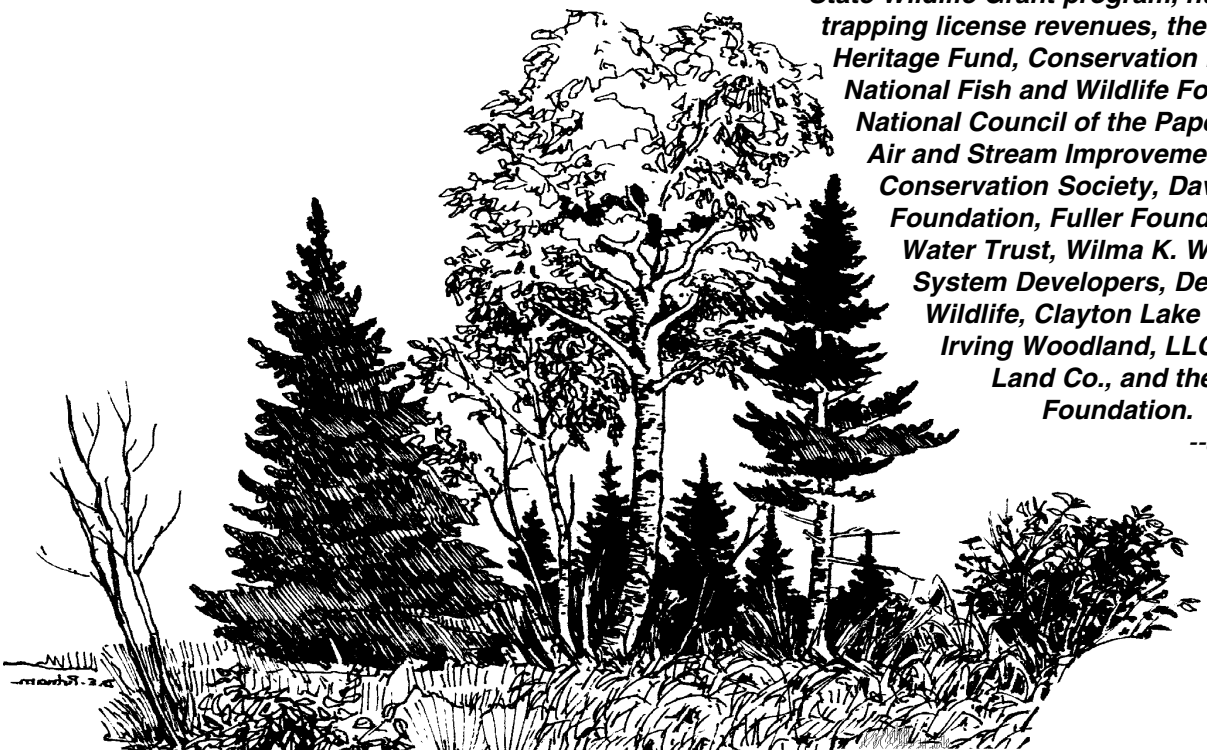
Since 1999, we have captured and radiocollared 60 lynx (31 males:29 females) and documented the production of 35 litters of kittens. Litters averaged just over 2 kittens per litter, and ranged from 1 to 5. About 20% of lynx (>1 year) died each year, and the leading causes of mortality were predation and starvation. Lynx home ranges were small averaging 26 mi^2 for males and 12 mi^2 for females, suggesting good habitat quality and prey density.

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 4 winters, lynx tracks were encountered in 21 of 54 townships surveyed, with lynx being most rare in areas south and west of Moosehead Lake and most common north of Moosehead Lake and west of Route 11. This information suggests that lynx are more widely distributed today then they were (based on surveys of game wardens) in the 1900s.

The clearcutting that occurred following the budworm outbreak has created extensive amounts of dense young spruce-fir forest that supports abundant snowshoe hare levels today. As a result, lynx are abundant in much of northern Maine. However, with concern over the extensive cutting that occurred following the budworm outbreak, Maine's legislature passed the Forest Practice Act in 1989 that limited the size of clearcuts. 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.

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, 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



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. 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 is the newest member of the Bird Group. He 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. One on-going project that Mike "inherited" is designed to collect information to allow us to enhance conservation efforts for Barrow's goldeneyes wintering in Maine.

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.

Allen Starr, Wildlife Biologist – Allen provides technical assistance on a variety of Endangered and Threatened species projects, including bald eagle Essential Habitat and Landowner Incentive Program. He is also involved in the ecoregional surveys for rare and special concern species. Allen is also a valued member of the Bird Group on waterfowl banding programs because of his interest and experience with the Department's waterfowl nest box program.

Upland Birds

Wild Turkeys

Historically, wild turkeys occurred in significant numbers in York, Cumberland, and Oxford Counties, and perhaps in lower numbers eastward to Hancock County. Reductions in the amount of forest land, due to intensive land clearing for farming, and unrestricted shooting, were probably the two most important factors leading to the extirpation of native wild turkeys in Maine in the early 1800s. The reversion of thousands of acres of farmland back to wooded habitat, and present day agricultural practices, have enhanced prospects for reestablishment of wild turkeys into, and likely beyond, their former range.

Attempts to reintroduce turkeys to Maine began in 1942 when the Department of Inland Fisheries and Game released 24 captive-reared birds on Swan Island, in Sagadahoc County. These birds, although provided with supplemental feed in the winter, were poorly adapted to life in the wild, and died within 4 years. In the 1960s, fish and game clubs in Bangor and Windham made similar attempts to reestablish turkeys into their areas using captive-reared stock. Neither attempt was successful in establishing a population of turkeys.

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.

Responding to requests from fish and game clubs and individual Maine sportsmen, and encouraged by successful reintroduction programs in Vermont and New Hampshire, MDIFW began planning our own turkey program in the mid-1970s. The goals of this program were twofold: to reestablish turkeys in the coastal part of the state where they historically occurred, and to provide turkey hunting opportunity in Maine.

The first step was to locate a source of birds. Vermont biologists, who had extraordinary success with their turkey program, were willing to supply Maine with birds from their wild flocks. The next step was to select a release site. York County was chosen as the initial release site because of its large area of wooded habitat, a good supply of mast-producing trees (beech and oak), and its mild winters with fewer than 60 inches of snowfall annually.

In 1977 and 1978, Vermont Fish and Game biologists trapped 41 turkeys, which MDIFW biologists released in the towns of York and Elliot. 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 (NWTF) 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 a record total of 219 birds to 14 release sites in Maine. Today, reports of wild turkeys in the northern commercial forests and southern Aroostook County and eastward into Washington County are common.

Wild turkeys eat a wide variety of grasses, seeds, fruits, and insects. In the Northeast, turkey populations reach their highest densities in agricultural areas, particularly around dairy farms. Food in the form of soft mast (berries), seeds, waste agricultural grains, as well as corn silage and undigested grains in manure, which is either spread on fields or stored outside on the farm, may help the birds get through the tough winter months. Because snow depths may limit turkeys here in the northern edge of their range, the Department's policy is to release turkeys only in the best remaining unoccupied habitat – areas near existing turkey flocks, with some combination of dairy farms and a large amount of land in mature, mast-producing hardwoods, such as oak or ash. Ultimately, the Department's goal is to have a viable wild turkey population wherever suitable wild turkey habitat exists.

Wild Turkeys in Winter

Winter habitat is the backbone of the wild turkeys annual range. Turkeys spend about six months (October to March) in winter habitat, which must provide a reliable and adequate food supply and cover during bad weather. The winter diet of the wild turkey is governed by food availability in localized habitats. Generally, the more important foods are acorns, corn residue, and the soft fruits of apples, dogwoods, and other fruit-producing shrubs. But wild turkeys are one of nature's opportunists, generally eating everything that is available. Further, their feeding habits often overlap with feeding habits of other wildlife for their preferred foods.

Wild turkeys in Maine are tough birds. However, research has shown that some turkeys will in fact starve during winters when powdery, deep snow covers the ground for a period of several weeks. 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. The deep, powdery snow is the problem, not the cold, as it limits the ability of turkeys to forage on the ground. Fortunately, powdery snow conditions that limit mobility rarely persist that long in Maine. But, the researchers also found that wild turkey populations can recover in just one breeding season.

A frequently asked question during a typical Maine winter is whether it is advisable to begin artificially feeding wild turkeys, especially during periods of sub-zero weather and deep snow. It is intuitive to think that these conditions can have a negative impact on the turkey population. In general, feeding wildlife in the winter does more for the person doing the feeding than it does for the intended species. One risk is that turkeys tend to become tame and dependent on the food. The potential of disease transmission around feeding sites poses another problem. Third, artificially concentrating turkeys at feeding sites attracts predators and makes them far more vulnerable to predation. So what's the bottom line? Biologically, artificial feeding is not the best approach to helping wild turkeys. The department advocates proper habitat management to promote a naturally sustaining wild turkey population in all suitable range.

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 (less than 5% of 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 12). By 1996, the hunting zone was expanded eastward to the Penobscot River, and two zones (north and south) were created. In 1999 and again in 2006, the hunting zone was further expanded, the two-zone concept has been dropped, and the hunting zone is now defined by Wildlife Management Districts (WMDs, see Figure 3, pg. 44).

Table 12. Wild turkey spring hunting effort and harvest in Maine, 1986-2006.

Year	Number of Applicants	Number of Permits	Wild Turkeys Harvested	Season Notes
1986	605	500	9	York County
1987	536	500	8	York County
1988	355	355	16	York County
1989	464	463	19	York County
1990	500	499	15	York County
1991	508	500	21	York County
1992	886	500	53	York/Cumberland County
1993	1,079	500	46	York/Cumberland County
1994	1,185	500	62	York/Cumberland County
1995	1,712	750	117	York/Cumberland County
1996	3,952	1,250	288	North/South hunting zones
1997	5,091	1,750	417	North/South hunting zones
1998	6,449	2,250	594	North/South hunting zones
1999	9,294	3,000	890	1 Zone, WMDs 15-17, 20-26
2000	14,909	4,000	1,559	1 Zone, WMDs 15-17, 20-26
2001	18,685	7,000	2,544	1 Zone, WMDs 12, 15-17, 20-27; 3,500 permits in **season A**: May 1-5, 21-28; and **B**: May 7-19
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.
2003	26,505	12,000	3,994	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.
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. Youth Turkey Day, May 1.
2005	23,951	23,951	6,236	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. Youth Turkey Day, May 30-June 4.
2006	N/A	18,845*	5,603*	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. Youth Turkey Day, April 29

**preliminary harvest and permit totals*

This past spring (2006), was the first 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 2006, 18,845 turkey hunters harvested 5,603 birds. This year was the third 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 29 in 2006 and 412 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 12 and 13). We now have 20 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 13. Results of the spring turkey hunter questionnaire, 1995-2006.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*
Permits Issued	750	1,250	1,750	2,250	3,000	4,000	7,000	9,000	12,000	15,600	23,951	18,845
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
Success Rate	22%	28%	27%	31%	34%	44%	41%	41%	36%	34%	32%	30%
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
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
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

**preliminary results*

Fall Turkey Hunting 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 conservative fall archery season was established. Over the past four 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 8-22, 2005 were successful in bagging 157 turkeys, down 33% from the previous year. Windham accounted for the greatest number of turkeys registered, with 6 birds. Other top turkey towns were Sanford and Brunswick with five, and Auburn, Limerick, Westbrook, and Windsor each with four. The hunting success rate of the 2,913 hunters who purchased permits for the fall 2005 season was 5.4%, down substantially from 14.3% in 2004. Only a bow and arrow may be used to hunt turkeys during the fall season, which was open in WMDs 15, 16, and 20-26, in fall 2005 (see Figure 3, pg 44). A fall turkey hunt differs from spring hunting as both males and females are legal quarry. 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. Similar to 2004, the kill this past season was composed of mostly of adult females (39%), with lesser numbers of juvenile birds (26%) and adult males (36%). The high number of adult hens and toms in the fall bag raises concern regarding effects of fall harvest on the quality of spring turkey hunting. Wildlife biologists with the Department are monitoring harvests carefully to ensure that quality hunting continues. Permit fees are $20 for Maine residents, and $47 for nonresidents.

Because of an increasing and expanding wild turkey population, increases in hunting opportunity have been proposed for fall 2006. In WMD's 21, 22 and 23, where densities of wild turkeys are highest, a four-week archery season has been proposed. In WMD's 15, 16, 17 (proposed to be added in fall 2006), 20, and 24-26, where densities of wild turkeys are lower, a two-week archery season will remain.

Establishment of a limited fall wild turkey hunting season is in accordance with the goals and objectives established by the Wild Turkey Public Working Group. The goal for Maine's wild turkey management is to increase the size and distribution of the turkey population within suitable habitat, with a primary objective being to provide unlimited spring hunting opportunity, as long as the wild turkey population can support it and current (2000) hunt quality (i.e., hearing,

seeing, working, and hopefully harvesting a turkey without interference from others) is maintained. A secondary objective was to implement a limited fall hunting season by 2003 in areas where the wild turkey population can support it, and without adversely affecting the primary objective of an unlimited 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.

During the 1980s, emphasis was placed on the introduction of wild turkeys into all suitable habitats between York and Waldo Counties. A "leap frog" trap and transfer technique was utilized with a goal of eventually joining these two populations. This goal was attained in the mid-1990s, and restoration is now directed to suitable habitat primarily north and east of existing populations. Additionally, management efforts focus on outreach programs designed to improve habitat conditions for wild turkeys throughout their reoccupied range in Maine.

We are optimistic that our program to increase the size and distribution of the wild turkey population in all suitable habitats in Maine will continue. We are 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

Ruffed Grouse

Hunting Seasons

The ruffed grouse, or partridge, is considered by many to be the premiere upland game bird in Maine. In 1987, approximately half of all licensed hunters in Maine hunted grouse and/or woodcock. Maine data from early 1980s show an estimated 100,000 hunters harvested over 500,000 grouse annually. Although no data exist on recent harvests, except by moose hunters (see below), successful bird hunters reported grouse in excellent (1995), fair (1996-97), and good (1998-2004) numbers in the recent past. However, record-breaking cold and wet weather in spring 2005 resulted in low reproductive output and one of the poorest fall grouse hunting seasons on record. Numbers of ruffed grouse are known to fluctuate greatly, with declines and increases in numbers of birds most often occurring on ten-year cycles. Although, it takes several years for grouse populations to recover, we are optimistic for improvements in grouse numbers for fall 2006.

Grouse Reports From Maine Moose Hunter Survey

For over a decade, moose hunters have been asked to report the number of grouse they and their party saw or harvested during the moose hunting season (Table 14). In general, 45-50% of all moose permit holders reported they hunted grouse during their moose hunt. In addition, over 80% of all moose hunting parties include individuals other than the moose permittee and the sub-permittee. Many of these individuals also hunted grouse during the moose hunt. Results of the survey indicate that slightly more than half of all grouse taken by moose hunting parties during the moose season are shot by moose hunt permittees and sub-permittees, and the other half are taken by others in the moose hunting party.

Table 14. Grouse harvests by moose hunters and others in their hunting party, 1994-2005.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Permit holders reporting	1,069	1,252	1,321	1,323	1,739	2,542	1,887	2,673	2,251	1,428	2,512	2,379
Number of grouse seen	5,804	18,069	4,880	6,868	11,604	17,754	11,731	28,723	16,636	11,802	18,489	7,914
Grouse seen/100 hrs hunting	35	107	20	25	43	37	33	48	31	34	33	13
Grouse taken by permit holders	1,432	4,160	871	1,268	2,424	3,268	1,933	2,441	—	—	—	—
Grouse taken by others in party	1,146	3,779	836	1,024	2,182	2,990	2,081	2,703	—	—	—	—
Total grouse taken	2,578	7,939	1,707	2,292	4,606	6,258	3,930	5,144	—	—	—	—

Beginning in 1994, MDIFW has calculated the number of grouse seen per 100 hours of moose hunting effort. That year, moose hunters saw an estimated 35 birds per 100 hours of moose hunting. In 1995, a banner grouse year in industrial forests by all accounts, the average of 107 grouse seen per 100 hours of hunting was nearly three times that of the previous year. In 2005, moose hunters reported seeing only 13 grouse per 100 hours, which is substantially lower than the previous year of 33. It should be noted that changes to the moose hunt area occurred in 1997, 2001, and again in 2002, as areas to the south and east were added. Areas that were added to the moose hunt traditionally have lower grouse densities than northern Maine and have likely contributed to the declining number of grouse seen per 100 hours throughout the total moose hunt area.

The average grouse harvest by this sample of moose hunters and their hunting parties over 1993-2001 was 4,057 (Table 14). The last statewide grouse harvest estimate was reported for the 1988 hunting season. That year, an estimated 579,100 grouse were taken in Maine. If we assume that current harvests are similar to those of the late 1980s, then the average total grouse harvest reported by moose hunting parties is less than 1% of this total.

Management and Research

Despite its importance as a quality game bird in Maine, little management and research effort is devoted to this species because of limited dollars and personnel time. Although this species appears to have done well despite a lack of management attention, there are a number of important grouse management issues that need to be addressed as Maine's landscape continues to change, shaped by human development and an ever changing forest industry. Further, information on the status of the statewide grouse densities, habitat use, and factors influencing annual survival would greatly enhance our understanding of grouse population dynamics in Maine. Currently, data generated from the moose survey (1994–2005) are being analyzed to determine the extent to which spring weather affects the availability of grouse during hunting season.

Ruffed grouse are a product of the forest. The amount and quality of Maine's forest is constantly changing, and the impact of these changes as they relate to statewide grouse numbers is difficult to predict. Fortunately, however, the future for ruffed grouse appears bright. Although maturation of some forest stands likely represents a decline in the quality of grouse habitat, 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 even-aged stands of aspen, birch, and mixed wood, will improve or sustain habitat for ruffed grouse and other wildlife species that use early successional hardwood forests. ***Ruffed grouse 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

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 is still at a relatively low level compared to populations in the 1960s.

Until recently, there existed no method to identify and survey the activities of hunters who pursue woodcock. To correct this deficiency, the USFWS and state wildlife agencies established the Migratory Bird Harvest Information Program (HIP). Data collected during the 2005 hunting season indicated that approximately 5,800 woodcock hunters bagged 9,100 woodcock in Maine last year. This is down substantially from an estimated harvest level of 15,600 woodcock by 4,300 hunters in 2004. This was not likely a result of low numbers of woodcock, but rather poor weather conditions for hunting that persisted through much of October, reducing the number of days afield by Maine hunters from 27,000 in 2004 to only 25,200 in 2005.

USFWS calculates indices of daily and seasonal hunting success for each state based on wings submitted to USFWS by a sample of hunters. The number of woodcock bagged per successful hunt in 2005 by Maine hunters was slightly higher than 2004, at 2.2 birds. The average seasonal take, was also slightly higher, from 10.3 to 11.0 woodcock killed per season. The recruitment index (the ratio of immatures per adult female woodcock) was 1.7; the same as the long-term (1963-05) index of 1.7 immatures per adult female, an indication of normal production in 2005 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 2006 were unchanged from 2005.

Woodcock Management and Research

Mild conditions resulted in an early migration of woodcock into Maine in spring 2006. Nesting also appeared to be well ahead of schedule, possibly reducing potentially negative effects of heavy rains that occurred in late May and sporadically throughout June. However, wet nesting and brood-rearing conditions could still have a negative effect on woodcock (and all gamebird) production this year. On a minor positive note, the number of male woodcock on singing grounds in Maine this spring was higher than last year. However, the most recent ten-year trend (1996-2006) reveals essentially no change in the male woodcock population index. Because the woodcock population index is unchanged recently and May nesting and hatching conditions were fair, fall woodcock population predictions can only be considered "fair" at this time.

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 its 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.

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.

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. Further, our research shows that these timberlands offer a great opportunity for large-scale woodcock management in Maine. The next step is integration of cost-effective wildlife management into timber management plans, because maintenance and creation of woodcock habitat are critical if woodcock populations are to be maintained at, or improved beyond, current levels. ***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

Since the 1985 waterfowl assessment was completed, the switch from a harvest-oriented goal to a breeding population-oriented goal has resulted in a more responsive program for waterfowl management in Maine. Waterfowl are now being managed to increase certain breeding populations. Low populations of black ducks caused major changes in regulations since 1983, which have altered traditional seasons enjoyed by Maine waterfowl hunters.

One method used to increase breeding populations in Maine has been to eliminate, where and when possible, significant forms of non-hunting mortality. Lead poisoning of waterfowl is an example of this type of mortality. This national problem affects many thousands of birds annually, and lead shot use for duck and goose hunting has been banned nationally since 1991 (and since 1999 in Canada). Maine hunters have been required to use steel shot statewide since 1988, three years ahead of the deadline required by USFWS's national plan. Maine hunters have accepted the facts and shouldered the responsibility for using the latest in shot-shell technology. Many have been pleasantly surprised with their results. All should be pleased to know that the ban on the use of lead shot for waterfowl hunting saves one to two million waterfowl annually in North America - ducks and geese that a decade ago would have succumbed to lead poisoning – as well as countless predators and scavengers, such as bald eagles, that consume waterfowl and would have been exposed to the effects of secondary lead poisoning (see *Loons and Lead Don't Mix*, pg. 77).

Habitat protection and enhancement efforts are another form of management that the Department is using to increase waterfowl breeding populations. 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.

How Hunters Benefit Many Migratory Bird Species

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 described below and the Federal Aid in Wildlife Restoration Act, better known as the Pittman-Robertson Act (see "Funding Wildlife Management", pg. 33).***

The Duck Stamp Program

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 are not the only wildlife to benefit from Federal Duck Stamp dollars. Numerous other birds, wildlife, and plants have similarly prospered because of habitat protection made possible by the program. An estimated one third of the nation's Endangered and Threatened species find food or shelter in refuges preserved by these funds. For every dollar you spend on Federal Duck Stamps, ninety-eight cents go directly to purchase vital habitat for protection in the National Wildlife Refuge System. Remember, Federal Ducks Stamps can also be used as postage, the more you buy, the more you as conservation minded people contribute to our waterfowl resources. The source of this information is USFWS Adm. Report titled Hunting and Migratory Birds- How Hunters Benefit Many Migratory Bird Species.

Current Waterfowl Populations

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 15). They surveyed coastal waters and estuaries from Kittery to Eastport during the month of January, 2006. In 2006, a total of 82,365 birds was a slight increase from last year's count of 73,503. Most notable was a record count of mallards (4,025), up 1,827 from 2005 (2,198) and 801 greater than the last high count in 2002 (3,224). Black duck numbers were also greater during 2006 (16,631) than in 2005 (14,027), but still remain below the 10-year average of 18,419. Scaup continued their long-term decline with only 73 birds observed this year. For sea ducks, numbers of common eider (34,041) were similar to last year, scoters (4,480) were well above the 10-year average of 2,905, and larger than normal flocks of long-tailed ducks (formerly called oldsquaw) were observed. The number of Canada geese counted this year (3,338) was nearly identical to 2005 (3,489).

Table 15. Mid-winter Waterfowl Survey data for Maine, January 1997-2006.

	Total Recorded by Year									
Species	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Mallard	556	995	1,849	892	1,162	3,224	2,857	2,055	2,198	4,025
Black Duck	14,597	24,027	32,600	20,666	12,971	21,368	17,283	10,799	14,027	16,631
Northern Pintail	0	0	0	0	0	0	0	10	0	0
Total Dabblers	**15,153**	**25,022**	**34,449**	**21,558**	**14,133**	**24,592**	**20,140**	**12,864**	**16,225**	**20,656**
Ruddy Ducks	0	0	0	0	0	508	60	0	0	0
Scaup	1,175	581	1,830	1,790	1,080	370	450	0	160	73
Common Goldeneye	5,429	4,543	7,416	3,392	2,510	5,577	3,912	6,783	7,374	5,982
Bufflehead	3,175	9,270	7,099	3,252	4,472	6,950	5,104	4,012	4,369	6,770
Common Merganser	1,662	4,028	5,451	4,948	5,550	7,802	3,600	1,944	2,298	4,114
Total Divers	**11,441**	**18,422**	**21,796**	**13,382**	**13,612**	**21,207**	**13,126**	**12,739**	**14,201**	**16,939**
Common Eider	39,001	31,809	38,735	38,351	28,664	46,036	26,347	17,240	34,794	34,041
Scoter	2,804	2,755	3,198	4,611	1,941	2,710	2,857	337	2,702	4,480
Long-tailed Duck	1,797	1,739	2,861	1,120	2,389	2,311	1,759	846	1,995	2,865
Harlequin	24	0	0	15	0	25	5	51	30	30
Total Sea Ducks	**43,626**	**36,303**	**44,794**	**44,097**	**32,994**	**51,082**	**30,968**	**18,474**	**39,521**	**41,416**
Unidentified Ducks	**90**	**246**	**254**	**210**	**425**	**248**	**18**	**0**	**37**	**16**
TOTAL DUCKS	**70,310**	**79,993**	**101,293**	**79,247**	**61,164**	**97,199**	**64,252**	**44,077**	**70,014**	**79,027**
Canada Goose	1,911	1,986	3,071	3,139	2,769	3,377	2,603	2,290	3,489	3,338
Brant	15	0	21	0	0	0	0	4	0	0
Total Geese	**1,926**	**1,986**	**3,092**	**3,139**	**2,769**	**3,377**	**2,603**	**2,294**	**3,489**	**3,338**
GRAND TOTAL	**72,236**	**81,979**	**104,385**	**82,386**	**63,933**	**100,506**	**66,855**	**46,371**	**73,503**	**82,365**

The Mid-winter Waterfowl Survey is conducted at the same time each winter in each state in the Atlantic Flyway (from Maine to Georgia). Overall status of wintering waterfowl populations are determined when Maine's information is pooled with the other states' numbers. Low numbers among some species of ducks seen in Maine this January may be offset by increased counts in states farther to the south, or vice versa.

North American duck populations in 2006 remained at good levels for most of the species annually counted by USFWS biologists. The USFWS recently reported in an administrative report titled Trends in Duck Breeding Population, 1955-2005 that the total duck population estimate, excluding sea ducks, was 31.7 million birds, similar to last year's estimate, but 5% below the 1955-2005 long-term average. After the mild winter, early nesting conditions prevailed throughout the east and duck broods were observed slightly earlier than normal in 2006. USFWS biologist/ pilot John Bidwell reported that the 2006 waterfowl breeding population survey of the Eastern Survey Unit was conducted in early May. This is the seventh operational year for the survey. Good habitat conditions were available for breeding ducks and timely rains produced much need habitat for duckling survival and growth. The breeding population of Black Ducks in the Eastern Survey Unit was estimated at 490,000,which is an increase of 4% from 2005 estimates. Canada goose production is also expected to be good along the North Atlantic coast this year with an early snowmelt and good nesting conditions throughout their range. Production by Maine's resident Canada Goose population appeared highly variable in 2006 with broods ranging from 2–10 goslings throughout the state.

In Maine, surveys of duck broods on 39 wetlands across the state provide an index to production of Maine's waterfowl populations. This long-term brood count survey has provided a means of following trends in waterfowl breeding populations since the mid-1950s. The number and proportion of broods, by species, has changed over time (Table 16). The number of black duck and wood duck broods observed declined precipitously from the mid-1950s to the late 1970s, but recovered somewhat during the 1980s and early 1990s. Since the mid-1980s, the numbers of broods observed of most species, except mallards, have declined. One goal of the state waterfowl management plan is to maintain or increase the number of ducks produced in Maine at historical levels. 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 and regional level so that trends can be detected. Out of all the information summarized from the brood survey, the number of ducklings per hen (or gosling per goose) is the essential statistic. This is an indication of yearly production and helps determine how large of a resource will be available to hunters during the fall migration.

Table 16. Mean number of broods and proportion of total, by species, during brood counts on 39 waterfowl production index areas in Maine during 1966-76, 1980-84, 1986-90, 1991-95, 1996-2000, 2001-2005[1].

	1966-76		1980-84		1986-90		1991-95		1996-2000		2001-2005	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
Black Duck	37	29	34	19	56	24	50	24	24	16	29	17
Ring-necked Duck	31	24	44	25	49	21	39	19	30	20	40	23
Wood Duck	15	12	24	13	38	17	43	21	32	22	30	18
Goldeneye	23	18	36	20	39	17	31	15	27	19	32	19
Hooded Merganser	10	8	19	11	26	11	24	12	21	14	23	13
Green-winged Teal*	1	1	2	1	1	1	1	<1	1	1	<1	<1
Blue-winged Teal	5	4	4	2	1	1	1	<1	0	0	1	<1
Common Merganser	4	3	11	6	12	5	8	3	6	4	8	4
Mallard	1	1	5	3	7	3	11	5	7	4	7	4
Northern Shoveler	0	0	0	0	0	0	0	0	0	0	<1	<1
Total Observed	**127**	**100**	**179**	**100**	**229**	**100**	**208**	**100**	**148**	**100**	**171**	**100**

**Known breeder: assigned 1 brood during 1966-76 even though not observed in brood counts.*
[1]Mallard x black duck hybrids and Canada geese were excluded from analysis.

Waterfowl Hunting Seasons

Waterfowl harvests in the United States have declined since 1978, when 15.1 million ducks were recorded in federal harvest surveys. This has been partly by design - as regulations became more restrictive - but it also reflects declining hunter numbers and lower waterfowl populations during the 1980s. The number of Maine's waterfowl hunters has also declined since 1978, when the high of 18,650 federal migratory bird-hunting stamps were sold. The average number of stamps sold in Maine has changed from 14,545 (1981-85) to 11,612 (1986-90) to 9,908 (1991-95) to 10,319 (2002). Unfortunately, since 2001 the number of waterfowl hunters in Maine has declined drastically. One of the most recent goals of the Department is to reverse this decline in license and Duck Stamp sales.

In response to drought conditions on U.S. and Canadian prairies (the "duck factory" of North America), season lengths were shortened significantly between 1985-93 (from 50 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 1994-95, 50 days in 1996, and 60 days in 1997-2005.

Restrictions in harvest regulations during the 1980s also resulted in reduced daily bag limits from 5 birds to 3 per day; species restrictions for black ducks, pintails, wood ducks, and hen mallards; and curtailed framework opening and closing dates (from October 1 to October 5, and from January 15 to January 5). Framework opening dates were moved back to October 1 in 1994, and bag limits were increased to 4 per day in 1994 and 1995, 5 per day in 1996, and 6 per day in 1997-2005.

In addition to recent extended season lengths, 1997 marked the first time that states with Sunday hunting prohibitions, such as Maine, were allowed additional week days to compensate for lost opportunity. The 1998 season in Maine was the most liberal (51 days) available to our hunters since 1958, when a 60-day federal framework also allowed 51 days of hunting. The 2004 and 2005 regular duck seasons allowed 60 hunting days in the north and south waterfowl hunting zones, for a total of 72 hunting days that did not overlap.

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). The one-day hunt takes place on a Saturday in September within two weeks of the start of the regular duck season. A 2001 mail survey indicated that approximately 9% of waterfowl hunters bring a youth hunting on Youth Waterfowl Hunt day.

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. Harvests of geese during the September season have remained relatively stable at approximately 3,000 birds in recent years. 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.

Past Hunting Effort and an Overview of the Harvest

A review of waterfowl hunter and harvest statistics provides an interesting comparison of Maine's waterfowlers and their success. The average Maine duck hunter today is doing quite well. This may surprise those who have listened to stories extolling the great old days of duck hunting. The number of hunters in the field today, as indicated by the 10,319 federal duck stamps sold in 2002, is close to the number commonly measured in the early 1960s. (This is, however, much lower than the average number sold during the 1970s.) The average Maine waterfowl hunter in 1998 spent 7.52 days afield per season, which was higher than the same measure from the 1960s (6.24 days). They were nearly as successful as their 1960s counterparts (0.93 ducks per day compared to 1.01 in the 1960s).

Table 17. Historic Maine dabbling and diving duck harvest statistics, 1961-2001. (Data collected prior to HIP Program.)

	Mallard	Black Duck	Green-winged Teal	Blue-winged Teal	Wood Duck	Greater Scaup	Lesser Scaup	Ring-necked Duck	Buffle-head	Common Goldeneye
1961-65 (mean)	960	21,080	5,960	840	4,500	125	50	950	1,780	2,240
1966-70 (mean)	2,360	32,060	12,000	4,460	5,500	220	100	1,100	1,980	2,380
1971-75 (mean)	4,600	32,680	13,340	4,640	7,660	200	160	1,550	3,340	2,040
1976-80 (mean)	5,040	23,580	9,620	2,740	9,880	260	360	2,620	6,240	3,040
1981-85 (mean)	4,660	12,740	8,700	1,380	11,240	220	300	2,620	4,340	4,040
1986-90 (mean)	4,700	8,280	7,100	640	6,840	100	180	2,750	2,240	2,940
1991-95 (mean)	7,960	11,040	5,080	400	8,000	60	120	1,680	3,100	1,720
1996	7,100	7,800	6,200	1,600	10,300	0	100	2,100	3,500	2,000
1997	9,360	9,380	11,720	600	6,220	90	0	1,540	2,180	830
1998	10,761	9,481	13,330	549	9,732	205	124	2,175	1,227	775
1999	11,974	10,393	11,576	857	7,290	123	245	1,050	2,441	889
2000	8,438	6,843	8,391	198	9,676	50	130	809	2,164	655
2001	14,972	11,903	5,222	843	15,074	---	---	1,140	4,075	1,803

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 (Table 17). 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 in the annual Maine waterfowl kill (Table 18). Showing sizable declines in the Maine harvest in recent years are black ducks, blue-winged teal, scoters, and common goldeneyes.

The declines in both the annual kill (Table 17) and the Mid-winter Waterfowl Survey estimate (Table 15) of common goldeneyes in Maine and other northeastern states have waterfowl managers concerned about this species. However, the breeding trend among goldeneyes in eastern Canada and Mid-winter Waterfowl Survey counts to the west

Table 18. Sea duck harvest statistics, 1961-2001. (Data collected prior to HIP Program.)

	Common Eider	Long-tailed Duck*	White-winged Scoter	Surf Scoter	Black Scoter
1961-65 (mean)	1,360	280	1,660	1,060	560
1966-70 (mean)	2,800	1,520	3,120	4,000	1,580
1971-75 (mean)	8,820	1,080	4,160	4,440	1,460
1976-80 (mean)	7,580	1,300	2,020	2,980	1,680
1981-85 (mean)	11,980	1,520	2,340	1,880	740
1986-90 (mean)	13,680	2,360	1,500	1,980	400
1991-95 (mean)	14,840	2,420	1,460	1,412	372
1996	21,100	800	1,100	3,800	300
1997	19,340	530	1,450	3,040	520
1998	9,019	2,917	685	4,604	421
1999	16,007	1,094	741	2,938	1,331
2000	11,661	810	477	710	178
2001	14,117	1,691	1,880	1,891	1,905

** formerly known as oldsquaw*

during 1990-2003 have been increasing, suggesting a redistribution of birds rather than population decline. Common goldeneyes, and their close relative Barrow's goldeneyes, are cavity nesters that breed predominantly along small lakes in Canada, where they may be increasingly affected by timber harvest practices. Common goldeneyes breed in Maine, but the less common Barrow's goldeneye is strictly a wintering or migrating bird in Maine.

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.

Recent Harvest Data – A Different Way of Estimating Waterfowl Harvests

Since the early 1950s, the USFWS has conducted a survey of Federal Duck Stamp purchasers to estimate waterfowl hunter activity and harvest in the U.S. That survey was conducted annually through the 2001-02 hunting season, after which it was replaced by a new migratory bird harvest survey system referred to as the Harvest Information Program (HIP). This cooperative, 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 responsible for using these data to annually conduct national hunter activity and harvest surveys for all migratory game birds.

Each year from 1999-2001, the USFWS conducted both the Federal Duck Stamp-based survey and a HIP waterfowl harvest survey concurrently, with the objective of comparing and evaluating the results of both surveys. The purpose of Table 19 is to present the results of the HIP waterfowl harvest surveys for the 2001 through 2005 hunting seasons. All harvest estimates herein are preliminary, pending (1) final counts of the number of migratory bird hunters in each state, and (2) complete audits of all survey response data.

Table 19. Maine duck harvest estimates based on Harvest Information Program, 2001-2005.

Maine dabbling and diving duck harvest estimates based on Harvest Information Program.					
	2001	**2002**	**2003**	**2004**	**2005 (preliminary)**
Black Duck	5,868	9,717	5,045	5,765	7,623
Mallard	7,839	15,744	12,025	12,218	16,855
Mallard x Black Duck Hybrid	422	861	510	317	979
Green-winged Teal	2,723	9,287	5,248	2,750	3,077
Blue-winged Teal	469	185	459	0	909
Northern Shoveler	0	62	0	0	140
Northern Pintail	94	554	357	159	350
Wigeon	47	185	306	264	70
Wood Duck	7,323	7,319	3,822	4,231	6,224
Greater Scaup	0	123	0	0	0
Lesser Scaup	0	123	0	0	0
Ring-necked Duck	610	1,845	459	529	699
Bufflehead	1,925	1,661	764	1,798	1,609
Common Goldeneye	704	431	357	1,745	3,777
Hooded Merganser	1,643	1,415	764	740	629
Other Mergansers	845	1,292	1,783	264	1,818
Total dabbling/diving duck harvest:	**30,512**	**51,804**	**32,000**	**30,780**	**44,759**
Seasonal duck harvest per hunter:	4.7	8.1	5.2	5.5	7.2
Canada Goose	5,165	12,800	9,637	7,000	7,826
Snow Goose	0	0	463	0	87
Seasonal goose harvest per hunter:	1.3	2.8	2.1	1.8	2.3

Maine sea duck harvest estimates based on Harvest Information Program.					
	2001	**2002**	**2003**	**2004**	**2005**
Common Eider	17,257	20,600	28,967	14,736	10,842
Long-tailed Duck	1,371	2,800	2,612	1,754	690
Scoter species	5,371	6,400	14,721	4,210	2,168
Total sea duck harvest:	**23,999**	**29,800**	**46,300**	**20,700**	**13,700**

Black Duck Harvest Management

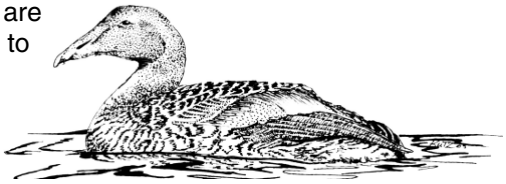
In 1982, a decline in the black duck population since the mid-1950s, as measured by the Mid-winter Waterfowl Survey, prompted MDIFW to unilaterally restrict harvest of this species in Maine by prohibiting the killing of black ducks during the first 16 days of the 50-day season. The rest of Atlantic Flyway states and provinces followed Maine's lead in 1983, when the U.S. and Canada instituted a harvest reduction plan for black ducks. During 1983-1987, Atlantic Flyway states targeted a reduction in their harvests of black ducks of 42% (compared to the 1977-1981 average). In 2001, the harvest reduction goal for black ducks in the Atlantic Flyway was changed to 25%, with the U.S. and Canada sharing approximately equal proportions of the harvest. Reductions in Canada's black duck harvests have also been achieved since 1984. The actual reduction in the harvest of black ducks in the Atlantic Flyway during 1983-2001 has been 50% compared to black duck harvests during 1977-1981.

During the 40- and 50-day seasons of 1983-1987, MDIFW met the harvest reduction target for black ducks by prohibiting their killing during the early portion of the duck season. Restrictive seasons (30 days) in the U.S. during 1988-1993, coupled with a 1 bird daily bag for black ducks for the entire 30 days, essentially accomplished the harvest reduction strategy for this species through 1993. Since 1994, with the return to 40-, 50-, and now 60-day seasons, MDIFW's challenge has been to maintain the reduction in harvest of Maine black ducks while providing abundant opportunity for waterfowl hunting in Maine during longer hunting seasons. This has best been accomplished by prohibiting the killing of black ducks during the first few days of the season; the alternative would be to

allow the killing of black ducks from the start of the duck season, but for a much shorter period than the full duration of the regular duck season. In fact, the Maine harvest of black ducks was higher during the period of 30-day seasons (1988-1993) than levels attained between 1983 and 1987. Sparing black ducks during the first few days increases the survival probabilities of our locally breeding and locally produced ducks, and enables Maine to attain the harvest reduction target for this species during long duck hunting seasons.

The return to 60-day duck seasons since 1997 has challenged Atlantic Flyway waterfowl managers, because the need to maintain low black duck harvests still exists. However, recent seasons have been successful as Maine's estimated annual black duck harvest since 1988 has been maintained at approximately 51% below those measured prior to black duck harvest restrictions. In fact, black duck kill estimates in the Atlantic Flyway during 1994-1996 were 16 percent lower than those measured during 30-day seasons (1983-1987) and 58% below those measured prior to 1983. During the 2004 hunting season, Maine waterfowl hunters took a reported 5,765 black ducks statewide. The black duck population seemed to respond slowly. However, declines in the count of black ducks in the Atlantic Flyway during the Mid-winter Waterfowl Survey (MWS) over the past five years could be reason for concern. Recent MWS counts are still well below levels counted prior to 1980 – before black duck harvest restrictions were instituted – and still well below the flyway MWS goal of 260,000 black ducks. In Maine, productivity, or the number of ducklings per hen, has shown only slight declines since 1955, while the number of total black duck broods counted on waterfowl production index areas continue to remain low in recent years (see Table 16).

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 (see Table 18). 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

Waterfowl Research in Maine

Current waterfowl research efforts are aimed at measuring and tracking trends in breeding populations and the harvests they support. An aerial waterfowl population survey is now an operational USFWS survey in Maine and the Maritimes in April and May. Further, Maine brood production information is collected on 39 wetlands, and several priority duck and goose banding efforts are conducted each year in the summer and early fall. These combined inputs help with setting yearly regulations for waterfowl season lengths and daily bag limits to ensure that resources are used at a sustainable level while offering maximum benefit to the hunting and non-hunting communities alike. Banding is 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. MDIFW is 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.

--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 2004. 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 1994-2005 are provided in Table 20.

Table 20. Nesting waterbirds, seabirds, and eider populations and number of colonies occupied.

	1976 – 1977		1994 - 2005	
	Pairs	**Colonies**	**Pairs**	**Colonies**
Arctic Tern (ARTE)	1,640	9	2,875	10
Atlantic Puffin (ATPU)	125	1	606	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	29,000	321
Common Tern (COTE)	2,095	24	5,671	19
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	-	86	9
Great Egret (GREG)	0	-	5	1
Herring Gull (HEGU)*	26,037	223	28,290	183
Laughing Gull (LAGU)	231	6	3,414	4
Leach's Storm-petrel (LHSP)	19,131	17	10,370	33
Little Blue Heron (LBHE)	4	2	8	2
Razorbill (RAZO)*	25	2	405	6
Roseate Tern (ROST)	80	3	195	6
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.*

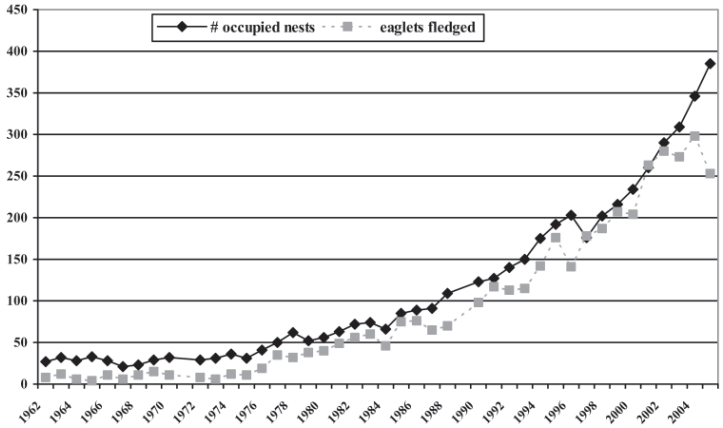
Colonial Waterbird inventories are supported by hunting license and permit revenues; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund); USFWS Section 6 Funds; and a 1994-95 Colonial Waterbird Grant from the Region 5 USFWS.

--R. Bradford Allen

Bald Eagle

Maine citizens, visitors to the state, and our data all agree that the steady increases in numbers and distribution of Maine's bald eagle population continue. Wildlife Division staff identified 385 nesting pairs during 2005 surveys. The preliminary count in 2006 has risen to 401 pairs, but the statewide inventory is not yet completed for the current season. Each year, agency pilots and biologist observers monitor traditional nest locations (some in use for more than 44 years) and search for new nests during low-level flights in fixed-wing aircraft. Annual increases in the count have averaged 8% each year since 1990 (Figure 7). Bald eagles have surpassed nearly all of the state's recovery criteria to "delist" (removal of the "Threatened" status on Maine's official list of Endangered and Threatened Species).

Figure 7. Bald eagle recovery trends in Maine.



Of course, we do not have the resources to search all potential habitats across Maine each year. In 2004, we checked our monitoring program against random plot surveys as an independent estimate and found the statewide inventory to be 85% thorough. You can always help by sharing knowledge or suspicions that you may have of eagle nest locations. Wildlife biologists in any MDIFW office can gladly compare our compilation of nests with insights you are willing to share. Each year, there are nearly 50 survey flights monitoring eagle nests in Maine and we can easily verify nest locations and breeding status from a flyover much more easily than ground observations.

Many individuals do not see an actual nest, but have strong suspicions based on the regular presence of adult bald eagles. The most revealing time of year is the spring breeding season, especially in March and April when territorial instincts peak for eagles, but don't to expect to see both birds. One is likely to be tending eggs in a nest if the pair is actively breeding. Each year, about 10% of adult pairs do not lay eggs, but they are often conspicuously defending their territories from other eagles by remaining close by. After breeding failures occur at some nests later in the spring, resident eagles can stray so the significance of adult eagle sightings to actual nests diminishes somewhat at other times of the year. At successful nests, young eaglets require constant parental attention and the family remains near nests into late summer or early fall.

If you would like to learn more about eagle nesting ecology in Maine, we urge you to check the "eagle cam" on the Internet. In January 2006 a camera was installed to provide nest level views of eagles in coastal Hancock County. As many as 2.3 million "hits" daily reveals the interest in the website *(http://www.briloon.org/ed/eagle/index.htm* or use the link from MDIFW's home page: *http://www.state.me.us/ifw/index.html)* to access the "eagle cam." Internet users with high-speed connections can access live-streaming video and audio. Still images are updated every 15 seconds for those with traditional dial-up Internet access. Three biologists with a combined >80 years of experience with Maine eagles write a weekly "Biologists' Journal" via a blog where viewers can also submit comments and questions. The "eagle cam" is a joint undertaking between BioDiversity Research, FPL Hydro Energy Maine, U.S. Fish and Wildlife Service, and MDIFW.

Historical estimates are misleading, but current projections of carrying capacity are that Maine could support at least 700 nesting pairs. This number could rise sharply if migratory fish populations (alewives, shad, eels, etc.) improve. Eagle declines began in Maine during the late-19th century, but the rate and extent of setbacks accelerated during the 1950s and 1960s. In response, the National Audubon Society began active survey efforts in Maine but could only locate between 21 and 33 nesting pairs annually from 1962 through 1970. The future of Maine's eagles was very much in question following dramatic declines of breeding numbers, very low reproductive success, and dwindling nest distribution. Annual counts dropped as low as 21 nesting pairs and 4 young eaglets in the entire state during the mid-1960s.

The U.S. Fish and Wildlife Service has supported annual eagle surveys in Maine since 1972. MDIFW assumed primary responsibility for this inventory in 1976. Only two nesting pairs were left in the western half of the state as declines continued through the 1970s. The declining trend and low reproductive success in Maine mirrored that elsewhere in the continental U. S. In 1978, the bald eagle was designated an Endangered Species in Maine and 42 other states under the U.S. Endangered Species Act. Maine's remnant population was the last hope for the species in the northeastern U.S. None were left elsewhere in New England, and only one nest remained in New York.

Small, relict populations become vulnerable to other threats. Disturbances from new land uses, increasing recreational pressures, and waterfront development became problematic along many coastal waters, rivers, and lakes that provide habitat to nesting bald eagles. Essential Habitat regulations were adopted in Maine to minimize disturbance impacts to breeding eagles. This was one of several management strategies important to eagle recovery across the state. Landowners are generally acknowledged as the true champions of eagle recovery in Maine by making sacrifices to accommodate nests on their property, cooperating with special regulatory and conservation initiatives, and providing effective local stewardship for this vulnerable resource.

A variety of environmental contaminants have impacted reproduction of Maine eagles and contributed to prolonged declines. By the late 1970s, only the easternmost coastal reaches of Washington County held a small stronghold of nesting eagles that experienced healthy reproductive rates. Empty nests and unoccupied habitats prevailed elsewhere across the state. Environmental contaminants severely impaired eagle nesting for three decades across Maine. DDE (a by-product of the insecticide DDT) caused shell thinning and frequent egg breakage. Harmful levels of PCBs and mercury can kill developing embryos or nestlings. The limited supply of young eaglets that survived was inadequate to offset eagle death rates. Following controls on DDT and related organochlorine pesticides, steady improvements in hatching success during the 1980s and enabled initial recovery of the species.

A total of 253 young eaglets took flight from Maine nests in 2005, a decrease of 45 fledglings from the previous year. Prolonged rains during the crucial spring breeding season may have contributed to more widespread nest failures. The comparable 2006 statistic is not yet determined. Productivity of Maine's eagle population is much improved from past years, but remains less than in most healthy eagle populations. Relatively high residues of PCBs were evident in eagle tissues from coastal Maine during the 1990s as well as from some inland river samples tested since 2000. A three-year study of mercury contamination in Maine eagles began in 2004 is a collaborative effort of the BioDiversity Research Institute, FPL Hydro Energy Maine, U.S. Fish and Wildlife Service, Maine Dept. of Environmental Protection, and MDIFW. There is no documentation of declining mercury levels in Maine eagles, and those nesting on many lakes reveal relatively high residues.

Continued progress in bald eagle recovery throughout the U.S. has led to a formal rule proposal by the U.S. Fish and Wildlife Service on February 16, 2006 to remove bald eagles from the "Threatened" status currently afforded bald eagles under the U.S. Endangered Species Act. The long recovery was acknowledged earlier by downgrades from a status of Endangered to Threatened across the lower 48 states in 1995. The Maine legislature similarly reclassified bald eagles to a Threatened Species under state law in 1996. "Downlisting" does not reduce the legal protection afforded by these laws. Both state and federal agencies are now evaluating future delisting of bald eagles altogether. Several initiatives are currently underway to minimize future threats to eagle habitat and other potential setbacks once special regulations related to the Endangered Species Act no longer apply. A federal statute, the Bald Eagle Protection Act, will still prohibit direct harm to eagles and their nests and national management guidelines have been published for review and comment.

Most eagles nest in undeveloped settings, but some live close to human activities. It is not yet certain that these "tolerant" eagles can persist in more populated regions without special efforts. Stewardship of eagle habitats by private landowners will remain a key strategy for the foreseeable future. Maintaining suitable habitat remains our ultimate challenge for a lasting recovery of bald eagles. Therefore, state objectives for delisting bald eagles in Maine include both biological criteria and habitat safeguards:

- The breeding population exceeds 150 nesting pairs for 3 consecutive years – achieved: 1996.
- Annual eaglet production exceeds 150 fledglings for 3 consecutive years – achieved: 1999.
- No annual population declines of 5% or more for 3 consecutive years – achieved: 2000.
- Federal "delisting" from Endangered/Threatened status – formally proposed February 16, 2006 (pending).
- Habitat "safety net" to maintain species recovery, including 2 specific objectives:
  - At least 50 nesting areas in conservation ownership or appropriate easements – achieved 2004;
  - And at least 100 additional areas under conservation ownership, appropriate easements, or cooperative agreements with private landowners – ongoing through 2006-2007.

Until all recovery criteria are achieved, the bald eagle remains a Threatened species in Maine. The legislature holds authority for status changes based upon MDIFW recommendations. In the interim, all modes of habitat protection remain operational. MDIFW will contact landowners as soon as possible when new nests are found each year. Qualified sites will be designated "Essential Habitat" under Maine's Endangered Species Act. Such areas (now numbering 559 locations statewide) require review by MDIFW before an agency or municipality can permit, license, fund, or carry out a proposed project within ¼ mile of a nest. Essential Habitats serve as consultation zones and biologists encourage landowners to review eagle safeguards in project planning stages. Many activities are permissible, but timing modifications are generally necessary, and specific habitat features may need special attention. The advantages of this regulation include advance notification, standardized reviews, and customized decisions based on individual circumstances.

A pamphlet "Living with Eagles" will be distributed to landowners of eagle habitat to promote coexistence and stewardship of nesting eagles. The Landowner Incentive Program is a new initiative for endangered and threatened species, and upcoming efforts in Maine will seek to advance the "habitat safety net" concept for nesting eagles. A wide array of conservation partners actively assist eagle habitat initiatives in Maine: U.S. Fish and Wildlife Service refuges, Acadia National Park, state wildlife management areas administered by MDIFW, other state lands managed by the Maine Bureau of Parks and Lands, as well as private organizations like The Nature Conservancy, Maine Coast Heritage Trust, Forest Society of Maine, New England Forestry Foundation, and numerous local land trusts. A broader initiative "Beginning with Habitat" allows owners and communities to consider the mosaic of important wildlife habitats, including those used by bald eagles, during town planning.

A species assessment for bald eagles was provided to a public working group in 2004 to establish goals and objectives through the year 2019. This is the first planning effort for Maine eagles outside the likely realm of endangered species programs. The group recommended that the breeding population should be at least 600 nesting pairs by the year 2019 and established related habitat management objectives. The Commissioner's Advisory Council adopted these on September 23, 2004. The document can be viewed on-line at the following Internet address: *http://www.state.me.us/ifw/wildlife/speciesplans/baldeagle.pdf*

The accomplishments in bald eagle recovery programs are indeed remarkable and the most desirable end product in endangered species conservation. Please note there are no quick fixes, and programs must adapt to address an array of limiting factors during long periods of rarity. You, of course, can help with contributions to Maine's Endangered and Nongame Wildlife Fund. These donations provide the only state revenue to provide match money for other grants and partnerships. Your help and support are encouraged. ***This work is supported by U.S. Fish and Wildlife Service, as well as state revenues from Conservation Plate and Chickadee Check-off funds.***

--Charlie Todd

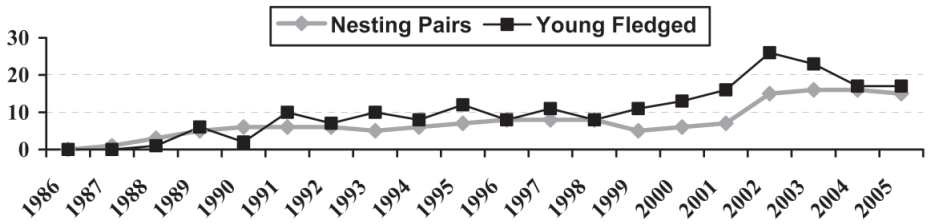
Peregrine Falcon

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 (Figure 8). Periodic setbacks are a common hazard in endangered species restorations.

Figure 8. Trends of Peregrine Falcon recovery in Maine, 1986-2005.



Significant improvements finally occurred in 2002. The statewide breeding count doubled in a single year. Peregrines inhabited 15 eyries in 2002, sixteen during 2003 and 2004, and fifteen again in 2005. Surveys are ongoing during 2006, but the preliminary count has risen to 17 nesting pairs. A closer look reveals considerable instability in the small, recovering population. Peregrines have inhabited a total of 24 different eyries during the last 5 years. The 7 vacancies in 2006 may reflect the loss of an individual adult: an inherent risks 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. Two near peregrine eyries were found in eastern Maine this year including the first modern-era record of nesting on an offshore coastal island.

A record high of 26 young peregrines fledged from ten eyries in 2002. Only seventeen young peregrines were tallied in 2004 and 2005. Slight declines help validate the need for annual monitoring and site management in Maine. 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.

Diligence by land managers has been crucial to maintaining eyries favored by peregrines. The White Mountain National Forest, Maine Bureau of Parks and Lands, Seven Islands Land Co., Hancock Timberlands, and especially Acadia National Park have championed stewardship of peregrines nesting on their property. 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. The peregrine falcon remains one of the premiere examples of a species nearly lost altogether and the remarkable recoveries possible from widely coordinated programs. ***State revenues from the Conservation Plate and Chickadee Check-off funds support this work.***

--Charlie Todd

Golden Eagle

Long considered the rarest breeding bird in the eastern U.S., there is no evidence of nesting by golden eagles in Maine since 1999. This species once inhabited mountainous cliffs in the Appalachian Mountain corridor from the mid-Atlantic States to Labrador and northern Quebec. Successful nesting of golden eagles (producing fledgling eaglets) was last documented at two Maine eyries in 1984.

There are significant habitat limitations for this species in the eastern U.S. (especially Maine). These have limited their numbers throughout recorded history. Golden eagles are relatively numerous in the West, where open terrestrial habitats favor their normal lifestyle of preying upon small mammals. The golden eagle resides around the northern hemisphere and is acknowledged to be the widest ranging, most successful species of eagle in the world. However, the extensive woodlands of Maine are poorly suited to the golden eagle's foraging requirements.

A single nesting pair persisted in Piscataquis County from 1985 to 1998. A lone adult remained there during 1999 - 2000. Like other species that mate for life, a new pairing will occur if potential replacements exist in the region. The nesting territory appears abandoned since 2001. Throughout this period, this location was the only breeding record for the species in the northeastern United States, although nesting failure plagued them. The site had been occupied by golden eagles as far back as 1736. The Abenaki Indians named this and another Piscataquis County eyrie for the historical presence of golden eagles. The other location was sketched and labeled a golden eagle eyrie in 1689 and generally considered to be the earliest written documentation of golden eagles in North America!

Figure 9. Physical characteristics of golden and bald eagles.

Characteristic	Golden Eagle	Bald Eagle
Wing profile - soaring:	very slight dihedral	straight horizontal line
Wing shape:	narrower, more pointed	broader, more rounded
Mid-wing coloration	white "epaulette" panels	mottled linings (immature plumages)
Body plumage:	uniformly dark brown	mottled except dark juveniles
Flight silhouette - head:	small head, short beak	large head, long beak
Flight silhouette - tail:	relatively long, narrow	shorter, broader
Beak length and color:	small, bluish-black	long and yellow (ad.) / black (imm.)
Tarsus appearance:	fine buff feathering	unfeathered, yellow
Habitat association:	uplands, mountains	rivers, lakes, coastal bays

Golden eagle sightings are reported sparingly across the state during migration periods in fall and spring. Occasional summer encounters in Piscataquis County and Oxford County suggest possible breeding, pioneering eagles looking for a home, or strays from the population in neighboring Quebec. All suspected sightings of golden eagles are greatly appreciated, especially during the late-spring or early summer when adults should be close to nests. At a distance, the species is easily confused with immature bald eagles (aged 1–4 years), but there are subtle differences if you see one up close or through good optics (Figure 9).

Only eleven golden eagle eyries are historically known in Maine. Historical perspectives often underestimate numbers especially for eagles that favor remote settings. All were cliff nests, although one pair built an alternate nest in a white pine tree more than a mile away from their cliff nest. Tree nesting should be more commonplace in a heavily wooded state such as Maine but none have been encountered in more than 3,200 hours of aerial searching during statewide bald eagle surveys ongoing since 1976.

Suitable foraging areas are perhaps more limiting to the potential residence of golden eagles in Maine. Wading birds, such as great blue herons and bitterns, were foremost among golden eagle diets in Maine, but these wading birds were heavily tainted with contaminants. Unhatched eggs recovered from the Piscataquis County eyrie in 1996 revealed significant contaminant burdens: a repeat (and more recent example) of the same toxic problems that once impaired reproduction among bald eagles and peregrines. There is no other direct evidence that environmental contamination was a primary culprit behind the decline of golden eagles in the East. Only 3 young goldens were produced in Maine eyries during the last 26 years. As the species vanished from its historic breeding range to the south, there is little surprise that low productivity in Maine resulted in the continued decline (and possible extirpation) of the golden eagle.

The current situation for golden eagles in Maine is bleak. However, the state is close to golden eagles breeding in Quebec and Labrador. Counts of migrant golden eagles are increasing in the Atlantic flyway. If habitats remain suitable, the birds may return on their own. Golden eagles are recognized as an Endangered Species in 2 other northeastern states (New Hampshire and New York) where nesting has occurred within the past 50 years. If contaminant impacts are diminishing (as generally the case for bald eagles and peregrines), then there is some hope of recruitment from eastern Canada. In the interim, MDIFW will work cooperatively with landowners to maintain suitable habitat at the few eyries once used by golden eagles.

A species assessment for golden eagles was provided to a public working group in 2004 to establish goals and objectives through the next 15 years. This is the first planning effort within Maine for golden eagles. The Commissioner's Advisory Council adopted these on September 23, 2004. Active restoration attempts do not appear warranted, but any possible nests will naturally be a high priority for monitoring and management. ***Funding for this work comes from state Conservation Plate and Chickadee Check-off funds.***

--Charlie Todd

Shorebirds

Purple Sandpiper

Maine has only one species of shorebird that is a regular winter resident, the purple sandpiper. Maine supports the largest known wintering purple sandpiper population in North America. Most of the wintering areas important to purple sandpipers are offshore islands and ledges where they feed on invertebrates in the rockweed. With threats from oil spills and consequent damage to shorebird habitats or shorebirds themselves, the Department identified the need to map purple sandpiper offshore habitats and acquire baseline data on population and distribution of wintering sandpipers.

In collaboration with the Maine Natural History Observatory, Acadia National Park, and Maine Coastal Island National Wildlife Refuge, the Department completed its third year of a four-year study to determine numbers and distribution of purple sandpipers in Maine. This year, survey routes were expanded west to cover offshore habitats in Muscongus and Sheepscot Bay and coastal areas south of Portland. Due to time limitations and the challenges of winter boating, Casco Bay was not completed but will be surveyed next winter to complete the coast wide survey.

To determine seasonal movements and site fidelity, this winter the same group of biologists began a two-year telemetry study. Funded by Acadia National Park, radio transmitters were placed on 40 purple sandpipers wintering in the Acadia National Park region. These birds were tracked throughout the winter and spring until they left for their Arctic breeding grounds in early June. ***In Maine, the shorebird fieldwork is supported by hunting license and permit revenues, federal excise taxes on guns and ammunition (Pittman-Robertson Fund), Oil Spill Funds, State Wildlife Grant, National Park Service, Maine Outdoor Heritage Fund, and the Gulf of Maine Project (USFWS).***

--Lindsay Tudor

Piping Plover

Piping plovers are small, sand-colored shorebirds that nest on sandy beaches and dunes along the Atlantic Coast from South Carolina to Newfoundland. 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. 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.

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, Maine Piping Plovers experienced a dismal nesting season. At 18 different beaches, a total of 49 pairs of piping plovers made 82 nesting attempts but produced only 27 fledglings (0.55 chicks fledged per pair) which was the lowest productivity ever recorded since monitoring began in 1981, far below the productivity rate needed to sustain the plover population. 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. We look forward to a better season in 2006.

MDIFW is grateful for the help of many groups that help monitor and manage piping plovers. They include the Maine Audubon Society, The Nature Conservancy, Maine Bureau of Parks and Lands, 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. As a result of a new beach management plan with residents of Wells and Drakes Island beaches, over 20 volunteers monitored plovers on their beach. ***This work is supported by federal Section 6 funds; Conservation 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

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 with the Maine Audubon Society and the U.S. Fish and Wildlife Service. During the past 13 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.

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; Conservation 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

Black Tern

Most people think of terns as nesting on Maine's coastal islands and beaches. However, one species, the black tern, nests in colonies on freshwater wetlands in central and eastern Maine. Prior to 1990, it was believed Maine's black tern population was relatively secure. In 1991, students at Nokomis High School, under the direction of their student advisor Don McDougal and MDIFW biologists, initiated the first statewide census of black terns. They found that the black tern was actually the rarest species of tern in Maine and made a strong case for listing the species as state Endangered. Black terns in the Northeast nest only in New York, Vermont, and Maine and their numbers are believed to have declined throughout their range in the last two decades.

Nokomis students have continued their annual survey of black terns, thus providing the state with 16 years of continuous information on this species' distribution and status. In 2005, a total of 114 nesting pairs were documented from 7 sites. This represents the highest count of black terns on record for Maine (Ten-year average = 83.9 pairs). However, breeding activity is concentrated at relatively few marsh locales, primarily in the Sebasticook River watershed, with no activity documented in 2004 and 2005 from several previously occupied breeding sites. With Maine's black tern population concentrated at so few active breeding locales, the species is especially vulnerable to chance events (e.g. hurricanes, predator population cycles, motorboat disturbance) that might have less of an impact if the population were distributed more widely. It is critical that MDIFW continue to monitor population numbers of this Endangered species and protect its high-value emergent marsh habitat. ***Funding for this work comes from the Conservation Plate, Chickadee Check-off funds, and U.S. Fish and Wildlife Service.***

--Lindsay Tudor

Harlequin Duck

The brilliantly colored harlequin duck inhabits both the Atlantic and Pacific Oceans, where they nest along fast flowing streams and rivers and winter in marine environments. In the Atlantic, there are three wintering populations with some evidence of genetic differences: Iceland, Greenland, and eastern North America. The eastern North American wintering population breeds from southern Labrador and southern Quebec to Newfoundland and northern New Brunswick, and winters from Newfoundland to North Carolina. The eastern North American population of harlequins is currently estimated at 1,800 – 2,000 individuals, of which about 1,300 winter in Maine. In Maine, harlequins are seldom observed because they inhabit remote rocky shores on outer islands, including Isle au Haut, west of Mount Desert Island.

In the mid-1980s, the eastern North American wintering population was estimated at fewer than 1,000 individuals, with numbers declining at most sites. Hunting harlequin ducks on the east coast was curtailed in the late 1980s. The USFWS was petitioned to federally list the harlequin as Endangered or Threatened several years ago, but the petition was denied. In Canada, the listed status of the eastern North American harlequin population, of which Maine's birds are part, was changed recently from Endangered to "Special Concern".

MDIFW listed the harlequin duck as Threatened in 1997 based on 1) the small number of harlequins occurring in Maine; 2) the small size of the eastern North American harlequin population, and the substantial portion of that population (estimated over 50%) that winters in Maine; and 3) the fact that more than 90 percent of those harlequins wintering in Maine are located at fewer than five locations.

In 1999, MDIFW completed an assessment of harlequin ducks in Maine. In 2001, harlequin management goals and objectives were developed by a public working group and were approved by the Advisory Council. A Harlequin Duck Management System was written and reviewed by the Wildlife Division in May 2004. In order to meet these goals and objectives, this document outlines three strategies for harlequin management: 1) population monitoring, 2) habitat protection, and 3) public outreach. Beginning in 1999, annual boat surveys of selected islands and ledges located in Vinalhaven, Isle au Haut, and Swans Island, have been conducted during the month of February to monitor numbers of wintering harlequins in outer Penobscot and Jericho Bays. This region supports the greatest concentration of harlequins on the Maine coast. Recent surveys of this area indicate harlequin numbers are steadily increasing, with 1,022 harlequins observed in 2006. Several more flocks were reported wintering off Ogunquit,

Gouldsboro, and Winter Harbor. Canadian biologists in New Brunswick and Nova Scotia also report increasing trends. Pending available funding, surveys of Penobscot and Jericho Bays will continue annually with an intensive coast-wide survey of wintering harlequins implemented every five years. ***The Department's role in harlequin conservation is supported by Conservation Plate funds, the Outdoor Heritage Fund, Oil Spill Funds, federal Section 6 Funds, financial assistance from the Gulf of Maine Project (USFWS), hunting license and permit revenues, and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Lindsay Tudor

Roseate Tern

Roseate Terns, an Endangered species, nested with Common and Arctic Terns on 6 coastal islands in Maine in 2005. The islands are critical to survival of the species in Maine, since they typically provide undisturbed, predator-free nest sites. With an increase of gull populations (a predator and competitor of the terns), and human disturbance on the islands, tern numbers and reproductive success have declined so that the species is now listed as Endangered. In the 1980s, 50-80 pairs of Roseate Terns nested in Maine. Their numbers have increased in response to management and in 2005, 195 pairs nested at 6 sites in Maine. In the 1930s, 200-300 pairs nested in the state and the figure of approximately 300 pairs serves as a benchmark for Roseate recovery in Maine.

Recovery of this species is a cooperative venture among the USFWS Maine Coastal Islands National Wildlife Refuge, National Audubon Society, Maine Audubon Society, and MDIFW. In 1992, 21 nesting islands used by Roseate Terns were protected by Essential Habitat provisions of the Maine Endangered Species Act. An additional island was designated Essential Habitat in 1999. In 1994 and 1995, new tern restoration projects were initiated to benefit Roseate Terns on Pond Island at the mouth of the Kennebec River, and recently on Outer Green Island in Casco Bay. Populations of Common Terns and Arctic Terns are also benefiting from these and other seabird restoration efforts. Common Terns have increased from 4,361 pairs in 1994 to 5,671 in 2005; however, Arctic Terns have declined during the same time period from 5,029 to 2,875 pairs. This summer, we will begin an Arctic Tern study to determine why Arctic Terns populations remain constrained. This investigation is a collaborative effort between U.S. Fish and Wildlife Service, University of Maine at Orono, and the Department. ***Funding for this work comes from Section 6 funds; the Maine Outdoor Heritage Fund; Conservation 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).***

--R. Bradford Allen

Ecoregional Surveys

In 2004, we conducted surveys for marshbirds, grassland birds, and rusty blackbirds in the northeast portion of Maine (mostly eastern, central, and southern Aroostook County) as part of MDIFW's Ecoregional Survey Project. This is a continuing effort to inventory rare birds and other fauna at key sites across the state. These data are important for understanding population status in Maine, and are especially useful in determining which species warrant Endangered and Threatened status.

Marshbirds - We conducted surveys for marshbirds at 32 wetlands in northeastern Maine from May 11 to July 27, 2005. All sites had 1 or more target species, and at twelve sites (38%), we detected five or more target species. The most target species detected at a single site was nine. As in previous ecoregions, we found few occurrences of species of conservation concern. Highlights of the survey in this region included three observations of black terns, two new sites occupied by sedge wrens and one new site for least bittern.

The most widely distributed marshbird species in this ecoregion was common snipe at 20 sites. American bittern and soras were next at 18 and 15 sites, respectively. Great blue herons, pied-billed grebe, and Virginia rails all were encountered during wetland surveys. Of the 14 target species, American coot and green heron were not detected at any of the 32 wetlands surveyed.

Rusty Blackbird - We conducted 20 days of fieldwork between June 10 and June 30, 2005. We surveyed 248 wetland sites in 86 townships during that period. We detected no rusty blackbirds at any of the 248 sites during last season's survey effort. These data provide further evidence that Rusty Blackbirds are especially rare in the region, and that the geographic range of the species may have contracted and may no longer be a regular breeder in eastern Maine. ***This work is being supported by Outdoor Heritage Funds, Conservation Plate Funds, and the State Wildlife Grant Program.***

Marshbird Trends and Habitat Selection

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 are of management concern because they are uncommon, have limited distributions, or show evidence of population decline. Also, three marshbird species support hunting seasons (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 in recent 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 were present in the past, and American bitterns were found to occur less frequently in southern than northern Maine, suggesting that population declines from 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 sets of marsh bird surveys; the first conducted during 1989-90 and the second resulting from 1998-2000 ecoregional surveys. 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.

Two survey crews visited 38 wetlands during spring and summer of 2005. Each site was visited on 3 occasions. Virginia Rail was the most frequently encountered target species. Based on preliminary data collected to date, more Virginia Rails and American Bitterns, and fewer Green Herons and Least Bitterns were observed than during previous surveys. In 2006 we plan to survey 37 additional sites bringing the total to 75 unique wetlands resurveyed. In addition, crews will resurvey all sites from 2005 with historic records of Least Bittern. This will add 10 sites for a total of 47 wetlands to be surveyed in 2006. A final report in the form of a Master's Thesis will be forthcoming by mid 2007. ***This work is being supported by Outdoor Heritage Funds, the Conservation Plate Funds, the University of Maine, and the Maine Cooperative Fish and Wildlife Research Unit.***

--Thomas P. Hodgman

Sharp-tailed Sparrow Diets and Foraging Ecology

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) occurs 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 sharp-tailed sparrow 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 in late 2006. ***This work is being supported by the U.S. Fish and Wildlife Service, the Maine Oil Spill Contingency Fund and 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 the region.

In response, state, federal, and non-governmental organizations have teamed up to develop a coordinated approach to monitoring avian 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 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 (*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. Participation in this program 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 are 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 will 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 will 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, hemaglutinin (H) and neuraminidae (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 199 humans since 2003, including the death of at least 110 people as of 7 April 2006; 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 this summer 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.

--Michael Schummer

Ethics are what we do when no one else is watching.

Maine is a very unique place. You can be completely alone in the wild, practicing ethical behavior and no one may be there to notice. However, the landowner as well as the hunters and anglers that follow you, will appreciate it greatly. Your ethical behavior contributes significantly to Maine's sporting future, and it encourages landowners to keep important habitat property available for all to enjoy.

So remember, always respect the rights of landowners and please ...

ASK FIRST

ALWAYS SEEK PERMISSION

Before engaging in any form of outdoor recreation on property which 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.

Maine Department Of Inland Fisheries And Wildlife

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PAUL F. JACQUES, DEPUTY COMMISSIONER

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(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
Skowhegan 1-800-452-4664 / Orono 1-800-432-7381
Thomaston 1-800-452-4664 / Gray 1-800-482-0730
Cellular Calls - 911
TDD / TTY line (Statewide) 1-888-524-7900

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
Department of Conservation

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