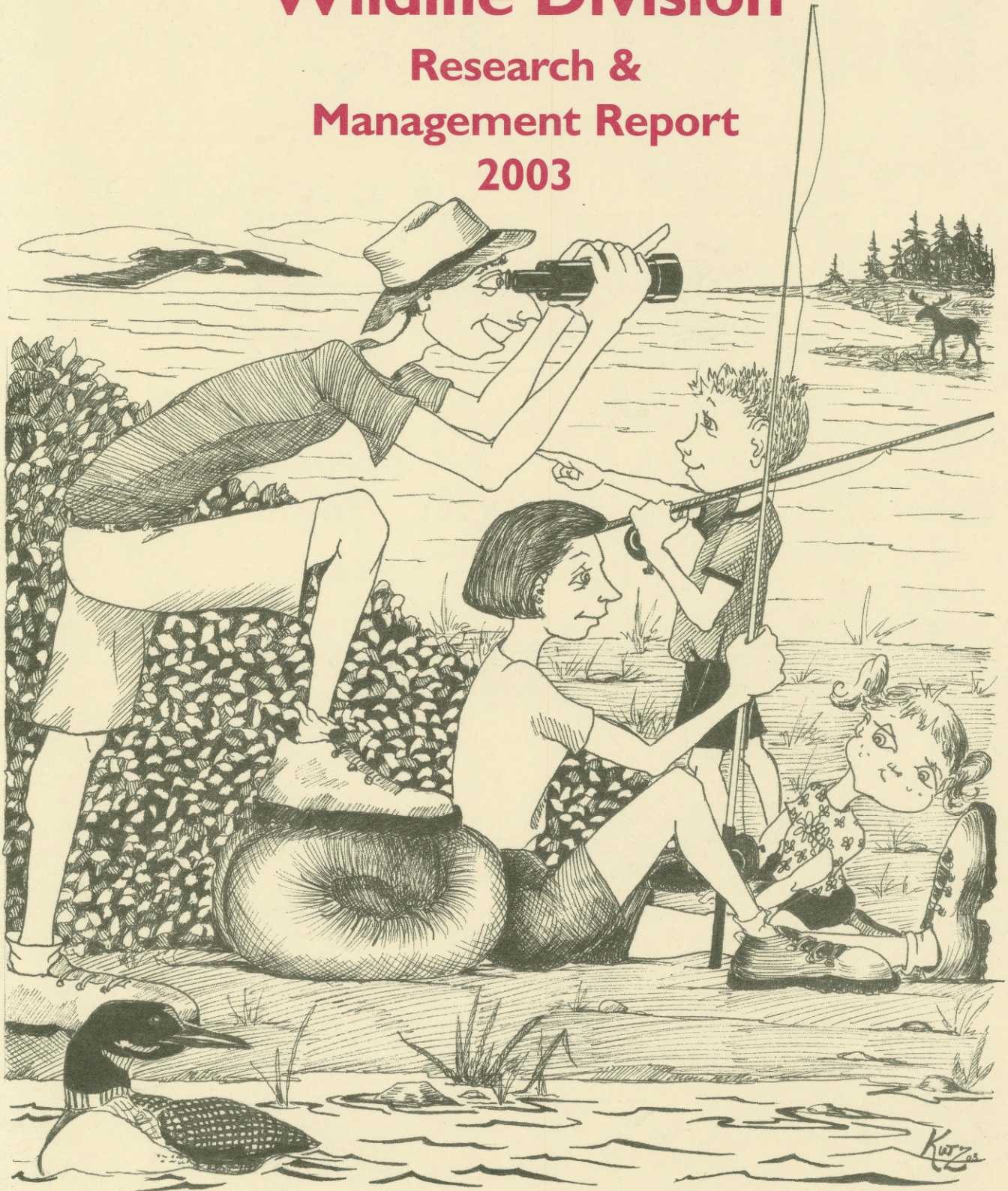


Maine Department of Inland Fisheries & Wildlife

Roland D. Martin, Commissioner

Wildlife Division

Research & Management Report 2003



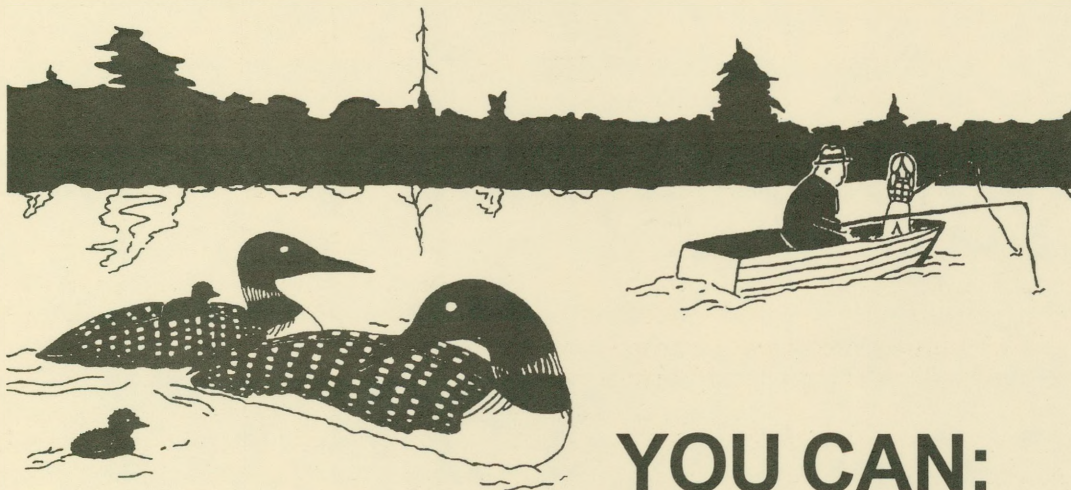
George J. Matula, Jr., Editor

LOONS & LEAD DON'T MIX

Lead tackle is deadly to waterbirds!

Lead sinkers & jigs cause fatal
lead poisoning in loons and other waterfowl.

Lead ingestion is the #1 killer of loons
in Maine, but any waterbird can die from
swallowing just one lead sinker or jig!



YOU CAN:

Use steel, tin, bismuth or plastic instead.
Ask local tackle shops to stock alternatives.
Properly dispose of old lead sinkers and jigs.



Maine Department of Inland Fisheries and Wildlife
Caring for Maine's Outdoor Future

INTRODUCTION

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. But habitat is at risk.... Today, development in Maine is sprawling across the landscape, contributing to the loss of habitat and outdoor experiences. In 1997, the Maine State Planning Office reported in *The Cost of Sprawl*, that "...the fastest growing towns in Maine have been 'new suburbs' 10 to 25 miles distant from metropolitan areas." Sprawl, or unplanned development, has ecological consequences. Again, from *The Cost of Sprawl*, the Maine State Planning Office notes:

"...habitats for wildlife in Maine have been seriously fragmented by development sprawl....In southern Maine nesting sites for endangered birds, such as the piping plover and least tern, have been lost to development."

"A study of 8 towns in southern Maine in 1985 found that 76% of the wetlands were visible from a road or within 2,000 feet..."

"Of 2,700 Maine lakes, over 200 have already been harmed by development, and another 300 are at risk if current trends continue."

"Over two-thirds of the state's rare and endangered species are endangered because of habitat loss."

Much is at stake. Maine is a large state — as large as the remaining New England states combined. It has a wealth of coastal, freshwater, and upland habitats; 32,000 miles of streams and rivers course through the state; and 3,000 lakes and ponds dot the landscape. Maine's scenic, rock-bound coast is 3,000 miles long and embraces 4,613 islands between Kittery and Eastport. One-third of the state's area is comprised of freshwater wetlands, including hardwood floodplains, freshwater marshes, and dense assemblages of vernal pools. Maine is the most heavily forested state in the United States, but also contains some of the most significant grassland and agricultural lands in the Northeast.

Collectively, these lands provide habitat for rare plants and rare or exemplary natural communities; for species such as deer, waterfowl and wading birds, heron rookeries, nesting seabirds, and shorebirds; and for rare, Threatened, or Endangered wildlife. Maine has the largest population of bald eagles in the Northeast. Maine'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 Furbush's lousewort; and support the recently listed Atlantic salmon in seven Down East rivers. Maine's mountains and forested habitat provide a significant proportion of the global breeding habitat for neotropical migrants such as the Bicknell's thrush and blackthroated-blue warbler. Maine 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.

The most important first step to protecting habitat is knowledge. *Beginning with Habitat* — a project of the Maine Dept. of Inland Fisheries and Wildlife, Maine Natural Areas Program, U.S. Fish & Wildlife Service, and Maine Audubon Society, among several other partners — provides the ecological data required to achieve optimal, focused habitat conservation. It does this by providing municipalities, land trusts, and other organizations engaged in habitat conservation with a series of habitat maps that depict and describe the habitats of significance found in their town. It also provides conservation recommendations for these habitats, information to help guide conservation of valuable habitats, and recommendations that can be used to build a system of interconnected and conserved lands. The habitat maps include:

a) Riparian Habitats, which are the transitional zones between aquatic habitats or wetlands and dry or upland habitats. They include the banks and shores of streams, rivers, ponds, and lakes, and the upland edge of wetlands. Riparian Habitat provides travel corridors and habitat for many plants and animals occurring in Maine.

b) High Value Plant and Animal Habitats include mapped locations of: rare plant locations and rare or exemplary natural communities; habitats for Endangered, Threatened, special concern, and other rare wildlife species including bald eagles, piping plovers, and least terns; and habitat for deer, waterfowl and wading birds, heron rookeries, nesting seabirds, and shorebirds.

c) Large Habitat Blocks provide habitat for plants and animals not included in Riparian or High Value Habitats. Large blocks of relatively intact habitat provide homes for medium to large bodied animals with large home ranges and, in the case of large forested blocks, for species requiring forest interior habitat.

If the 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 seeks to conserve and maintain sufficient habitat to support all native plant and animal species currently breeding in Maine. 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 50 years from now Maine will retain its rich and diverse outdoor heritage.

In the pages that follow, we've outlined several other wildlife habitat conservation and management efforts undertaken by the Wildlife Division – as you know, it all begins with habitat.

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



The following 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.

The Department of Inland Fisheries and Wildlife receives Federal funds from the U. S. Department of the Interior. Accordingly, all Department programs and activities must be operated free from discrimination in regard to race, color, national origin, age or handicap. Any person who believes that he or she has been discriminated against should write to The Office of Equal Opportunity, U. S. Department of the Interior, Washington, D.C.

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WILDLIFE PLANNING

MAINE'S STATE WILDLIFE GRANT PROGRAM

The State Wildlife Grant (SWG) Program is designed to assist States by providing federal funds for the development and implementation of programs that benefit fish and wildlife and their habitat, especially species of greatest conservation need. SWG monies in the amount of \$483,933 appropriated in 2001 and \$776,000 in 2002 support work on many of Maine's rare, Threatened, Endangered and nongame wildlife species. An additional \$576,727 will be awarded to Maine in 2003. Here are several examples of projects that SWG monies support:

◆ Beginning with Habitat



Beginning with Habitat is a cooperative effort of agencies and organizations working together to secure Maine's outdoor legacy. The goal of the program is to maintain sufficient habitat to support all native plant and animal species currently breeding in Maine by providing each Maine town with a collection of maps and accompanying information depicting and describing various habitats of statewide and national significance in the town. Maps provide communities with information to incorporate into their comprehensive planning efforts to help guide conservation of valuable habitats.

◆ Wildlife Management Areas - Planning and Habitat Management for the Future

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

◆ Distribution & Ecology of Purple Sandpipers Wintering in Maine

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

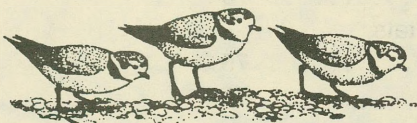
◆ Bald Eagle "Safety Net"

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



◆ Enhanced Management of Piping Plovers and Least Terns

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

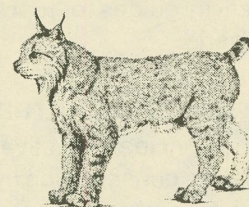


◆ Aroostook Hills and Lowlands Inventory

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

◆ Partnership for Lynx Conservation

The Canada lynx has long been a rare carnivore in northern and western Maine. Until recently, its status was largely unknown and was based on anecdotal reports or a track in the snow. SWG funds help support an ongoing study of Canada lynx in Maine to 1) determine if there is a viable, self-supporting population of lynx in the State; 2) document mortality factors affecting lynx; 3) identify habitats used by lynx and how they relate to snowshoe hare distribution and abundance; 4) investigate how lynx distribution in Maine is affected by populations of bobcats, coyotes, fishers, and fox; and 5) test the efficacy of various survey methods used to determine status of lynx.



◆ Stream Survey Databasing/Utilization of Restored Aquatic Habitats

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

◆ Lake Habitat Inventories



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

◆ Aquatic Biodiversity Project

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

◆ Estimating Moose Density

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



◆ Unique Aquatic Ecosystems

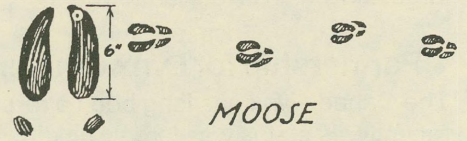
Fishless Ponds are believed to be rare in the Maine landscape. Many of these ponds occur in mountainous terrain where fish access is limited because of local topography. These sites have sometimes been targeted for introductions of sport fish, but they may have unique ecological attributes, especially for invertebrates and amphibians. Introduction of predatory fish could permanently alter their ecology. The objective of this study is to document the ecology of fishless ponds in Maine and to conduct a landscape analysis to predict and evaluate the presence of these potentially unique natural communities.

◆ Wildlife Park Displays

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

◆ Fish and Wildlife Education

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



◆ Seabird Outreach

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

--Sandy Ritchie, Wildlife Resource Planner

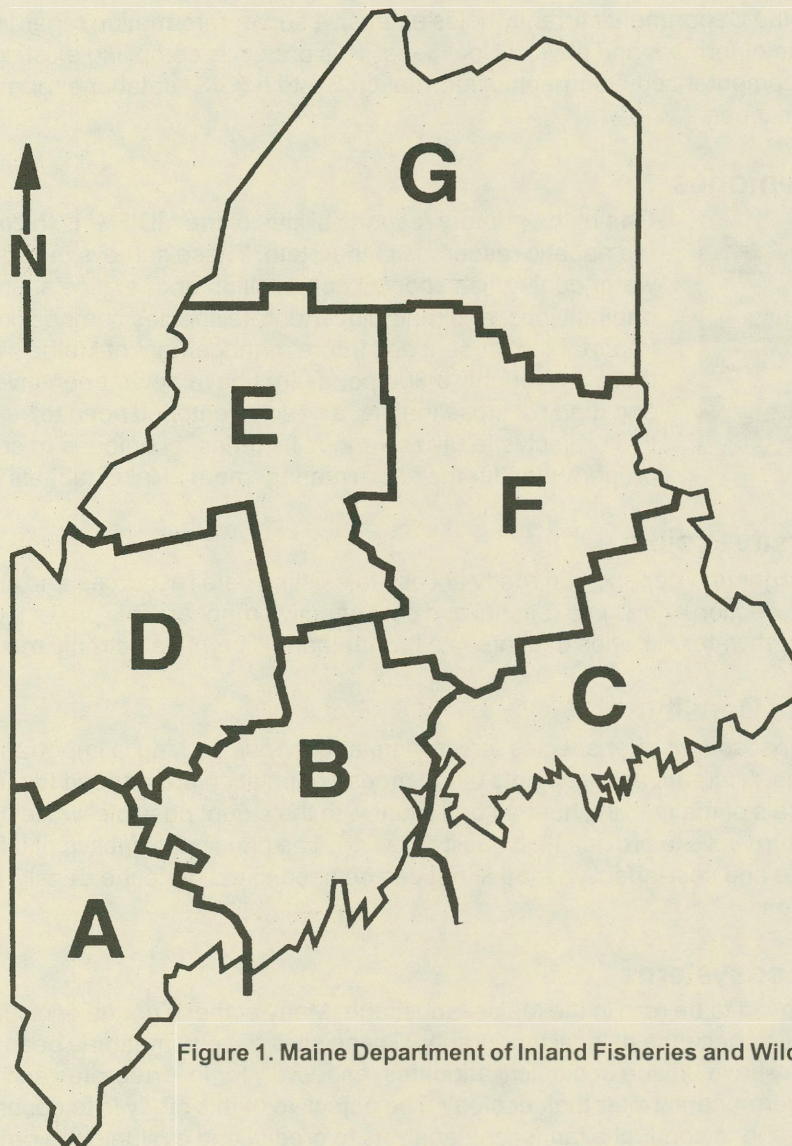


Figure 1. Maine Department of Inland Fisheries and Wildlife

WILDLIFE MANAGEMENT SECTION

REGIONAL WILDLIFE 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 Regional Wildlife Management Section (WMS). Their breadth of knowledge, activities, and job responsibilities range far and wide, often requiring the regional staff to juggle numerous public requests, inquiries, and wildlife management projects at the same time. In essence, the regional wildlife biologist represents the Department in a multitude of arenas and serves as the "state's wildlife expert" within their assigned regional geographic area (Figure 1). They are responsible for implementing the Wildlife Division's 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 newest addition to the Wildlife Management Section is our Lands Management Biologist. Centrally located in the Sidney regional headquarters, the Lands Management Biologist assists regional biologists in habitat enhancement projects on the Department's Wildlife Management Areas as well as with developing a land management database to help track these efforts.

The regional wildlife staff receives many requests by landowners who wish to improve their lands for various wildlife species such as ruffed grouse or white-tailed deer. **Therefore, the Wildlife Management Section has dedicated the 2003 Wildlife Division's Research and Management Report to wildlife habitat enhancement articles that will hopefully be of use by landowners who wish to enhance their lands for wildlife.**

--Eugene Dumont, Wildlife Management Section Supervisor

LANDS MANAGEMENT PROGRAM - WILDLIFE MANAGEMENT AREAS

Over the last 60 years, the Maine Department of Inland Fisheries and Wildlife has acquired nearly 100,000 acres of property to establish Wildlife Management Areas. Most of these lands were purchased with Pittman-Robertson and other federal matching funds, Maine citizen approved bond monies, gifts, Maine State Lottery Outdoor Heritage Fund dollars, and North Atlantic Wetland Conservation Agreement Grants. The three primary objectives for the WMAs are: 1) protection from development, 2) enhancement or maintenance of quality wildlife habitats, and 3) access for traditional public recreational uses. By employing active management strategies outlined in resource plans developed by the Department's wildlife biologists, habitats can be enhanced for all wildlife species - game and nongame.

Wildlife Management Areas are geographically distributed throughout the state, supporting a diverse suite of habitats including freshwater wetlands and ponds, seabird nesting islands, saltwater marshes, and an assorted collection of upland communities representing all common Maine forested habitat types. Before enhancement efforts commence, each area is inventoried to quantify and qualify habitat attributes such as tree and shrub species composition, percentage of emergent vegetation in a wetland, presence of large diameter den trees, etc. Management decisions developed around habitat goals are implemented to achieve these WMA objectives.

There are two basic approaches to forestland management for wildlife; 1) featured species management, and 2) biodiversity (biological diversity). Which approach is implemented depends upon forest stand attributes. For example, if an evenly distributed presence of poplar is noted, one can take advantage of the sprouting nature of this species to initiate small patch cuts to benefit ruffed grouse. Another example of featured species management is the perpetuation of a pitch pine-scrub oak type to benefit endangered Lepidoptera (butterflies and moths). An excellent example of biodiversity is a multi-aged, upland hemlock-maple-beech community with vernal pools, dead trees, and woodland seeps. This type of forest stand has diverse age structure offering multiple microhabitats, which promote greater numbers of wildlife species or "species richness." The final management approach of a stand is determined by examining the inventory of vegetative components and structure.

Maine Department of Inland Fisheries and Wildlife is embarking on several habitat enhancement operations this year and next. Habitat improvement projects will continue to be public demonstration areas offering techniques to augment biological diversity and bolster featured species populations. Revenues earned from habitat enhancement efforts are reserved in a dedicated lands management account to support future WMA activities.

--Jeff Williams, Lands Management Biologist

REGION A - GRAY

Management of Rare, Threatened, and Endangered Species

One aspect of managing Department lands involves being aware of special habitats and rare species. To ensure compliance with the National Environmental Policy Act (NEPA), the Department of Inland Fisheries and Wildlife must guarantee that no habitat management practice, facility development, and/or maintenance action will have "adverse effects on species listed or proposed to be listed on the Federal List of Endangered or Threatened Species, or have adverse effects on designated Critical Habitat for these species."

One habitat of special concern is the pitch pine-scrub oak barrens. This habitat is found on several management areas, particularly those that were purchased by the Department after the 1947 forest fires in southwestern Maine. Management areas located in the Oxford County towns of Brownfield and Fryeburg and in the York County towns of Newfield and Shapleigh have substantial acreage in this fire-dependant type.

In the mid-1980s, research was conducted by scientists on rare or little-known wildlife species of moths, butterflies, reptiles, and amphibians. As this work was being analyzed, it became clear that some of these species are found primarily within specific plant communities owned and managed by the Department. Early research indicated that plants such as scrub oak, pitch pine, and gray birch were essential to the survival of these species. Twelve species of rare moths were documented on and near the Vernon S. Walker Wildlife Management Area. Additional surveys documented several of these species occurring on the Brownfield Bog WMA as well. Among the species found were two State listed Threatened Species, the twilight moth and the pine barrens zanclognatha. Some of these represented the first documentation of the species in the State of Maine.

In addition to the rare, Threatened, and Endangered wildlife species present, the pitch pine-scrub oak barrens type is considered critically imperiled in Maine due to its rarity or vulnerability to extirpation. Because of Maine's successful efforts at forest fire suppression, this forest type, which is highly dependent on fire to regenerate, is losing the battle to natural succession and to fragmentation by human development.

Efforts to improve habitat for upland game species such as ruffed grouse, white-tailed deer, and woodcock were initiated in the 1970s on the Brownfield Bog and Vernon Walker WMAs. These management areas have acreage in the pitch pine-scrub oak-gray birch forest type as well as other early successional forest species such as balsam fir, white birch, quaking aspen, and red maple. An even-aged forest management system was prescribed for these areas. Harvest units of 2-12 acres were established, and a predetermined percentage of these are to be cut every 10 years. This promotes a regulated, controlled, and predictable type of forest succession, which most game species require during their life cycle. As additional knowledge was obtained from the on-going research previously mentioned, concerns were raised among Department biologists as to the impact this management would have on rare wildlife species. Discussions and correspondence with noted entomologist Dr. Dale Schweitzer indicated that management efforts to promote the occurrence of younger age classes, and the perpetuation of this forest type, should indeed prove beneficial to these rare moths.

The development of whole-tree harvesting operations that provide wood fiber for fuel greatly increased the economic viability of our management efforts. Areas once considered non-merchantable were now providing raw materials and producing revenue. Timber harvests that initially were designed to improve grouse habitat are now seen as a tool to perpetuate the pitch pine-scrub oak type forest type. Department staff and other scientists periodically monitor the harvest areas in an attempt to evaluate the success of our efforts, consider different harvest removal rates, and to develop new land management strategies that may provide additional benefit to our treasured flora and fauna.

--Norman D. Forbes, Biology Specialist

REGION B - SIDNEY

Habitat Management for Ruffed Grouse

Wandering through the woods in the fall, have you ever thought to yourself, "This sure looks like great cover for grouse," but then, not seen any? Have you walked through an area in the spring expecting to find a grouse brood, not encountered them and wondered why? One of the major reasons for finding wildlife in one place and not others is the availability or lack of suitable habitat. Going back to my college text, habitat is defined as the place where a population lives and its surroundings, both living and nonliving. For grouse, habitat includes cover for breeding, nesting, brooding, and winter protection. These areas, known as covers (blocks of vegetation or forest stands), must also provide food and water. All of these must be available within a reasonable distance to be considered part of a home range, the area where a grouse normally lives.

The goal of grouse habitat management is to create a series of vegetative blocks where these requirements are met in the 15-40 acres of a grouse's home range. The better these needs are met, the less land it takes to support a grouse. Breeding cover includes 15 to 25 year-old hardwoods that are relatively open underneath. Good breeding cover also includes drumming logs. These logs are 14-16 inches in diameter and decayed to the point where the bark falls off. Males standing on these logs and drumming (flapping their wings) are visible to females, which enables the male to attract a mate. In addition, these open stands allow grouse to see predators and avoid them. Nesting occurs in a variety of habitats including the base of mature aspen or under the edge of brush piles or slash. As a result, no special cover needs to be created for grouse to nest in. Brood habitat is a brushy or regenerating hardwood / alder area. These areas have abundant herbaceous vegetation and lots of insects and low overhead cover. Hens with broods find food and cover while being able to move easily through the area and remain protected. The brood areas will later develop into breeding covers as they mature. Winter habitat consists of dense mature forest stands, particularly softwoods, that provide protection from the winter weather. Grouse will also spend the night in fluffy snow, roosting there for protection from cold temperatures and wind. Grouse eat fruits like apples and berries as well as seeds, buds, and catkins. Mature male aspen buds are the preferred winter food for grouse.

So how do we get these ideal conditions to come into being? Laying out a 20-acre management unit with four 5-acre stands, managed on a 40-year rotation with 10 year cutting intervals creates the 3 critical age classes needed to provide these covers. The three age classes 0-10, 10-25, and 25+ will develop as the blocks are cut over time and then progress from one cover type to another as they mature. Cutting should occur when aspen, which are the most desirable trees for grouse, are dormant. These blocks are then cut and the wood chipped as they reach their turn in the schedule. By setting up several of these 20-acre units, back to back, additional activity centers for grouse can be created. All of the 5-acre stands are numbered within the 20-acre block from 1 to 4, and every ten years the next number is chosen and those blocks are cut. Adjacent blocks from different 20-acre management units can be used by grouse to provide all of the critical age classes needed within a grouse's home range. So after all of this what do we get? Grouse, deer, hare, bears, songbirds, furbearers, and insects will all be present in the areas. The greatest misconception about wildlife management has been that we are only managing for game species. Anyone who visits our Wildlife Management Areas and walks through these grouse management blocks, or looks out over a "duck marsh," would see many different kinds of wildlife - game and nongame - that have benefited from wildlife habitat management. Before engaging in any harvest, please consult local ordinances and state law as forest harvests are regulated in the State of Maine. In addition, given the differences between wood lots, the use of a licensed professional forester and the development of a forest management plan for your property will help ensure your success. Thanks to Vermont Fish and Wildlife whose publication *Model Habitat Guidelines for Deer, Bear, Hare, Grouse, Turkey, Woodcock And Non-Game Wildlife*, was consulted in developing this article.

--James Connolly

REGION C - JONESBORO

Woodcock Habitat Management

The woodcock is a migratory, webless shorebird that has evolved to live in poorly drained, interior woodlands. Woodcock typically inhabit Maine from April thru October. Not only do they nest in Maine, but their numbers peak during spring and fall migrations to and from the Canadian provinces. Having a long bill with a hinged adaptation that allows it to open when probed into the ground, the woodcock are worm and insect specialists. They are ground nesters, and their young mature very quickly. Both sexes have similar, mottled brown color patterns, and the adult female is slightly larger than the male. Although they are capable of going without food for periods of time, woodcock must have sufficient fat reserves to undertake migration to the southern regions of the United States in late October through December.

Preferred habitats of woodcock can be grouped into three types: open non-forested (fields, meadows, recently cutover patches) for nocturnal roosting and spring courtship; young, second growth, intolerant hardwood stands (poplar, birch, pin cherry, maple) for nesting and brood rearing; and early successional hardwood stands, such as alder and aspen that provide feeding opportunity. These feeding areas are characterized by high stem density, "crawl through covers", that provide earthworms and protection from avian predators. Landscapes that provide a combination of these cover types within close proximity are the most productive for woodcock.

It is important to evaluate both your land and the surrounding area to assess for natural features and habitats that are needed by woodcock. An aerial photo is an extremely useful tool, as are the services of a consulting biologist or forester to evaluate your land's potential. With regards to forested land, woodcock require open and early successional stages of hardwoods. Many of these stands don't normally produce highly merchantable forest products, so enhancing habitat for woodcock can usually be integrated into forest management without compromising high quality growth sites.

Landowners with woodlots can create small, even-age stands by periodically clear cutting small patches on a predetermined schedule. This will result in a diverse combination of forest openings, young second growth stands, and older stands approaching merchantable age. Optimizing timber harvests for woodcock involves making small cuts at 5-10 year intervals adjacent to previously cutover patches. Depending on the species and rotation age of the merchantable hardwoods, approximately 1/3 of the area will be in prime habitat and 2/3 in stands approaching maturity. The only sites not in forest growth are permanent log landings and roads, which are maintained in an open state for roosting and courtship. This is generally a sound, basic approach to upland management. Not only are wildlife habitat enhancements provided, but so are sustainable forest products for the landowner.

There are also management practices that can be applied to low quality, wooded sites as well as non-forest areas to enhance woodcock habitat. Old fields should be mowed at least every other year to discourage the advancement of shrubby and woody growth. Maintaining small, grassy clearings where they occur in proximity to forested and brushy edges is particularly beneficial. Low quality forest stands, like alder and poplar, should be periodically rejuvenated. This is best done by dividing an area into 60-70 foot wide strips and clearing 1/4 of the number strips every 5 years so that the stand undergoes a complete rotation in 20 years. This assures maximum productivity and benefit to the soil, the habitat, and the birds as well.

An excellent publication that explains these strategies in detail is available to the public through the University of Maine Cooperative Extension Service: *A Landowner's Guide to Woodcock Management in the Northeast*. It is also available online at: www.umaine.edu/mafes/elec_pubs/ne_woodcock.pdf

--Region C Wildlife Staff

REGION D - STRONG

Managing Deer Wintering Areas

Deer wintering areas (DWAs), or "deer yards," are vitally important habitats for Maine's deer when temperatures drop below freezing and snow depths exceed a foot. Conifer or "evergreen" stands comprised of spruce, fir, cedar, or hemlock near or adjacent to streams, rivers, ponds, or lakes afford the best refuge from deep snow and extreme cold.

As the name "evergreen" implies, these trees retain their leaves (needles) throughout the winter. The leaf shape and configuration of these four species best intercept wind and snow. Much of the snowfall caught in their crowns either returns directly to the atmosphere as vapor or melts, reaching the ground as a liquid before refreezing. This reduces snow depths where the deer reside by up to 50% less than open ground. Deer congregating, or "yarding," in these forest types in large numbers creates a system of trails, further enhancing the conservation of energy and predator evasion. If you have ever been snowshoeing in deep snow with friends, you know firsthand how exhausting it is to break trail vs. being last in line and benefiting from the collective work of others.

Unless actively managed via forestry, spruce, fir, cedar, and hemlock have a tendency to grow in **even-aged stands**. Such stands provide good shelter once they mature, however it is not desirable to have an entire DWA be comprised solely of mature trees. It's the old, "don't put all your eggs in one basket" principle. Ideally, a DWA should have a variety of stand ages so as older stands **approach, but not reach** overmaturity, they are harvested and "replaced" with younger stands coming into maturity elsewhere in the DWA. Equally important are sapling stands graduating into pole or middle-aged stands, which are on the doorstep of becoming mature stands. For the last step (or the first step), harvesting mature trees or stands provides the growing space necessary for seedling spruce, fir, cedar, or hemlock - the future winter shelter.

Managing this vital wildlife habitat is essentially an exercise in forestry. Stand age, species composition; vigor, wind firmness, and quality (disease, insect, and defect) are key factors in deciding when or whether to thin a stand or conduct a regeneration cut. Our goal is to manage DWAs so that a minimum of 50% of the area is comprised of stands capable of providing quality shelter at any point in time. The balance of the area should contain a distribution of younger age-classes. This approach blends well with landowner objectives to provide a steady or "sustained yield" of lumber or fiber. Habitat value can be further enhanced by seeding trails or log landings with a mix that includes a hearty dose of legumes, such as clover. In addition to erosion control, the right seed mix will intersperse a source of late fall and early spring food throughout the DWA.

If you are an owner of woodland growing spruce, fir, cedar, or hemlock, and have deer residing throughout the winter months, then you may be providing a vital wildlife habitat. One of our regional biologists can help determine if your land is a wintering area, and offer general recommendations. A list of state and private professional foresters in your area can be obtained from the Maine Forest Service in Augusta (207-287-2791), should you want to consider actively managing your forest for timber and wildlife.

--Chuck Hulsey, Regional Wildlife Biologist

REGION E - GREENVILLE

Beech Management for Wildlife

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 in September and carry it into November.

During that magical time when the nuts hit the ground, northern hardwood stands containing beech become magnets to a variety of wildlife including white-tailed deer, black bears, ruffed grouse, blue jays, squirrels, chipmunks and other small mammals. In addition, mammalian predators such as fisher and pine marten frequent these areas to capitalize on the concentrated prey as well as the nuts themselves. But, among all of the “critters” that seek out this important food source in the north, none appear to be as dependent and so closely linked to the frequency of nut production as our black bears. In fact, research from our Department has clearly shown that nearly all (i.e. ninety plus percent during most years of the study) of the reproductive-aged female black bears produce cubs during the winter following an 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 recent 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. So, 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 continues to work with forest managers in an attempt to insure that a percentage of the mature beech will always be available to produce mast for our wildlife. Although some beech trees infected with beech bark disease will succumb, many will survive for years. In addition, diseased trees are stressed, so they frequently produce large nuts crops – often more than if they were healthy.

Our recommendation to foresters and other landowners is to always keep some mature (i.e., at least 8 inches dbh, or roughly 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 used to dictate harvest. Instead, look at crown characteristics. A large, live crown is a good indication of 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

REGION F - ENFIELD

Herbaceous Seeding for Wildlife

Herbaceous seeding - plantings of grasses and legumes - is a great wildlife management technique all landowners can use whether they own one acre or a million acres. Region F staff routinely plant herbaceous food and cover plots on our Wildlife Management Areas to improve habitat. Deer, bear, partridge, and hare forage directly on the greenery; small mammals hide and feed in the plots and provide food for foxes, owls, and hawks; and songbirds and wild turkeys hunt for insects in these semi-permanent openings. Herbaceous plantings also prevent soil erosion and slow succession of woody brush onto the site.

Log landings and winter roads are the most common sites on which landowners can establish herbaceous food and cover plots, but shoulders and ditches of all-season gravel roads are also possibilities. Site preparation is critical to ready a proper seedbed and to eliminate or reduce competition from woody vegetation. Plantings made in late spring or early fall have the best chance for successful establishment. Successful seeding also may require application of up to 3 tons of lime and 600 to 700 pounds of 10-10-10 fertilizer per acre. The landowner may apply these with a bulk truck, a 4-wheeler with an attached spreader, or a hand spreader. The latter two methods are best suited to small sites or areas inaccessible to a bulk truck. Selecting the proper seed mixture to match shade conditions and to meet your wildlife management objective is another important consideration. Specific seed recommendations are available from your local regional wildlife biologists; grass and clover seed are readily available at local feed-and-seed stores.

So the next time you are out and about and see these grassy areas, remember, landowners have invested time and money in these sites to help wildlife. They restrict motor vehicle access on their property to protect the plantings; please respect their land and efforts by staying off these areas with your vehicle. Would you want someone driving across your lawn?

--Buster Carter, Assistant Regional Wildlife Biologist

REGION G - ASHLAND

Backyard Wildlife Management

Any backyard, large or small, can be made into an excellent wildlife area for the enjoyment of the owners and their visitors. In creating such an area, you first need to keep in mind the needs of wildlife. All living things need food, water, cover, and space to survive. Food supplies energy and nutrients. Each wildlife species has its own nutritional needs, which change from one season to another. Water is essential to all forms of life. If you have a seep or waterway on your property, managing it for the needs of wildlife is important. Cover in the form of trees, shrubs, grasses, and flowering plants provide shelter, as do nonliving objects like rock piles, brush piles, cavities in trees, and birdhouses. Wildlife use cover to protect them from the weather, to hide from predators, to establish their living quarters, and to raise and rear their young. Space, or home range, is the area occupied by an animal when it performs its daily functions and travels to cover, food, and water and is often defended as a territory. The amount of space needed for a territory varies with the species, the quality of habitat, and time of year.

When managing wildlife on your land, first ask yourself what you want on your property in terms of wildlife and other uses. Do you want to manage for a few wildlife species, or do you want to manage for as many species as possible? Always keep in mind that you will be managing the habitat not the wildlife species themselves. It's always a good idea to start your planning by making a list of goals for your habitat, and place them in order of priority. This will enable you to provide suitable habitat for wildlife while you create a landscape to meet your personal needs.



When choosing plants for your yard, consider their function and appearance in relation to the wildlife species you want to manage for. Determine if the plants will be providing food, shelter, or just adding to the diversity. There may be limits to what can be planted due to the size of the area or the cost, so choose plants that serve more than one function. Diversifying your habitat will promote a healthy landscape and attract the greatest number of wildlife species. The presence of many plant species makes it less likely that insects or disease will cause severe problems. Having many species of trees, shrubs, perennial and annual flowers, and grasses in your yard will also attract more varied wildlife. A variety of plants provide a wide range of food and cover that are available throughout the year. It is important to think about wildlife needs during each season - especially here in Maine during the winter months when resident wildlife species face some of their most difficult times.

The longer the period when flowers, seeds, and fruits are available, the better it is for wildlife. Fall, winter, and early spring are critical to the survival of resident and migrating species, while summer foods are important for reproduction when energy needs of wildlife are very high. Cover is very important whether for nesting sites, shelter from weather, escape from predators, or for roosting. Conifers (softwood trees), cavity trees, and brush/rock piles provide winter cover. Cover not only has benefits for wildlife but also has benefits to the landowner, depending on arrangement and position. Planting conifers to break the prevailing winds can directly save on home energy costs, and on the protected side of the windbreak, the landowners can place feeders and wildlife shrub plantings. These wildlife shrub plantings offer wildlife access to mast, berries, and fruit and are very important where snow often covers many foods in late fall and early winter - a very critical time period for wildlife. Along side these windbreaks, planting food plots consisting of a herbaceous seed mix also offers considerable food benefit to deer, bears, turkey, hare, and grouse during late fall and early spring.

Partial list of common wildlife shrub plantings and trees for food and cover. All will grow in zones 3, 4 or 5.

Highbush Cranberry (*Viburnum trilobum*)
Autumn Olive (*Elaeagnus umbellata*)
Winterberry (*Ilex verticillata*)
Highbush Blueberry (*Vaccinium corymbosum*)
Mountain Ash (*Sorbus americana*)
Silky Dogwood (*Cornus amomum*)
Hawthorn (*Crataegus*)

Sargent Crabapple (*Malus sargentii*)
Tatarian Honeysuckle (*Lonicera tatarica*)
Bristly Locust (*Robinia fertilis*)
Serviceberry (*Amelanchier*)
Bayberry (*Myrica pensylvanica*)
Nannyberry (*Viburnum lentago*)
Elderberry (*Sambucus canadensis*)

--Rich Hoppe, Regional Wildlife Biologist

BUREAU OF PARKS AND LANDS

Long-term Habitat Agreement

In December 2002, the Department of Conservation, Bureau of Parks and Lands (BP&L) and the Department of Inland Fisheries and Wildlife signed a cooperative agreement that sets the general management guidelines for managing mature softwood dominated habitats for deer and other wildlife species. The Bureau of Parks and Lands manages 485,000 acres of land certified by both the Forest Stewardship Council (FSC) and the Sustainable Forest Initiative (SFI) under a statutory mandate to "manage these lands in a manner consistent with the principles of multiple use to produce a sustained yield of products and services in accordance with both prudent and fair business practices and the principles of sound planning."

Management plans for specific Habitat Management Areas (HMAs) will be developed jointly giving special emphasis to areas with traditional winter use by white-tailed deer. The primary management objective for HMAs is to provide dense conifer cover for deer, and other wildlife that utilize this type of habitat, in half of the area on a sustainable basis. Values are assigned to coniferous forest stands based on their suitability for sheltering deer during severe and normal winter conditions. Standards for HMA tree canopy density and height in softwood stands are established in the agreement.

The long-term goal of the agreement is to bring the HMAs into the proper mix of tree ages and sizes to provide stable habitat levels over time. This will require BP&L to implement a computer habitat modeling system to assist in timber harvest planning in HMAs and on its other lands.

Other HMA guidelines cover the seasonal timing of harvests, road construction, forest buffers, and travel corridors. Standards for gravel and mineral excavation, recreational use (including property leasing), and other structures and services, are included in the agreement.

Forestry guidelines establish a priority order for removal of trees within HMAs based on food and shelter value to wildlife and tree longevity. Standards for different types of harvests that achieve both forestry and wildlife objectives are also described in the agreement.

The agreement is established for 5 years and is renewable annually when BP&L and MDIFW staff meet to review past accomplishments and plans for the coming year. As HMA plans are developed for specific areas, the parties will review all proposed harvests in identified HMAs on a case-by-case basis. The parties have agreed that the approximately 10,000 acre deer wintering complex in T13R12 WELS would be the first HMA plan to be developed. Other areas identified for HMA plans include BP&L lands in T6R11 WELS and Holeb.

--Joe Wiley, BPL Wildlife Biologist



WILDLIFE RESOURCE ASSESSMENT SECTION

The Wildlife Resource Assessment Section (WRAS) is located in Bangor and includes 22 wildlife biologists and 2 secretaries. Most of us are assigned to one of four groups: the Bird Group, the Endangered & Threatened Species Group, the Habitat Group, and the Mammal Group. As you will see in the rest of this report, each group has specific areas of responsibility.

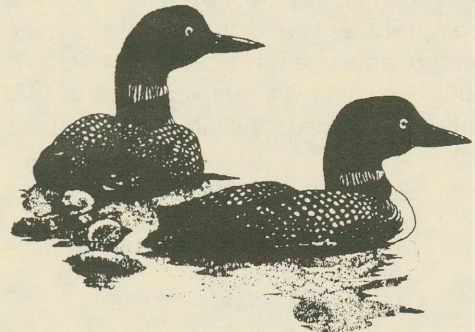
In general, we are responsible for assessing the status and trends of Maine's wildlife populations and habitats. We design management plans and play a major role in developing harvest recommendations, habitat conservation strategies, and Endangered and Threatened species listing criteria. We serve as the Department's wildlife species specialists and are often called upon to provide professional input to the Commissioner and his Advisory Council, the Legislature, and other entities. We also conduct research and collaborate with university wildlife research efforts.

This past year, our major commitment was to continue to support the wildlife planning process by writing species assessments and participating in the public working group process. **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.

Also, several management systems were completed or started. **Management systems** document how the Department will meet species' goals and objectives recommended by the public working groups; outlines how data will be collected, analyzed, and interpreted; and describes what management actions will be recommended under various scenarios. Management systems are crafted by WRAS staff and are reviewed and approved by all Wildlife Division staff.

Although a large portion of our time was dedicated to species planning, 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.

You might ask, "Where does the money come from to support this work?" A large portion of the funds comes from the sale of hunting licenses and permits. Some of these funds are used as match to obtain federal Pittman-Robertson funds, which are derived from excise taxes on sporting firearms, hand guns, ammunition, and archery equipment. Other sources of money include federal Section 6 funds, Federal State Wildlife Grants (SWG), the Oil Spill Conveyance Fund, contributions to the Nongame and Endangered Wildlife Fund ("Chickadee Checkoff"), and purchases of Loon Conservation Registration Plates.



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.

Our obvious need is a stable and adequate source of funding. The State of Missouri's natural resource agency faced a similar need. In their case, the citizens of Missouri became convinced that the state's fish and wildlife resources are the responsibility and for the benefit of all of the state's citizens. Consequently, Missouri chose to earmark one-eighth of one percent of their sales tax to help conserve their forests, fish, and wildlife. This has allowed Missouri's natural resource divisions to become some of the most dynamic and responsive agencies in the country. Do you think this approach could work for Maine?

--George J. Matula, Jr.
Supervisor, Wildlife Resource Assessment Section

MAMMAL GROUP

The Mammal Group is one of 4 groups in the Wildlife Resource Assessment Section (WRAS), based out of the Bangor Office. We develop and oversee implementation of all management systems for Maine's mammals; address public and Departmental information needs through the development of research programs, monitoring protocols, species assessments, and public presentations; and assist in the formulation of harvest regulations by analyzing biological data (as stipulated by management systems), meeting with regional biologists, and making recommendations to upper administration. We work closely with the E/T Group in WRAS in developing research and monitoring programs for all mammals considered rare, Threatened, or Endangered, and provide technical assistance to other groups or divisions in the Department.

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.

Gerry Lavigne, Wildlife Biologist – Oversees white-tailed deer management, data collection, data analysis, serves as Departmental spokesperson on white-tailed deer issues, and is the lead biologist on issues concerning chronic wasting disease (CWD).

Jennifer Vashon, Wildlife Biologist – Coordinates and supervises the bear and lynx research programs, oversees bear management and data analysis, and serves as Departmental spokesperson on lynx and bear issues. Jen is the newest member of our permanent staff in the Mammal Group. Prior to accepting the position vacated by Craig McLaughlin, she coordinated lynx research activities for 4 years, and worked on our bear crew for a number of years. Jen is an experienced bear biologist and received her Master's degree studying black bears. We are very pleased to welcome her on board!

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

2002-03 Contract Workers & Volunteers – Contract Workers: Shannon Crowley – lynx and bear projects; Sky Dhali – bear, deer, bobcat, and moose projects; Kendall Marden – bear project and CWD sample collection; Lanea Naylor-Murphy, Kristen Parks, and Nathan Webb – bear project; Shevenell Mullen, Holly Shepley, Jenny Sika, and Chris West – lynx project. Volunteers: Annelie Crook, Dave Marancik – bear project; Dana Smith – large canid tracking.

Black Bear

2002 Bear Season

The general hunting season for black bear in 2002 opened August 26 and closed November 30. 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 26 through September 21. The hound season overlapped the bait season, opening September 9 and closing November 1. The bear trapping season opened September 1 and closed October 31.

The 2002 harvest of 3,512 bears fell short of the 2001 harvest of 3,903 bears, but it is consistent with recent harvest levels (the 1999 bear harvest was 3,483 and in 2000 it was 3,951). Hunters have clearly benefited from Maine's large bear population, conservatively estimated at 23,000 animals. Most of the bears were taken early in the season, with 3,003 bears (86%) harvested before the end of September. Of these, 2,683 were taken over bait and 375 bears were taken by hound hunters (Table 1). The large number of deer hunters afield during November only managed to kill 264 bears, despite the availability of beechnuts. Beechnut availability usually increases deer hunter success in harvesting bears every other year. Heavy beechnut crops, in alternate years, provide an abundant food source for bears, which delays their entry into dens. The late deer season framework, combined with an early onset of winter snows in the North Woods, likely reduced the late season harvest of bears in 2002, compared to most falls with heavy beechnut crops.

Table 1. Bear harvest in Maine in 2002 by Wildlife Management District (WMD). The harvest is categorized by method of take, residency, and by guided hunts.

WMD	Method of Take					Total Harvest in District	Archery	Assisted by		
	Hunting with bait	Hunting with dogs	Trapping	Other	Unknown			Guide	Residents	Nonresidents
1	254	6	1	20	2	283	26	252	23	260
2	174	4	3	9	4	194	22	179	15	179
3	165	14	3	21	2	205	23	141	59	146
4	243	2	1	16	5	267	15	217	33	234
5	223	16	6	10	5	260	18	228	25	235
6	223	19	4	24	1	271	32	201	61	210
7	85	31	5	14	0	135	10	91	43	92
8	150	52	24	23	5	254	12	173	74	180
9	99	1	3	20	0	123	18	71	32	91
10	170	8	3	7	1	189	19	162	26	163
11	268	54	5	36	4	367	23	255	77	290
12	50	46	5	5	2	108	15	43	57	51
13	32	23	9	11	1	76	5	50	23	53
14	77	20	4	11	0	112	7	75	34	78
15	12	5	2	9	1	29	2	8	17	12
16	2	0	0	1	0	3	1	0	3	0
17	16	8	3	13	0	40	0	5	27	13
18	151	8	2	23	1	185	10	100	71	114
19	133	29	0	17	2	181	22	132	44	137
20	5	0	0	1	2	8	1	1	5	3
21	3	0	0	1	1	5	0	3	1	4
23	5	5	0	3	0	13	1	9	5	8
26	16	0	0	2	0	18	3	2	16	2
27	28	6	1	7	1	43	2	11	32	11
28	75	17	4	8	0	104	7	60	44	60
29	24	1	7	7	0	39	3	18	23	16
State	2,683	375	95	319	40	3,512	297	2,487	870	2,642

Bear harvests increased through the 1990's despite relatively constant bear hunter numbers (10,000 to 11,000 hunters; Table 2). This increase appears to be associated with bear population growth, which was promoted by conservative season lengths instituted in the 1990s. Success rates for bear hunters prior to the deer season increased from 15.4% (1990 to 1993) to 25.5% (1998 to 2002).

Following Ontario's loss of their spring hunt in 1999, Maine bear hunter numbers increased by 15% to nearly 13,000 in 2000 and continued to increase to just over 15,000 in 2002. Residents and nonresidents are equally represented among bear hunters in recent years. The heavy harvests posted since 1999 is likely to have stabilized bear numbers and the bear population should remain at approximately 23,000 bears in the spring of 2003.

Geographic Distribution of the Harvest

Bears were harvested in 26 Wildlife Management Districts (WMDs; Fig. 2). No bears were taken in WMDs 22, 24, 25 and 30. The density of harvest expressed as the number of bears killed per 10 square miles of habitat (forested land) was greatest in WMD 3 at 2.5 bears/10 mi² followed closely by WMDs 11, 6, and 10 with 2.3 bears/10 mi². An average of 2.1 bears/10 mi² were harvested from forestland in WMD 1, and in all other WMDs, hunters harvested less than 1.7 bears/10 mi² (statewide average of 1.3/10 mi²).

Table 2. Hunter effort and harvest level 1990 - 2002.

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

Residence of Successful Hunters

Maine's reputation for producing high-quality bear hunting is reflected in the harvest distribution by hunter residency (Table 1). Visitors to Maine killed 2,642 bears (75%) of the 3,512 bears tagged during 2002. Visitors took most of their bears over bait or with the aid of hounds. Nonresident hunters accounted for only 43 % of bears killed by unreported means (most of these bears are taken without the aid of hounds or bait and during deer season). Maine trappers accounted for most of the trapped bears (77%). The number of bears trapped each year (95 in 2002) remains a small fraction of the total harvest. Maine is the only state that offers people an opportunity to take a black bear by trapping, and the number of nonresidents that come to Maine to experience this thrill has increased in recent years.

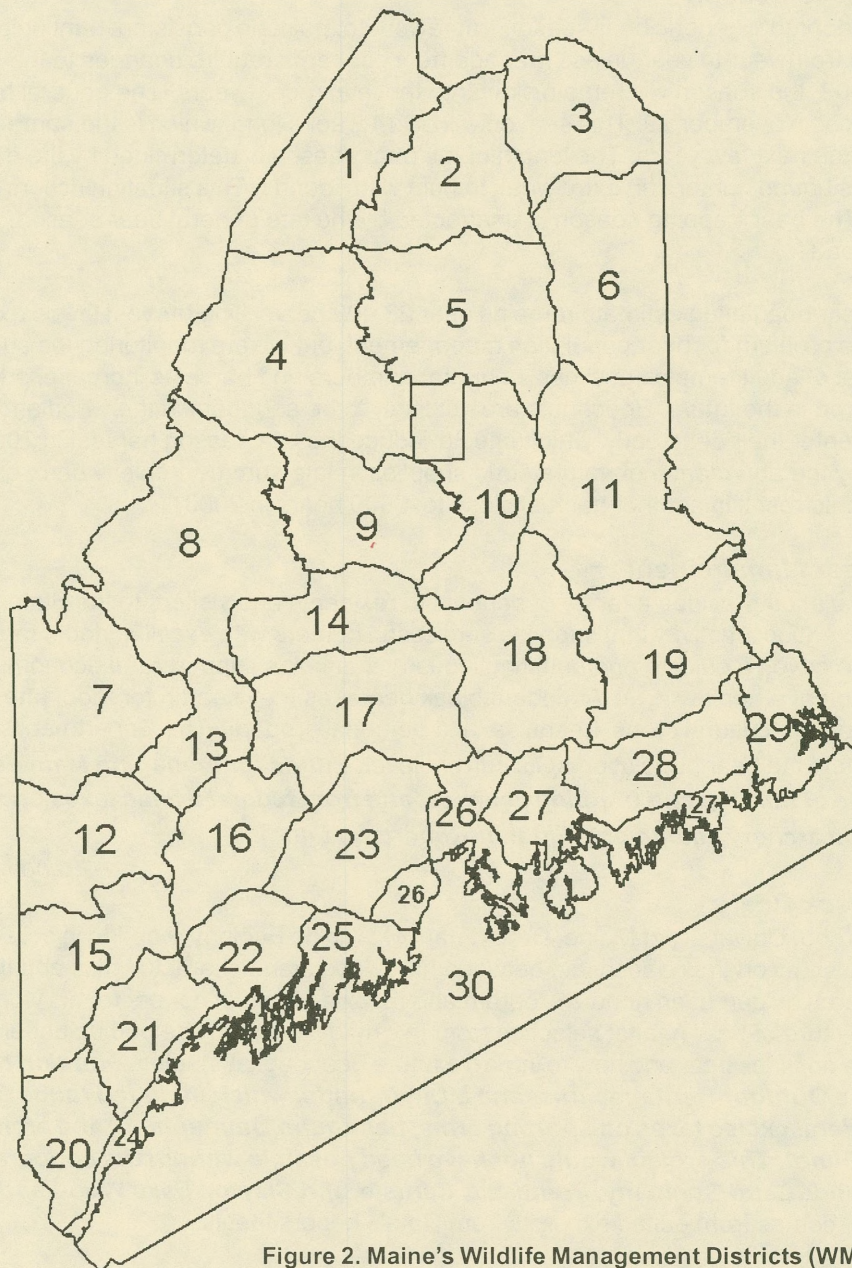


Figure 2. Maine's Wildlife Management Districts (WMDs)

Assistance by Registered Maine Guides

In 2002, guides helped take 79% of bears shot with hounds, 80% of the bears taken over bait, 31% of trapped bears, and 4 % of the bears for which method of take was unreported (mostly deer hunters). Guides assisted 2,487 residents and nonresidents with their successful hunts in 2002. Nonresident hunters using hounds are required to employ the assistance of a Maine Guide by law.

Sex and Age Distribution of the Harvest

Males made up 52% (1,894 bears) of the 2002 harvest, while females comprised 48% (1,599 bears) of the take. We are monitoring the female harvest rate closely as it approaches 50% of the total harvest, to make sure the bear population is not overexploited. Hunters registered 268 of these bears (8%) as cubs-of-the-year, which include 136 males and 132 females. Age and/or sex were not reported for an additional 19 bears. Our research indicates that the two most common registration errors concerning sex and age are males registered as females and yearlings (21-23 months old) registered as cubs. This affects only a small portion of the harvest, however, and likely remains consistent from year to year.

Prospects for the 2003 Season

The Department has adopted a generic bear season framework to maintain consistent hunting periods. The framework will remain unchanged from year to year unless management concerns require changes to the lengths of hunting or trapping periods. In 2003, the season will remain similar to those in recent years. The general bear hunting season will open August 25 and close November 29. This season will be 14 weeks long, which is the same as last year, but will return to 13 weeks for the next few years. The length of the bear season is determined by the date of Thanksgiving. A late Thanksgiving gives hound hunters an extra week to hunt with hounds. This situation occurs twice (consecutive years) every 7 years. The bear trapping season is unaffected by the late general bear season, and will run from September 1 to October 31.

Maine's spring 2003 bear population estimate remains near 23,000 bears. The harvest levels experienced since 1999 do not appear to pose a problem for bear population management, but we are monitoring the survival of adult female bears closely. If survival of adult females declines as hunter numbers and harvests increase, additional restrictions to harvests may be required in the future. Beechnuts are not likely to be abundant in the woodlands of Maine this fall. As a result, bears should enter their dens early, which should reduce the late season harvest in 2003. As usual, the bait harvest is influenced by the abundance of natural food supplies in late summer (chiefly berry crops). The current bear season framework should result in another harvest close to 4,000 bears in 2003.

Future Issues in Bear Management

Maine's large bear population provides a range of benefits to residents and visitors to the State. Our tradition of bear hunting is a healthy recreational activity that supplies successful hunters with excellent table fare and memories of good days afield. It also drives a guiding and outfitting industry that helps support rural economies and allows us to keep the bear population at a healthy level. Abundant black bears, as they search for food, often come into conflict with people by damaging agricultural crops, beehives, and personal property. The Department's goal, chosen with public input, is to maintain the bear population at its current level. ***Funds for managing Maine's black bears come primarily from the sale of hunting and trapping licenses, and from federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Randy Cross & Wally Jakubas

Beech Stands & Black Bears

In Spring 2003, Nate Webb, University of Maine, Department of Wildlife Ecology, working in collaboration with MDIFW biologists, completed a study on the relationship between hardwood stand characteristics and their use by black bears. Nate took on this research as part of an honors program and received highest honors for his work. Although it was difficult to get a clear picture of bear habitat selection from this study, the study helped us understand the limitations of our radiotelemetry data on black bear and how to improve future bear habitat studies. ***Funding for this project was provided by the Maine Outdoor Heritage Fund, and MDIFW funds, which included funds from hunting and trapping licenses; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund). This project would not have been possible without the cooperation of Irving Woodlands LLC, Seven Islands Land Company, Prentiss & Carlisle, and Clayton Lake Woodlands.*** The following description of the study comes from edited excerpts from Nate's honors thesis.

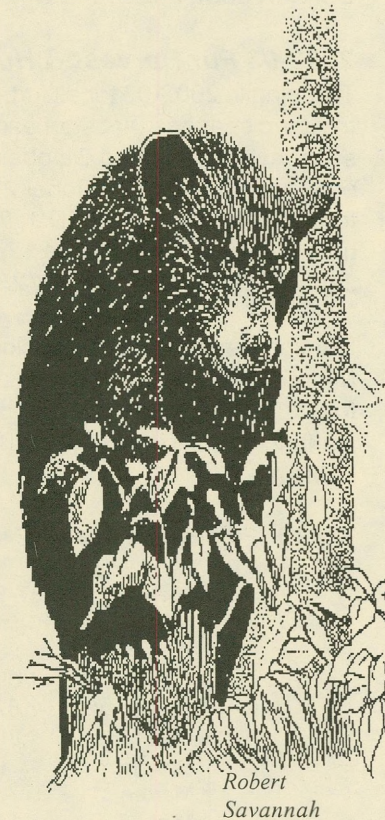
Nuts of the American beech (*Fagus grandifolia*) are an important fall and early spring food source for American black bears (*Ursus americanus*) in northern Maine. Field observations indicate beechnut production varies from high to low on alternate years and significantly influences bear behavior and reproduction. When beechnuts are abundant, bears delay denning to take advantage of the food source and heavily utilize mature hardwood stands. Few female bears produce offspring in years following a poor beechnut crop, and the synchrony of bear reproduction (bears in Maine tend to have cubs during the same years) in northern Maine has been correlated to fluctuating beechnut yields.

Changing forest practices, and the potential for widespread loss of beech trees due to the effects of beech bark disease, has raised concerns about the future of beech stands in Maine. Low market prices for beech lumber and pulp,

coupled with the disfiguring effects of beech bark disease, caused some forest landowners to selectively remove beech trees from hardwood stands in favor of more merchantable species such as sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and spruce (*Picea spp.*). Beech bark disease, which was introduced from Europe, has been shown to cause high levels of mortality in some beech stands and may have intensified in Maine over the past decade. Because beech trees do not produce significant quantities of nuts until 40-50 years of age, a widespread loss of mature trees in northern Maine would likely cause a substantial reduction in the total beechnut crop for several decades. Computer simulations suggest that a decline in beech productivity in northern Maine would result in a significant reduction of bear cub production. Such a drastic decline in recruitment would weaken the population's ability to withstand current levels of hunting pressure, and harvests would have to be reduced. Given the uncertain future of beech stands within the forests of northern Maine, it is important that biologists have the information needed to make recommendations to forest landowners that will maintain adequate distribution of beech on the landscape.

The objective of this study was to investigate the relationships between forest structure and habitat use by bears. Overstory composition (e.g., species making up the tree canopy), the abundance and size of beech trees, and understory structure (e.g., height of shrubs, woody debris, visual obscurity) were measured in 15 hardwood stands with high levels of use by bears and 15 hardwood stands with little use. Technicians sampled a total of 716 plots (22 to 28 per stand) during the two-month field season. Differences between high and low use hardwood stands were tested using 71 habitat variables, and a predictive model was developed to describe bear selection of hardwood stands. Only 3 of the 71 variables submitted for analysis exhibited differences between stands with high and low levels of documented use by bears. Total density of foods below the tree canopy, hazelnut density, and percent groundcover were greater in low use stands. Although correlations of bear use of hardwood stands and beech abundance appeared to be consistent with those suggested by previous researchers, no statistically significant differences between high and low use stands were detected.

Two assumptions of this study were that 1) radiocollared bears were representative of all bears in northern Maine, and more specifically, representative of all bears in the study area, and 2) the location dataset allowed us to determine the degree hardwood stands were being used by bears. MDIFW strives to monitor a minimum of 20 female bears in the Spectacle Pond study area, which is only a small portion of the number (~280 bears) that may exist there. Furthermore, although bears in Maine are not known to be territorial, large male bears frequently prey on smaller individuals, which could result larger bears keeping females and smaller males away from choice hardwood stands. Because only telemetry locations of female bears were used to delineate use, it is possible that stands used for foraging by dominant males were classified as low-use even though nut producing beech trees were common. If this were true, the misclassification of stands would make it futile to determine whether "high-" and "low-use" stands differed from each other by their vegetative characteristics.



The frequency of radiotelemetry relocations restricted the degree to which inferences could be made about bear habitat use. Research bears were located at least once per week from 1982-1990, but only once monthly from 1991-2001. Given this level of sampling intensity, it is possible that hardwood stands with high levels of use by bears - both monitored and unmonitored - went undetected and were erroneously classified as low-use. In addition, it is unlikely bears select foraging areas based only on the habitat characteristics of individual forest stands. Rather, it is more likely that bears base their habitat selection on a broader scale and take into account what the overall landscape provides in term of food, water, cover, and space. All bear locations were recorded from a fixed-wing aircraft, resulting in a telemetry database that is comprised exclusively of locations during daylight hours and good weather conditions. Although bears feed intensively during fall and generally make small daily movements, many of these locations may have been resting sites that were chosen outside of stands used for foraging. In several instances, Nate noted that high-use stands with low abundance of beech existed in close proximity to stands dominated by beech. Given infrequent telemetry flights, telemetry error, and movements of bears that are unrelated to foraging, it is possible that feeding activity was actually focused in stands near to (and not in) those classified as high use, and that bears were located often in some stands primarily due to their proximity to beech in other stands. Future work on bear habitat relationships will require monitoring bears with greater frequency (e.g., using the technology of Global Positioning System [GPS] collars) and focusing on habitat use by individual bears, rather than comparing hardwood stands we suspect have different intensities of use by bears.

--Wally Jakubas & Nate Webb

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

2002-03 Fur Harvest & Hunting Seasons

Trapping in 2002-03 for all furbearers except beaver began November 3 and ran through December 31. Maine has two trapping seasons that start earlier than the general trapping season. These are the early fox and coyote trapping season, which started October 20 and ran through November 2, and the early muskrat season (WMDs 1-6, and 9-11 only), which opened October 27 and closed November 2 (Figure 2). Last year's beaver season ran from November 1 through March 31 in WMD 1; from December 1 through March 31 in WMDs 2-11, 13, 14, 18, and 19; from December 1 until February 28 in WMDs 12, 15, 16, 17, and 23; from December 15 until February 28 in WMDs 25-30; and from January 1 through February 28 in WMDs 20-22, and 24.

Hunting Seasons were as follows: October 1 through December 31 for raccoon and gray squirrel, October 1 through March 31 for cottontail and snowshoe hare (except on Vinalhaven [Oct. 1 - Feb. 28]), October 21 through December 31 for skunk and opossum, October 21 through February 28 for fox, and December 1 through January 31 for bobcat. Hunting was allowed year-round for coyote, woodchuck, porcupine, and red squirrel. All Sundays are closed to hunting in Maine.

Table 3. Furbearer harvest in Maine, Fall 1997 to Spring 2003

Species	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03
Beaver	10,547	10,482	9,850	9,803	11,757	7,809
Bobcat	205	150	194	308	269	331
Coyote	1,894	1,915	1,823	1,977	2,741	2,287
Fisher	2,827	1,807	2,578	2,028	3,117	2,630
Red Fox	1,894	1,539	1,248	1,272	2,056	1,469
Grey Fox	92	75	82	89	164	172
Marten	5,736	2,160	4,396	1,832	5,529	2,908
Mink	1,177	1,519	1,545	1,606	2,031	935
Otter	876	838	737	943	1,103	803

Compared to previous years, Maine's 2002-2003 fur harvest was markedly lower for species associated with wetlands, but remained high for upland species (Table 3). Early ice-up, overflows, and thick ice all made late fall and winter trapping difficult for the wetland trapper. High snowshoe hare populations in many regions of the state provided an abundant prey base for a number of upland furbearers and kept their populations strong.



Beaver

The 2002–2003 beaver harvest was the lowest since the 1995–1996 season, with 7,809 beaver taken. Pelt prices for beaver remained relatively weak (Table 4). The beaver population in Maine is likely stable or increasing. As always, the challenge in managing beaver is to keep damage to roadways and property to a minimum, while maintaining a healthy beaver population whose dam building activities benefit many wetland species. The upcoming year will be a challenge to the Department and landowners, because the Department's animal damage control (ADC) budget was cut last year due to the state's budget shortfall. Hopefully, the public's ADC needs will be reduced by longer beaver trapping seasons in 2003–2004, and through the work of federal Wildlife Services' agents and private contractors.

Table 4. Average pelt price offered for Maine furs over the last 6 trapping seasons. All prices over \$5 are rounded to the nearest dollar.

Species	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03
Beaver	\$23.00	\$13.00	\$15.00	\$19.00	\$18.00	\$14.00
Bobcat	35.00	28.00	30.00	N/A	30.00	61.00
Coyote	17.00	9.00	12.00	14.00	13.00	20.00
Fisher:						
(Female)	34.00	22.00	15.00	16.00	20.00	23.00
(Male)	25.00	21.00	15.00	16.00	20.00	24.00
Fox, Gray	11.00	7.00	8.00	8.00	10.00	10.00
Fox, Red	17.00	110.00	14.00	15.00	16.00	24.00
Mink:						
(Female)	9.00	6.00	8.00	8.00	9.00	6.00
(Male)	15.00	10.00	13.00	12.00	12.00	10.00
Muskrat	2.88	1.18	1.65	2.27	2.29	2.64
Otter	43.00	32.00	36.00	49.00	41.00	51.00
Pine Marten	23.00	13.00	17.00	17.00	16.00	18.00
Raccoon	14.00	7.00	4.00	8.00	9.00	9.00
Skunk	2.25	2.75	2.50	2.67	3.50	2.33
Weasel	1.75	1.50	1.81	2.33	2.43	1.97

Currently, the Department is proposing lengthening the beaver season to address animal damage control problems with beavers and concerns expressed by fisheries biologists on the effect high densities of beaver are having on brook trout. The proposed season would run from November 1 through April 30 for WMDs 1, 2, 4, and 5; from December 1 through April 30 for WMDs 3, 6, 9, 10, and 11; from December 1 through April 15 for WMDs 18, 19, 28, and 29; from December 1 through March 31 for WMDs 7, 8, 13, and 14; December 1 through February 28 for WMDs 12, 15–17, and 23; December 15 through February 28 for WMDs 25–27, and 30; and January 1 through February 28 for WMDs 20–22 and 24.

Bobcat

The number of bobcat harvested during the 2002–2003 trapping and hunting seasons (Table 3) exceeded the upper harvest limit (275) called for in the bobcat management system. A number of factors contributed to the high harvest, including a strong bobcat population. Early snows for tracking, high prices for bobcat pelts (Table 4), and a healthy bobcat population, likely made bobcat a tempting target for trappers and hunters last year. Usually bobcat are not targeted by trappers but are caught incidentally when traps are set for other upland furbearers. However, during the 2002–2003 season, upland trappers enjoyed a high success rate for trapping bobcat with 23% of them catching cats. Hound hunters enjoyed favorable snow conditions for tracking and running cats for most of early winter.

One reason for the strong bobcat population going into last season was high snowshoe hare densities in many regions of the state. Currently, snowshoe hare habitat is considered near optimum (2002 Snowshoe Hare Assessment). These optimum habitat conditions resulted from clearcuts made during and after the spruce budworm epidemic, which started in 1975. These clearcuts have now regenerated into thick stands of conifers and hardwoods, creating ideal habitat conditions for snowshoe hare.

Heavy snows in February and March, and the high bobcat harvest, limited our management recommendations for the 2003–2004 season to either shortening the hunting season on bobcat or maintaining the status quo. Because our biological information indicated that the bobcat population was likely doing well, and we had numerous reports of abundant cats from hunters and trappers, our recommendation to the Advisory Council was to maintain the current season structure.

Coyote

A total of 2,287 coyote pelts were tagged (Table 3), with 319 animals snared. The total coyote harvest was down from last year, and considerably fewer coyotes were snared.

Fisher

Fisher harvest and trapping success rates continue to be high. From 1993 – 2002, there has been a significant increase in the statewide harvest. Harvest rates for fisher, like marten, fluctuate every other year, with even years producing the lowest harvest rates. This year's harvest was the highest harvest recorded for an even year since we began tagging fisher pelts.

Red and Grey Fox

Red fox harvest rates dropped to more normal levels this past year; however, their southern cousin, the grey fox, continues to be harvested in good numbers relative to other years (Table 3). The grey fox harvest surpassed last year's harvest, which was the highest harvest since the 1985-1986 season.

Marten

Marten harvest rates fluctuate considerably each year, with high harvest rates occurring during odd numbered years when beechnut crops are poor, and low harvest rates coinciding with good beechnut crops or even numbered years. In 2002, the marten harvest dropped, as expected, from last year's harvest of 5,529 marten (Table 3); however, the 2002 harvest was the highest even-year harvest since the 25 marten limit / person was instituted in 1990. Looking at even and odd year harvest rates separately, it appears that the marten harvest has been stable the past five years. Pelt prices for marten were slightly higher this year (Table 4).

Mink

Poor trapping conditions really hurt the 2002 mink harvest. Harvest rates were the lowest since mink were first tagged in 1981 (Table 3). Pelt prices for mink offered little additional incentive to trappers for harvesting the species (Table 4).

Otter

Like this year's beaver harvest, the otter harvest declined considerably, and was the lowest otter harvest since 1995 (Table 3). The low harvest occurred in spite of a jump in otter pelt prices (Table 4). Generally, the otter harvest tracks the beaver harvest, with a fair number of otter being taken incidentally by beaver trappers.

--Wally Jakubas

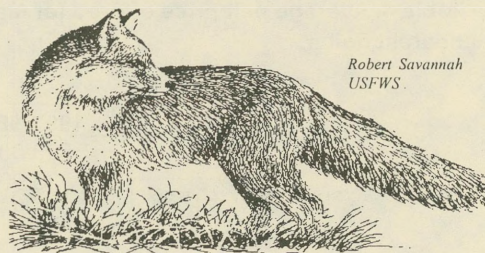
Research and Monitoring

Coyote/Wolf

In the winter of 2000-2001, Maine's Department of Inland Fisheries and Wildlife (MDIFW) undertook a genetic study to clarify whether Maine's coyotes are true coyotes or coyote/wolf hybrids, and to determine whether our coyotes can be distinguished from eastern Canadian wolves. Cooperating in this effort is Dr. Paul Wilson, Trent University, who is one of the leading experts on wolf genetics. Information from this research will help our Department better understand how to approach enforcement issues concerning the incidental killing of wolves by trappers or snarers, and may give insight into the behavior of our coyotes (e.g., their reliance on deer, their potential for preying on moose, and pack formation). At the same time, this research will be an essential step in determining whether it is feasible or desirable to recover wolves in Maine and the rest of the Northeast. I expect the final report to be submitted to the Maine Outdoor Heritage fund this summer, and submit a draft for scientific publication by this fall.

Preliminary results indicate that coyotes in Maine may be grouped into three categories. Most of Maine's coyotes appear to be similar to eastern coyotes found in New Brunswick and New York. Previous, research on coyotes from New Brunswick and New York, by Dr. Wilson, indicates the presence of genes that are frequently found in wolves from eastern Canada. The second group of coyotes appears to have a genetic make-up similar to western coyotes. This group only made up a small proportion of coyotes collected in our sample. The third group appears to be similar to animals commonly referred to as tweed wolves in Canada. Again, this group of coyotes only made up a small proportion of our sample. Tweed wolves are technically considered eastern coyotes, but have more wolf-like characteristics than the average coyote.

Of particular interest was the high percentage of wolf genes (markers) found in a 27-pound "coyote" collected for the study. We documented four other cases of coyote-like animals having high amounts of wolf ancestry that were collected by other researchers in Canada. These findings raise numerous policy issues regarding the management of



endangered species in areas where hybridization occurs, and questions on the limitation of genetic markers for distinguishing species in hybrid zones. **Funds for this research came primarily from the Outdoor Heritage Fund; hunting and trapping licenses; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund); and funds from Loon Conservation Plate funds.**

-- Wally Jakubas

Trapping - Best Management Practices

The Best Management Practices (BMP) for trapping eastern coyote was published and distributed in the Spring of 2003. The Department is working with the Maine Trappers Association to make this booklet available to all interested parties. If you are interested in a copy, please contact your regional biologist or our Information and Education Department in Augusta (207) 287-8000.

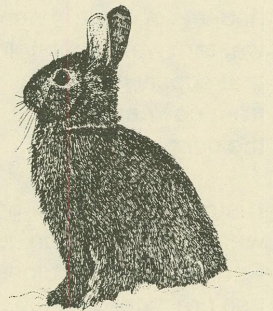
Maine was asked whether we would be interested in participating in a new BMP study for fisher. After consulting with some members of the Maine Trappers Association, we decided to decline for this year. Most BMP studies in the United States focus on testing restraining traps. However, in Maine, most fisher are trapped using conibears, which of course, are killing traps. Because of the late request by the International Association of Fish and Wildlife Agencies for Maine to participate in this study, and the lack of its applicability to Maine's trappers, we decided not to participate until we could have adequate time to discuss the study with Maine trappers.

--Wally Jakubas

New England Cottontail

The New England cottontail reaches the northern limit of its range in southern Maine. It has become a rare animal in New England, and the US Fish and Wildlife Service is being petitioned to list it as an Endangered species. New England cottontails live in brushy, scrubby areas that result from fire, forest cuttings, or farmlands being abandoned. Such areas are becoming rare in southern Maine. This habitat was abundant 50 years ago, but most of these areas are now mature forests or have been developed. The remaining habitat that is suitable for cottontail is highly fragmented, which makes it difficult for rabbits to disperse to other areas to find mates or new food sources. New England cottontail numbers, like those of other animals, are closely tied to the amount of habitat they have to live in. When habitat conditions were excellent during the first half of this century, cottontail populations expanded. With the loss of shrubby habitat in recent years, the population of cottontails has declined.

A shortage of suitable habitat is not the only challenge New England cottontails face. In most of their range, they compete with the eastern cottontail, which was introduced into southern New England early in the century. Eastern cottontails use a wider variety of habitats and are better adapted to living in suburban areas.



New England Cottontail Research

A cooperative Master's project between MDIFW and Dr. John Litvaitis, University of New Hampshire, was started in the Fall of 1999. The objectives of this project were to (1) determine the current distribution of New England cottontails in Maine using snowtrack, fecal pellet, and live trapping surveys; (2) characterize the attributes of sites occupied by New England cottontails in Maine; and (3) develop a monitoring protocol capable of detecting status changes of New England cottontails in Maine. This study was completed and a final report was submitted to Maine's Outdoor Heritage Fund, who helped fund the study. In addition, we published a portion of the study's results in the Canadian Journal of Zoology 81:877-887.

Currently, Dr. Litvaitis has contracted with the Department to write a species assessment for New England cottontail this summer. Completion of this document will allow us to enter a public planning process during which the public will set management goals for the species. Having a clear set of management goals for New England cottontail is critical at this time, since the species is on the verge of being listed as either a Threatened or Endangered species by the U.S. Fish and Wildlife Service. Maine is one of the last strongholds for the species, and how we decide to manage for this species will have large bearing on its welfare. **Funds for the New England cottontail research were provided by a Maine Outdoor Heritage Fund grant; MDIFW funds, which includes funds from hunting and trapping licenses; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund); and funds from the University of New Hampshire.**

-- Wally Jakubas

Canada Lynx

Lynx, one of seven cat species in North America, occur primarily in Canada and Alaska. Maine is one of only four states in the "Lower-48" to currently support a lynx population; however, historically, lynx occurred in 10 additional states. Within the historical range of lynx, surveys are being conducted to determine where lynx occur. Where lynx are found, research is being conducted to better understand the needs of lynx at the southern edge of their range.

We have monitored 32 lynx in northern Maine by equipping them with radiocollars, which supplies us with valuable information on the habitats that are important to lynx for foraging, producing kittens and raising their young; mortality factors; and we have documented other lynx movements. In addition, we have been able to gather information on prey abundance, and developed a technique for using snow track surveys to detect lynx in other areas of the state.

The Canada lynx has long been a rare carnivore in northern and western Maine. Until recently, its status was largely unknown and was based on anecdotal reports, an occasional animal caught in a trap or snare, or a track in the snow. 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 tail, and tawny-gray fur. However, the lynx has noticeably larger paws, longer legs, and tends to be a little lighter in weight than the bobcat. Lynx are associated with boreal environments (northern forests). The numbers and distribution of their primary prey, snowshoe hare, largely dictate their population's location and growth rate. Lynx are capable of moving extremely long distances in search of food or to establish new home ranges.

The USFWS listed the lynx as Threatened under the federal Endangered Species Act in 14 of the lower 48 states, including Maine. Maine, Washington, and Montana are the only states, outside of Alaska, where lynx currently have resident populations. Recent information suggests Minnesota may also have a resident lynx population. Reasons given for listing the lynx are complex and include range restrictions and habitat concerns. In some western states, lynx are associated with old growth forests at high altitudes, which are being cut for timber. Because these are high profile habitats of environmental concern, environmental groups are advocating greater restrictions on land-use to protect western lynx habitat. In the East, lynx occur on large tracts of woodlands, including areas of young regenerating forests that supply habitat for snowshoe hares. Maine's lynx are found across the northern part of the state, with a few reports from downeast Maine. Lynx are rarely encountered by the public, and we are just beginning to understand the status of the population.

Historical records suggest lynx have persisted in low numbers in Maine throughout the past century. They apparently were more common during the 1800s, according to fur trapping records. Although lynx may have lived as far south as Pennsylvania in colonial times, Maine is currently at the southern edge of the species' range in the east. Current land use practices on industrial forestlands in northern Maine, which include areas of regenerating clearcut stands that are prime snowshoe hare habitat, appear to be beneficial for lynx.

The Department has conducted track surveys each winter since 1994 to detect lynx and other furbearers. During the winter of 2003, we began a comprehensive track survey for detecting lynx in the Northwestern Ecoregion (north of Moosehead and west of Ashland). Sixteen townships were surveyed, and lynx tracks were detected in 14. This winter, we intend to survey townships to the east (eastern Aroostook county).

MDIFW began a field study of lynx in January 1999 in partnership with the USFWS, several nongovernmental conservation organizations, and the paper industry, including industrial forest landowners in northern Maine. Early field efforts began near the Maine-Quebec border close to St. Pamphile, but little lynx sign was observed. The study was moved to a four-township area near the Musquacook Lakes, and since March 1999, we have captured 93 lynx, including 32 adults and subadults that were fitted with radiocollars.

Although lynx are known to be long-distance dispersers capable of traveling hundreds of miles before establishing home ranges as adults, only three of the radiocollared lynx have made extensive movements. We estimated the area needed by lynx to carry out their daily activities to be 19 mi² for females and 35 mi² for males.

Lynx face a variety of mortality factors, with females having a lower survival rate than males. Fourteen collared lynx and one uncollared juvenile have died during the study. Although these mortalities are still under investigation, it appears as if another predator killed five lynx, five starved to death, four died of unknown causes, and another was illegally taken.

Radiocollared lynx have been found chiefly in young, regenerating forest stands that provide cover, as well as food in the form of snowshoe hares. Female lynx establish dens to protect the kittens they produce in mid May, and by mid June, the kittens have grown large enough for us to examine safely. Over the last five springs, we have located 23 dens and

handled 63 kittens. Litters ranged from 1 to 5 kittens and averaged 2.7 kittens per litter. The newborn kittens are too small to carry radio collars, but 62 of them have been marked with numbered eartags. If adequate funding is obtained, the study will continue for the next 1 to 5 years. ***This work is supported by federal Section 6 funds, federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), hunting and trapping license revenues, the Maine Outdoor Heritage Fund, Loon Conservation Plate funds, the National Fish and Wildlife Foundation, the National Council of the Paper Industry for Air and Stream Improvement, the Wildlife Conservation Society, Davis Conservation Foundation, Sweet Water Trust, Wilma K. Wilensky, Lynx System Developers, Defenders of Wildlife, Clayton Lake Woodlands, Irving Woodland, LLC, International Paper, and Seven Islands Land Co.***

--Jennifer Vashon

Wolves

Wolves are listed as a federal Endangered species in Maine. Although wolves have been extirpated in the state since the early 1900s, recent occurrences in 1993 and 1996 suggest that occasional animals may be dispersing into the state or that wolves are being illegally released into the wild. The nearest wolf population is in Quebec, only 75 miles from the Maine border. MDIFW maintains contact with state, provincial, federal, and non-governmental biologists to stay current with issues surrounding wolves in the Northeast.

The U.S. Fish and Wildlife Service (USFWS) recently proposed to change the status of wolves from Endangered to Threatened in the northern Rocky Mountains and western Great Lake states. In addition, the USFWS is proposing to remove gray wolves in the western and eastern United States from the Endangered and Threatened species list altogether, once the Service determines that all recovery criteria for wolf populations in those areas have been met and sufficient protection remains in place to ensure sustainable populations.

The USFWS manages wolves in three "Distinct Population Segments" (DPS) in the lower 48 states, which encompass the historic range of the gray wolf and where wolf recovery is currently ongoing. The Eastern DPS includes all Northeastern states and wolf populations in Minnesota, Wisconsin, and Michigan. One point of dispute between the USFWS and wolf advocates is whether the states in the Northeast should be designated as a separate DPS. People have questioned whether the distance between wolf populations in the Great Lake States and the Northeast is large enough to merit a separate DPS, and whether wolves in the Great Lake States are even the same species that historically occurred in the Northeast. Currently, many wolves in eastern Canada are not considered gray wolves but a different species that has closer ancestral ties to the red wolf. The USFWS defends its designation by pointing out that they do not know of a wolf population in the Northeast, so there is nothing to designate. This argument has implications for Maine in that if wolves are found in Maine, the USFWS may be forced to reconsider their DPS designations and whether or not wolves in the Northeast can be downlisted.

A lack of funds from the federal endangered species program for wolves in 2002 kept our large canid investigations to a minimum. However, volunteers and non-governmental organizations were very active this past year looking for wolf sign in Maine, in part, because of the implications a find would have on the USFWS delisting procedures. MDIFW is always interested in whether or not we have wolves in Maine because of management and law enforcement implications associated with the arrival of wolves. One volunteer, Dana Smith, spent 23 days looking for wolf sign; logging over 2,200 miles in the field riding on snowmobiles, in trucks, and walking on foot. In addition, the National Wildlife Federation hired a retired wildlife biologist from Michigan to help follow up on possible wolf sightings. The National Wildlife Federation has submitted some scat samples for DNA analysis, but as of yet, no wolves have been found in Maine. ***Funds for administering wolf monitoring activity in Maine come primarily from hunting and trapping licenses; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund); and funds from Loon Conservation Plate funds.***

--Wally Jakubas

Deer

2002 Deer Harvest

Season Dates and Structure

Maine hunters could pursue white-tailed deer for 85 days within five separate hunting seasons during 2002. From September 7 to December 14, bowhunters could harvest 2 deer of either-sex during the expanded archery season. This limited area hunt encompassed WMDs 24 and 30 (Figure 2) and 8 other predominantly urban locations in central and southern Maine. The regular (statewide) archery season took place between October 3 and November 1 (26 days); deer of either-sex were legal quarry. October 26, 2002 marked our first youth deer-hunting day. Hunters must be 10 to 15 years old to be eligible to participate in this statewide either-sex deer hunt. The regular firearms season, which began for Maine residents on November 2, and for all hunters on the following Monday (November 4), ended on November 30 (25 days). Black powder enthusiasts had 6 days (December 2-7) to hunt whitetails in eastern, western, and northern WMDs. Elsewhere; the special muzzleloader season spanned a total of 12 days (December 2-13).

Regardless of season, deer could not be hunted on Sunday. The limit on deer was one per hunter per year for the statewide archery, regular firearms, special muzzleloader seasons, and youth hunt combined. The two-deer limit during the expanded archery season was separate from other deer seasons. During the regular firearms and special muzzleloader seasons, hunters could harvest a buck (a deer with antlers three or more inches in length) anywhere in Maine. Hunters who drew an any-deer permit could choose to take a doe or a fawn instead, but only in the WMD designated on the permit.

Doe Quotas, Any-Deer Permits, and Applicants

Each year, we estimate how many does would need to be harvested to achieve deer population objectives in each WMD. Termed doe quotas, these desired doe harvests are calculated prior to the deer season. They include the cumulative harvest of all does older than fawn from each deer hunting season. Since hunters are free to select 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. The opposite situation prevails following severe winters. During 2002, doe quotas in eastern, western, and northern WMDs were kept very conservative to allow deer populations to rebuild after losses sustained a year earlier. In contrast, more liberal quotas were set in central and southern Maine WMDs to stabilize or begin reducing deer populations following the very mild 2002 winter.

During 2002, doe quotas ranged from zero in 8 WMDs (districts 1 - 6, 19, and 28) to 2,138 in WMD 23. Among the 22 WMDs in which a doe harvest was desired, the doe quota tallied 10,712. 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 6,400 fawns (both sexes) during the 2002 deer seasons.

Generally, 3 to 8 any-deer permits must be issued to achieve a registered harvest of one adult doe. Some any-deer permittees may choose to take a buck or a fawn instead, 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 maintain herd size) are allocated considerably more any-deer permits (central, southern, and coastal WMDs). Finally, the number of does taken in our archery and youth hunts count against doe quotas. This tends to reduce the number of any-deer permits that can be issued to firearms hunters, in order to meet adult doe quotas.

As deer populations 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.

Any-deer and bonus permits are allocated to qualified applicants in a random computer lottery. Both the application and the permits are free. During 2002, we issued 66,985 any-deer and 10,004 bonus any-deer permits (WMDs 22 - 26, and 30). Combined, these 76,989 permits represent a 42% increase in antlerless deer hunting opportunity, compared to 2001 (54,406 permits). Permit allocations ranged from zero in the 6 WMDs with a zero doe quota, to 18,193 permits in WMD 23. The top 5 WMDs receiving any-deer permits on a per 100 square mile basis were: WMD 23 (1,992 permits per 100 sq. mi.), WMD 22 (1,334 permits), WMD 24 (1,232 permits), WMD 21 (1,084 permits), and WMD 17 (1,004 permits). Maine residents drew 70,266 permits (91%) and nonresidents drew the remaining 6,723 any-deer permits (9%). A total of 9,636 any-deer permits (13%) were awarded to qualifying landowners in a separate, early computer lottery. It is worth noting that only about one-half of our resident deer hunters, and less than 40 % of our nonresident hunters apply for an any-deer permit each year.

Statewide Statistics for 2002

Overall, 38,153 deer were registered during 2002, of which 1,428, 601, 553, 34,533, and 1,038 were taken during the expanded archery, regular archery, youth day, regular firearms, and muzzleloader seasons, respectively (Table 5). This was the 10th highest deer harvest on record for Maine, the highest since 1968 (41,080 deer), and it represents a 37% increase over the 2001 deer harvest (27,769). All-time harvest records were established during 2002 in 4 central-southern Maine counties: Cumberland, Kennebec, Sagadahoc, and Waldo. Three additional counties tallied deer harvests that were very close to all-time highs: Androscoggin, Knox, and Somerset. Deer harvests improved in all corners of the state, compared to 2001. Reasons for the outstanding deer harvest we experienced in 2002 include excellent carry-over from the very mild 2002 winter, conservative harvests in 2001, favorable hunting conditions (cool weather and tracking snow) in November, a record-high allocation of any-deer and bonus permits, and a willingness to use them.

Table 5. Sex and age composition of the 2002 deer harvest in Maine by season type and week, statewide¹.

Season	Sex/Age Class				Total Deer	Total Antlerless Deer	Percent by Season & Week		
	Adult		Fawn				Total	Adult	
	Buck	Doe	Buck	Doe				Buck	Antlerless
Archery	746	840	230	213	2,029	1,283	5	4	7
Expanded	508	596	162	162	1,428	920	4	2	5
October	238	244	68	51	601	363	2	1	2
Youth Day	154	213	103	83	553	399	1	1	2
Regular Firearms	19,320	9,880	2,902	2,431	34,533	15,213	91	93	87
Opening Saturday	2,002	1,004	303	250	3,559	1,557	9	10	9
November 4 - 9	4,799	2,174	702	545	8,220	3,421	22	23	20
November 11 - 16	4,128	1,477	496	372	6,473	2,345	17	20	13
November 18 - 23	4,108	1,660	498	410	6,676	2,568	17	20	15
November 25 - 30	4,283	3,565	903	854	9,605	5,322	25	21	30
Muzzleloader	474	389	91	84	1,038	564	3	2	3
December 2 - 7	304	193	38	41	576	272	2	1	2
December 9 - 14	170	196	53	43	462	292	1	1	2
Total	20,694	11,322	3,326	2,811	38,153	17,459	100	100	100

¹ Sex/age data were corrected for errors in the deer registrations.

Buck Harvest

The statewide harvest of antlered bucks (20,694) in 2002 was the second highest ever, coming in just 3% below the record buck harvest set in 2000 (21,422). The buck kill in 2002 represents a dramatic recovery (+23%) from the low buck harvest experienced during 2001 (16,798 antlered bucks). The top 5 buck-producing WMDs during 2002 were (in descending order) districts 24, 23, 22, 21, and 17, all in central and southern Maine. Among the 20,694 antlered bucks taken in 2002, roughly 9,100 (44%) were 1 ½ year olds (yearlings) sporting their first set of antlers, while more than 3,700 (18%) 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 bucks available, and in those states, bucks rarely survive beyond 3½ years! In a sense, deer management in Maine has long adhered to the "Quality Deer Management" principles that so many other states desire to achieve. In Maine, deer populations 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. Finally, hunting effort on bucks (to date) remains light enough to allow a significant number of bucks to attain maturity, even old age (4 ½ to 15 ½ years). In 2002, 785 bucks were entered in the "Biggest Bucks in Maine Club" which

requires a dressed weight of at least 200 pounds. In addition, 251 bucks were entered in the Maine Skull and Antler Trophy Club (minimum B&C score of 140 points for gun or 120 for bow). Three of these bucks qualified for the national Boone and Crockett Record Club during 2002.

Antlerless Deer Harvest

The magnitude of Maine's harvest of does and fawns depends on the number and success rate of archers, the number of any-deer permits issued to firearms deer hunters, and hunting conditions (e.g., the availability of tracking snow). The statewide harvest of adult (older than fawn) does during 2002 was 11,322 or 6% above the pre-set quota. Although doe quotas were slightly exceeded for most WMDs, these harvests did not adversely affect deer management objectives for any WMD. Among WMDs, harvests of adult does ranged from 3 does in WMD 19 to 2,248 in WMD 23 (Table 6). The availability of bonus any-deer permits played a major role in attaining desired harvests of does in several central and southern Maine WMDs (22 - 26, and 30). In addition, hunters seemed able and willing to utilize their any-deer permits to harvest does this year, possibly due to increased deer sightings, cool weather, and occasional tracking snow. 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 hunters during the either-sex era, and antlerless deer harvests were not restricted, except for the 1 deer bag limit.

During 2002, any-deer and bonus permittees also tagged 5,508 fawns, while archers and youth day hunters tagged 629 young of the year. Overall, 17,459 antlerless deer were registered by hunters during 2002. This was the highest kill of does and fawns, statewide, since 1981 (18,455 antlerless deer).

Table 6. Sex and age composition of the 2002 deer harvest in Maine by Wildlife Management District¹.

WMD	Adult		Fawn		Total		Harvest Per 100		Harvest Per 100	
	Buck	Doe	Buck	Doe	Antlerless Deer	All Deer	Adult Does	Anterless	Adult Bucks	All Sq. Miles Habitat
1	390	12	1	0	13	403	3	3	28	28
2	228	11	6	4	21	249	5	9	19	21
3	114	9	6	3	18	132	8	16	12	14
4	277	5	2	1	8	285	2	3	14	15
5	431	15	5	3	23	454	3	5	28	29
6	371	29	12	4	45	416	8	12	27	30
7	544	52	33	11	96	640	10	18	40	47
8	519	73	23	13	109	628	14	21	25	31
9	168	14	6	5	25	193	8	15	18	20
10	234	55	14	10	79	313	24	34	26	35
11	494	90	27	24	141	635	18	29	30	38
12	602	226	63	67	356	958	38	59	64	102
13	616	263	71	58	392	1,008	43	64	109	178
14	327	58	17	14	89	416	18	27	41	52
15	1,259	720	185	161	1,066	2,325	57	85	126	233
16	1,442	1,005	325	264	1,594	3,036	70	111	201	423
17	2,838	1,991	588	531	3,110	5,948	70	110	208	436
18	449	81	24	21	126	575	18	28	35	44
19	159	3	2	0	5	164	2	3	14	14
20	969	533	168	132	833	1,802	55	86	161	300
21	1,017	730	216	171	1,117	2,134	72	110	208	437
22	1,193	960	264	221	1,445	2,638	80	121	229	506
23	2,404	2,248	699	620	3,567	5,971	94	148	263	654
24	896	761	185	184	1,130	2,026	85	126	325	734
25	682	460	103	95	658	1,340	67	96	141	277
26	1,092	657	169	148	974	2,066	60	89	176	334
27	451	59	21	15	95	546	13	21	55	67
28	140	6	1	0	7	147	4	5	17	18
29	154	12	3	2	17	171	8	11	32	35
30 ²	234	184	87	29	300	534	79	128	-	-
Statewide	20,694	11,322	3,326	2,811	17,459	38,153	55	84	71	131

¹Sex/age data were corrected for errors in the deer registrations.

²Area of deer habitat in WMD 30 has not been determined.

Harvest by Season and Week

Of the five separate deer hunting seasons, Maine's regular firearms season attracts the most hunters (about 173,700), and accounts for the greatest share of the total harvest. In 2002, 91% of the total deer take occurred during the 4-week firearms deer season (Table 5). Within that season, after a strong initial burst of hunting pressure on opening Saturday by residents (which accounted for 9% of the total harvest), hunter effort and deer harvest remained remarkably stable during each week. Normally, there is a tendency for hunter effort to spike during the final (Thanksgiving) week. 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.

Continually gaining in popularity, archery hunting for deer now accounts for 5% of the total deer harvest in Maine (Table 5). Black-powder hunting is also growing in popularity. Yet, our one-to-two-week late muzzleloader deer season accounted for only 3% of the 38,153 deer tagged in Maine during 2002. The relative contribution of firearm vs. archery vs. black powder seasons to total deer harvest noted in 2002 is typical of long-term trends in harvest distribution by season.

We are uncertain how many of the 17,940 youth license holders participated in our first-ever youth deer hunting season on Saturday, October 26, 2002. Based on likely rates of hunting success, however, we estimate that at least 10,000 10 to 15 year olds contributed to the 553 deer harvested. This was an either-sex hunt, and youth hunters capitalized on that opportunity. The adult doe harvest exceeded the antlered buck kill, and nearly as many fawns were taken as adult does. The addition of the youth day to our deer hunting season line-up did not adversely affect deer management objectives, since the 399 antlerless deer harvested were spread among all 30 WMDs. The youth day kill comprised only 1% of the total Maine deer harvest.

Harvest by Hunter Residency

Among deer hunters, Maine residents outnumbered nonresidents by more than 6 to 1. Not surprisingly, residents tagged 88% (33,637 deer) of the total harvest during 2002 (Table 7). Among seasons, the proportion of the harvest registered by Maine residents was highest for youth day (98%), followed by expanded archery (96%), muzzleloader (93%), regular archery (92%), 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 500 since 1990. Despite some declines in "out-of-staters", Maine deer hunting still attracts hunters from 40 to 43 other 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, 51% of the deer harvested in remote, unpopulated 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 WMD 21 (south-coastal Maine) were registered by Maine residents (Table 7).

Table 7. Deer registrations by Wildlife Management District and hunter residence, 2002.

WMD	Deer Registered By:				Total
	Residents		Nonresidents		
	Number	Percent	Number	Percent	
1	197	49	206	51	403
2	168	67	81	33	249
3	125	95	7	5	132
4	141	49	144	51	285
5	238	52	216	48	454
6	378	91	38	9	416
7	368	58	272	42	640
8	315	50	313	50	628
9	113	59	80	41	193
10	247	79	66	21	313
11	454	71	181	29	635
12	867	91	91	9	958
13	838	83	170	17	1,008
14	286	69	130	31	416
15	2,083	90	242	10	2,325
16	2,814	93	222	7	3,036
17	5,152	87	796	13	5,948
18	490	85	85	15	575
19	131	80	33	20	164
20	1,648	91	154	9	1,802
21	2,093	98	41	2	2,134
22	2,561	97	77	3	2,638
23	5,402	90	569	10	5,971
24	1,948	96	78	4	2,026
25	1,296	97	44	3	1,340
26	1,970	95	96	5	2,066
27	516	95	30	5	546
28	128	87	19	13	147
29	168	98	3	2	171
30	502	94	32	6	534
Statewide	33,637	88	4,376	12	38,153

A substantial number of Maine residents typically travel to hunting areas outside their home WMD. Many residents pursue deer within two or more WMDs during the course of Maine's five deer seasons. Roughly, one-quarter of the statewide deer harvest is registered by Maine residents who traveled to a WMD away from their home district.

Hunter Participation and Success Rate

During 2002, 228,379 licenses that permit deer hunting were sold in Maine; 84% were bought by residents. License sales in 2002 were nearly 3% above sales recorded in 2001 (222,757). Not all hunters who purchase big game hunting licenses actually pursue deer. According to recent (1988 and 1996) and past (1970 to 1984) surveys, 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 2002 was approximately 173,700. Hunter density, therefore, averaged nearly six per square mile, statewide, and this hunter force expended an estimated 2.08 million hunter-days effort pursuing deer over the course of our 85-day hunting seasons. The 4-week regular firearms season accounts for 88% of total deer hunting effort (1.83 million hunter-days).

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 1996-00 has averaged 2.07 million hunter-days, despite a marked drop in hunter numbers (about 175,000 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, we offered 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 about one-half of the state. Overall, we offered only 48 days of hunting opportunity in the late 1970s vs. 85 days in 2002. 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 accommodate only 3 to 5 hunters per square mile over Maine's 85-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 as much 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 6th year, the expanded archery season attracted 5,583 participants (97% residents). During the first three years, hunter participation in the expanded archery season had doubled each year. Since 2000, participation and harvest seem to have stabilized. As noted earlier, this season was limited to WMDs 24, 30, and 8 smaller sites in southern Maine.

License sales for the statewide archery season in October, included 10,968 resident and 1,130 nonresidents. Over the past 2 decades, sales of archery licenses have more than quadrupled, reflecting a strong trend toward greater participation in the sport of bowhunting for deer. In that time, the archery deer harvest has climbed from about 100 to more than 2,200 deer (2002 harvest).

Compared to the regular firearms season, which attracts at least 173,700 participants, relatively few deer hunters currently participate in Maine's late black powder deer season. Sales of special muzzleloading season permits totaled 9,089 during 2002, 2% less than muzzleloader permit sales during 2001 (9,282). The addition of an extra week to the black powder season in 1995 sparked additional participation in this primitive firearm hunt. Muzzleloader license sales increased by >50% when we changed the black powder season from one to two weeks in 1995. Since its inception in 1981, the black powder deer season has increased steadily in the number of participants. In its first year (1981), only 415 hunters purchased a muzzleloading permit. The number of deer registered during Maine's muzzleloader season has grown from 7 in 1981, to 1,038 in 2002. This hunting season is expected to continue to grow in popularity.

Deer hunting success in Maine averaged 22%, overall, during 2002. Success rate among nonresidents (17%) was lower than success rate experienced by residents of Maine (23%). Apparent success rate among hunters who drew an any-deer permit (27 to 39%) is typically higher than among hunters who were restricted to "bucks-only" (8 to 16%) 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 higher success. Unfortunately, some hunters evidently pool their antlerless deer kill with any-deer permittees, which is illegal. Success rate among bow hunters differed markedly between the expanded archery season (26%), and the statewide October archery season (6%). Deer are very abundant in much of the

expanded archery hunt area. This, and the two deer limit, account for the exceptional degree of success hunters enjoyed during this archery season. In recent years, black powder enthusiasts have experienced increasing success during the late muzzleloader season. During most seasons prior to 2000, 2 to 5% of black powder hunters had tagged a deer. Success rates increased to 6.2%, 8.4%, and 11.1% during 2000, 2001, and 2002, respectively. Increased availability of any-deer permits and healthy deer populations in central and southern WMDs likely contributed to higher success during recent muzzleloader seasons. Success rate among youngsters who participated in the youth deer hunting day could not be directly calculated, but it may have been roughly 5%, based on data for individual days during regular firearms seasons.

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 during 2002 are typically lowest in northern Maine's WMDs (3 to 10%); they are above-average in central and southern WMDs (15 to 30% success rate).

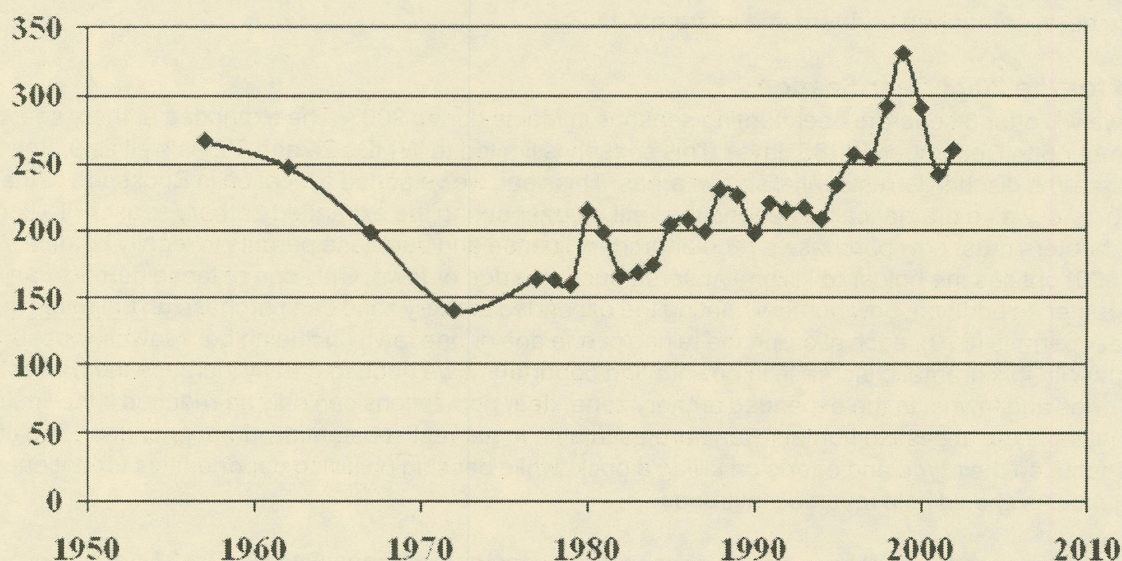
Maine's Deer Population and Strategic Plan

Since the early 1970s, our deer management program has been guided by a strategic plan developed with considerable public input. The deer 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 for 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. Hence, we implemented the any-deer permit system to regulate doe harvests, and we divided Maine initially into 18 Deer Management Districts (1986 to 1997), and later into our current 30 Wildlife Management Districts.

By harvesting does conservatively, and by taking advantage of mild winters when they occurred, we increased deer populations from roughly 160,000 to 300,000 wintering deer between 1982 and 2000 (Figure 3). Regionally, we noted wide variation in our success at increasing deer populations. We were most successful in central and southern 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 were 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.

Figure 3. Maine's Statewide Wintering Deer Population (x 1,000).



In the current planning cycle, 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/mi², 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/mi² for each central and southern Maine WMD. Currently, deer populations range between 15 and 30 deer/mi² 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/mi².

Attaining our new population objectives in central and southern Maine WMDs 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 our more heavily developed towns.

In northern and eastern Maine, the road to a more abundant deer population 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. This in turn, should enable us to maintain deer populations of 10 to 15 deer/mi², compared to the 2 to 8 deer/mi² 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 trimming 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 the 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. <300,000 currently. In addition, 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. Then, the unusually mild winter of 2002 led to very favorable deer survival and recruitment, allowing the wintering herd to recover to 259,000 deer (Figure 3). Conservative harvests in 2001 (statewide) and 2002 (northern half of Maine) aided the recovery.

The winter of 2003 again proved a bit more severe than normal in most WMDs, although the magnitude of that severity did not equal the effects of the 2001 winter. Although population estimates for 2003 will not be available until after the 2003 hunting season (we use harvest data in our population model), we don't anticipate more than a minor decrease in the statewide herd, primarily in northern and eastern WMDs.

Prospects for the 2003 Deer Season

As in 2002, we will offer 5 separate deer hunting seasons in Maine during 2003. The expanded archery season will span September 6 to December 13 (85 days). This season is limited to WMDs 24 and 30, as well as 9 other locations, primarily in firearms discharge-residential sprawl areas. This year, we've added a location in Bucksport to the expanded archery zone, and, we've dramatically changed the limit on deer during the expanded archery season. To participate in this season, hunters must now purchase a regular archery license and purchase permits to legally kill deer. An either-sex permit (\$30) entitles the holder to kill one antlered buck or a doe or fawn. Only one of these permits can be purchased per hunter. In addition, bow hunters hunting the expanded archery zone can purchase an unlimited number of antlerless deer permits (\$10), each allowing the taking of one doe or one fawn (including buck fawns, whose nubbins are <3" long). With this dramatic increase in bowhunting opportunity, we hope to greatly increase the harvest, particularly among does and fawns. 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. Too often, these bow hunters focused their time and efforts on killing a buck, while passing up killing opportunities for antlerless deer. The new regulations should help reverse that trend.

The regular archery season, as always, will be statewide in scope and will span October 2 – 31 (26 days). Youth day will be Saturday, October 25. It 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 implement). The 25-day regular firearms season opens for Maine residents on Saturday, November 1, and for nonresidents the following Monday. This season ends the Saturday following Thanksgiving (November 29). Finally, the muzzleloader season will begin in all WMDs on December 1, but will end on December 6 (6 days) in WMDs 1 – 11, 14, 19, and 27 – 29. Elsewhere, the muzzleloader season will continue until December 13 (12 days).

As always, availability of any-deer permits among our 30 WMDs reflects deer management objectives. Very conservative doe harvests are required in eastern and northern WMDs, as we facilitate herd recovery from the severe winters of 2001 and 2003. In contrast, does must be more heavily harvested in central and southern WMDs as we strive to stabilize or reduce 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 2003, we have set doe harvest quotas ranging from zero to 2,213 among our 30 WMDs. Totaling 10,427 statewide, the 2003 doe quota is 9% below the doe harvest we achieved in 2002. The desired drop in doe harvest reflects the need to accommodate the additional doe losses incurred during the 2003 winter.

In addition to doe harvest to be achieved during the archery and youth seasons, we will issue a total of 72,600 any-deer permits statewide in 2003. No any-deer permits will be available in WMDs 1, 2, 3, 5, 6, 11, 19, 27, 28, and 29. Elsewhere, any-deer permits range from 100 (WMD 4) to 15,450 in WMD 17 and 15,550 in WMD 23. The 2003 allocation of any-deer permits is still the 2nd highest ever.

Last year, undersubscription (too few applicants) led to issuance of 10,004 bonus any-deer permits in 6 WMDs. We are unlikely to repeat that number of bonus permits in 2003, for 2 reasons: 1.) slightly fewer permits are available in districts that went undersubscribed in 2002; and 2.) we've expanded choices for entry into the permit lottery. Beginning this year, applicants may select up to 3 WMDs to be entered in the any-deer lottery. Hence, hunters who live (and normally hunt) in a part of the state with limited antlerless deer hunting opportunity, now would have a better chance to be drawn for an any-deer permit in districts with high permit allocations, but limited 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, if that lottery becomes necessary.

The allocation of 76,200 any-deer, along with the archery and youth seasons, should result in the statewide harvest of roughly 10,400 does and an additional 5,900 fawns in 2003. Antlered buck harvests should approximate 19,500, slightly below the buck kill of 20,694 in 2002. If normal hunting conditions and hunter effort prevail, the statewide deer harvest in Maine should be in the vicinity of 35,800 white-tails. This compares favorably to the 38,153 deer killed in 2002, the 27,679 deer taken in 2001, and the 35,750 deer harvested in 2000.

Deer Feeding Video Available

"What You Should Know about Supplemental Feeding" is a 30-minute video highlighting the many pitfalls of supplemental white-tailed deer feeding programs. This practice is gaining in popularity in Maine and elsewhere. The people who feed deer are a diverse group who are motivated to feed deer for a wide variety of reasons. There are those who believe deer cannot survive winter without supplemental food, or that feeding deer in winter will result in more deer to hunt the next year. Suburban landowners sometimes believe supplemental foods will divert deer away from eating expensive shrubbery, reducing landscaping costs. Others simply enjoy seeing deer at close range. Some business owners have learned that attracting deer also attracts customers. There are even deer feeding sites being maintained by municipalities, which use public funds to feed deer.

Deer feeding programs are difficult to implement without incurring unintended deer losses to predators, depredation by dogs, motor vehicle accidents, disease, and even to malnutrition among the deer being fed. Feeding deer can be costly, not only to the person feeding the deer, but also to adjoining landowners who may bear the brunt of excessive browsing on landscape plantings and young forest growth. Over the long term, deer feeding can disrupt deer migration to natural wintering areas, or cause greatly diminished ability to sustain deer in browsed-out deeryards.

The Maine Department of Inland Fisheries & Wildlife acknowledges that most people feeding deer are well-intentioned. As the agency responsible for the stewardship of Maine's wildlife resources, it is our duty to alert people to the problems winter feeding can place on white-tailed deer and their habitat. We feel that winter feeding of deer in Maine is not necessary for maintaining a healthy, abundant deer population. In the video, which is patterned after the Department's policy statement on deer feeding, we suggest more appropriate ways that Maine people can safeguard the health and abundance of deer. Rather than feeding expensive, and unnecessary food supplements, we believe that

improving the amount and quality of wintering habitat will better ensure viable, healthy deer populations anywhere in Maine. We point out several ways in which all interested people can participate in ensuring that quality wintering habitat is protected and maintained in perpetuity.

Professionally-produced and rich in wild deer footage shot in Maine, the deer feeding video costs \$10 and can be obtained from our Augusta headquarters by calling our Information Center at (207) 287-8000 or order from our online store (www.mefishwildlife.com). The Department's policy statement on deer feeding can be downloaded from our website.



Chronic Wasting Disease

Recently, you may have heard about a disease called Chronic Wasting Disease (CWD) in a news report or on TV. CWD is a fatal brain disease in deer and elk that has been present in the western states of Colorado, Wyoming, and Nebraska since the 1960s. Chronic wasting disease is one of a group of diseases known as transmissible spongiform encephalopathies (TSEs), each causing irreversible damage to brain tissues, ultimately leading to death. Other TSEs include scrapie (in sheep), TME (in mink), FSE (in cats), BSE, or mad cow disease (in cattle), and Creutzfeldt-Jacob disease or CJD (in humans). A variant form of CJD (nvCJD) became known in the 1990s as a result of people consuming BSE-infected beef in Europe.

Chronic wasting disease is known to occur in mule deer, elk, and whitetailed deer, although other cervids such as red deer, fallow deer, sika deer (commonly raised in captivity), as well as caribou and moose may also be susceptible. Like all other TSEs, CWD is thought to be caused by an infectious protein called a prion that, upon entering the body, causes the host's normal proteins to take on a diseased form. In ways that are not well understood, these diseased prions accumulate in the brain and spinal cord, as well as lymph nodes, spleen, eye tissues, bone marrow, saliva, feces, and urine in diseased deer.

CWD is thought to be passed among deer by direct contact or by contact with contaminated feed or soil. Hence, practices that concentrate deer in close proximity (e.g., at feeding sites, wintering areas, in captivity) can facilitate spread of the disease. Chronic wasting disease, as with other TSEs, has a long incubation period. Between 18 months and 3 years may elapse before disease symptoms become apparent. Deer in advanced stages of CWD have difficulty walking, salivate excessively, droop their ears and head, lose awareness of their surroundings, lose fear of man, and their body weight and condition becomes progressively poorer until death.

There is not yet a live-animal test for the presence of CWD. Diagnosis is confirmed by microscopic examination of brain or lymph tissues in freshly-killed deer. Some of these tests can detect CWD in deer that have not yet developed the behavioral and outward physical symptoms of the disease. However, testing is time-consuming and expensive, at present.

At this time, there is no proof that the infectious agents that cause CWD can infect and cause a TSE disease in people. However, given the similarities between CWD and other TSE diseases, such as BSE (which has been transmitted to humans), health officials urge caution until more is known about CWD. **The World Health Organization recommends that people avoid handling or consuming deer showing symptoms of chronic wasting disease.**

Until the mid-1990s, CWD was thought to be restricted to a small portion of the western US, primarily in northeastern Colorado. Since that time, we have learned that CWD is becoming more widespread, in part, because of natural dispersal of infected deer or elk, and by inadvertent importation of CWD-infected captive deer and elk among commercial farms and ranches. As with so many other facets of CWD and other TSE diseases, mode of transmission of infective prions among susceptible deer remains incompletely understood.

To date, CWD has been detected in wild or domestic deer or elk in Colorado, Illinois, Kansas, Minnesota, Montana, New Mexico, Nebraska, Oklahoma, South Dakota, Utah, Wisconsin, Wyoming, and Alberta and Saskatchewan, Canada. Detection of CWD in a high density deer population in southwestern Wisconsin in 2002 generated considerable interest, since this was the first record of CWD being present east of the Mississippi River.

Programs designed to prevent or manage CWD outbreaks are in progress throughout North America. Where CWD appears to be located in fairly small areas (less than 500 sq. mi.), wildlife agencies (e.g., Colorado, Wisconsin, and Saskatchewan) are attempting to greatly reduce or eliminate local deer populations in an effort to curb the spread of the disease. When CWD is detected in captive deer or elk (anywhere in the US or Canada), the captive population is killed and tested. Under this federally funded program, deer farmers are reimbursed for the fair market value of their livestock. All states with wild or captive herds infected by CWD have established programs to monitor and test for the disease. Many other states that are considered CWD-free (including Maine) have begun monitoring programs at varying levels of intensity. After it became apparent in 1996 that CWD-infected domestic livestock had been translocated to other states, many states (including Maine) have banned commercial importation of domestic deer and elk from CWD-infected states. In the wake of the discovery of CWD in Wisconsin during early 2002, all New England states have banned the importation of deer and elk from any state or country. In addition, the federal government is taking steps to coordinate CWD surveillance and testing programs among all states, including providing funds for disease monitoring and control.

At this time, we have no indication that CWD is present either in farmed red deer, elk, sika deer or fallow deer, or in free-ranging whitetails or moose in Maine. In 1999, nearly 300 hunter-killed deer from western Maine were tested for CWD. In 2002, a similar sample of 831 deer from throughout the state were also tested. In the past 2 years, more than 250 captive elk and red deer from Maine farms were tested at slaughter. All Maine samples were negative for CWD.

We intend to monitor captive and wild cervids, as needed, to be confident we remain disease-free. We will continue to coordinate with other state agencies (commercial deer farms are regulated by the Maine Department of Agriculture) to ensure that CWD is not inadvertently introduced into the state as a result of deer farming, slaughter, or hunting practices. Preventing the introduction of CWD into Maine is a high priority. Steps are being taken to ensure that livestock producers do not inadvertently introduce clinically ill captive deer into the state.

Maine's deer hunters also have a role to play in CWD prevention. Because the infectious agent accumulates in nervous tissue, lymph glands, feces, and urine of CWD-infected deer, it is important to prevent introduction of these infectious tissues into the state. To prevent the introduction of CWD into Maine, we are encouraging hunters who travel to other states and provinces to hunt deer or elk to avoid returning to Maine with carcass parts that pose a risk of containing CWD prions. **We recommend that you return to Maine only with boned-out meat, hardened antlers (with cleaned skull caps), hides without the head portion, and finished taxidermy mounts.**

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, urine-based deer lures are not being checked for the presence of CWD prions. Until more is known about whether commercial deer lures pose a 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.

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).**

--Gerry Lavigne

Moose

2002 Maine Moose Season

The 2002 season was held under the same framework as the 2001 season. There were 34 possible combinations of WMD, permit type, and season (Figure 4, Table 8). Split seasons were established in 7 of the 18 open WMDs to reduce hunter crowding. Each hunter in these WMDs was assigned to either the week of September 23 or the week of October 7. The remaining 11 WMDs were open only the week of October 7. Hunters were issued one of two types of permits. Any moose permits (AMPs) were issued in all open WMDs. Antlerless only permits (AOPs), that restrict the hunter to killing a cow, a calf, or a bull with antlers shorter than its ears were issued in 9 WMDs.

Table 8. 2002 moose permit allocations by WMD and permit type.

WMD	Any Moose	Antlerless Only Moose	Total
1	175	0	175
2	120	25	145
3	175	100	275
4	320	20	340
5	140	20	160
6	220	100	320
7	150	40	190
8	360	80	440
9	100	0	100
10	130	0	130
11	160	100	260
12	50	0	50
13	50	0	50
14	40	10	50
18	100	0	100
19	135	0	135
28	50	0	50
29	30	0	30
TOTAL	2,505	495	3,000

Eighty percent (2,375) of the 2,964 hunters who purchased a moose permit killed a moose in 2002 (Table 9). Success rates varied by season, WMD, and permit type. As would be expected, AOP holders were less likely to kill a moose than AMP holders. Not only were they restricted as to what type of moose they could shoot, they seemed to put a little less effort into searching for a moose. In 8 of the 9 WMDs where AOPs were issued, AOP holders reported that they spent less time than AMP holders hunting away from the road.

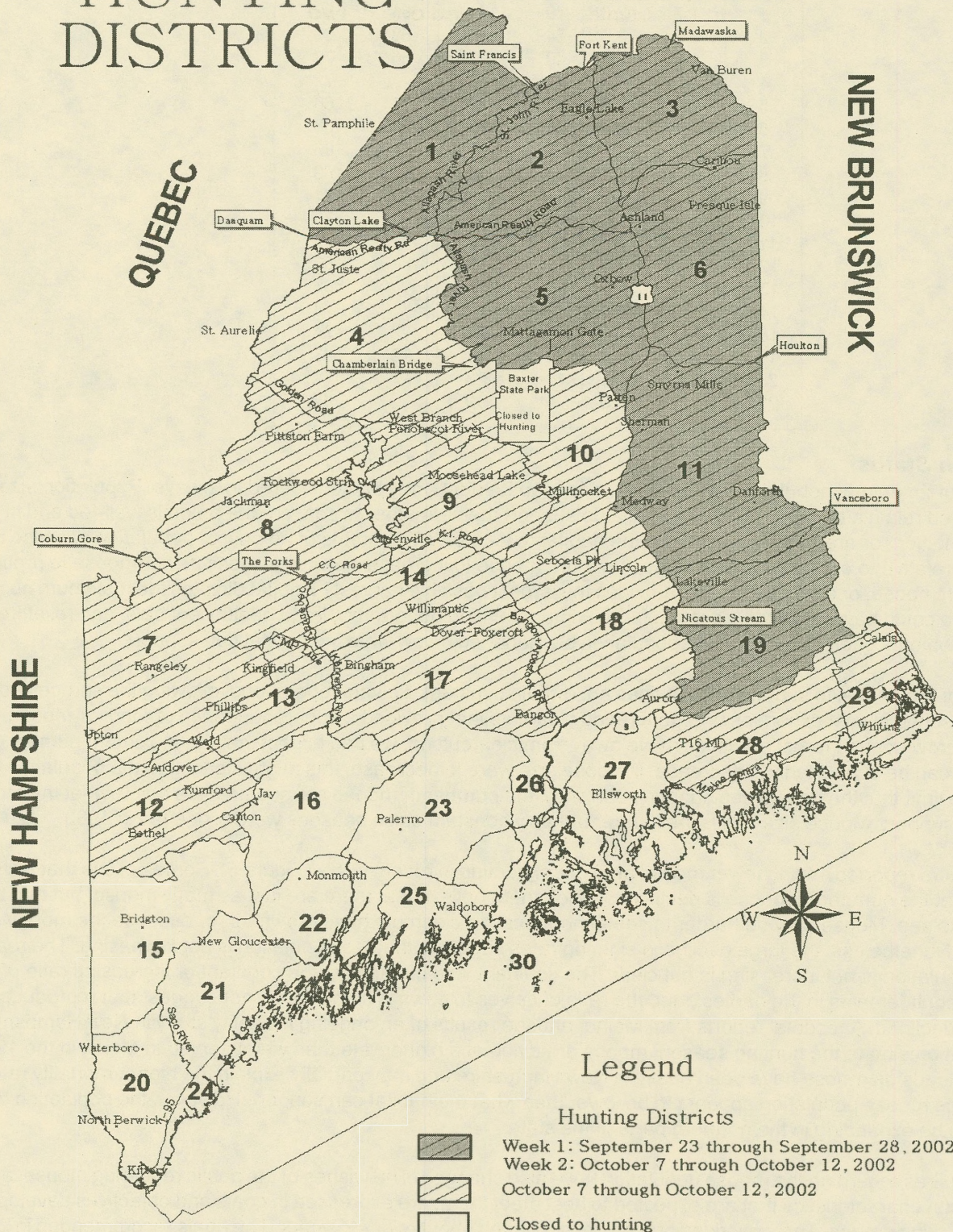
Table 9. 2002 Moose permits, moose registrations, and success rates by WMD, season, and permit type. (Note that alternate permits were not issued so the total number of permits is less than 3,000.)

WMD	September - AMP			October - AMP			October - AOP		
	Permits	Harvest	% Success	Permits	Harvest	% Success	Permits	Harvest	% Success
1	86	71	83	87	68	78	0	-	-
2	72	66	92	44	41	93	22	19	86
3	138	116	84	37	34	92	97	73	75
4	0	-	-	318	260	82	19	16	84
5	79	70	87	60	58	97	19	15	79
6	160	138	86	58	54	93	96	69	72
7	0	-	-	150	138	92	38	29	76
8	0	-	-	358	316	88	78	58	74
9	0	-	-	100	96	96	0	-	-
10	0	-	-	131	118	90	0	-	-
11	131	79	60	30	27	90	98	44	45
12	0	-	-	50	35	70	0	-	-
13	0	-	-	50	37	74	0	-	-
14	0	-	-	38	30	82	10	2	20
18	0	0	-	99	56	57	0	-	-
19	66	42	67	67	51	76	0	0	-
28	0	-	-	49	35	71	0	0	-
29	0	0	-	29	9	31	0	0	-
Totals¹	732	584	80	1,755	1,463	83	477	326	68

¹ Totals include moose from unknown WMDs

Figure 4.

2002 MOOSE HUNTING DISTRICTS



Although many people feel that September is the better season for calling bulls, AMP holders were more successful in October than September in 5 of the WMDs that were open in both seasons. Hunters saw more moose per hour in October (Table 10) than in September.

Table 10. Sighting reported by moose hunters by WMD during the 2002 season.

WMD	MOOSE SIGHTINGS					
	Moose /hr		% Bulls		% Bulls W/ Palms	
	Sept	Oct	Sept	Oct	Sept	Oct
1	1.7	2.0	49	44	61	82
2	2.2	3.6	54	46	68	66
3	1.6	2.8	49	47	66	70
4	-	2.0	-	50	-	72
5	1.8	2.8	51	32	77	66
6	1.7	2.6	47	53	62	68
7	-	3.0	-	47	-	65
8	-	2.0	-	45	-	69
9	-	3.6	-	45	-	71
10	-	1.9	-	49	-	75
11	0.5	1.1	63	52	71	76
12	-	1.2	-	52	-	80
13	-	0.9	-	43	-	81
14	-	2.0	-	47	-	73
18	-	0.5	-	54	-	74
19	0.6	1.4	61	43	79	83
28	-	1.1	-	53	-	72
29	-	0.5	-	59	-	69

Population Status

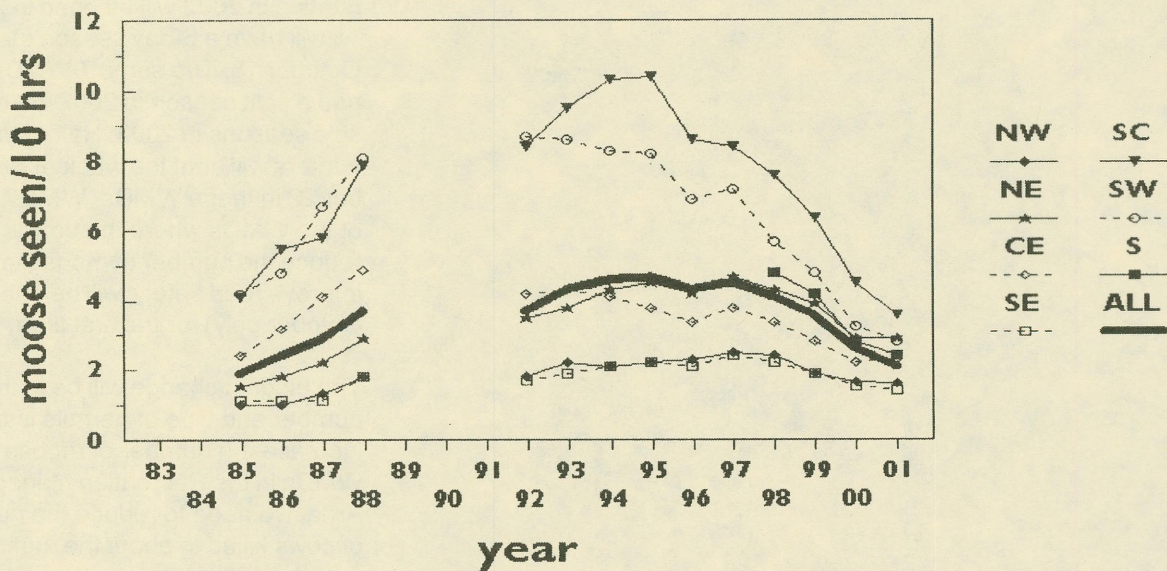
The status of an animal population (too many, too few, about right) may be considered in 2 ways. Population size can be considered relative to the ability of the habitat to support them. In other words, are the animals well-fed and in good physical condition, or are there too many for the habitat to support? The status of an animal population can also be considered relative to our desires. Would we like more moose to increase viewing success, fewer moose to reduce conflicts with moose, or a population that provides the largest possible harvest? Habitat dictates the maximum number of moose we could have, but public desires for maximum hunting opportunity, large healthy animals, and relief from nuisance problems often dictate that the population be managed below what the habitat can support.

The ability of the habitat to support moose does not remain constant. Salvage operations following the spruce budworm outbreak resulted in vast expanses of regenerating clearcuts that provided a superabundance of food for moose. As these cuts grow up, and forest practices move away from clearcutting, we can expect that the maximum number of moose that can be supported will decrease. If moose size were to decrease, this might signal that the population has reached the limit that the habitat can support. Currently, the number of moose still seems to be below what the food supply can support. Moose size has remained remarkably constant since seasons were reopened in 1980.

Moose hunters reported seeing fewer moose per hour of hunting in recent years (Figure 5). Some believe that this indicates that the number of moose is declining, while others believe that there are just as many moose, but that they are harder to see. Moose may be harder to see either because clearcuts have grown up, or because the moose are more wary. Nonetheless, the large decline in sighting rates suggests that the population is not increasing. The reason why the population is not increasing is not clear. The constant size of animals, the constant or increasing ratio of yearling to adult females in the harvest, and the ratio of calves to cows in sightings do not suggest that reproduction rates have declined. Anecdotal reports from Maine, and the results of an ongoing mortality study in New Hampshire, indicate that outside of the hunting season, moose are dying at a higher rate than we observed in Maine in the 1980s. Winter tick loads on moose have been heavy in New Hampshire and may partially explain the higher mortality rates. Currently, the moose population appears to be lower than what the habitat can support. However, the population does not seem to be expanding in the northern parts of the state.

Peoples' desires regarding the moose population have also changed. The wishes of the public regarding moose, and the population characteristics that are expected to best meet them, are expressed in goals and objectives developed by public working groups. These working groups are convened about every 15 years. The goals recommended in 2000 were very different from those recommended in 1985.

Figure 5. Three year average of the number of moose seen by moose hunters in Maine by year and zone.



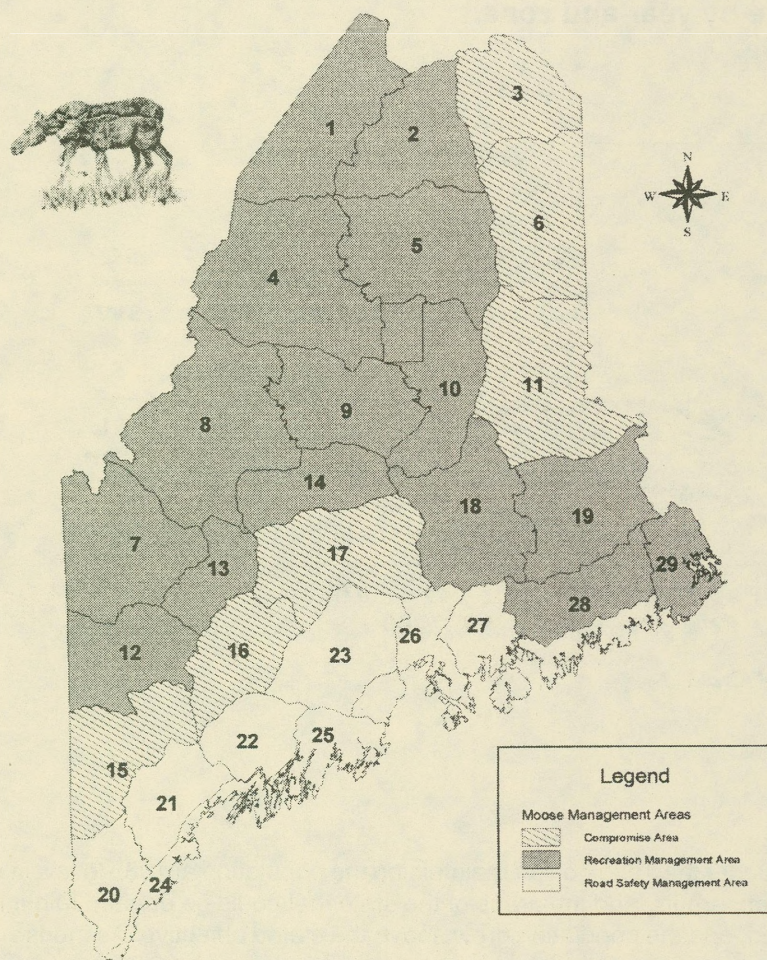
From 1985 through 2000, moose were managed under the 1985 goal of maintaining the population at 1985 levels in all parts of the state. Because the number and type of permits, and the areas of the state that could be opened to hunting were limited by law, this goal could not be achieved, and the population grew above the stated objective. As moose hunting regulations were liberalized, more permits were issued, additional areas were opened, and AOPs were introduced to reduce moose numbers to the stated objective.

The latest working group developed different goals and objectives for different areas of the state (Figure 6). In the Safety Management Area, the objective is to reduce the number of moose to minimize the number of moose/vehicle collisions. In the Compromise Management Area, the objective is to reduce the number of moose by one third to reduce the number of moose/vehicle collisions while maintaining some good hunting opportunity. In these 2 areas, the population objectives (fewer moose than we have now) are quite similar to those developed in 1985. However, in the Recreation Management Area, which includes most of the area that is currently open to hunting, the new goal is very different from the old goal. In the Recreation Management Area, the moose population is now to be managed at a density that will maximize hunting and viewing without damaging forests. The density of moose called for by the new goal is higher than the density recommended by the working group in the 1980s, and it is higher than the moose densities that currently exist in most of the Recreation Management Area.

Census of WMD 9

Last winter, we contracted with AirScan to conduct an aerial moose census in WMD 9 using infrared sensors. They searched 184 square miles in 28 sample blocks, or about one fifth of the WMD. In the area that was searched, the mean density of moose was 3.45 moose per mi². If the entire WMD supports a similar density of moose there are 3,300 moose in WMD 9. Of course, moose are not evenly spread out, so some of the sample blocks had many moose and some had few or none. Based on the amount of variation between the different sample blocks, we feel confident that there are at least 2,100 moose in WMD 9.

Figure 6. Wildlife Management Districts included in the Three Moose Management Areas



2003 Maine Moose Season

Season timing for the moose hunt will be similar to the past 2 seasons, but many other aspects will change. All of the WMDs that were open to moose hunting in 2002 will be open in 2003. All will have a 6-day season starting October 13. The same 7 WMDs that had a split season in 2002 will have split seasons in 2003. Half of the hunters will hunt the week of September 22 in these WMDs. WMD 17, one of the WMDs where the goal is to reduce the number of moose to improve road safety, will be open (in October only) for the first time.

The biggest change will be in the number and type of permits issued. To increase the number of moose in WMDs in the Recreation Management Area, we need to reduce the number of cows killed to about the number that were being taken when the population was increasing. To achieve that with the permit types currently in use, we would need to eliminate AOPs from those WMDs and reduce the AMP allocation to mid-to-late 1980s levels. However, it is not possible to reduce the harvest of cows without also reducing the harvest of bulls using AMPs. Doing so would reduce the total permit allocation by nearly one third.

Table 11. Permit distribution by Wildlife Management District.

WMD	Bull Only Permits		Antlerless Only Permits		Total Permits	
	Sep	Oct	Sep	Oct	Sep	Oct
1	55	65	0	20	55	85
2	40	50	0	0	40	50
3	75	85	0	150	75	235
4	0	255	0	0	0	255
5	60	60	0	0	60	60
6	105	115	0	140	105	255
7	0	125	0	0	0	125
8	0	290	0	0	0	290
9	0	80	0	0	0	80
10	0	100	0	10	0	110
11	60	70	0	100	60	170
12	0	35	0	20	0	55
13	0	45	0	10	0	55
14	0	35	0	0	0	35
17	0	15	0	15	0	30
18	0	80	0	20	0	100
19	40	50	0	15	40	65
28	0	45	0	20	0	65
29	0	25	0	5	0	30
Total	435	1625	0	525	435	2150

To reduce the cow harvest without reducing hunting opportunity to such a large extent, a change in permit type is needed. In 2003, the harvest of cows will be restricted by issuing AOPs, but the number of bulls shot will be managed by a new type of permit that allows the hunter to only shoot a bull (BOP – bull only permit). In 2003, 2,585 hunters will be issued moose permits. 2,060 will be hunting for a bull and 525 will be hunting for a cow (Table 11). Some folks may wonder why the number of AOPs is increasing when we are trying to reduce the cow harvest in parts of the state. Remember that under AMPs, about 20% of the harvest is cows. In WMDs that are to have the cow harvest remain high to reduce the moose population, AOPs will have to be increased to make up for the cows that were harvested by AMP holders in the past. In several WMDs that have just been opened, or that hunters tended to avoid before permits were issued by WMD, there is no evidence that the harvest of cows needs to be reduced, and AOPs have been issued to maintain the cow harvest at current levels.

--Karen Morris

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 certain Endangered and Threatened species. The breadth of the Bird Group's programmatic responsibilities involve stewardship of approximately 200 bird species that nest 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 coordinates Department interests in seabird inventories.

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. Lindsay also works with harlequin ducks and ospreys.

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 (song-birds), hawks, owls, herons and other nongame marshbirds, and loons. Tom's current focus is on the conservation status and volunteer monitoring of Maine owl populations and working with Maine Audubon on the Important Bird Areas Project.

Andy Weik, Wildlife Biologist - Coordinates the development and implementation of banding programs, surveys, and research to assess the status of gamebird populations in Maine. Other species or groups that Andy deals directly with include grouse, woodcock, wild turkeys, ducks, and geese. Andy is currently working on projects designed to improve Maine's status in duck and Canada goose banding activities, a satellite telemetry project involving Canada Geese, and an investigation to enhance our ability to conserve Barrow's goldeneyes wintering in Maine.

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 supplementally fed 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 and north. Today, reports of wild turkeys well inland of the coast and eastward into Hancock and Washington Counties, particularly in towns adjacent to the Penobscot River, are common as birds crossed this major river on their own in the mid 1990s.

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.

IMPORTANT!!

Possessing, raising, or releasing wild turkeys or wild hybrids will negatively impact the future success of this program, and is prohibited by law. Birds from these strains do not survive or reproduce well in the wild, and they introduce inferior breeding stock and potentially, disease into natural populations. Illegal releases of pen-raised turkeys into the wild will jeopardize the years of hard work and money invested by the sportsmen and women of Maine, the National Wild Turkey Federation, and MDIFW to make wild turkey restoration in Maine a reality.

Spring Turkey Hunting Seasons

The restoration of wild turkey populations in North America is truly a modern wildlife management marvel. The wild turkey's adaptability to a variety of climate and habitat conditions has resulted in burgeoning populations capable of supporting considerable spring hunting opportunity. Wild turkeys, like white-tailed deer, are polygynous, meaning that one male may mate with several females; thus, a relatively few dominant males in the population do the majority of the breeding. Male turkeys (toms) are larger and darker plumaged than females (hens), and can be distinguished further from females by the male's spurs and beard, which is a hair-like tuft of modified feathers that protrudes 5-10 inches or more from the center of the breast (<5% 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 should be 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, the hunting zone was further expanded, the two-zone concept was dropped, and the hunting zone was redefined by Wildlife Management Districts (WMDs).

This past spring (2003), 12,000 hunters were permitted to hunt wild turkeys in Maine during two, over-lapping 3-week seasons: 6,000 hunters during season A, April 28 through May 3 and May 19-31; and 6,000 hunters during season B, May 5-17 and May 26-31. This 2-season concept was instituted to allow greater participation in spring turkey hunting while striving to keep it a safe and enjoyable experience. In 2003, 33% more hunters had the opportunity to hunt turkeys than in 2002. In addition to the 12,000 permitted hunters, an unknown number of landowners and their families took advantage of the new landowner "privilege" rule to hunt turkeys.

Table 12. Wild turkey spring hunting effort and harvests in Maine, 1986-2003.

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.

Despite the substantial increase in turkey hunters in 2003, the hunter success rate remained high - 36%, owing to an abundant turkey population in most areas where they are hunted in Maine (Table 13). Turkey hunters killed 2,796 toms (adult males), 1,090 jakes (juvenile males) and 62 registered birds of unrecorded sex or age, for a total of 3994 turkeys. The low proportion of jakes in the kill relative to toms (2.5 toms per jake) probably reflects generally poor turkey production last year, when we had greater than average rainfall in May. Wet weather during the nesting season is correlated with poor nest success among wild turkeys, because moist conditions are believed to aid mammalian predators such as raccoons and foxes, which rely on their keen sense of smell, in finding nests.

Table 13. Results of the spring turkey hunter questionnaire, 1993 - 2003.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003*
Permits Issued	500	500	750	1,250	1,750	2,250	3,000	4,000	7,000	9,000	12,000
Questionnaires Rec'd	417	424	628	1,075	1,546	1,961	2,517	3,350	5,776	5,451	2,072
Participation Rate	73%	78%	72%	82%	87%	85%	86%	88%	88%	92%	92%
Success Rate	13%	16%	22%	28%	27%	31%	34%	44%	41%	41%	36%
Avg. Hours Hunted	21.1	23.3	21.5	20.6	23.4	20.8	21.7	20.8	15.2	16.5	17.0
Gobblers Seen/hour	0.073	0.106	0.123	0.196	0.176	0.219	0.235	0.235	0.33	0.44	0.38
Hens Seen/hour	0.131	0.125	0.167	0.286	0.228	0.311	0.288	0.290	0.45	0.73	0.57
Used Shotgun	283	305	429	825	1,260	1,564	—	—	—	—	—
Used Bow	32	42	24	39	52	41	—	—	—	—	—

*preliminary results

As interest and participation in turkey hunting increases, hunters must be especially 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**, both during spring and fall seasons; 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 18 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.

Fall Turkey Hunting Seasons

Turkey hunters got a chance to hunt their quarry during the fall 2002 in Maine. In the inaugural fall hunt, 1,859 licensed archers purchased a permit to hunt wild turkey during this fall season, and tagged 153 turkeys. Only a bow and arrow may be used to hunt turkeys during this season, which ran from October 21, 2002 through November 1, 2002 in WMDs 15, 16, and 20 - 26. Unlike the spring season, both male and female turkeys are legal in the fall season. Permit fees are \$10 for Maine residents, and \$40 for nonresidents.

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

--Andrew Weik and R. Bradford Allen



Ruffed Grouse

Hunting Seasons

The ruffed grouse, or partridge, is considered by many to be the premiere 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 (1998-2002) numbers in recent years. Reports of abundant grouse drumming this spring are tempered by early-summer observations of numerous broods in some districts and scarcity in other areas, resulting in a "clear as mud" grouse forecast for fall 2003.

Grouse Reports From Maine Moose Hunter Survey

For the last 10 moose hunts (1993-2002), moose hunters were 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.

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 2002, moose hunters reported seeing 31 grouse per 100 hours, which was down from the previous year's mark of 48. The average grouse harvest by this sample of moose hunters and their hunting parties over the 9-year period was 4,057 (Table 14).

Table 14. Grouse harvests by moose hunters and others in their hunting party, 1993-2002.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Permit holders reporting	888	1,069	1,252	1,321	1,323	1,739	2,542	1,887	2,673	2,251
Number of grouse seen	4,624	5,804	18,069	4,880	6,868	11,604	17,754	11,731	28,723	16,636
Grouse seen/100 hours of hunting	-	35	107	20	25	43	37	33	48	31
Grouse taken by permit holders	1,039	1,432	4,160	871	1,268	2,424	3,268	1,933	2,441	—
Grouse taken by others in party	1,022	1,146	3,779	836	1,024	2,182	2,990	2,081	2,703	—
Total grouse taken	2,061	2,578	7,939	1,707	2,292	4,606	6,258	3,930	5,144	—

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 harvest management issues facing wildlife managers today as more hunting pressure is directed toward grouse in Maine's vast, but increasingly accessible, industrial forests. Further, annual information on the status of the statewide grouse population, hunting pressure, and harvests is needed. Over the last three years, we have increased hunting opportunity for ruffed grouse by extending the hunting season through December in most Wildlife Management Districts. To do this, we have had to rely on information provided by wildlife agencies in other northern states that have invested more in research and monitoring of their ruffed grouse resource.

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).***

--Andrew Weik and R. Bradford Allen

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 state-wide 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.

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 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 grows, it is important to recognize the contributions of sportsmen to migratory bird efforts. 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, described in the Introduction of this publication.

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 than \$500 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. The source of this information is USFWS Adm. Report titled, *Hunting and Migratory Birds- How Hunters Benefit Many Migratory Bird Species*.

Current Waterfowl Populations

Again last winter, biologists Andy Weik, Brad Allen, and John Bidwell conducted Maine's annual Midwinter Waterfowl Survey (Table 15). They surveyed coastal waters and estuaries from Kittery to Eastport during January 3-12, 2003. They recorded over 66,800 ducks and geese wintering along Maine's coast, a number considerably lower than last January's near record numbers. Normal "old-fashion" winter weather conditions generally translate to modest waterfowl counts, and that was the case this year. All species except scoters were found in lesser numbers this year in Maine compared to last year's unusually high count. As usual, the most frequently observed duck was the common eider; but the count of approximately 26,000 was substantially less than the 46,000 counted last year, and was considerably lower than the most recent 10-year average of nearly 42,000. The black duck count (17,283) was also lower than the 10-year average. Mallards and Canada geese continue to winter in generally improving numbers in Maine, with sizeable concentrations of both species showing up in eastern Maine this past January.

Table 15. Mid-winter Waterfowl Survey data for Maine, January 1996-2003.

Species	Total Recorded by Year							
	1996	1997	1998	1999	2000	2001	2002	2003
Mallard	480	556	995	1,849	892	1,162	3,224	2,857
Black Duck	15,848	14,597	24,027	32,600	20,666	12,971	21,368	17,283
Green-winged Teal	0	0	0	0	0	0	70	0
Total Dabblers	16,328	15,153	25,022	34,449	21,558	14,133	24,662	20,140
Ruddy Ducks	0	0	0	0	0	0	508	60
Scaup	1,052	1,175	581	1,830	1,790	1,080	370	450
Common Goldeneye	3,776	5,429	4,543	7,416	3,392	2,510	5,577	3,912
Bufflehead	2,613	3,175	9,270	7,099	3,252	4,472	6,950	5,104
Common Merganser	1,244	1,662	4,028	5,451	4,948	5,550	7,802	3,600
Total Divers	8,685	11,441	18,422	21,796	13,382	13,612	21,207	13,126
Common Eider	35,716	39,001	31,809	38,735	38,351	28,664	46,036	26,347
Scoter	5,134	2,804	2,755	3,198	4,611	1,941	2,710	2,857
Long-tailed Duck	954	1,797	1,739	2,861	1,120	2,389	2,311	1,759
Harlequin	3	24	0	0	15	0	25	5
Total Sea Ducks	41,807	43,626	36,303	44,794	44,097	32,994	51,082	30,968
Unidentified Ducks	12	90	246	254	210	425	248	18
TOTAL DUCKS	66,832	70,310	79,993	101,293	79,247	61,164	97,199	64,252
Canada Goose	1,090	1,911	1,986	3,071	3,139	2,769	3,377	2,603
Brant	13	15	0	21	0	0	0	0
Total Geese	1,103	1,926	1,986	3,092	3,139	2,769	3,377	2,603
GRAND TOTAL	67,935	72,236	81,979	104,385	82,386	63,933	100,576	66,855

The Midwinter Waterfowl Survey is conducted at the same time each winter in each state in the Atlantic Flyway (from Maine to Florida). Overall status of wintering waterfowl populations are determined when Maine's 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 2003 remain 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 Populations, 1955-2003*, that the total duck population estimate, excluding sea ducks, was 36.2 million birds, 16% above last year's estimate and 9% above the 1955-2002 long-term average. They also reported that habitat conditions for breeding waterfowl have greatly improved over last year in most of the North American prairie survey area. These improved conditions are reflected in the numbers of ponds counted during the 2003 surveys. The estimate of "May ponds" was 91% higher than last year. This is good news but, years of dry conditions in part of the U.S. and Canadian prairies, combined with aggressive agricultural practices during periods of drought, have reduced the quality and quantity of nesting cover in many regions. Good moisture conditions received in late winter and early spring in 2003 could result in rapid growth of new cover.

Conditions and duck numbers were different in the east. USFWS biologist/pilot John Bidwell (a resident of Hampden, Maine) reported that the 2003 waterfowl breeding population survey of Maine and the Maritimes was conducted from May 3 to June 7. This is the fourth operational year for the survey. For Maine and most of the Maritimes, below average temperatures and below average precipitation was the overall climatic theme that may have profoundly influenced the survey results. John and his survey colleagues report that the overall duck population estimate for 2003 is the second lowest of record at 826,600. It is 42.7% below last years index and 17.1% below the 1996-2002 average. American black ducks were down 40.5%, and Canada geese declined slightly, which could reflect a fall flight similar to 2002. This years survey shows a consistent, across the board, decline in all indices. On a brighter note, good to excellent habitat conditions were believed available to nesting waterfowl this year, so production should be good for 2003.

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. Since the mid-1980s, the numbers of broods observed of all species, except mallards, have declined. One goal of the state waterfowl management plan is to restore the relative proportions of species found breeding in Maine to historical levels.

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, 2002¹.

	1966-76		1980-84		1986-90		1991-95		1996-2000		2002	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%		%
Black Duck	37	29	34	19	56	24	50	24	24	16	26	15
Ring-necked Duck	31	24	44	25	49	21	39	19	30	20	50	29
Wood Duck	15	12	24	13	38	17	43	21	32	22	31	18
Goldeneye	23	18	36	20	39	17	31	15	27	19	31	18
Hooded Merganser	10	8	19	11	26	11	24	12	21	14	21	12
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	0	0
Common Merganser	4	3	11	6	12	5	8	3	6	4	5	2
Mallard	1	1	5	3	7	3	11	5	7	4	9	5
Total Observed	127	100	179	100	229	100	208	100	148	100	174	100

*Known breeder: assigned 1 brood during 1966-76 even though not observed in brood counts.

¹Mallard x black duck hybrids and Canada geese were excluded from analysis.

Waterfowl Hunting Seasons

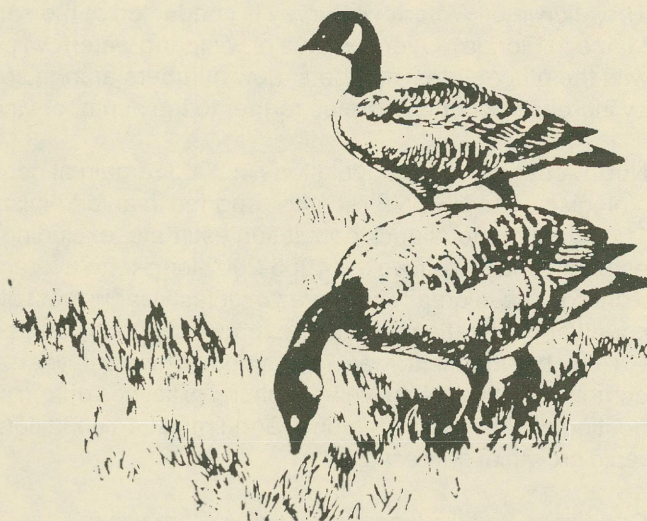
Waterfowl harvests in the United States have declined since 1978, when 15.1 million ducks were recorded in federal harvest surveys. This has been partly by design - as regulations became more restrictive - but it also reflects declining hunter numbers and lower waterfowl populations during the 1980s. 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). Recent estimates indicate that the number of waterfowl hunters in Maine remain stable at approximately 10,000 hunters.

In response to drought conditions on the U.S. and Canadian prairies (the "duck factory" of North America), season lengths were shortened significantly between 1985-1993 (from 50 days to 30 days in the Atlantic Flyway). This, in concert with declining numbers of hunters, led to a plunge in the estimated number of hunter days afield. Since 1994, the federal framework for duck seasons has increased to 40 days in 1994-1995, 50 days in 1996, and 60 days in 1997-2002.

Restrictions in harvest regulations 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 1997-2002.

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 2002 regular duck season 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 mail survey conducted this past winter indicates that approximately 9% of waterfowl hunters bring a young person 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 increased annually to approximately 5,000 birds in recent years. Participation in the September goose hunt has increased as well. The mail survey conducted this past winter indicates 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. Study of these figures reveal that 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. Maine dabbling and diving duck harvest statistics, 1961-2001.

	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 (preliminary)	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 dramatically changed over this period (Table 17). Harvests of mallards have increased from less than 1,000 birds per year (1961-65 mean) to nearly 15,000 birds in 2001. The common eider is another bird that has shown dramatic increases in the annual Maine kill (Table 18). Showing sizable declines in the Maine harvest in recent years are black ducks, blue-winged teal, scoters, and common goldeneyes.

Table 18. Sea Duck harvest statistics 1961-2001.

	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 (preliminary)	14,117	1,691	1,880	1,891	1,905

* formerly known as oldsquaw.

The declines in both the annual kill (Table 17) and the MWS estimate (Table 15) of common goldeneyes in Maine and other northeastern states have waterfowl managers concerned about this species. 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. Smaller numbers of common goldeneyes breed in Maine, but the less common Barrow's goldeneye is strictly a wintering 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 center shifts, 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 then 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 2001-02 and 2002-03 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, 2001-2002.

	2001	2002 (preliminary)
Black Duck	5,868	9,717
Mallard	7,839	15,744
Mallard x Black Duck Hybrid	422	861
Green-winged Teal	2,723	9,287
Blue-winged Teal	469	185
Northern Shoveler	0	62
Northern Pintail	94	554
Wigeon	47	185
Wood Duck	7,323	7,319
Greater Scaup	0	123
Lesser Scaup	0	123
Ring-necked Duck	610	1,845
Bufflehead	1,925	2,661
Common Goldeneye	704	431
Hooded Merganser	1,643	1,415
Other Mergansers	845	1,292
Total dabbling/diving duck harvest:	30,512	51,804
Seasonal duck harvest per hunter:	4.7 (+/- 40%)	8.1 (+/- 41%)
Canada Goose	5,165	12,800
Seasonal goose harvest per hunter:	1.3 (+/- 62%)	2.8 (+/- 52%)
(Maine sea duck harvest estimates based on Harvest Information Program, 2001-2002.)		
	2001	2002 (preliminary)
Common Eider	17,257	20,600
Long-tailed Duck	1,371	2,800
Scoter species	5,371	6,400
Total sea duck harvest:	23,999	29,800
Seasonal sea duck harvest per hunter:	9 (+/- 76%)	10 (+/- 117%)

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 unilaterally to 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 reduced their harvests of black ducks by 42% (compared to the 1977-81 average). Until 2000, this figure served as the harvest reduction goal for black ducks in the Atlantic Flyway, 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 current harvest goal for black ducks in the Atlantic Flyway is for each state to harvest at least 25% fewer ducks than the average kill during 1977-81.

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. 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 (1983-87) and 58% below those measured prior to 1983. During the 2002 hunting season, Maine waterfowl hunters could hunt black ducks for 55 days in each zone and took a reported 9,717 black ducks statewide. The black duck population seems to be responding slowly. The count of black ducks in the Atlantic Flyway during the Midwinter Waterfowl Survey (MWS) reached a low in the early 1990s, and has since risen to a level similar to that of the 1980s. However, recent MWS counts are still well below levels counted prior to 1980 – before black duck harvest restrictions were instituted – and still 13% below the flyway MWS goal of 260,000 black ducks. Additionally, we are concerned with the low number of black duck broods counted on waterfowl production index areas in Maine during the past five years (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, their populations are particularly sensitive to slight increases in adult mortality and 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 in 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 increase. The percentage of eiders in Maine's waterfowl harvest has increased from 3-4% in the mid-60s, to over 20% in the mid-80s, to a recent high of 29% in 1996 (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.

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.

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 the marine surf zone. 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 individuals, of which about 1,000 winter in Maine. In Maine, harlequins are seldom observed, because they inhabit remote rocky shores on outer islands, including Isle au Haut, west of Acadia National Park.

In the mid-1980s, the eastern North American wintering population was estimated at fewer than 1,000 individuals, with numbers declining at some winter 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 eastern North American harlequin population, of which Maine's birds are part, is designated as "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 as 50%) that winters in Maine; and 3) more than 90 percent of those harlequins wintering in Maine are located at fewer than five locations.

In Maine, work focusing on several objectives relative to the conservation of the harlequin duck began in 1995 and was completed in 2002. These objectives included: 1) determining the status, survival, and movements of the wintering population of harlequins on the Maine coast; 2) developing and testing inventory techniques for assessing winter populations; and 3) working to coordinate regional and national survey, management, and research activities with Canadian and other U.S. interests.

Results from this work suggest the wintering population in Maine is stable and may be increasing. Reduced budgets and limited personnel dictate a less intensive monitoring effort for the next five to ten years. Volunteers will likely contribute much of the field work regarding survival and movements of harlequins wintering in Maine.

Common Eider Study

Working with waterfowl researchers from Patuxent Wildlife Research Center (USGS) and Petit Manan National Wildlife Refuge, the department is collaborating on a study to determine survival, recruitment, and recovery rates of Common eiders along the Maine coast. After our first full year of the study refining capture techniques, we had 2,218 total captures: 2,197 "new" birds banded, 61 returns captured, 18 foreign (Canadian) recaptures, and 41 repeat captures.

Waterfowl 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). The Department's role in harlequin conservation is also supported by Loon Conservation Plate funds, the Outdoor Heritage Fund, federal Section 6 Funds, and financial assistance from the Gulf of Maine Project (USFWS).

--Andrew Weik, R. Bradford Allen, and Lindsay Tudor

North American Waterfowl Management Plan

Coordination of Maine habitat protection efforts among several state and federal agencies, and private organizations, has resulted in many key land purchases that benefit Maine waterfowl now and in the future. The stimulus for this coordinated effort has been implementation of the North American Waterfowl Management Plan and its various Joint Ventures.

The Atlantic Coast Joint Venture area includes all of Maine's inland and coastal wetlands. The emphasis for habitat protection in this Joint Venture is on significant waterfowl migration, wintering, and production areas. Efforts to secure protection are being directed toward the most significant and vulnerable areas.

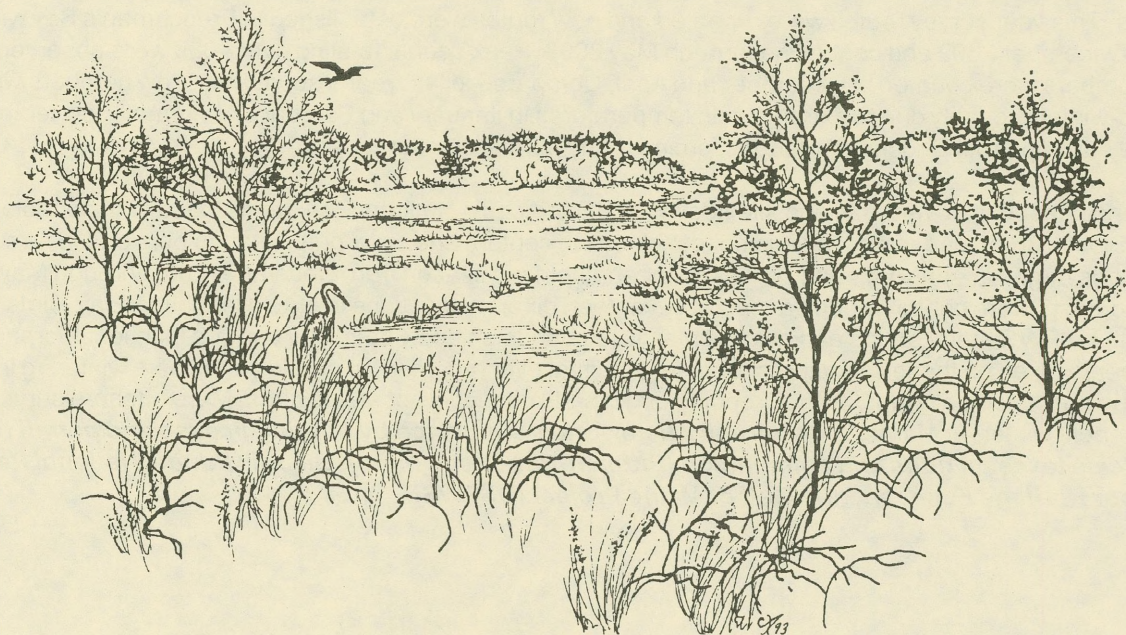
The Cobscook Bay focus area, and the Merrymeeting Bay - Lower Kennebec River focus area are two priority regions selected for projects in Maine to date. Efforts in these areas have resulted in a coordinated plan to secure protection for these important ecosystems. As of 1999, the Department and its partners have received more than \$1.9 million from grants provided by the North American Wetlands Conservation Act. These funds have allowed coordinated habitat conservation projects through purchase of fee title or conservation easements in Cobscook Bay and the lower Kennebec River region. More than 20 organizations, working through the Maine Wetlands Protection Coalition, have identified priorities and worked to conserve the most significant properties in these focus areas.

A coordinated approach to habitat conservation in the three remaining focus areas, the downeast region (Penobscot Bay east), west coast region (west of Penobscot Bay), and inland wetlands focus areas, is planned as implementation of the North American Waterfowl Management Plan proceeds. Personnel and funding limitations have, to date, slowed progress on habitat initiatives in these focus areas. Money from two other programs, the **Loon Conservation License Plate** and the **Maine Outdoor Heritage Fund**, are now available and can be used to continue and expand these efforts.

Other Bird Group Activities

In the late 1980s, the Legislature passed the Natural Resources Protection Act (NRPA). The act consolidated several state laws pertaining to protected natural resources as being of state significance. In an effort to protect significant wildlife habitat, and the birds that use these habitats, the Bird Group is developing species assessments for many coastal birds. The groups of species we are concentrating on are island-nesting seabirds, waterfowl, wading birds, and shorebirds, which represents a large and diverse group of species. Some occur in Maine in small numbers and others number in the thousands.

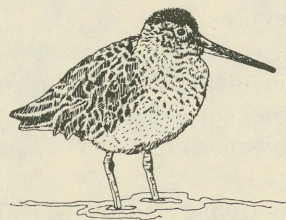
Bird Group personnel have also become involved in a number of other projects to broaden our participation in bird conservation and management activities. We participate in the North American Breeding Bird Survey, mourning dove surveys, seabird censuses and management activities, Partnerships for Wildlife in Maine, and various bird research and habitat protection initiatives. Bird management activities in Maine continue to be both challenging and rewarding. This section describes some other major initiatives we are involved in.



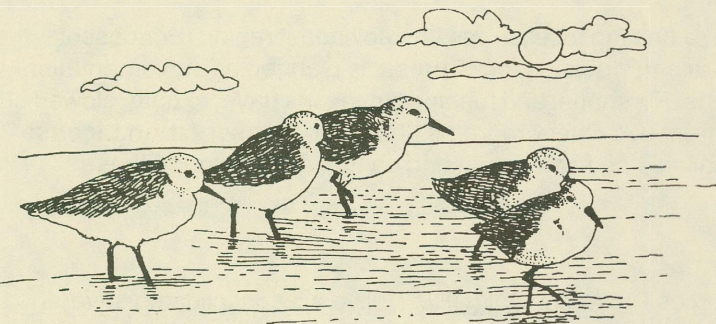
Migratory Shorebird Surveys

Shorebirds are represented in Maine by sandpipers, plovers, turnstones, godwits, curlews, dowitchers, and phalaropes. Thirty-six species of shorebirds have been reported along the coast of Maine. Along with the Bay of Fundy, the Maine coast is recognized as a critical staging area for migratory shorebirds. Many of these migrants depend on staging areas to accumulate the fat necessary to fly a nonstop, transoceanic flight to their South American wintering areas.

Shorebird staging habitat consists of discrete coastal areas that provide both tidal mud flats rich in invertebrates for feeding, and areas, such as gravel bars and sand spits, that remain above high tide for roosting. Such areas are susceptible to degradation from disturbance, development, and environmental contaminants.



In May 2001, Shorebird management goals and objectives were developed by a public working group and approved by the Advisory Council. Two goals were established: 1) Maintain or enhance vital shorebird staging and wintering habitats in Maine; and 2) Maintain or enhance nesting, feeding, and roosting habitats to support viable breeding shorebird populations in Maine.



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." Management recommendations are also prescribed to help biologists and landowners cooperatively protect and enhance shorebird habitats and meet the goals and objectives developed by the public working group.

Maine has only one species of shorebird that is a regular winter resident, the purple sandpiper. Eastern 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 the sandpipers feed on invertebrates in the rockweed. Previously, the only survey that touched upon wintering purple sandpiper numbers is Audubon's Christmas Bird Count. This survey covers only selected areas along the mainland and does not address offshore habitats. With threats from catastrophic oil spills and consequent damage to shorebird habitats or shorebirds themselves, the department has determined the need to identify and map purple sandpiper offshore habitats and acquire baseline data on population and distribution of wintering sandpipers.

In 2002, with support from Petit Manan National Wildlife Refuge, six coastal survey routes were established in Jericho and outer Penobscot Bay. Routes were surveyed between January and May with peak counts totaling over 3,400 purple sandpipers. This year survey routes were repeated and new routes were established in Frenchman's Bay with surveys starting in December 2002 and continuing through May 2003. Peak counts totaling over 4039 were observed. Most of the high numbers were counted in December and April. Compared to last year's survey, very low numbers were observed mid-winter probably due to extreme cold temperatures in January and February. Abnormally low temperatures caused ice build up around rocks and ledges forcing many purples to migrate south.

To determine seasonal movements and site fidelity, MDIFW, Acadia National Park, and Coastal Maine Biological Research Station combined efforts to develop techniques to capture and band purple sandpipers on Maine's offshore ledges. Efforts began in April 2002 and continued for another field season from December 2002 through May 2003; 103 purple sandpipers were captured and banded at seventeen different locations in outer Penobscot Bay. Birds were banded with USFWS metal bands and colored plastic leg bands uniquely coded by capture location. Morphometric measurements taken on these sandpipers represent the first ever recorded on purple sandpipers wintering in North America and may eventually identify the breeding origin and subspecies of Maine birds. More offshore survey work is planned for next winter. ***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, National Park Service, the Outdoor Heritage Fund, and the Gulf of Maine Project (USFWS).***

--Lindsay Tudor

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 2003. 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 1994-2002 are provided in (Table 20).

Table 20. Nesting waterbirds, seabirds, and eider populations and number of colonies occupied, 1976-77 and 1994-2002.

	1976-77		1994-02	
	Pairs	Colonies	Pairs	Colonies
Arctic Tern (ARTE)	1,640	9	2,975	10
Atlantic Puffin (ATPU)	125	1	555	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	5,936	22
Double-crested Cormorant (DCCO)*	15,333	103	19,680	125
Glossy Ibis (GLIB)	75	3	182	3
Great Black-backed Gull (GBBG)*	9,847	220	15,800	231
Great Blue Heron (GTBH)	903	18	644	14
Great Cormorant (GRCO)	0	-	192	6
Great Egret (GREG)	0	-	5	1
Herring Gull (HEGU)*	26,037	223	28,290	183
Laughing Gull (LAGU)	231	6	2,638	3
Leach's Storm-petrel (LHSP)	19,131	17	10,370	33
Little Blue Heron (LBHE)	4	2	8	2
Razorbill (RAZO)*	25	2	299	5
Roseate Tern (ROST)	80	3	285	3
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 Colonial Waterbird Grant from the Region 5 USFWS.

--R. Bradford Allen

Marshbird Surveys

Several species of wetland-associated birds are found in Maine, yet their distribution and population status remain poorly understood, because their presence is not easily detected. But, by broadcasting tape recordings of their vocalizations, the presence of many of these species in a marsh can be confirmed. In 2002, we completed the second and final year of our fieldwork (as part of the Ecoregional Survey conducted in cooperation with the Maine Natural Areas Program) to evaluate the distribution and relative abundance of 10 wetland bird species in the Boundary Plateau and St. John Upland regions of northwestern Maine. Target species included least and American bitterns, sora, Virginia rail, common moorhen, sedge wren, and pied-billed grebe, among others. We also conducted nighttime surveys for yellow rails. During the two year survey, we visited 27 wetlands, where common snipe and American bitterns were the most frequently detected species followed by Virginia rail and sora. The maximum number of target species at a single site was 7, and 5 of 27 sites had 5 or more species. Because the distribution and habitat requirements for these species are not well known, current habitat protection efforts may be inadequate to ensure long-term population viability, especially for the less abundant species. Furthermore, least bittern, yellow rail, and common moorhen are currently listed as special concern in Maine. Additional information about these species would help clarify their status, and may lead to habitat management strategies to aid in their conservation. Some species may prove to be so rare that they warrant the special protection afforded Threatened and Endangered species. **This work is supported by Loon Conservation Plate and Maine Outdoor Heritage Funds.**

--Thomas P. Hodgman

Rusty Blackbird

As part of the ecoregional survey, MDIFW also continued to examine the population status of Rusty Blackbirds in the Boundary Plateau and St. John Upland regions of northwestern Maine. Rusty Blackbirds are the northernmost blackbirds in North America, reaching the southern limit of their breeding range in Maine. During the summers of 2001 and 2002, we conducted roadside surveys for this species by stopping at small, beaver-created wetlands, alder-choked streams, and pond and lake shores, broadcasting a tape recording of a territorial male's vocalization, then watching and listening for a response. We surveyed 188 sites among 84 townships during the two field seasons. Despite this amount of effort, we detected this species at only 18 of the 188 sites. Furthermore, these birds did not appear to be uniformly distributed, rather we found them somewhat concentrated in roughly 4 areas. Evidence of successful breeding was limited as most observations were of individuals, but we observed multiple birds at 6 of 18 occupied sites as well as a fledged brood at one site. Rusty Blackbirds are thought to be declining throughout North America; however, no empirical data are available to evaluate their population trend. Results of our surveys will form a base from which the first steps toward a monitoring program could be taken. ***This work is supported by Loon Conservation Plate Funds and Maine Outdoor Heritage Funds.***

Owls

For several years, Bird Group staff has been conducting nighttime surveys for owls in late winter and early spring. Our purpose has been to evaluate the status and distribution of several species, and secondly, to examine the feasibility and best methods for setting up a volunteer-based monitoring program in Maine. In January 2002, we teamed up with Maine Audubon and enlisted a large group of volunteers to help with the initial phases of this effort. With the help of local media, we surpassed expectations for volunteers with over 300 interested individuals assigned to just over 150 survey routes. Interest waned slightly in 2002, but we still managed to assign about 120 routes to volunteers. Preliminary examination of our data indicates a state-wide distribution for barred, great horned-owl and northern saw-whet owl as expected. Most interesting, however, were several observations of eastern screech-owls in central and southern Maine, a species of special concern in our state. Our preliminary data also indicate that the best time of night to conduct surveys is after 1:00 AM from the latter half of March through the first week of April. We anticipate continuing this project in a downsized monitoring format in the coming years. A more thorough analysis of all data should begin by late summer and be completed by late winter 2004. ***This work is being supported by the Loon Conservation Plate Funds; Maine Outdoor Heritage Funds; USFWS; Maine Audubon; hunting license and permit revenues; excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), and hundreds of volunteers.***



Important Bird Areas

The idea of identifying the most significant sites for bird conservation is not unique to Maine. In fact, it's a concept that has been ongoing worldwide for about a decade. In the United States, National Audubon Society has led the effort by engaging state-based partner organizations. In Maine, staff from the Bird Group and from Maine Audubon form a three-person coordinating team to lead the project. In addition, other members of IFW staff, as well as over a dozen outside individuals, serve as a panel of bird experts on the technical committee. The coordinators and technical committee work together to identify the top spots for birds in Maine. To date, we have identified 43 areas, which are typically made up of a cluster of important sites often, but not always, centered around existing conservation lands. The intent of the project is to identify these areas, work cooperatively with landowners to maintain them in bird-friendly habitat, and to encourage that the areas remain open to public access for birding and other traditional outdoor activities. Currently, the technical committee is assembling data from state archives that can be used to objectively evaluate an area's potential, statewide importance to bird conservation. This project will continue through spring 2005. ***This work is being supported by the Loon Conservation Plate Funds, Outdoor Heritage Funds, National Audubon Society, Maine Audubon; hunting license and permit revenues; excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

Sharp-tailed Sparrows

The sharp-tailed sparrows that inhabit tidal marshes are of management concern throughout the Northeast. Maine hosts both species (Nelson's and saltmarsh sharp-tailed sparrows) and contains nearly all the sites where these two species co-occur. These small birds are of concern because they are restricted to coastal marshes for every aspect of their life cycle, their habitat is somewhat restricted and fragmented, and they nest within inches of the ground, making them vulnerable to flooding by high tides and heavy rain storms.

In 2001, we completed field work on the ecology of sharp-tailed sparrows at Scarborough Marsh Wildlife Management Area and final analyses continue. Specific analyses in the past year have included developing a standardized method for monitoring these species. As these sparrows are not territorial like other birds, standard methods for monitoring populations cannot be used. Field work on these species has been limited with more work anticipated in 2003 to further evaluate the degree of exposure of these species to mercury. We continue to work toward building partnerships to help explore the risk posed to these species and to evaluate its significance in their conservation. ***This work is being supported by the Loon Conservation Plate Funds, Outdoor Heritage Funds, and USFWS.***

Partners In Flight

In the early 1990s, a coalition, known as Partners In Flight, was formed between federal and state natural resource agencies, educational institutions, and private conservation groups to focus their collective efforts on the most important issues facing landbird conservation in the western hemisphere. Species that winter in Central and South America and breed in North America were of primary concern, having experienced population declines in parts of their ranges as evidenced by the North American Breeding Bird Survey (Table 21). As such, Partners In Flight has worked to prioritize species of conservation concern for each region and state in the U.S. Beyond that, several physiographic areas have been identified in each region as units for a planning process that have identified research, management, monitoring, and outreach needs necessary to implement effective bird conservation strategies from coast to coast.

Table 21. Estimated population trends for selected songbird species (% change per year) observed in Maine according to the North American Breeding Bird Survey.

Species	Habitat	1966-02	1966-79	1980-02
Red-winged Blackbird	Marshes/Wetlands	-2.7 *	-4.7	-0.1
Tree Swallow	Fields and Marshes	-0.9	+2.5	-2.3*
Savannah Sparrow	Fields and Pastures	+1.0	+2.0	+0.7
Bobolink	Fields and Pastures	-1.2	+1.7	-2.7
Eastern Meadowlark	Fields and Pastures	-6.7*	-8.1*	-5.8*
Eastern Bluebird	Fields and Pastures	+8.3 *	-3.9	+7.0*
Chestnut-sided Warbler	Brushy Areas	-2.4*	+1.1	-2.8*
Gray Catbird	Brushy Areas	-1.7*	-1.5	-1.4*
American Robin	Yards and Edges	+0.1	-1.4	+0.5
Baltimore Oriole	Forest and Edges	+1.9	+3.9	-0.3
Wood Thrush	Forest	-2.3*	+8.7*	-3.8*
Blue-headed Vireo	Forest	+6.0*	+19.1*	+3.8*
Ovenbird	Forest	+0.4	+4.3*	+0.1
Scarlet Tanager	Forest	+3.5*	+13.7*	+3.3*
Black-capped Chickadee	Forest	+1.8*	-7.0*	+1.5*

Each state, or group of states, has a working group comprised of individuals dedicated to conserving bird populations. Maine Partners In Flight is a working group assembled to address issues within the state of Maine. Nearly 70 individuals, representing over 40 agencies, institutions, and organizations, have participated in Maine Partners In Flight meetings and activities. Coordination of the Maine Partners In Flight working group resides within the Bird Group at IFW's Wildlife Resource Assessment Section. Bird Group personnel serve as Maine's representative to the regional Partners In Flight Working Group. Partners In Flight, at the regional and national levels, has encouraged state working groups to take responsibility for priority species within their borders, before they become rare, by using cooperative management approaches based on the best scientific data available.

Within the Maine working group, members are participating in a mountaintop bird monitoring program; working with Maine Audubon Society to develop an Important Bird Areas program; and expanding participation in International Migratory Bird Day, the North American Migration Count, and Maine Audubon's Spring Bird Festival, as well as other bird outreach activities statewide. More information about Partners In Flight activities in Maine is available on our department's website (<http://janus.state.me.us/ifw/wildlife/pif/index.htm>).

Over time, the focus of Partners In Flight has broadened to include birds other than just long distance migrants. This approach has helped ensure that the conservation status of "all birds/all habitats" will be included in decision-making processes. Recently, the idea of further integrating bird conservation, that is, hunted and nonhunted species alike, has risen to the forefront. At present, Partners In Flight is working closely with the Atlantic Coast Joint Venture to better integrate the conservation of all birds. Within North America, 37 bird conservation regions have been identified to facilitate delivery of conservation projects for all bird species. ***This work is supported primarily by Loon Conservation Plate Funds.***

--Thomas P. Hodgman

ENDANGERED SPECIES GROUP

The Endangered Species Group's primary responsibilities are to develop and implement recovery plans for Endangered and Threatened wildlife and to coordinate amphibian, reptile, and invertebrate conservation initiatives. Populations of Endangered and Threatened species are small and vulnerable, and they need special attention if they are to remain viable. Some, like the Katahdin arctic butterfly, Clayton's copper butterfly, and Tomah mayfly, are called endemics – they are found nowhere else in the world but Maine. Much like emergency room patients, these species need immediate attention and treatment if they are to survive. To provide the level of care that is needed, MDIFW developed a program to address the growing needs of the state's Endangered and Threatened species, and assigned the Endangered Species Group programmatic responsibility for these species. Like the other groups in WRAS, the Endangered Species Group consists of highly dedicated professionals.

Vacant, Group Leader – Mark McCollough was the Group Leader, but he accepted a position with the US Fish & Wildlife Service this past year. The enthusiasm and leadership of this talented biologist and artist will be missed.

Charlie Todd, Wildlife Biologist – has devoted over 25 years of his life 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, and works closely with the Mammal Group on wolf and Canada lynx issues.

Beth Swartz, Wildlife Biologist – coordinates closely with the Maine Natural Areas Program to maintain the Maine Biological and Conservation Database – a compilation of all the state's rare and endangered wildlife, plant, and natural community data. She also coordinates freshwater mussel and Clayton's copper butterfly conservation initiatives.

Phillip deMaynadier, Wildlife Biologist – the department's species expert on amphibians and reptiles. He coordinates vernal pool conservation and serves as Maine's representative to the national organization, Partners in Reptile Conservation. He also leads Maine's dragonfly and butterfly atlasing projects.

Vacant, Wildlife Biologist – Heather Givens coordinated ecoregional surveys for the department. This past fall, she married and moved to New York. Heather's talent and drive have already been missed.

Funding

Stable funding to address these and other wildlife programs is desperately needed. Unfortunately, there has never been a stable and secure source of funding for nongame and endangered wildlife programs. The Nongame and Endangered Wildlife program began in 1983 with establishment of the Maine Endangered and Nongame Wildlife Fund, which is based on the "Chickadee Checkoff," a voluntary tax check-off on the state income tax form (Table 22). This was

Table 22. A history of income derived from the "Chickadee Checkoff," Loon Plate, and Maine Outdoor Heritage Fund to benefit nongame and endangered wildlife programs.

Year	Chickadee Checkoff				Loon License Plate		Maine Outdoor Heritage Fund	
	Total Given	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

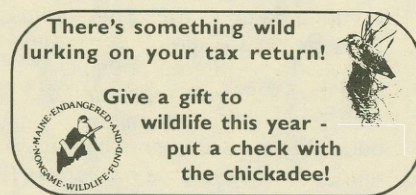
followed in 1993 by the Conservation Registration Plate (Loon Plate) a voluntary vehicle plate registration. Finally, the Maine Outdoor Heritage Fund, established in 1996, allocated proceeds from a lottery ticket sale to conservation, including 15% allocated to Endangered and Threatened species. Unfortunately, these sources of funding have been inconsistent or, in some instances, have declined because of competing check-offs, placement on tax forms, competing license plates, or competing lottery tickets, prompting many to wonder whether it is prudent to fund resource conservation in this way. In 2000, a legislative Futures Committee assessed MDIFW's unmet needs, threats, and documented the resources that MDIFW needs to achieve their mandates and public expectations. They recognized the need for additional funding, especially from the state's General Fund, for nongame and watchable wildlife programs.

Furthermore, the Conservation and Reinvestment Act (CARA) made a major breakthrough in Congress in 1999 when it passed the House Resources Committee. Unfortunately, it was not scheduled for a vote in the Senate in 2000. This bill continued to be debated in 2001. Ironically, it passed in the Senate, but not in the House! If passed, CARA would allocate \$21 million to Maine annually for conservation-related programs, including \$2.2 to 3.5 million to MDIFW for wildlife diversity programs. As welcome as these funds would be, they would meet only a portion of the resource needs. Other sources of state-funding, including General Funds, need to be invested in Maine's wildlife resources. Wildlife belongs to **all** of the people of the state, and sportsmen's dollars can't be expected to do it all.

Speaking of sportsmen's dollars - 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.

Chickadee Checkoff

Income from the Chickadee Checkoff dropped dramatically (40-50%) in 1998, because the check-off was unexpectedly moved from the primary tax form to a supplemental form. The checkoff remained on a supplemental form in 2001, and it looks as though it will now permanently stay there. Income in 2002 remained at a reduced level and was \$50,412 (up about \$15,000 from 2001 - Table 22). Only 0.06% of taxpayers contributed. Participation rates have steadily declined from highs of over 5% in the mid-1980s to 1.5-2.0% just prior to moving the tax form to a supplemental form. However, average donations have increased steadily from \$4-\$5 in the 1980s to \$13.77 in 2002. If contribution levels could be increased to the 3-4% range, income from the checkoff would increase to \$221,098 - \$294,408 at current average levels of giving. This could provide substantial increases for nongame and endangered programs.



Conservation Registration Plate (Loon Plate)

The Loon Plate has been very successful, but competition with the free, general issue Chickadee Plate, introduced in July, 1999, has significantly reduced this important source of funding. Loon plate sales rose from nearly 60,000 in 1994 to over 110,000 in 1998, providing MDIFW with up to \$617,000 annually for nongame and endangered wildlife projects (Table 22). Residents pay a \$15 annual renewal for this conservation plate, of which \$5.60 is returned to MDIFW and \$8.40 to the Bureau of Parks and Lands. Maine has one of the highest participation rates nationally for conservation license plates with about 13% of eligible vehicles registered as Loon Plates. The introduction of the chickadee plate in 2000 resulted in about a 20% decline in the sales Loon Plate. Revenue to MDIFW dropped by another 9% (\$41,429) in 2001. In the 2002 legislative session, many new license plate designs were introduced- all of



which could further reduce revenues from the Loon Plate. A new lobster plate was introduced in 2003. We believe that all new plate designs will result in a measurable loss of Loon Plate revenues.

Outdoor Heritage Fund

In 2002, MDIFW received \$172,191 from competitive grants from the Outdoor Heritage Fund for 8 wildlife diversity projects. Sales of Outdoor Heritage Fund lottery tickets have fluctuated, but annual income generated to the Fund is approximately \$1.5 to \$2 million annually. Available funds were fewer and competition was greater for Outdoor Heritage funds in 2002. Fifteen percent of the revenues are dedicated to endangered species projects. This important new source of funding is benefiting many nongame and endangered species.



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.

Given our limited resources, Maine can be proud of the accomplishments made for nongame and endangered wildlife in the last 17 years. We thank those of you who buy a Loon Plate, participate in the Chickadee checkoff, 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 Society, 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 and 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!

New Federal Funding

In lieu of passing CARA (see above), new federal funding was established in 2001 to help critical wildlife projects in Maine. MDIFW was the recipient of funds from the Wildlife Conservation and Restoration Program (WCRP) the new State Wildlife Grant Program (SWG). Details of this program have been outlined by Sandy Ritchie (see page 4).

Endangered Species Listing

Table 23. Maine and Federally listed Endangered and Threatened species (as of June 10, 1997).

Maine Endangered Species:	
Golden Eagle - <i>Aquila chrysaetos</i>	Blanding's Turtle - <i>Emydoidea blandingii</i>
Peregrine Falcon - <i>Falco peregrinus</i> B	Box Turtle - <i>Terrapene carolina</i>
Piping Plover - <i>Charadrius melodus</i> **	Black Racer - <i>Coluber constrictor</i>
Roseate Tern - <i>Sterna dougallii</i> *	Roaring Brook Mayfly - <i>Epeorus frisoni</i>
Least Tern - <i>Sterna antillarum</i>	Ringed Boghaunter (dragonfly) - <i>Williamsonia lintneri</i>
Black Tern - <i>Chlidonias niger</i>	Clayton's Copper (butterfly) - <i>Lycaena dorcas claytoni</i>
Sedge Wren - <i>Cistothorus platensis</i>	Edwards' Hairstreak (butterfly) - <i>Satyrrium edwardsii</i>
American Pipit - <i>Anthus rubescens</i> B	Hessel's Hairstreak (butterfly) - <i>Callophrys hesseli</i>
Grasshopper Sparrow - <i>Ammodramus savannarum</i>	Katahdin Arctic (butterfly) - <i>Oeneis polixenes katahdin</i>
Maine Threatened Species:	
Bald Eagle - <i>Haliaeetus leucocephalus</i> **	Loggerhead Turtle - <i>Caretta caretta</i> **
Razorbill - <i>Alca torda</i>	Swamp Darter (fish) - <i>Etheostoma fusiforme</i>
Atlantic Puffin - <i>Fratercula arctica</i>	Tidewater Mucket (freshwater mussel) - <i>Leptodea ochracea</i>
Harlequin Duck - <i>Histrionicus histrionicus</i>	Yellow Lampmussel (freshwater mussel) - <i>Lampsilis cariosa</i>
Arctic Tern - <i>Sterna paradisaea</i>	Tomah Mayfly - <i>Siphonisca aerodromia</i>
Upland Sandpiper - <i>Bartramia longicauda</i>	Pygmy Snaketail (dragonfly) - <i>Ophiogomphus howei</i>
Northern Bog Lemming - <i>Synaptomys borealis</i>	Twilight Moth - <i>Lycia rachelae</i>
Spotted Turtle - <i>Clemmys guttata</i>	Pine Barrens Zanclognatha (moth) - <i>Zanclognatha martha</i>

Federally Listed Endangered or Threatened Species currently or historically occurring in Maine, but not listed under Maine's Endangered Species Act	
Eskimo Curlew - <i>Numenius borealis</i> */	Sei Whale - <i>Balaenoptera borealis</i> *
Gray Wolf - <i>Canis lupus</i> **/?	Leatherback Turtle - <i>Dermochelys coriacea</i> *
Eastern Cougar - <i>Felis concolor cougar</i> */	Atlantic Ridley Turtle - <i>Lepidochelys kempii</i> *
Canada Lynx - <i>Lynx canadensis</i> **	Shortnose Sturgeon - <i>Acipenser brevirostrum</i> *
Right Whale - <i>Eubalaena glacialis</i> *	Atlantic Salmon - <i>Salmo salar</i> *
Humpback Whale - <i>Megaptera novaeangliae</i> *	American Burying Beetle - <i>Nicrophorus americanus</i> */
Finback Whale - <i>Balaenoptera physalus</i> *	Karner Blue - <i>Lycaeides melissa samuelis</i> */
Sperm Whale - <i>Physeter catodon</i> *	
note: * = Federally listed Endangered Species; ? = current presence uncertain in Maine.	
** = Federally listed Threatened Species; B = breeding population only.	

(For the companion list of Endangered and Threatened Plants in Maine, contact the Maine Natural Areas Program, Dept. of Conservation, 93 State House Station, Augusta, ME 04333-0093)

Since European settlement, at least 14 species of wildlife are known to 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. Present information does not indicate an extinction crisis, but considering the number of species for which we have no information, the growing number of rare species (Table 23), the relative absence of conserved ecosystems, and the growing threats to wildlife habitat, we cannot afford to be complacent.

What follows is a summary of the programs and major accomplishments for Endangered and Threatened wildlife, and herptiles and invertebrates that have not already been covered under the “MAMMALS” and “BIRDS” sections in this report. More information on Maine’s endangered species and nongame wildlife projects can be found on MDIFW’s web site by selecting “wildlife” at www.mefishwildlife.com

Habitat Management and Protection

Regulation is one of many tools that can be used to protect wildlife habitat. The Maine Endangered Species Act enables the Department to designate Essential Habitat for Threatened and Endangered species. This is not mandatory, and to date, has been applied only to bald eagles, roseate terns, piping plovers, and least terns. In 2001, MDIFW developed a proposal to update Essential Habitat designations for bald eagles. Since this had not been done for three years, there was a considerable backlog of sites. One-hundred-and-seventeen eagle nests were designated as Essential Habitat. All landowners were notified of this process, individual consultations occurred to address their questions and concerns and the changes became effective May 30, 2002. Final notification, updated maps, and Essential Habitat Handbooks were sent to all affected municipalities. Essential Habitat maps for Endangered and Threatened species will likely be provided in the future on MDIFW’s web site.

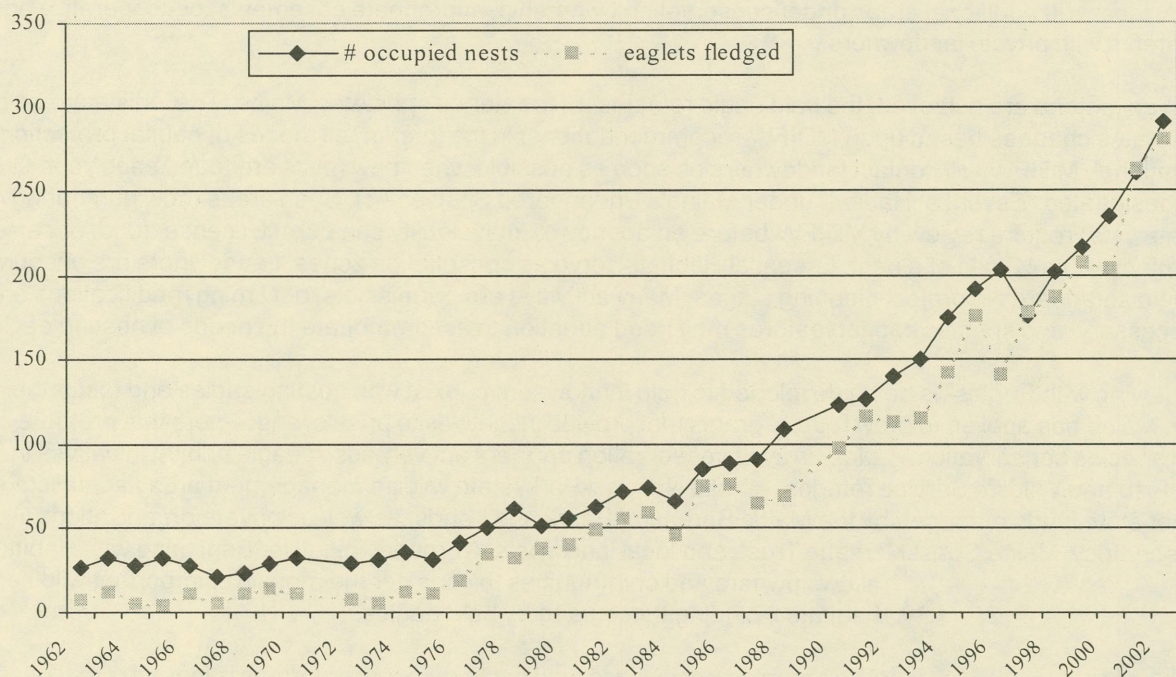
In 2001, the Endangered Species Group developed a new poster depicting all 49 state and federal Endangered and Threatened species. The reverse side of the poster contains considerable information about Endangered wildlife and is ideal for use in the classroom. Copies of the poster can be obtained from MDIFW’s Bangor or Augusta offices. Endangered species staff have also been busy preparing a new book entitled “Maine’s Endangered Wildlife,” which will be printed in 2003.

--George Matula and Mark McCollough

Bald Eagle

Bald eagles are continuing a dramatic comeback across Maine. A census of the statewide breeding population identified 290 nesting pairs in 2002. A total of 280 young eaglets took flight from Maine nests that year. Surveys are still underway in 2003, but the preliminary total already exceeds 300 pairs. Increases have averaged 8% each year since 1990 (Figure 7) when Essential Habitat regulations were put into action to help prevent disturbances to breeding eagles. This was one of several management strategies important to eagle recovery.

Figure 7. Bald eagle recovery trends in Maine.



In 1978, the bald eagle was designated an Endangered Species in Maine and 42 other states. The state’s remnant population was the last hope for the species in the northeastern U.S. The future of Maine’s eagles was very much in question following marked declines of breeding numbers, reproductive success, and nest distribution. Annual counts dropped as low as 21 nesting pairs and 4 young eaglets in the mid-1960s. Ten years later, a local stronghold of breeding eagles persisted only in easternmost Washington County.

Empty nests and unoccupied eagle habitats prevailed across the state. Environmental contaminants impaired eagle reproduction for three decades. DDE (a by-product of the insecticide DDT) caused shell thinning and frequent egg breakage before hatching. Harmful levels of PCBs and mercury sometimes killed developing embryos. The limited supply of young eaglets was not enough to offset eagle deaths. The small, relict population became 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. Human-related deaths were an additive problem.



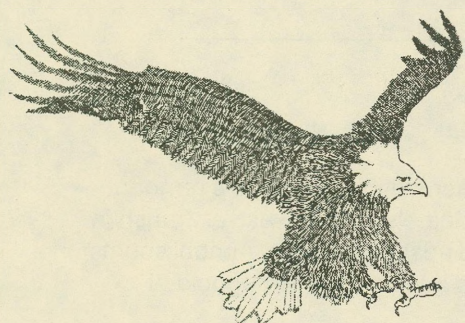
Recovery programs had to address a wide array of limiting factors, but eagle numbers and reproduction began to increase in the 1980s. Sustained improvements finally led to a downgrade of bald eagle status to that of a Threatened Species across the lower 48 states in 1995. The Maine legislature similarly reclassified bald eagles to a Threatened Species under state law in 1996. These changes do not reduce the legal protection afforded by endangered species statutes. 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.

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 of the midcoast and central Maine. Stewardship of eagle nests by private landowners has been a key ingredient of program success in the state. Maintaining suitable habitat remains our ultimate challenge for a lasting recovery. Therefore, state objectives for delisting bald eagles in Maine include both biological criteria and habitat safeguards:

- ❖ Size of resident 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 - pending.
- ❖ Habitat “safety net” to maintain species recovery (efforts ongoing through 2003-2004), including
 - At least 50 nesting areas under conservation ownership or appropriate easements; and
 - At least 100 additional areas under conservation ownership, appropriate easements, or cooperative agreements with private landowners.

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 440 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. Landowners are encouraged to review eagle safeguards in project planning stages. Many activities are permissible, but timing modifications are generally necessary, and specific habitat features may need attention to accommodate the needs of nesting eagles.

A pamphlet “Living with Eagles” is being developed to help landowners coexist with nesting eagles and foster their stewardship. Maine has applied for new federal grants that provide incentives to private landowners that promote endangered species conservation. 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, and 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.

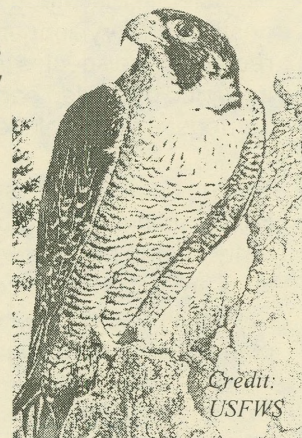


The progress achieved in bald eagle recovery programs is indeed remarkable. Improvements in Maine are mirrored across most of the species range. Bald eagles now nest in 48 different states. The U.S. Fish and Wildlife Service will reexamine removal of the Threatened Species designation for bald eagles after a national monitoring strategy is completed, and after “delisting” and clarification of “harassment” prohibitions under the Bald Eagle Protection Act are resolved. ***This work is supported by Loon Conservation Plate and Chickadee Checkoff Funds, Maine Outdoor Heritage Fund, federal Section 6 Funds, hunting***

Peregrine Falcon

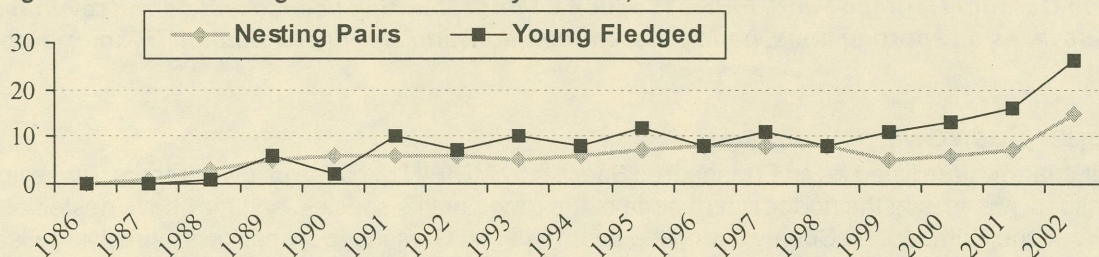
The peregrine is another species that has benefited greatly from federal/state partnerships in endangered species conservation. Formerly a breeding resident of coastal headlands and cliffs in mountainous regions, the species was extirpated from Maine and the entire eastern U.S. by the early 1960s. Like 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 1984-1997. More than 93% of young peregrines released in Maine have successfully made the transition into the wild. 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 found their way back to Maine. A peregrine from the 1984 release in Baxter State Park found his way back to the same Penobscot County cliff in 1985 and reappeared in 1986 as the first adult peregrine searching for a home in Maine. The first pair of peregrines to reside in Maine for more than 25 years chose Mount Kineo (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).

Figure 8. Trends of Peregrine Falcon recovery in Maine, 1986 - 2002.



Significant improvements finally appeared in 2002. The statewide breeding population doubled in a single year. Peregrines inhabited 15 eyries, and 26 young peregrines fledged from ten of those eyries. Some of the premiere cliff settings have been used each and every year since the return of peregrines to Maine. Others have been occupied intermittently, but virtually all were reoccupied in 2002. Three new eyries were established in southern Oxford County near the state's western border. Numbers of nesting peregrines have apparently leveled off in New Hampshire and Vermont, so our recent gains likely includes some recruitment from those sources. Maine has been on the periphery of the northeastern population centered in the mountains of New York, Vermont, and New Hampshire, so periodic setbacks were more likely.

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., and especially Acadia National Park have championed stewardship of peregrines nesting on their property. 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. Major improvements in their status in the western U.S. are largely responsible for federal delisting of peregrines in 1999. ***This work is supported Loon Plate and Chickadee Checkoff funds, Maine Outdoor Heritage Fund, federal Section 6 Funds, hunting license and permit revenues, and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

Golden Eagle

The golden eagle continues to bear the unfortunate distinction of being the rarest breeding bird in the eastern U.S. This species once inhabited mountainous cliffs in the Appalachian Mountain corridor from the Mid-Atlantic States to Labrador and northern Quebec. Two successful golden eagle eyries were last found in Maine during 1984. A single nesting pair persisted in Piscataquis County from 1985 to 1998, but only a single adult occupied the site during 1999 - 2000. The nesting territory appears abandoned since 2001. Throughout this period, the Piscataquis pair had 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. Unhatched eggs recovered in 1996 revealed significant contaminant burdens: a repeat of the same toxic problems that once impaired reproduction among bald eagles and peregrines.

Golden eagle sightings occurred in Oxford County during May - September, 2002: the entire breeding season. Biologists are hopeful but have not yet located a nest. The public is encouraged to be on the lookout for this special rarity among Maine's wildlife. Only eleven golden eagle eyries are historically known in Maine, but historical perspectives are not always accurate for birds of prey, like 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.

Suitable foraging areas are perhaps more limiting. Wading birds, such as great blue herons and bitterns, are foremost among golden eagle diets in Maine, but these wading birds were heavily tainted with contaminants. Other than the 1996 eggs from Piscataquis County, 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 at Maine eyries during the last 20 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 soon return. There are natural habitat limitations for this species in the East, which have made them rare throughout recorded history. Golden eagles are relatively numerous in the West, where open terrestrial habitats favor their normal lifestyle of preying upon small mammals. 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 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 goldens. ***Funding for this work comes from Loon Plate and Chickadee Checkoff Funds, Maine Outdoor Heritage Fund, federal Section 6 Funds, hunting license and permit revenues, and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Charlie Todd

Grasshopper Sparrow

Grasshopper sparrows are listed as an Endangered Species by MDIFW because of low numbers, range limits, and habitat limitations. Maine is at the northeastern edge of the range of this species, and they have nested at only four locations in York and Cumberland County during the past 19 years. Grasshopper sparrows inhabit large, sandy grasslands and blueberry barrens vegetated with sparse bunch grasses. These grassland habitats are rare in Maine, and require special vegetation management.

The largest nesting population of grasshopper sparrows in Maine occurs on 600 acres of sandplain grassland and blueberry barrens on the Kennebunk Plains in West Kennebunk. This site annually supports 30 - 60% of the statewide breeding population. The 2002 census conducted by The Nature Conservancy identified 46 singing males, the best indicator of territorial pairs. This is second only to the tally of 49 singing males recorded there in 2001. Surveys at the nearby Wells Barrens identified 4 additional grasshopper sparrow territories.

Funds from Lands for Maine's Future and The Nature Conservancy were responsible for the previous purchase of the Kennebunk Plains, the premiere setting for this species in the Northeast. It is now a Wildlife Management Area managed by MDIFW and The Nature Conservancy. The vegetation must be actively managed to sustain suitable habitat for grasshopper sparrows, other grassland birds, and rare plants. In the last year, managers brush-hogged 100 acres, hand cut shrubs on another 20 acres, and conducted prescribed burns on 132 acres. MDIFW provides technical assistance to the U.S. Navy and the City of Sanford to maintain grasshopper sparrow habitat at the Brunswick Naval Air Station and Sanford Municipal Airport, respectively. Inventories were curtailed in 2002 due to increased airfield security.

Conservation efforts for grasshopper sparrows benefit a suite of bird species nesting in grasslands: most notably upland sandpipers (a state Threatened Species); vesper sparrows and eastern meadowlarks (both are recognized as Species of Concern); and several others experiencing regional declines like bobolinks, horned larks, savannah sparrows, short-eared owls, and northern harriers. Maine is a stronghold in the Northeast for upland sandpipers and vesper sparrows. Guidelines for managing grassland birds in the Northeast during agricultural practices, delayed mowing of hayfields, and airfield operations were developed by the Massachusetts Audubon Society and distributed to interested landowners by MDIFW. **This work is supported by Loon Plate and Chickadee Checkoff funds, Maine Outdoor Heritage Fund, federal Section 6 Funds, hunting license and permit revenues, and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).**

--Charlie Todd

Amphibian and Reptile Studies

Partners in Amphibian and Reptile Conservation

MDIFW is involved 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 participates in PARC meetings designed to improve communication on efforts to conserve threatened herptile species in the Northeast, and to identify new projects of regional priority for implementation. To date, PARC-Northeast has made progress on drafting model state regulations and a list of regional species of conservation concern. For more information on herptile conservation efforts, or to join a northeastern working group, visit the PARC website at www.parcplace.org. **This work is supported by Loon Conservation Plate and Chickadee Checkoff funds.**

--Phillip deMaynadier

Maine Amphibian and Reptile Atlas Project (MARAP)

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

By 1998, considerable new information 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, Aram Calhoun, and Mark McCollough revised a second edition, incorporating 1,300 new records into the range maps, color photographs, and a CD of the calls of the frogs and toads of Maine. Copies of the book, *Maine Amphibians and Reptiles* (published in 1999), can be ordered for \$20.05 plus \$3.50 S&H from the Information Center, MDIFW (207 287-8000).

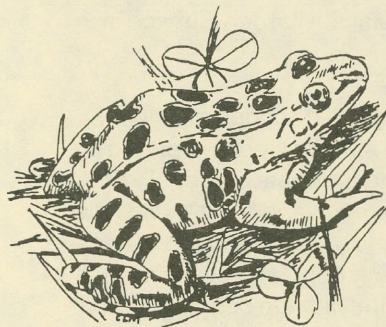
MDIFW continues to maintain a statewide database for amphibians and reptiles and encourages those enthusiasts who possess a copy of *Maine Amphibians and Reptiles* to submit new township records (using the blank record sheet at the end of the book). As always, observations of any of the four state-listed reptiles — box turtle, Blanding's turtle, spotted turtle, and black racer — should be submitted to MDIFW immediately (email phillip.demaynadier@maine.gov or call 207-941-4239). **This work is supported by Loon Conservation Plate and Chickadee Checkoff funds.**

--Phillip deMaynadier

Amphibian Monitoring

Since 1989, scientists have been concerned that amphibian populations may be declining worldwide. Maine, like many other states, had little data to assess trends in amphibian populations. In 1996, MDIFW and Maine Audubon received an Outdoor Heritage Fund grant to initiate a statewide amphibian-monitoring program, which was launched in 1997. Maine's *Calling Amphibian Survey* is part of a nationwide survey organized by the U.S. Geological Survey. Sixty-two frog and toad road monitoring routes were randomly established across the state. Each spring, volunteers drive their

routes 3 times, recording the diversity and intensity of calling frogs and toads. Eleven vacant routes still exist with volunteers needed in the following areas: N. Lebanon, S. Parsonfield, Wiscasset, Wesley, Sebec Lake, Pittston Farm, Musquacook Lake, and Presque Isle. New volunteers are provided training materials and a cassette tape of the calling amphibians of Maine. Thus far, over 100 volunteers are participating with 45 routes completed in 2002. With six years of data collected, we anticipate the capability of determining preliminary population trends for many of Maine's frogs and toads within the next few years. Currently, leopard frogs, 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 207-781-2330 or Dr. Aram Calhoun at 207-581-3010, or visit the website at: www.maineaudubon.org/conservation/mamp. **This work is supported by Maine Audubon Society, Loon Conservation Plate, and Chickadee Checkoff funds.**



This work is supported by Maine Audubon Society, Loon Conservation Plate, and Chickadee Checkoff 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 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 are medium-sized turtles (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 Atlas 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 13 years. To date, more than 2,600 wetlands have been surveyed yielding over 100 new locations for these rare species.

In the early 1990s, 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 movements. 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 one of the best remaining locations to achieve turtle conservation goals is on a 35,000-acre area surrounding Mt. Agamenticus in York County. MDIFW is working closely with the Mt. Agamenticus Conservation Coalition – including The Nature Conservancy, local land trusts, water districts, and towns - to initiate conservation planning 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.

The inherent population constraints faced by Blanding's and spotted turtles – long age to reproductive maturity and high nest mortality – have historically been offset by long adult lifespans. For example, it may require decades for an adult female Blanding's turtle to replace herself with a single offspring surviving to reproductive age. The introduction of artificial sources of adult mortality, such as road kill, short-circuits this evolutionary strategy by reducing the number of years available for adult reproduction below that required to sustainably recruit new turtles into the population. 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 turtles in Maine. Recognizing this, MDIFW, Maine Department of Transportation (MDOT) and The Nature Conservancy are cooperating on a program to enlist volunteers to adopt key road segments throughout York County for monitoring road-crossing movements and road kill of rare and common turtles. Combined with survey data on known turtle wetlands in close proximity to roads, the volunteer road-monitoring effort will help MDIFW and MDOT identify specific road segments for turtle movements and mortality. Measures for mitigating road mortality will then be considered for various hotspot road segments including "turtle crossing" signage, seasonal press releases, barrier fencing, and wildlife overpasses. ***Funding for this work comes from federal Section 6, Loon Conservation Plate, and Chickadee Checkoff funds.***

--Phillip deMaynadier

Wood Turtles

Primarily a northeastern species, the wood turtle is declining throughout its range with Maine hosting some of the largest and most viable remaining populations in the U.S. Wood turtles spend most of their time in or near streams or rivers, while becoming increasingly terrestrial during the summer months when they frequent adjacent riparian habitat. 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 about 40 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 the species' range. Dr. Judith Rhymer, a UMaine faculty member, is now studying the conservation genetics of wood turtles. Preliminary results suggest that, at the state level, several of Maine's major watersheds host unique wood turtle populations that have been isolated from one another over hundreds or thousands of years. At the

range-wide level, it is hoped that different lineages may be detectable among states and provinces, thus providing a potential forensic tool for identifying the origin of animals collected illegally for the pet trade. **Funding for this work comes from federal Section 6, Maine Outdoor Heritage Fund, Loon Conservation Plate, and Chickadee Checkoff funds.**

--Phillip deMaynadier

Invertebrate Studies

Rare Dragonflies

Maine's clean, free-flowing streams and rivers provide valuable habitat for some of North America's rarest dragonflies. The pygmy snaketail and the extra-striped snaketail dragonfly once had wide distributions throughout eastern North America, but pollution, dams, and deteriorating water quality have resulted in the extinction of many populations. Entomologists in Maine recently discovered some of the largest known populations of these species in the Penobscot, Allagash, Aroostook, Saco, Machias, and St. Croix watersheds.

In 1995, one of the world's rarest dragonflies, the ringed boghaunter, was discovered in York County by MDIFW biologists. This dragonfly is known from fewer than 60 sites in North America, mostly in the Northeast. Since 1998, and with support from the U.S. Fish and Wildlife Service (USFWS), MDIFW has surveyed over 250 wetlands in York and Oxford Counties where a total of eight populations have been discovered. From 1997-1999, biologists have captured several individuals in the Fryeburg-Brownfield Bog area, providing evidence that populations further north remain to be discovered.

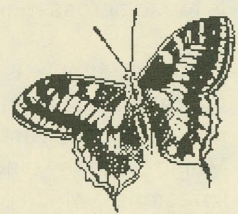
In 1996, MDIFW received an Outdoor Heritage Fund grant to conduct a statewide assessment of dragonflies and damselflies of Maine. Paul Brunelle of Halifax, Nova Scotia, compiled a 6,210 record database of all of the historical data on these species and increased the state list to 155 species! He also produced fact sheets and a beautiful color poster of the rare and endangered dragonflies and damselflies of Maine, which is available to the public for \$10 from MDIFW (207-941-4239).

Subsequently, MDIFW received a second Outdoor Heritage Fund grant, as well as support from the USFWS, to initiate the Maine Damselfly and Dragonfly Survey (MDDS) in 1999. The purpose of this 5-year, volunteer-based atlasing initiative is to improve our knowledge of the distribution, abundance, and status of damselflies and dragonflies in Maine. To date, over 200 individuals are participating at some level in the project. Aware that few individuals have had experience in collecting these insects, MDIFW provides volunteers with a collecting manual, workshops, newsletters, and web page-based aids in identification. In the first four years of the survey, over 90 volunteers were trained during five workshops held at Eagle Hill Field Research Station in Steuben. In turn, volunteers have collected over 10,000 specimens including hundreds of new county records, seven new state records, and 1 national record (the globally rare Quebec Emerald). The data, in just four years, increased by nearly 200% all of the records collected in the last century! To our knowledge, the MDDS is among the first completely state-sponsored dragonfly atlasing projects of its kind in North America. Those wishing to learn more about this project and opportunities for participation should visit the MDDS website at: <http://mdds.umf.maine.edu/~odonata/>. **This work is supported by the USFWS, Maine Outdoor Heritage Fund, Loon Conservation Plate, and Chickadee Checkoff funds.**

--Phillip deMaynadier

Rare Butterflies

Hessel's Hairstreak, Juniper 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. A colorful and conspicuous insect, butterflies have attracted increasing attention from scientists and the general public. By documenting the distribution and abundance of state-listed and other rare butterfly species, 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 recently received a grant from the Maine Outdoor Heritage Fund to contract a professional lepidopterist, Dr. Reginald Webster from New Brunswick, to help assemble a baseline atlas and assessment of the state's butterfly fauna. Drawing from published literature and specimen records located in museums and amateur collections throughout the Northeast, Reggie will assemble the first site-specific, statewide database of Maine's butterfly fauna – an essential tool for future conservation and management of the group by MDIFW and cooperators. **This work is supported by Maine Outdoor Heritage Fund, Loon Conservation Plate, and Chickadee Checkoff funds.**

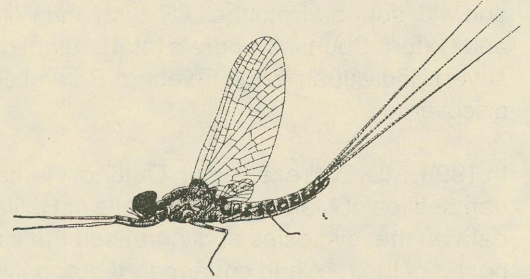
--Phillip deMaynadier

Roaring Brook Mayfly

The “Roaring Brook mayfly” was first collected at Roaring Brook on Mt. Katahdin in 1939 by T.H. Frison of the Illinois Natural History Survey. It was later described as a unique species (*Epeorus frisoni*) by well-known entomologist B.D. Burks in 1946. Despite numerous and extensive mayfly collections throughout Maine since then, *Epeorus frisoni* has never been found anywhere else!

Because this mayfly’s entire global range was documented as only Roaring Brook on Mt. Katahdin, it was listed as “Endangered” under the Maine Endangered Species Act in 1997. Since then, MDIFW has learned of a second specimen identified as *Epeorus frisoni* housed in the insect collection of a midwestern University. This individual was collected in Tompkins County, New York in 1932. These two 1930s records are the only known occurrences of the mayfly in the world! Consequently, nothing is known about its life history or conservation needs. Its current status and distribution in Roaring Brook, which has not been resurveyed since the original specimens were collected, is also unknown. In addition, questions have since been raised about the taxonomic validity of *Epeorus frisoni*. Its similarity to a closely related species has led at least one mayfly expert to speculate that the Roaring Brook mayfly could be just a variant of a more common *Epeorus* species found in Maine.

Without confirmation of the mayfly’s taxonomic identity, and a better understanding of its current status and distribution in Roaring Brook, conservation of this listed species cannot be adequately addressed. If *Epeorus frisoni* is a valid species, it would be one of the rarest mayflies in the world. Advancing our understanding of its life history and habitat requirements at Roaring Brook would enable MDIFW to more effectively survey for new occurrences statewide and further investigate its actual rarity and conservation needs.



In 2002, MDIFW applied for and was awarded an Outdoor Heritage Fund grant (\$5,511) to investigate the status of *Epeorus frisoni* at Roaring Brook on Mt. Katahdin. Matching funds (\$2,500) from the Department’s Endangered and Nongame Wildlife Fund will supplement the grant. Essential to the project’s success is the partnership of Baxter State Park, whose Director’s Research Committee has approved the Department’s request to resurvey Roaring Brook and collect *Epeorus* mayflies for species identification. These individuals will then be compared to the two museum specimens from the 1930s and, hopefully, provide us with some answers to the more than 60-year mystery behind this rare insect! This project is scheduled to begin in the spring of 2003. **Funding for this work comes from the Maine Outdoor Heritage Fund (Maine’s conservation lottery ticket), “Loon Plate” revenues, and “Chickadee Checkoff” contributions on the State income tax form. Thank you!**

--Beth Swartz

Clayton’s Copper

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

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

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

In 1997, Clayton's copper was listed as "Endangered" in Maine because of the extremely limited number, size, and distribution of its populations; the limited availability of its habitat, and its near-endemic status in Maine. Forest succession, impoundments, and dewatering of wetlands for irrigation are currently the most serious threats to the butterfly and its habitat. In 2001, MDIFW completed an assessment of the Clayton's copper's status and conservation needs in Maine, and convened a public working group to establish recovery goals and objectives. In 2002, a management system outlining the Department's strategy for achieving those recovery goals and objectives was also completed. Studies initiated in 2000 at Dwinal Pond Wildlife Management Area - where a proposal to stabilize water levels could potentially affect the largest known occurrence of the butterfly - were continued in 2002. Five survey plots were surveyed throughout the peak of the copper's flight season in order to begin estimating population size and monitoring trends at Dwinal Pond. A habitat characterization system was developed and used to document the butterfly's habitat preferences and distribution within the flowage. Population and habitat data will be analyzed in 2003. What is learned about monitoring Clayton's copper populations and managing habitat at Dwinal Pond will then be applied to benefit other sites and potentially improve the butterfly's status. **Funding for this work comes from the U.S. Fish & Wildlife Service, Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), "Loon Plate" revenues, and "Chickadee Checkoff" contributions on the State income tax form.** Thank you!

--Beth Swartz

Vernal Pools

Vernal pools are small, isolated 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 habitat. Some, like spotted salamanders, blue spotted salamanders, and wood frogs, breed more successfully in these fishless habitats than in any other wetland type. In addition to providing habitat for a variety of small mammals, wading birds, waterfowl, and aquatic invertebrates, several state-listed rare animal species in Maine also use vernal pools for breeding or feeding 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).

At this time, MDIFW is actively working with cooperators at UMaine and Maine Audubon Society to promulgate voluntary protection measures for these valuable wildlife habitats. Workshops on vernal pools have been held throughout the state for land managers, educators, land trusts, and land owners. In 2003, a *Maine Citizen's Guide to Locating and Documenting Vernal Pools* was updated and republished in cooperation with Maine Audubon Society and University of Maine and is currently available from MDIFW (207-941-4239). Following extensive input from experts in Maine's wildlife and forest management community, *Forestry Habitat Management Guidelines for Vernal Pool Wildlife* was recently published by the Wildlife Conservation Society and will be available by fall 2003 from MDIFW. A companion document for developed landscapes, *Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*, is also now available from the Maine Audubon Society. Finally, vernal pool fact sheets, describing threats and management considerations, are available upon request from MDIFW for use by municipalities, land trusts, and other cooperators.

MDIFW continues to participate in a vernal pool working group organized by the Maine State Planning Office for the purpose of developing a draft definition for "Significant Vernal Pools", a new Significant Wildlife Habitat designated by the state's Natural Resource Protection Act. We have a great deal to learn about why some vernal pools receive greater wildlife use than others. To this end, recent grants from the Maine Outdoor Heritage Fund and the Environmental Protection Agency are helping to support a UMaine doctorate student, Robert Baldwin, to research the wildlife use and characteristics of vernal pools in three southern Maine townships - Biddeford, Kennebunkport, and North Berwick. This collaborative study will provide MDIFW with critical data needed to determine the magnitude of the "Significant Vernal Pool" resource in Southern Maine, as well as an evaluation of the effectiveness of moving forward with the protection of high value pools using a potential combination of regulatory and nonregulatory tools. **Funding for this work comes from Maine Outdoor Heritage Fund, Loon Conservation Plate, Chickadee Checkoff, and the Environmental Protection Agency.**

--Phillip deMaynadier

Freshwater Mussels

Freshwater mussels are relatively sedentary, bottom-dwelling bivalves found in many 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.

The life history of a freshwater mussel is unique and interesting. All freshwater mussels 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 have burrowed into the substrate, they typically remain in the same spot for their entire lives. For some species, a lifetime can span 100 years or more!

Freshwater mussels are one of the most diverse groups of species in North America. About one third of the world's mussel species are found in the United States, and nearly all occur east of the Mississippi River. Maine is relatively poor in mussel diversity, with only ten species currently documented as living here. Although most of our mussel species are widely distributed throughout the State, each has a unique set of habitat requirements. Some are found only in flowing water, and others occur only in still water; some species prefer sand or mud substrates, and others succeed only on gravel or cobble bottoms. Flow rate, water depth, water chemistry and temperature, availability of fish hosts, and substrate type are some of the factors determining where each mussel species can survive.

Habitat integrity is an equally important component influencing mussel survival. Freshwater mussels are very sensitive to contaminants and changes in their environment - a vulnerability compounded by specific habitat and fish host requirements, and an inability to leave their surroundings. Consequently, freshwater mussels are one of our most valuable indicators of water quality and ecosystem health. They are also one of the most imperiled groups of animals in the country. Approximately half of the species representing our uniquely diverse mussel fauna have already vanished, or are in danger of extinction. Of the nearly 300 species of freshwater mussels found in the United States, only 25% are thought to be maintaining stable populations. Thirty-five species (12%) are thought 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.

Freshwater mussels are in trouble nationally because of pollution, channelization, dredging, and sedimentation of our once clean, free-flowing rivers and streams. These factors have all contributed to the degradation and loss of mussel habitat. 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 some mussel populations. Too late for many species, efforts to maintain habitat quality and prevent further loss have now become a high priority for many state, federal, and private conservation agencies.

From 1992-97, MDIFW conducted a statewide survey to determine the status, abundance, and distribution of the State's freshwater mussels. As a result, we now know much more about the status of our ten freshwater mussel species. Two species, the tidewater mucket and yellow lampmussel, were found to be very limited in range and distribution and occurred in abundance at only a few sites. Both species are now listed as "Threatened" in Maine. Three additional species - the brook floater, creeper, and triangle floater - were found to be uncommon or of special management concern.

Compared to most states within the range of these species, Maine seems to have some of the best remaining populations and may be a last stronghold for these rare mussels. 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.

To ensure they remain a part of our natural heritage, MDIFW continues to document the occurrences of the State's freshwater mussels; learn about their life histories, habitat requirements, and conservation needs; and conserve habitat for Maine's rarer species. With so many species experiencing dramatic declines throughout the United States, including neighboring northeastern states, it is becoming more and more important to monitor the status of, and develop conservation plans for, our entire mussel fauna.

In 2002, MDIFW continued collaboration on a research project with Drs. Alex Huryn and Judith Rhymer of the University of Maine, and Dr. Cyndy Loftin of the U.S.G.S. Maine Cooperative Fish and Wildlife Research Unit, to advance the understanding and conservation of Maine's two rarest freshwater mussel species - the yellow lampmussel and tidewater mucket. Graduate student, Chip Wick completed an investigation of the identity of the mussels' fish host(s), which were previously unknown for both species. Two host species (yellow perch and white perch) were identified for the yellow lampmussel, and one host species (white perch) was identified for the tidewater mucket. Chip also researched the age and population structures of both species at several sites in each of the three watersheds where they occur, and is participating in a study to identify the effects of landscape-level characteristics on the mussels' distribution and occurrence. A second graduate student, Morgan Kelly, is just completing her first year of data collection and analysis to research the genetic structure of yellow lampmussel and tidewater mucket populations within and between watersheds. All of the information learned from these projects will greatly assist MDIFW in conserving these rare species.

Much of MDIFW's management activities involving freshwater mussels in 2002 centered on reviewing numerous project proposals and permit applications, and working with applicants to avoid or minimize any loss of listed mussel species as a result of project activities. MDIFW worked closely with the Maine Department of Transportation to ensure construction of the new Augusta bridge crossing over the Kennebec River would not endanger the threatened mussel species living in the vicinity. MDIFW also worked with Trout Unlimited to relocate several hundred yellow lampmussels that would have been dewatered when a small dam on the St. George River was replaced. Also in 2002, MDIFW began working with FPL Energy Maine Hydro to develop a plan to minimize the loss of yellow lampmussels and tidewater mussels that would be affected by the proposed 2003 removal of the Fort Halifax Dam on the Sebasticook River.

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, Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), University of Maine, U.S. Geological Survey, "Loon Plate" revenues, and "Chickadee Checkoff" contributions on the State income tax. Thank you!**

--Beth Swartz

Maine's Natural Heritage Program

MDIFW is part of a cooperative national/international network of Natural Heritage Programs and conservation data centers. Natural Heritage Programs were originally created by The Nature Conservancy (TNC, an international nonprofit organization devoted to the conservation of biological diversity), to inventory and monitor the status of rare species and ecological communities, track their locations, and facilitate site protection programs and conservation planning. Today, Natural Heritage Programs exist in all 50 states, as well as in many other countries, and most are now funded and managed by individual state or federal agencies.

At the heart of every Natural Heritage Program is the Biological and Conservation Data System (BCD), a complex data management system designed to track information on the status, life history, conservation needs, and occurrences of rare species and natural communities. As a partner in the Natural Heritage network, MDIFW is responsible for maintaining the zoological portion of the BCD for Maine, while the Natural Areas Program (Maine Department of Conservation) maintains the rare plant and natural community components. MDIFW's zoological database currently contains information on more than 1,100 animal species native to our state. It also tracks more than 2,500 existing and historical occurrences of rare species in Maine, ranging from bald eagle nest sites and roseate tern nesting islands to rare freshwater mussel areas and black racer snake sightings. This information is invaluable to MDIFW for status assessment, species management, and habitat conservation for Endangered, Threatened, and other rare species. BCD data are also regularly provided to other state and federal agencies, municipalities, conservation organizations, and landowners, to assist with planning and conservation projects, and to ensure that the most current information on Maine's rare species is available to all who need it.

In 2002, over 100 new occurrence records were entered into the BCD bringing the total number of rare species locations tracked to 2,516. An updated GIS copy was provided to all seven MDIFW regional offices to assist with environmental permit review, information requests, habitat protection, and conservation planning initiatives. Statewide BCD data were also provided for the Department's *Habitat Conservation and Mapping Project* (HCAMP). Also in 2002, MDIFW continued working to upgrade its information system for rare species by developing and updating files that document the life history, status, conservation needs, and occurrences of our rare animal species, and by incorporating new data management and mapping standards being developed and adopted throughout the Natural Heritage Network. **Funding**

for this work comes from the U.S. Fish and Wildlife Service, Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), The Maine Chapter of The Nature Conservancy, "Loon Plate" revenues, "Chickadee Checkoff" contributions on the State income tax form, hunting license and permit revenues, and the Pittman-Robertson Fund (excise taxes on sporting arms, handguns, ammunition, and archery equipment). Thank you!

--Beth Swartz



WILDLIFE HABITAT GROUP

Conservation and management of wildlife habitats continues to be a high priority for MDIFW Wildlife Biologists. Lands owned by the state or our Department are managed by our Regional Biologists in the Wildlife Management Section (for information on these activities see their section of this report). Wildlife Biologists in the Resource Assessment Section in the Bangor office address statewide wildlife habitat issues, and the Wildlife Habitat Group in our Bangor office spearheads these efforts.

Richard Dressler, Habitat Group Leader – Supervises Group activities and coordinates habitat-related projects with other Division and Department staff as well as other State and Federal agencies.

MaryEllen Wickett, Wildlife Biologist – Manages wildlife habitat data and develops computer databases to store and analyze these data, and provides assistance to other Division biologists to assess species habitats on a statewide basis.

John Kenney, 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, and enters this information into a computerized system to map and track important wildlife habitats. She also conducts field inventories of wildlife habitat.

Don Katnik, Wildlife Biologist – Develops computer applications to facilitate habitat data to IF&W staff and other users, and provides technical support and habitat data analyses for landscape planning efforts (including *Beginning with Habitat*) and species habitat model development.

Conserving Wildlife Habitats and Open Space in Southern Maine

Biologists in the Wildlife Habitat Group have played a major role in the development and implementation of the *Beginning with Habitat* (BwH) project that continues to be one of the most important projects undertaken by our staff (see Introduction by G. Mark Stadler, Director, Wildlife Division).

The foundation of our approach is to encourage towns to 1) **protect riparian habitats and associated water resources** through effective implementation of the current Shoreland Zoning regulations and prescribed buffers, 2) **protect identified high value wildlife** (see HCAMP description below) **and plant habitats** (natural communities and rare plant locations) through resource protection zoning and other conservation tools, and 3) **maintain large blocks of forest and grassland habitats** by taking action to maintain rural areas and encourage concentration of developed areas. If these steps are accomplished over enough towns, all wildlife species currently found in Southern Maine will have adequate habitat to thrive and maintain their populations. We recognize more “tools” need to be developed to assist towns and encourage landowners to participate in this effort.

Using this “landscape” approach, MDIFW and MNAP have completed a series of maps to identify habitats required to support wildlife species over Maine’s diverse landscape, and we are in the process of providing sets of maps to towns on a priority basis. Over the next year, the Wildlife Division will continue to work proactively with MNAP to provide maps and digital data to municipalities in southern and central Maine to encourage them to conserve riparian habitats, high value plant and animal habitats, and large blocks of forest and grassland. We are also developing a website for *Beginning with Habitat* that will be up by fall of 2003.

We are also providing wildlife habitat information to land trusts to help them identify focus areas for conservation and to prevent further loss of important wildlife habitats. Working cooperatively with Maine Natural Areas Program, Maine Coast Heritage Trust, and Maine Audubon, MDIFW staff has identified focus areas for land trusts in mid-coast, central, and southern Maine. **Funding was provided by Maine’s Outdoor Heritage Fund; Maine citizens who purchase Maine’s Loon Conservation License Plates; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).**

--Richard Dressler

Conserving Wildlife Habitats in Northern & Eastern Maine

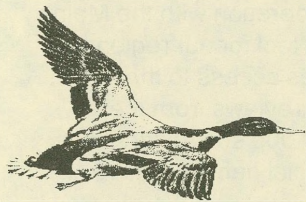
Currently, MDIFW has mapped, or is mapping, Deer Wintering Areas (DWA), Essential Habitats, and other Endangered, Threatened, or special concern species locations, and inland Waterfowl and Wading Bird Habitats (WWH) in northern Maine. A number of areas are being managed cooperatively based on agreements with forest landowners. All of these efforts are important to maintaining wildlife habitat in northern Maine. However these efforts are not enough to provide adequate wintering habitat for deer over the northern tier of Maine, provide sufficient beech mast as food for bear and other wildlife species, or to provide a distribution of habitat types over the landscape to assure long-term maintenance of habitat for all of the species currently found in northern and eastern Maine.

We have been working on a landscape approach to protection of habitat in southern Maine, and now we are turning our attention to developing a landscape approach to protection of habitat in northern Maine. Our staff has started working with other interested parties, including landowners, to develop a landscape approach based on cooperation.

Protecting Wildlife and Their Habitats from Oil Spills

Sanborn Pond Oil Spill Response and NRDA

In the fall of 2001, an H.O. Bouchard tanker truck traveling from Searsport and heading toward Skowhegan overturned in Brooks, spilling almost 6,000 gallons of heavy black #6 fuel oil into small Sanborn Pond (~100 acres). Within hours, almost the entire surface of the pond was coated with a layer of black oil, in some cases several inches thick. Following notification of the spill, MDIFW staff responded to survey wildlife in and around the pond and to attempt to capture and rehabilitate as many oiled animals as possible. We worked closely with staff from the International Bird Rescue and Research Center, MDIFW's oiled wildlife rehabilitation contractor, and the Center For Wildlife in York, Maine. During our initial survey, we observed common loons, a great blue heron, a double-crested cormorant, gulls, a spotted sandpiper, belted kingfisher, and osprey in or adjacent to Sanborn Pond. We were able to capture three loons, a cormorant, and 15 painted turtles for rehabilitation. One of the loons and all of the turtles were successfully rehabilitated and released. Two loons, 1 cormorant, 1 snapping turtle and 3 muskrats died. We did collect one dead fish.



MDIFW has been involved in the Natural Resource Damage Assessment process to collect additional data at Sanborn Pond to document injuries to natural resources. Our staff is working with US Fish and Wildlife Service to complete surveys of the pond to document wildlife use post-spill. After quantifying the natural resource damage resulting from the spill, we will work with other state and federal agencies to file a claim against the spiller and rectify the damage.

Julie N Oil Spill Settlement Funds Restoring Scarborough Marsh

The third and final *Julie N* restoration project to be completed is located in the Scarborough Marsh. This project was identified to compensate for impacted wildlife (birds) and wetlands during the 1996 oil spill in Portland harbor. MDIFW and other state and federal natural resource trustees have completed initial studies of the marsh with a consultant, Normandeau Associates. We are currently in the process of working with the Army Corps of Engineers and Normandeau to develop a final design and implement a restoration project to benefit waterfowl, wading birds, and shorebirds in the marsh. The Army Corp will provide 65% of the funding for this project to match with funds from the *Julie N* settlement. The project will also benefit from the Maine DOT's plans to replace the culverts under Route 1 in the north end of the marsh. Work will begin on this project within the next year, and, with its completion, the books can be closed on the *Julie N* spill.

Coastal Waterbird Surveys Underway to Identify Sensitive Areas

To improve oil spill response capabilities and provide species management information, MDIFW's staff, in cooperation with the U.S. Fish and Wildlife Service, initiated a five-year series of aerial surveys of coastal water birds along the entire coast of Maine. Thus far, areas from Casco Bay to Penobscot Bay have been surveyed. These aerial surveys are being conducted over several seasons to update species assessments and management systems, and are combined with on-ground and boat surveys. The resulting data are used to provide habitat updates for a variety of coastal bird species to generate revised Environmental Vulnerability Index (EVI) oil spill response maps. Vulnerable areas will be given the highest priority during cleanup operations following an oil spill. ***Funding was provided by Maine's Outdoor Heritage Fund; Maine citizens who purchase Maine's Loon Conservation License Plates; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), with additional funding from Maine's Oil Spill Fund.***

--Richard Dressler

Other Oil Spill Planning Efforts

Again, over the past year, numerous hours have been spent in planning efforts at the state and federal level. We have provided input to the Maine Oil Spill Contingency Plan. Our staff continues to assist in preparing and updating the Area Contingency Plan, a federal effort coordinated by the U.S. Coast Guard. This plan addresses oil spill response efforts for the coast of Maine and New Hampshire. MDIFW is represented on the Area Committee, a group of state and federal agency representatives authorized to approve the Area Plan. We are coordinating with our neighbors, New Hampshire and New Brunswick, through federal oil spill planning and exercise efforts. In the past year, we participated in the CANUSLANT oil spill response exercise in St. Andrews, New Brunswick, Canada. We are also working directly with the U.S. Fish and Wildlife Service to address oil spill-related issues of common interest.

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

Mapping Habitats to Facilitate Environmental Review

HCAMP, or *Habitat Consultation Area Mapping Project*, implemented by MDIFW in 1998, in cooperation with the Maine Natural Areas Program (MNAP) in the Department of Conservation, continues to be an important tool for our regional wildlife biologists to respond to permit reviews and landowner requests. MDIFW regional staff has access to the digital (computer) version of HCAMP in our Bangor office, which allows them to complete timely project reviews from their desktop computer. We also produce hard copy maps for various users. Each HCAMP map (1:70,000 scale), identifies known locations of all natural features and wildlife habitats that, because of species rarity or special habitat requirements, need to be addressed through regulation, landowner notification, or some level of cooperative habitat protection planning. Locations of these habitats are indicated on the maps by grid cells (roughly 0.24 mi square, or about 154 acres). Grid cells are "turned on" by

- Endangered, Threatened, and special concern plants and wildlife;
- Essential Habitats for Endangered and Threatened species;
- Deer wintering areas;
- Waterfowl and wading bird habitats;
- Shorebird feeding and roosting areas;
- Seabird nesting islands; and
- Other plant and wildlife habitats of concern.

If a proposed project falls within a shaded grid cell on the map, indicating the presence of a habitat of concern, the applicant is encouraged to visit or contact MDIFW or MNAP. If a project is on or adjacent to any standing or flowing water, regional fisheries biologists should be contacted.

MDIFW and MNAP annually update these maps to facilitate, streamline, and provide predictability to the environmental permitting process; help landowners plan, in advance, for impacts of proposed projects on candidate Natural Resource Protection Act (NRPA) Significant Habitats, Essential Habitats for Threatened and Endangered species, and habitats for threatened and endangered plants; cooperatively work with landowners for land management or project modifications that will retain the value of important natural features and wildlife habitats; share knowledge of these special habitats with landowners for their information, appreciation, and planning; and standardize, on a statewide basis, permit reviews and comments on habitat issues to the public by MDIFW and MNAP.

Since many areas defined on the maps include unregulated habitats, the maps provide an opportunity to meet with landowners, notify them of special features of their ownership, and provide guidance on project planning and land management to avoid, or minimize, disturbance to these important areas. Although inventory of these habitats will never be complete, the information presented on the maps is the most current available to MDIFW and MNAP. **Funding for HCAMP was provided by Maine's Outdoor Heritage Fund; Maine citizens who purchase Maine's Loon Conservation License Plates; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), with additional funding from Maine's Oil Spill Fund.**

NOTE: THESE ARE INFORMATIONAL MAPS, NOT REGULATORY ONES.

Assessing Species Habitat – Providing Input for Public Working Groups

Wildlife Division species specialists are continuing to document the current status of the population and habitat of each major species, i.e., hunted and Endangered or Threatened species. The Habitat Group is providing support for this process by collecting and analyzing available habitat data (e.g., U.S. Forest Service's forest resurvey data for the State of Maine collected in 1994-95 at over 3000 plots throughout the state). We are converting these data into a useable form (by Wildlife Management Districts) for input to species habitat models. In addition, we are working closely with remote sensing experts from the University of Maine to utilize satellite data to map habitats at a statewide scale. Other available data on human population trends, agriculture, development, etc. are being assembled to assess effects of humans on the availability of wildlife habitat.

We are continuing to collect more current data on the forest survey plots (see above). We have provided input to the development and implementation of an annual survey. These surveys will result in a complete statewide survey every five years with more timely data for our wildlife habitat assessments.

Tracking and Rating Deer, Waterfowl & Wading Bird Habitats, Coastal Nesting Islands

MDIFW staff developed updated computer database applications for Deer Wintering Areas (DWAs), Waterfowl and Wading Bird Habitats (WWHs), and coastal islands & seabird nesting islands. These databases have been installed on the Geographic Information System (GIS) server in the Bangor office and allow more efficient tracking of these important habitats by our staff. Using their local computers, Wildlife Division biologists can access and update these databases over the State Wide Area Network.

Inland Waterfowl & Wading Bird Habitats

We recently implemented a process to identify high and moderate value WWHs in all towns in Maine using a computer model developed with data from the National Wetland Inventory. The computer model follows the protocol previously used to manually map WWHs in organized towns by our staff. Some of the mapped WWHs must be field checked by Regional staff. As a result of this effort, less time commitment of field staff has been required to complete the WWH mapping and rating statewide. ***Funding for these projects was provided by Maine's Outdoor Heritage Fund; Maine's Loon Conservation License Plates; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

Using Current Technology to protect habitats

Using the GIS based in our Bangor office, the Habitat Group staff is able to track a wide variety of wildlife habitats with digital data, analyze these data, and generate maps of important habitats for protection and management. During the past year, we continued to enter mapped boundaries or point locations into the GIS. This process is referred to as "digitizing," or creating a computerized digital version of the hardcopy maps. MDIFW is using standard base maps generated by the State Office of GIS (MEGIS) on which to locate many of the wildlife occurrences and habitats. In addition to digitizing the mapped features or habitats (DWAs, seabird nesting islands, bald eagle nests, etc.), information about these features or habitats is also being entered so we can determine how and when these locations are being utilized by wildlife. Using the GIS, maps can be produced for Department biologists, other agencies, landowners, conservation groups, etc., for general information, regulatory purposes, planning, and many other uses. HCAMP (see previous description) is one example of maps being produced using the GIS. Several major projects (described previously) have required the use of GIS over the past year: development of HCAMP maps; continuing work on identification of sensitive coastal wildlife areas for marine oil spill response; entry of DWA regulated by LURC into GIS; digitizing DWA and WWH in southern and western Maine; tracking Essential Habitats for Endangered or Threatened species; and mapping locations of Endangered, Threatened, or special concern species being tracked in the wildlife portion of the Natural Heritage database.

Habitat Group staff also provided GIS assistance to analyze habitat information in support of the Canada lynx study in northern Maine. Based on forest stand information and radio-collared lynx locations, we are identifying habitats used by lynx throughout the year.

We are continuing to build on our current knowledge of GIS and computer technology to provide the support needed to meet the goals and objectives identified for protection and management of wildlife habitats. We are planning for additional training and integration of new approaches, such as Global Positioning Systems (GPS), into our operation to provide support to Wildlife Division staff and gain a better understanding of wildlife habitats. Many challenges are ahead as the Wildlife Division moves into a more active role of habitat conservation and management to maintain Maine's wildlife populations.

--Richard Dressler

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 - 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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Main Office, #41 State House Station, Augusta, ME 04333-0041

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

TDD # — 287-4471

For our automated line with seasonal information/updates
on hunting & fishing seasons and laws.....call **(207) 287-8003**

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

REGIONAL HEADQUARTERS **(Game Wardens and Biologists)**

Ashland -- 435-3231
Gray -- 657-2345
Sidney -- 547-5300
Bangor -- 941-4440
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

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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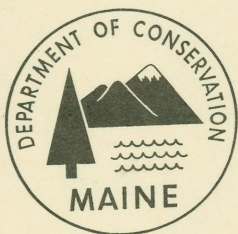


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Learn more: when you visit a State Park, ask the park staff about Loon Conservation License Plate projects



Loon Conservation License Plate funds are administered by the
Department of Conservation and the
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