

Maine Department of Inland Fisheries & Wildlife

Lee E. Perry, Commissioner

Wildlife Division

Research & Management Report 2002



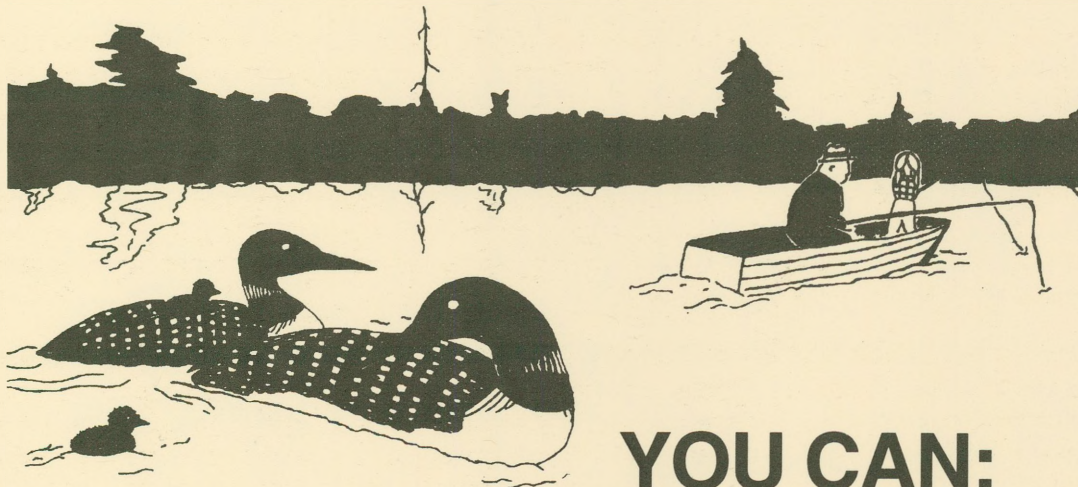
George J. Matula, Jr., Editor

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

Welcome to the 2002 Wildlife Division Research & Management Report.

Throughout this report you will read about the many and diverse wildlife management and conservation projects we've been working on this past year — our wildlife planning effort, management programs, and survey, research, and assessment work. Without funding provided by the Federal Aid in Wildlife Restoration Act, the Wildlife Division would be unable to conduct much of this wildlife management work.

So, what is the Federal Aid in Wildlife Restoration Act? ¹

Only a few decades ago, wildlife's survival was very much in doubt. The early settlers had encountered a spectacular abundance of wildlife, but in their zeal to conquer an untamed continent, they squandered that legacy, wiping out some species and reducing others to a pitiful remnant of their original numbers. Then a remarkable thing happened. With a handful of farsighted conservationists leading the way, organized sportsmen and the firearms and ammunition industries joined efforts with state wildlife agencies to meet the wildlife crisis with an ingenious long-range plan - the Federal Aid in Wildlife Restoration Act.

The Federal Aid in Wildlife Restoration Act, popularly known as the Pittman-Robertson Act, was approved by Congress on September 2, 1937, and began functioning July 1, 1938. The Pittman-Robertson Act provides funding for the selection, restoration, rehabilitation, and improvement of wildlife habitat, wildlife management research, and the distribution of information produced by the projects. It really began to take off in the 1950s, and from that time until the present its successes have multiplied over and over, exceeding the high hopes of many of its early boosters. The Pittman-Robertson Act was amended in 1970, to include funding for hunter training programs and the development, operation, and maintenance of public target ranges.

Funds are derived from an 11 percent federal excise tax on sporting arms, ammunition, and archery equipment, and a 10 percent tax on handguns. These funds are collected from the manufacturers by the Department of the Treasury and are apportioned each year to the states and territorial areas (except Puerto Rico) by the Department of the Interior. Appropriate state agencies are the only entities eligible to receive grant funds. Funds for hunter education and target ranges are derived from one-half of the tax on handguns and archery equipment.

Each state's apportionment is determined by a formula that considers the total area of the state and the number of licensed hunters in the state. The program is a cost-reimbursement program, where the state covers the full amount of an approved project then applies for reimbursement through Federal Aid for up to 75 percent of the project expenses. The state must provide at least 25 percent of the project costs from a non-federal source.

In Maine, P-R money is used to buy, manage, maintain, and operate wildlife management areas. The Wildlife Division manages 100,000 acres of wildlife habitat, ranging from upland forest and wetlands to coastal islands and ledges. [You can read more about the Wildlife Division's wildlife management areas and our wildlife habitat management program in the Regional Wildlife Management Section of this report.]

In addition, the Wildlife Division uses P-R funds to conduct surveys and research that have helped to substitute science for guesswork in wildlife restoration. Wildlife surveys provide solid information on the location and activities of species, the makeup of their population by age and sex, and whether their numbers are rising or declining - essential data in managing the species and its habitat. P-R funded research has yielded new data that have enabled wildlife biologists to keep wild creatures in balance with their environments and to permit more people to enjoy wildlife without endangering the future of any species. [You can read more about the Wildlife Division's survey and research projects in the Wildlife Resource Assessment Section of this report.]

Although firearms users and archery enthusiasts wholly finance P-R, it benefits a larger number of people who never hunt, but who enjoy wildlife-related pastimes. Hikers and fishermen, birdwatchers and picnickers, use Maine's wildlife management areas. Our wildlife management areas are managed both for wildlife habitat and for compatible public uses. Numerous non-game species enjoy P-R benefits too. Fortunately, P-R does not restrict use of funds to game species, but instead, allows their use for any species of wild bird or mammal. Much of the money spent on research and management is aimed specifically at helping non-game and endangered and threatened species in addition to game species.

In the more than 50 years since P-R began, over \$2 billion in federal excise taxes have been matched by more than \$500 million in state funds (chiefly in hunting license fees) for wildlife restoration. Without P-R, Maine and the nation would be poorer in terms of wildlife knowledge, science, and the confidence that we can indeed change things for the

better. The abundant presence of wildlife among us clearly contributes to our pride and happiness as a people and a civilization. But - there are twice as many Americans today as there were in the 1930s, and we are changing the natural landscape at a rate unequaled in the past. People need homes and jobs, food and transportation, and economic opportunities for their children. We can have these things and healthy wildlife populations too, but the future will test our wisdom and skill at least as much as the half-century just ended.

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

¹ Adopted from the U.S. Fish and Wildlife Service, Division of Federal Aid, Arlington Square, Room 140, 4401 N. Fairfax Drive, Arlington, Virginia 22203

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

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WILDLIFE PLANNING

Ours is a country with a rich tradition of enjoying nature. Whether wetting a fly or photographing a young fawn taking its first awkward steps, Americans find wildlife-associated recreation a source of lifelong enjoyment and fulfillment. Maine's citizens share this national passion. Maine ranks near the top nationally when comparing the percentage of people who participate in hunting, fishing, trapping and wildlife related outdoor recreation.

Every five years, the U.S. Fish and Wildlife Service conducts the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation to measure U.S. residents' participation in and expenditures for hunting, fishing, and wildlife-watching activities such as observing, feeding, and photographing wildlife. The 2001 Survey is the tenth in a series that began in 1955.

Results are based on data collected by the U.S. Bureau of the Census during interviews of 80,000 households and more detailed interviews of 30,000 potential anglers and hunters and 15,000 potential wildlife watchers. State agencies, conservation organizations, and related industries use this information to estimate demands for wildlife-related recreation, evaluate the impacts of expenditures on state and national economies, and identify trends in wildlife recreation.

Preliminary results from the 2001 Survey once again demonstrate the remarkable impact that wildlife recreation has on our economy. In 2001, more than 80 million Americans 16 years old and older (39% of the U.S. population) enjoyed some recreational activity relating to fish and wildlife and spent more than \$110 billion in pursuit of those recreational activities.

An estimated 38 million hunters and anglers spent \$70 billion dollars on trips, equipment, licenses, and other items to support their activities. In addition, more than 66 million people 16 years old and older (31% of all Americans) fed, photographed, or actively observed wildlife in 2001 and spent \$40 billion dollars to do so.

Comparing the results from the 2001 Survey with those of the 1996 Survey reveals that the number of anglers was about the same, hunting participation dropped 7% (but big game and migratory bird hunting remained steady), and wildlife watching increased by 5%. Overall expenditures by both hunters and anglers declined by 5% and 16% respectively; however, wildlife watching expenditures increased by 5%. The economic recession, terrorist attacks, and a military reaction experienced in 2001 (unlike the prosperous and peacetime economy of 1996) may, in part, account for the declines in 2001; nonetheless, Americans remained involved with wildlife recreation regardless of what else was going on in their lives.

Similarly, Maine's quality of life and its economy are strongly influenced by the diversity and abundance of fish and wildlife that inhabit our state. In 2001, an estimated 607,000 people 16 years old and older (60% of Maine's population) engaged in fishing, hunting, or wildlife-watching activities – a 16% increase from the 511,000 participants in 1996. Of the total number of participants, 256,000 hunted and fished (down 4% from 1996) and 520,000 participated in wildlife-watching activities (up 15% from 1996) where the enjoyment of wildlife was the primary purpose of the activity.² As such, Maine ranked 6th nationally when comparing the percentage of people who participated in hunting, fishing, and wildlife watching. Only Alaska, Minnesota, Montana, Vermont and Wisconsin had higher participation rates.

¹ U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census. 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation Preliminary Findings. Survey results are preliminary and subject to change. A final report will be issued later this fall.

² The sum of sportsmen and wildlife-watching participants exceeds the total number of participants because many individuals engaged in more than one activity.

But fish and wildlife provide more than a source of enjoyment and recreation in Maine. A University of Maine report published in 1998 estimated that fish and wildlife related recreation contributed over \$1 billion dollars in economic output, \$342 million in payroll, 17,680 jobs, and \$67 million in sales and income tax revenue.³ At over a billion dollars annually, hunting, fishing, and wildlife-associated recreation generates **over four times** the economic output of the ski and snowboard industry in the state⁴ and **more than three times** the combined sales of Maine's potato and blueberry industries.⁵

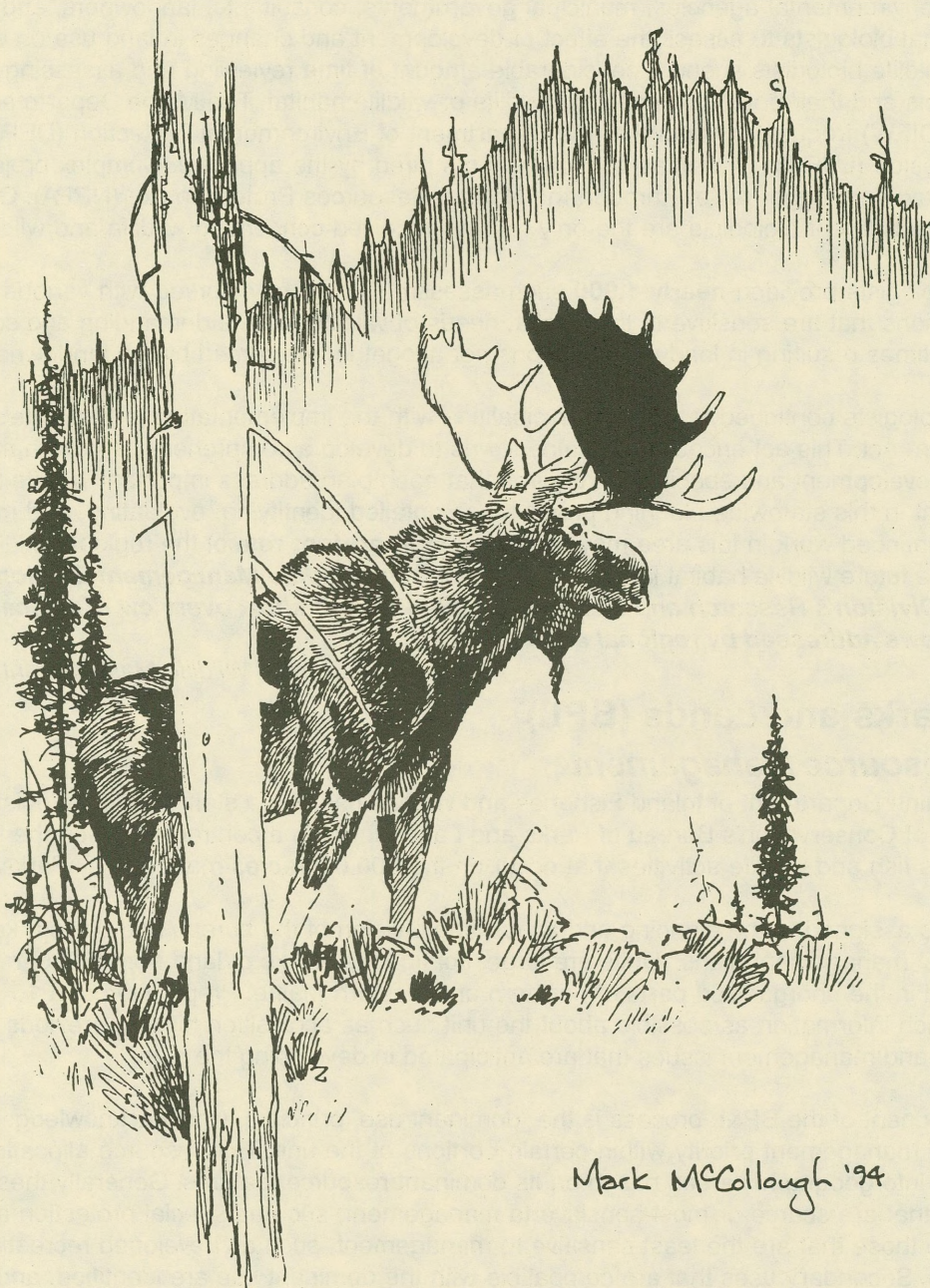
Whether enjoying an industrious beaver weaving sticks into its dam, the splash of a well-placed lure in a remote pond, or a sunrise over a deer stand, clearly wildlife has an important place in our lives.

--Sandy Ritchie, Wildlife Resource Planner

³ Teisl, Mario F. and Kevin J. Boyle. 1998. The Economic Impacts of Hunting, Inland Fishing and Wildlife-Associated Recreation in Maine. Staff Paper 479. Department of Resource Economics and Policy, University of Maine, Orono.

⁴ Ski Maine Association

⁵ Maine Department of Agriculture



WILDLIFE MANAGEMENT SECTION

The regional wildlife management staff of biologists is best described as the Wildlife Division's wildlife generalists or the "jack of all trades." The eighteen wildlife biologists who staff the Department's seven regional field offices constitute the majority of the 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.

Environmental Assessment - An Overview

State and Federal environmental agencies, municipal governments, consultants, landowners, and businesses regularly ask regional biologists to assess the effect of development and changes in land use on wildlife or wildlife habitat. Regional wildlife biologists spend a considerable amount of time reviewing and assessing the effects of development projects and their potential impact on wildlife or wildlife habitat. The Maine Department of Inland Fisheries and Wildlife (MDIFW) frequently works with the Department of Environmental Protection (DEP) and the Land Use Regulation Commission (LURC), as well as consulting firms hired by the applicant. Complex projects usually invoke the Site Location Law and trigger review through the Natural Resources Protection Act (NRPA). Oftentimes, review and comment by Department biologists are the only reviews received concerning wildlife and wildlife habitat impacts.

Last year, WMS biologists provided **nearly 1,900** such assessments as they worked with various entities to encourage land-use decisions that are sensitive to the habitat needs of wildlife. This is demanding and sometimes controversial work - oftentimes resulting in land use decisions not altogether welcomed by the landowner.

Regional wildlife biologists continued to assist municipalities with the implementation of the state's Comprehensive Growth Management Act. This act encourages Maine towns to develop a comprehensive growth management plan to guide their future development and specifically requires that each plan address important wildlife habitats. Wildlife Division involvement in this statewide planning process has entailed identifying, evaluating, and mapping important wildlife habitats. Continued work in this area may be the **most important role** of the regional wildlife biologist in helping to shape the future wildlife habitat landscape of Maine. ***The Wildlife Management Section has dedicated the 2002 Wildlife Division's Research and Management Report to a short overview of typical Environmental Assessment Reviews addressed by regional staff.***

--Eugene Dumont Wildlife Management Section Supervisor

Bureau of Parks and Lands (BPL)

Integrated Resource Management

Since 1984, the Maine Department of Inland Fisheries and Wildlife has had a staff wildlife biologist assigned to The Maine Department of Conservation's Bureau of Parks and Lands through a contract between the two agencies. This position coordinates fish and wildlife activities that occur on the 500,000 acres managed by Parks and Lands.

The staff biologist is assigned to the planning and acquisition division of the bureau and plays a key role in the development of "unit management plans." Units are large, contiguous blocks of land from 3,000 to 42,000 acres in size, mostly located in the unorganized parts of northern and western Maine. Preparation of a 10 year plan begins by gathering as much information as possible about the unit such as acquisition history, previous timber harvesting or other land uses, and management issues that are anticipated in developing the plan.

An important component of the BP&L process is the "dominant use" principal, which acknowledges that different resources will have management priority within certain portions of the unit. This resource allocation process subdivides the landbase into geographic areas based on its dominant resource features. Generally these features are ranked from those that are scarce or most sensitive to management, such as special protection and backcountry recreation areas, to those that are the least sensitive to management, such as developed recreation or timber management areas. Secondary uses that are compatible with the dominant use are identified, and a variety of standards are applied to the management of secondary uses. For example, timber harvesting is often considered an

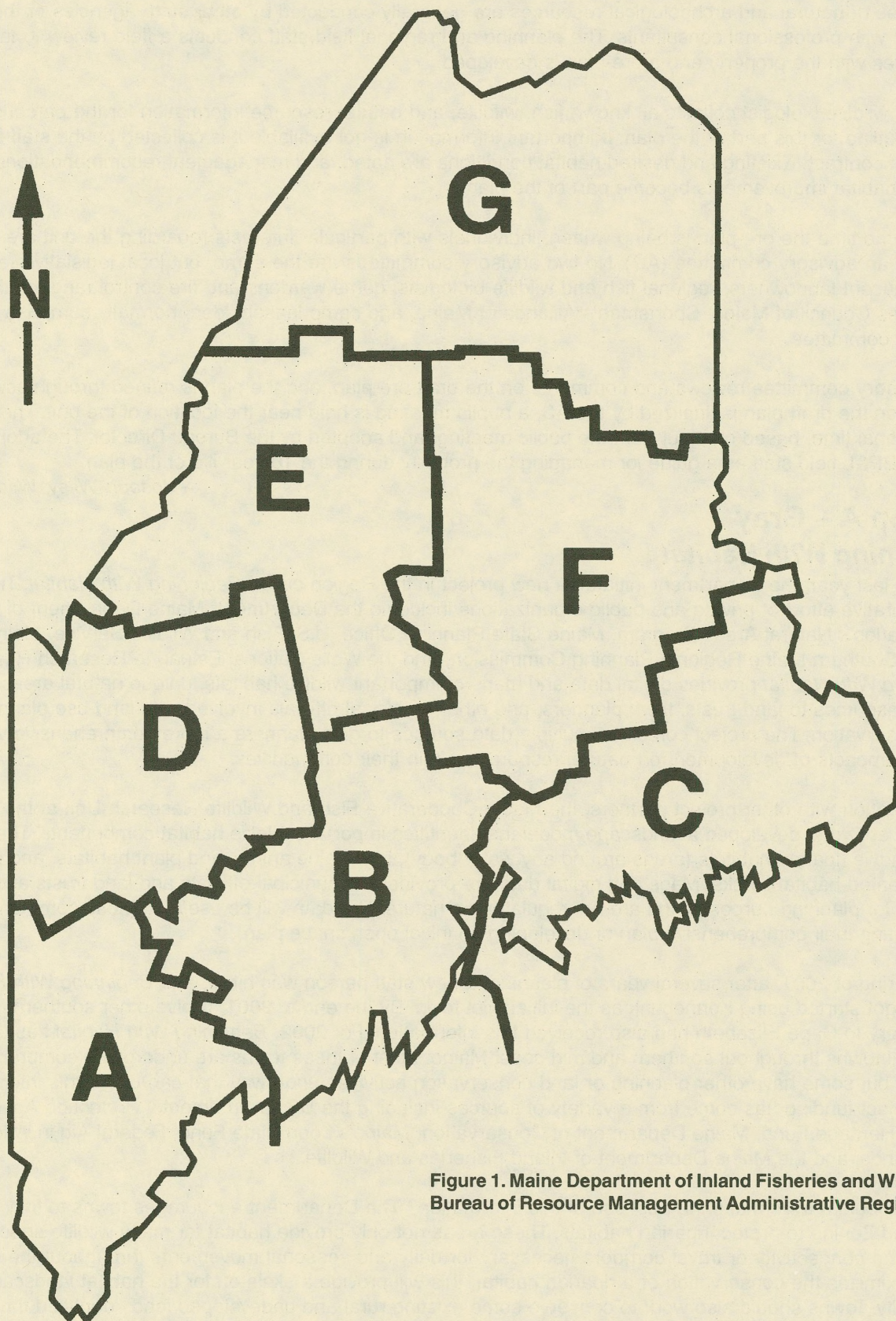


Figure 1. Maine Department of Inland Fisheries and Wildlife
Bureau of Resource Management Administrative Regions

appropriate secondary use within wildlife dominant areas and may be permitted as a means to effectively manage certain wildlife habitats, such as deer wintering areas.

Inventories of natural and archeological resources are generally conducted by other state agencies or through contracts with professional consultants. The planning and regional field staff conducts a field review to familiarize themselves with the property and a pre-plan is developed.

The staff wildlife biologist collects all known fish, wildlife, and natural resource information for the parcel and develops an outline for this part of the plan. If important information is not available it is collected by the staff biologist or through a contract. Existing and desired habitat conditions are noted, and management recommendations needed to address habitat improvements become part of the plan.

At the same time the pre-plan is being written, individuals with particular interests regarding the unit are invited to serve on an advisory committee (AC). No two advisory committees are the same, but local legislative representatives, adjacent landowners, regional fish and wildlife biologists, game wardens and fire control rangers, the Natural Resources Council of Maine, Sportsman's Alliance of Maine, and camp leaseholders normally comprise the basic advisory committee.

The advisory committee reviews and comments on the draft pre-plan, and the plan is refined through several meetings. When the draft plan is finalized by the AC, a public meeting is held near the location of the unit. The draft plan is edited a final time, based on input from the public meeting, and adopted by the Bureau Director. The adopted plan is used by BP&L field staff as a guide for managing the property during the 10-year life of the plan.

--Joseph Wiley, Wildlife Biologist

Region A – Gray

Beginning With Habitat

Over the last year, the Department initiated a new project in the Region called *Beginning With Habitat*. This project is a collaborative effort of private and public organizations including the Department, Maine Department of Conservation's Natural Areas Program, Maine State Planning Office, U.S. Fish and Wildlife Service, Maine Audubon Society, Southern Maine Regional Planning Commission, and the Wells National Estuarine Research Reserve. *Beginning With Habitat* provides digital data and maps of important wildlife habitats, unique natural areas, and other natural resources to land trusts, town planners, and other municipal officials involved with land use planning and land conservation. The project combines multiple data sources to give planners a more comprehensive view of potential impacts of development on natural resources within their communities.

In cooperation with other project partners, the Maine Cooperative Fish and Wildlife Research Unit at the University of Maine at Orono developed a landscape model that identifies important wildlife habitat components. The landscape model shows riparian habitats (areas around any water body), high value animal and plant habitats, and large unfragmented habitat blocks. Maps and digital data are provided to municipal officials and land trusts and are intended for planning purposes and are not regulatory in nature. The data will be useful to those communities that are updating their comprehensive plan or developing an initial open space plan.

In the spring of 2001, after several years of planning, a new staff person was hired, and *Beginning With Habitat* formally got started using Kennebunk as the initial pilot town. By the end of 2001, twelve other southern Maine towns from Kittery to Cape Elizabeth had also received this information. For 2002, *Beginning With Habitat* has targeted 30 additional towns throughout southern and mid-coast Maine. Most of these towns are undergoing comprehensive plan updates, but some have other planning or land conservation activities underway that can utilize this information. To date, project funding has come from a variety of sources including the US Environmental Protection Agency, Maine Outdoor Heritage Fund, Maine Department of Conservation, Maine's Loon Plate Fund, Federal Aid in Wildlife Restoration Funds, and the Maine Department of Inland Fisheries and Wildlife.

So how should a town make the best use of this information? The Department encourages towns to fully implement Shoreland Zoning to protect riparian habitats. These areas not only provide habitat for many wildlife species but also provide the connectivity or travel corridors necessary for daily and seasonal movements throughout the town. If a town maximizes the conservation of a riparian habitat, this will provide a skeleton for the habitat landscape in the community. Towns should also work to conserve some existing rural and undeveloped land, identified through this process as large unfragmented habitat blocks, by developing new municipal ordinances and tax incentives. This effort will hopefully protect the long-term welfare of high value wildlife resources and maintain large blocks of agricultural land or woodlands important to wildlife species requiring larger areas of habitat.

--Philip Bozenhard, Regional Wildlife Biologist

Region B – Sidney

Communication Towers: For the Birds?

It's amazing the amount of wireless technology available today. Laptops, palm pilots, digital TV, and the wireless Internet are revolutionizing society. My favorite wireless gadget is the cellular telephone. Cell phones provide convenience, safety, and help make our hectic lives easier. It's no surprise that cell phone use is growing rapidly throughout Maine. Consequently, the structural communication towers required to transmit the various signals are sprouting up across the Maine landscape. Regional Biologists are currently asked to provide input to various entities to site these structures in a way that minimizes impacts to wildlife and the community.

While no one favors a reduction or elimination of these services, it is important to realize there are valid wildlife concerns associated with communication towers. Birds occasionally collide with towers just as some birds periodically strike my picture glass window. This is referred to as a blind collision. While this is an unfortunate event, it does not have a significant impact on our local bird populations.

"Phototactic mortality" is an elaborate term to describe a complex event that may significantly impact local bird populations. When a low cloud ceiling or foggy conditions exist, light from the tower refracts off water molecules in the air creating a large illuminated "halo" around the tower. Passing birds are attracted to this illuminated area. Once encompassed by the light, they are reluctant to leave. Like moths around a light bulb, birds continue to circle the tower, staying within the lighted area. Eventually, they may collide with the structure or the guide wires that support it. It is not completely understood why birds experience this visual confusion, but it is an established biological fact that it does occur.

Let's put this in perspective. Communication towers don't kill as many birds as weather. For that matter, house cats probably kill more birds annually than communication towers. However, with the Federal Aviation Administration's estimate of 5,000 new towers being erected each year, bird mortality associated with communication towers can only increase. As of 1998, 223 communication towers had been erected in Maine. That number has grown dramatically as the demand for wireless technology has increased.

Why don't we erect communication towers in Maine that are as advanced as the technology they support? The FAA does not require lighting for towers of less than 200 feet. An unlighted tower eliminates the problem. Towers without guide wires are possible to build. No guide wires significantly reduce the opportunity for collision. If a tower must be illuminated for aviation safety, a strobe light is better than a pulsating beacon. A tower that resembles a flagpole is preferable to a lattice type structure. Co-locating on existing structures is sometimes possible. These modifications can be achieved without substantial cost to the tower developer.

Maine is blessed with exceptional bird resources in a large part because of its location within the eastern flyway, an important bird migration corridor. If we promote a few simple modifications when siting communication towers, we can reduce loss of avian wildlife while providing essential communication services. If you would like more information on this subject, contact your MDIFW regional biologist (see inside back cover). We can provide technical assistance to individuals or towns regarding this issue.

--Keel Kemper, Assistant Regional Wildlife Biologist

Region C – Jonesboro

Environmental Reviews: Essential Habitat for Nesting Bald Eagles

To support the recovery of threatened and endangered species, the Maine Legislature passed an amendment to the State's Endangered Species Act in 1988. This amendment provided the Commissioner of the Department of Inland Fisheries & Wildlife the authority to designate "Essential Habitats" ... areas that are determined to support certain physical or biological features critical for the survival and recovery of a listed species. Probably the best-known and widespread application of this amendment was the 1990 adoption of Essential Habitats for nesting bald eagles.

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

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

Given that approximately 55% of the State's bald eagle population resides in Washington and Hancock County, Region C staff has been deeply involved with the implementation and application of the Essential Habitat Rule. We spend a significant amount of time consulting with landowners, land managers, foresters, prospective buyers, realtors, municipalities, and developers on questions about the provisions of the rule, whether or not a wide variety of projects are affected, and the implications to specific project proposals.

In the 12½ years that the rule has been in effect, the vast majority of applications in Region C have been approved with adequate provisions in place to safeguard the specific needs of nesting eagles. In fact, we have had only one case where a development proposal could not be successfully integrated with nesting eagles due to the proposed structure being literally "under the nest." With adequate buffering, most projects can be approved with permit restrictions that minimally limit the timing of certain outside construction activities to avoid disturbance.

Rather than a liability to ownership, it has been our experience that most landowners are enthusiastic about sharing real estate with nesting eagles, and they have been more than willing to accommodate the needs of eagles. Key to the successful implementation of yet one more environmental regulation, I believe, is that dialogue is initiated early in the process between Department biologists and prospective applicants to identify issues and incorporate their solutions into a final project design.

--Tom Schaeffer, Regional Wildlife Biologist

Region D – Strong Wind Power Projects

Wind power is perhaps the fastest growing energy source, and the rugged, mountainous, terrain of western Maine is a potential site to establish wind farms. In the early 1990s, Regional staff was involved with two wind farm proposals. One project was located in the Boundary Mountains area of Kibby, Skinner, and Merrill Strip Townships. A second project was considered in the Redington Pond Range near Sugarloaf Mountain. Neither project was built, however, the Redington Pond Range project is once again being considered, and our wildlife staff is currently evaluating the project's potential impact on wildlife.

Regional wildlife biologists work closely with the species specialists in the Wildlife Division's Resource Assessment Section (WRAS). Together we identify potential impacts to wildlife, develop or review proposed survey methodology and survey results, and comment on project design. Our objective is to eliminate or reduce impacts to wildlife or their habitats.

We work closely with environmental consulting firms hired by the permit applicant. Consulting firms often conduct the various wildlife studies requested by MDIFW. Pre-application and post-project surveys may be required for rare, threatened, and endangered species; passerine and raptor migrants; breeding birds; mammals; herptiles; and invertebrates. We also provide habitat information to consultants from the Division's Habitat Consulting Area Mapping Project (HCAMP).

Wind farm projects proposed for mountaintops may affect high elevation species or habitats. Examples include: yellow-nosed vole, Bicknell's thrush, and three-toed woodpecker (listed by MDIFW as Species of Special Concern) and also the northern bog lemming (listed as State Threatened). Concerns include the size of the project or "footprint" and how much habitat will be impacted and how quickly it will return to a natural state, if at all. The number of turbines proposed, their height, and length of the blades are important potential impacts to birds in flight, or migrating flocks of passerines or raptors. The Federal Aviation Administration (FAA) may require lights on the towers or blades. Lighting schemes can impact passerine and raptor movements. Additional issues include transmission line and road layout.

No large-scale wind farms exist in the mountainous regions of Maine. Wind farms operating elsewhere might provide us with information on potential impacts. However, each project is unique, and wildlife issues are not uniformly similar or of the same magnitude. If a wind farm is established in Maine, it could provide us with a unique opportunity to evaluate the effects on wildlife and to develop guidelines that will eliminate or minimize impacts with future wind farm proposals.

--Mark Caron, Assistant Regional Wildlife Biologist

Region E – Greenville

FERC Relicensing of Hydro Dams

A common thread among our seven regional offices around the state is the diversity of tasks we encounter from day to day as part of our job. One such task that may not be readily apparent to the public is our involvement in the relicensing of hydro dams. Although the Federal Energy Regulatory Commission (FERC) administers the relicensing process, it is our job as the state's authority on wildlife and their habitats to identify and evaluate possible impacts of project operations. During the last 10-12 years, we have reviewed applications for new licenses for four different hydro projects in the Moosehead Lake Region, and we are currently working on our fifth.

The basic objective of the dam owner for projects in our area is to catch as much precipitation and runoff as possible during wet times of the year (i.e. usually spring and late autumn) so that water can be used as power demands dictate. At times, project operations can result in fairly significant daily or seasonal fluctuations in impoundment water levels. These fluctuations, if great enough, may influence the nesting success of shoreline nesting birds, and possibly the ability of aquatic furbearers to successfully over winter in these impoundments. Severe fluctuations may also impact rare freshwater mussels.

Over the years, project applicants have worked with our Department on a variety of solutions to help mitigate negative impacts. On most projects, some level of modification in project operations is first achieved as a step toward minimizing impacts. On a couple of the projects, nesting platforms for loons have been built and placed in areas within the impoundment where loons commonly attempt to nest. The platforms are made to float so the rising and falling water levels should have much less impact. The long-term success of the platforms is currently being evaluated on two impoundments in our region. Hydro applicants have also provided direct funds for certain wetland enhancement projects.

Although the FERC makes the final decision toward issuing a hydro license and the stipulations associated with that license, our Department continues to work cooperatively with hydro applicants to ensure that negative impacts of project operations on fisheries and wildlife will be minimized and enhancements implemented when possible.

--Doug Kane, Regional Wildlife Biologist

Region F – Enfield

Wildlife Reviews for Tree Growth Tax Forest Management and Harvest Plans

The State of Maine is almost 90% forested – the most heavily forested state in the nation. The industry that generates the greatest economic impact in our state, the forest products industry, relies on productive forestland that is 95% privately owned. For that reason, the legislature established the Tree Growth Tax Law to reduce property taxes as an incentive to keep private forestlands productive and undeveloped. An added benefit is that the land is maintained as wildlife habitat and is available for public recreation, at the discretion of the landowner. The Tree Growth Tax Law provides for the valuation of forestland based on productivity value rather than fair market value. For example, statewide tree growth valuations average just over \$200 per acre for softwood land and less than \$100 per acre for hardwood land, much lower than fair market value.

The local tax assessor may only enroll undeveloped land in the program, upon completion of a forest management and harvest plan prepared by a Licensed Professional Forester. The law requires that the management plan must include the location of water bodies and wildlife habitat identified by the Maine Department of Inland Fisheries and Wildlife. Wildlife biologists in the regional offices are the forester's source for the required wildlife habitat information. We supply information on bald eagle nest sites; deer wintering areas; waterfowl and wading bird wetlands; habitats for rare, threatened, or endangered species; and other important wildlife habitats. We also make management recommendations for those habitats and offer to visit sites with the forester. A site visit with the forester and landowner gives us the opportunity to make other wildlife habitat recommendations such as seeding log landings to grass and clover, wild apple tree maintenance, snag and den tree management, and management of hardwood stands to maintain mast production. If you are a landowner interested in reducing your property taxes, generating additional income, and improving wildlife habitat, you should consider enrolling your land under the Tree Growth Tax Law.

--Kevin Stevens, Regional Wildlife Biologist

Region G – Ashland

Fish and Wildlife Protected Subdistrict (P-FW)

The Land Use Regulatory Commission (LURC) was first established in 1971 as a planning and zoning authority for unorganized townships for those towns without a form of organized government. In 1972, temporary zoning was first adopted for the protection of Deer Wintering Areas within LURC territory. During this time, the Maine Department of

Inland Fisheries and Wildlife (MDIFW), with assistance from industrial landowners, outlined and mapped essential portions of deer wintering habitat within all unorganized towns. These mapped locations were then transposed onto a LURC zoning map to be used as reference to landowners and other user groups. In 1977, permanent standards went into effect, designating these sites as P-FWs or "Fish and Wildlife Protection Areas." The purpose of P-FWs is to conserve important Fish and Wildlife habitats essential to the citizens of Maine, because of their economic, aesthetic, educational or scientific value.

Special protection is provided within P-FWs when certain types of land use activities take place. A permit is required through LURC for timber harvesting, water crossings, campsites, filling and grading, and home occupations, to name a few.

The regional wildlife biologist is the first contact for all industrial landowners before proceeding with any type of timber harvest operation within a zoned P-FW. The process starts with discussions between MDIFW and the landowner on the type of harvest (clear-cut, selective, shelterwood, overstory removal), present condition of stand (blow down, very open cover, very tight cover), and timing of harvest (winter, spring, summer, fall). The next step is a "walk-through", allowing the wildlife biologist and forester to discuss, on site, the best silvicultural management for the deer wintering area that also meets the goals of the industrial landowner. Silvicultural management includes boundary line layout, type of equipment to be used, harvest layout recommendation, type of harvest, tree planting, herbaceous seeding, and road layout. Once the "walk-through" is completed, both MDIFW and the landowner are usually in mutual agreement on how the harvest operation will proceed. The final step is a written plan agreement between the landowner and MDIFW (this step is only for P-FWs) outlining all operational aspects, including a location map within the P-FW. The operational agreement is signed by both parties prior to harvest entry into the P-FW. Once the operation is completed, an onsite review of the harvest is conducted, which enables the biologist to check if guidelines within the operational agreement were followed, and to make corrections and adjustments, if necessary. *

Presently, 103,762 acres are zoned as P-FW in Wildlife Management Districts 1-6, or 56% of the 185,892 acres zoned P-FW throughout the state.

--Rich Hoppe, Regional 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 major 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, the Oil Spill Conveyance Fund, contributions to the **Nongame and Endangered Wildlife Fund** ("Chickadee Checkoff"), and purchases of **Loon Conservation License 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 formulating harvest regulations by analyzing biological data (as stipulated by the 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, and serves as furbearer biologist and Departmental spokesperson on furbearer issues.

Gerry Lavigne, Wildlife Biologist – oversees white-tailed deer management, data collection, data analysis, and serves as Departmental spokesperson on white-tailed deer issues.

Craig McLaughlin, Wildlife Biologist – coordinated and supervised the bear and lynx research programs, oversaw bear management and data analysis, coordinated the monitoring of large canids and cougar, and served as Departmental spokesperson on issues concerning lynx, wolves, and bears. After many years with the Department, Craig opted for a change of scenery and professional challenges. He is now a supervisor in Utah's Division of Wildlife Resources in Salt Lake City. Craig's position is currently vacant.

Karen Morris, Wildlife Biologist – oversees moose management, 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.

Jennifer Vashon, Wildlife Biologist – coordinates lynx research activities, including grant writing, fieldwork, personnel hiring, and study protocols.

Adam Vashon, Wildlife Biologist – coordinated field activities for the lynx research project, including field camp operations, trapping, and chemical immobilization of research animals. Adam recently left this position for an opportunity to work for the U.S. Department of Agriculture's Wildlife Services division in Augusta, Maine.

2001-02 Contract Workers & Volunteers – Contract Workers Included: Shannon Crowley – lynx project and bear project, Susan Marquis – bear project, Tony McCue – lynx project, Shevenell Mullen – lynx project and coyote genetic study, Lanea Naylor-Murphy – bear project, Saleen Richter – lynx project, Jeff Sikich – lynx project, Nathan Webb – bear project, and Christine Wooley – bear project. **Volunteers Included:** Amy-Sue Littlefield – bear project, Kendall Marden – bear project, Kristen Parks – bear project, Deborah Perkins – bear project, Shiloh Schulte – lynx project, Holly Shepley – lynx project, and Dana Smith – large canid tracking.

Black Bear

The 2001 Bear Season

The general hunting season for black bear in 2001 opened August 27 and closed November 24. 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 27 through September 22. The hound season overlapped the bait season, opening September 10 and closing October 26. The bear-trapping season opened September 1 and closed October 31.

The 2001 harvest of 3,903 bears rivaled the record harvest in 2000 (3,951 bears), and was 12% greater than the 1999 harvest of 3,483 bears. Hunters have benefited from Maine's large bear population, estimated at 23,000 bears. For the second year in a row, they posted a harvest that was over 50% greater than the harvest objective of 2,500 bears, established in 1986. Nearly two-thirds of the harvest (2,559 bears, or 66%) was taken during the first two weeks of the season. The beechnut crop was scarce throughout much of northern Maine last fall, and most bears dened by mid-October. Consequently, the large number of hunters afield during the November firearms deer season

killed only 103 bears. Bear harvests have been increasing during the past decade, and have more than doubled from 1,665 bears in 1991 to 3,951 in 2001. The Department has maintained a conservative stance on bear harvests since 1990 to promote population growth. We restricted season lengths in an attempt to limit harvests to 2,300 bears annually. The bear population responded, and bear harvests increased through the 1990s, despite a rather consistent level of hunting effort. Numbers of bear hunters remained rather stable from 1991 to 1998, when about 10,000-11,000 permits were sold annually. By 2000, hunter numbers increased 15% to nearly 13,000, primarily due to additional nonresident hunters traveling to Maine to pursue bears. Nonresidents now make up slightly over half of all bear hunters in the state. The consecutive heavy harvests posted since 1999 have stabilized bear numbers, and the population should approximate 23,000 bears in the spring of 2002.

Geographic Distribution of the Harvest

Bears were harvested in 27 Wildlife Management Districts (WMDs) (Figure 2), representing an expansion since 2000, when only 26 WMDs posted bear harvests (Table 1). No bears were harvested in WMD 22 and WMD 24 in the south coastal region, or in WMD 30, the coastal islands. WMD 11 accounted for 392 bears, or 10% of the State harvest, followed by WMD 8 with 311 bears (8%) and WMD 1 with 293 bears (8%).

Table 1. Bear harvest in Maine during 2001 by Wildlife Management District and method of take.

Wildlife Management District	Method of Take				Total Harvest in District	Assisted by			
	Hunting with bait	Hunting with dogs	Trapping	Unknown		Archery	Guide	Residents	Nonresidents
1	283	2	1	7	293	34	269	16	277
2	178	3	2	4	187	23	166	22	165
3	175	17	1	31	224	41	151	63	161
4	261	0	1	7	269	24	224	37	232
5	231	6	1	5	243	21	216	26	217
6	241	22	3	22	288	38	196	90	198
7	117	30	6	11	164	18	103	59	105
8	225	66	16	4	311	17	235	93	218
9	120	2	1	5	128	18	86	43	85
10	213	9	6	9	247	18	189	56	191
11	335	36	6	15	392	29	271	71	321
12	81	58	8	20	167	19	65	91	76
13	52	33	7	9	101	3	68	37	64
14	96	22	5	3	126	7	98	31	95
15	25	15	1	21	62	4	18	42	20
16	4	1	0	2	7	1	1	4	3
17	35	11	9	16	71	5	15	47	24
18	177	11	6	8	202	22	104	89	113
19	119	27	2	5	153	21	111	36	117
20	6	0	0	4	10	1	2	9	1
21	1	0	0	2	3	0	0	3	0
22	0	0	0	0	0	0	0	0	0
23	8	0	0	2	10	0	5	5	5
24	0	0	0	0	0	0	0	0	0
25	0	0	0	1	1	1	0	1	0
26	16	0	0	3	19	5	6	15	4
27	52	7	1	6	66	10	31	36	30
28	79	11	1	5	96	12	46	49	47
29	43	12	3	5	63	4	28	31	32
30	0	0	0	0	0	0	0	0	0
State	3,173	401	87	232	3,903	396	2,704	1,102	2,801

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 2,801 (72%) of the 3,903 bears tagged during 2001. Nonresident hunters accounted for most (75%) of the harvest prior to the opening of the firearms deer season, but only 24% of the bear kill during the November period.

Nonresidents also recorded most bears taken over bait (76%), and in front of hounds (75%). Maine residents tagged 76% of the bears taken by unreported methods, and resident trappers accounted for 77% of the trapped bears. The number of bears trapped each year remains a small fraction of the total harvest. However, the portion of trapped bears registered by nonresidents has increased in recent seasons. Maine is the only state that offers trappers an opportunity to take a black bear, and more nonresidents are making a special trip to experience the thrill of trapping a black bear.

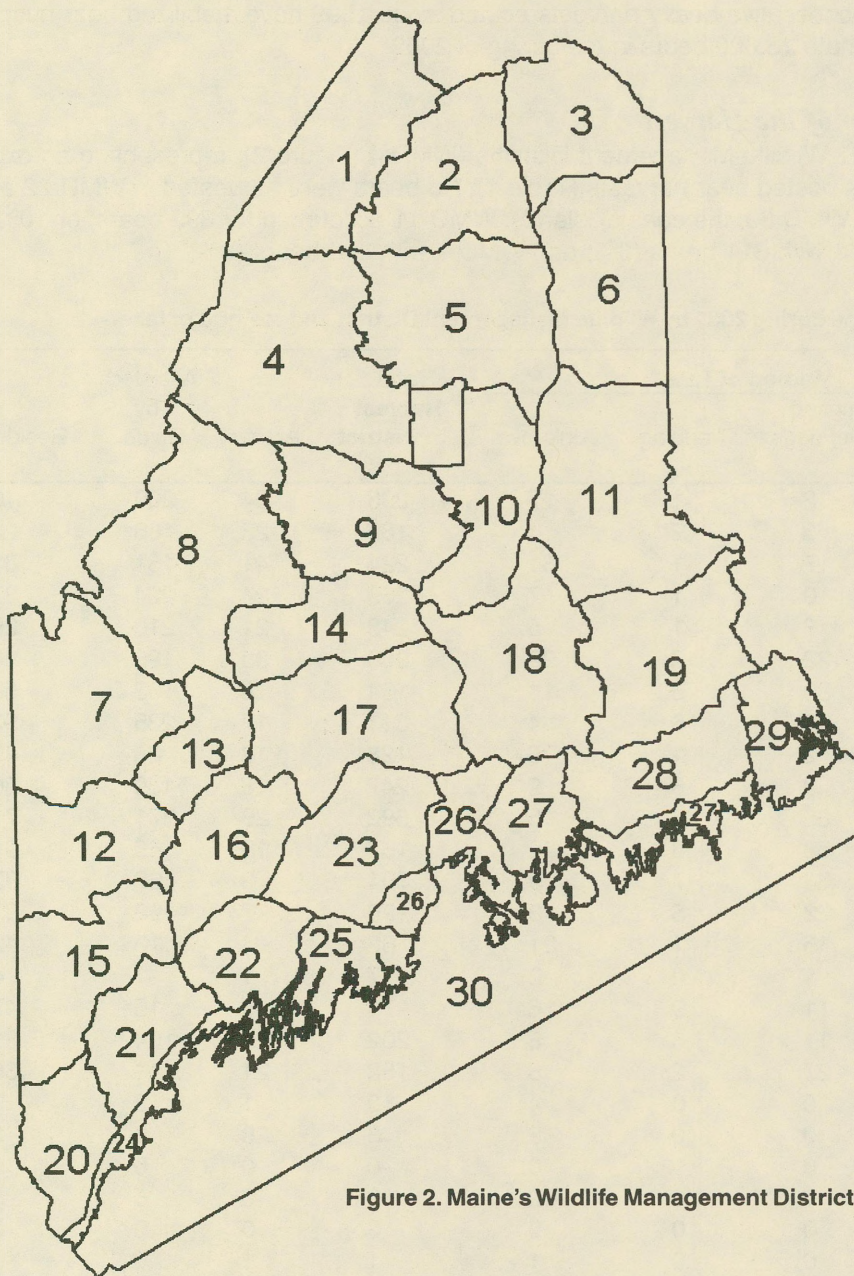


Figure 2. Maine's Wildlife Management Districts (WMDs)

Assistance by Registered Maine Guides

Overall, 2,704 (69%) successful bear hunters employed Registered Maine Guides to assist them during their hunts (Table 1). Guides helped take 81% of the bears killed in front of hounds, 74% of all bears killed over bait, 24% of trapped bears, and 5% of bears for which method of take was unreported.

Sex and Age Distribution of the Harvest

The 2000 bear harvest included 2,030 (52%) males and 1,846 (47%) females. Hunters registered 296 of these bears (8%) as cubs of the year, including 151 males and 145 females. Age and/or sex were not reported for an additional 27 bears (1%).

Prospects for the 2002 Season

The Department has adopted a generic bear season framework to maintain consistent hunting periods, unless management concerns require changes to the lengths of hunting or trapping periods. In 2002, the season will remain similar to those in recent years. The general bear-hunting season will open August 26 and close November 30. This season will be 14 weeks long; one week longer than most years. Under the present season framework, hunters enjoy an extra hunting week once every 6 years, due to the late date of Thanksgiving (determines season ending date). Bears may be hunted over bait from August 26 until September 21. Bear hunting with dogs will be permitted from September 9 until November 1. Bear trapping will be permitted from September 1 through October 31.

Maine's spring 2002 bear population is estimated at 22,000 to 23,000, very close to the Department's objective level of 23,000 bears. The record bear harvests we experienced during 2000 and 2001 did not pose a problem for bear population management, but we are monitoring the survival of adult female bears closely. If survival continues to decline as hunter numbers and harvests increase, additional restrictions on harvests may be required in the near future. Bear hunters can expect fall populations this year to be similar to 2001. Beechnuts are likely to be abundant in the woodlands of Maine this year. As a result, bears should delay den entry until late November, and the late-season harvest should be considerably higher than the 103 bears taken in November of 2001. Harvests will be influenced by the abundance of natural food supplies (chiefly berry crops), but early fall bear hunters can expect another successful hunting season, with plenty of bears. The current bear season framework should result in a harvest of close to 4,000 bears in 2002.

Future Issues in Bear Management

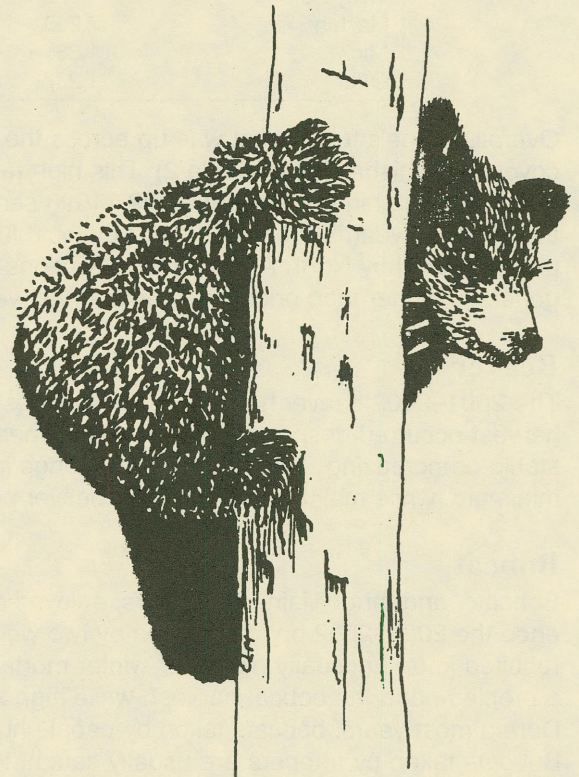
Maine's large bear population provides a range of benefits to residents and visitors of the State. Our tradition of bear hunting is a healthy recreational activity that supplies successful hunters with excellent table fare and memories of good days afield, and drives a guiding and outfitting industry that helps to support rural economies. In recent years, the public's interest in opportunities to view bears has been fueled by the increased visibility of bears along roadsides during the spring and summer months. As our human population grows, and the number of tourists visiting Maine increase, we will be challenged to address potential conflicts between bears and humans while maintaining our abundant bear population.

The Commissioner's Advisory Council has approved new bear management goals and objectives to drive the Department's bear program through 2015. These goals and objectives were recommended by a public working group of citizen advisors, representing diverse interests in bears. The Department's bear management goal is to provide hunting, trapping, and viewing opportunity for bears through the 15-year planning period. Three management objectives were developed. First, we will strive to stabilize the bear population by 2005 at no less than levels experienced in 1999 (23,000 bears statewide), through annual hunting and trapping harvests. Second, we will create information and education programs by 2002 that target specific audiences and promote traditional hunting and trapping methods as valid and preferred tools to manage black bear populations in Maine. Third, we will create information and education programs by 2002 that target specific audiences and promote public tolerance of bears in Maine.

The new management objectives are ambitious undertakings. They will require more refined monitoring of bear populations and hunting harvests, and greater knowledge of bear habitat relationships. The new objectives will also require additional funding to support expanded research and population monitoring programs, and public information and education efforts. If we obtain this support, the Department's long-term bear management plan ensures that Maine will continue to be a stronghold for black bears well into the future.

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).

—Craig McLaughlin



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. Pelts of all furbearers, except weasel, raccoon, muskrat, skunk, and opossum, must be tagged by an MDIFW agent. 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).**

2001-02 Fur Harvest & Hunting Seasons

Trapping in 2001-02 for all furbearers except beaver began October 28 and ran through December 31. Maine has two special trapping seasons that start earlier than the general trapping season. These are the early fox and coyote trapping season, which started October 14 and ran through October 27, and the early muskrat season (WMDs 1-6, and 9-11 only), which opened October 21 and closed October 27 (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 15 until February 28 in WMDs 12, 15, 16, 17, 23, and 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, October 1 through December 31 for gray squirrel, October 1 through March 31 for cottontail and snowshoe hare (except on Vinalhaven [Oct. 1 - Feb. 28]), October 15 through December 31 for skunk and opossum, October 15 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 2. Furbearer harvest in Maine, Fall 1996 to Spring 2002

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02
Beaver	16,640	10,547	10,482	9,850	9,803	11,757
Bobcat	128	205	150	194	308	269
Coyote	1,587	1,894	1,915	1,823	1,977	2,741
Fisher	1,886	2,827	1,807	2,578	2,028	3,117
Red Fox	1,599	1,894	1,539	1,248	1,272	2,056
Grey Fox	25	92	75	82	89	164
Marten	2,208	5,736	2,160	4,396	1,832	5,529
Mink	1,365	1,177	1,519	1,545	1,606	2,031
Otter	1,237	876	838	737	943	1,103

Overall, Maine's fur harvest was up across the board this past season, with new records set for the number of coyotes and fisher taken (Table 2). This high fur harvest was due, in part, to the number of active trappers this year, which was the highest since the 1997-1998 season. We cannot readily explain the reason for the increase interest in trapping this year. Fur prices offered by local furbuyers did not differ too much from last year (Table 3); however, fur prices offered by North American Fur Auctions (NAFA; the largest fur auction house in North America) were generally higher than prices they offered last year.

Beaver

The 2001–2002 beaver harvest was the highest since the 1996-1997 season, with 11,757 beaver taken. The high harvest occurred despite a slight decline in pelt prices for beaver (Table 3). 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.

Bobcat

Bobcats, and other Maine furbearers, enjoyed a much milder winter this year than last year. The Department shortened the 2001–2002 bobcat season by two weeks out of concern that deep snows and a high harvest may have resulted in an unusually high over-winter mortality rate in 2000-2001. This year, snow sinking-depths have not been a problem, and the bobcat harvest, while high at 269 animals, was below the harvest limit of 275 bobcats (Table 2). During most years, bobcats taken by people hunting with hounds make up the majority of the bobcats harvested. Bobcats taken by trappers are usually caught incidentally while pursuing other species. However, with a trapping

harvest of 141 bobcat this year (more than double last year's harvest by trappers), it raises the question of whether trappers are starting to target bobcat. Local furbuyers were only offering an average of \$30 for each bobcat pelt as of February 2002 (Table 2), even though bobcat pelts from the Western U.S. were selling for more than \$100 per pelt. Preliminary results from our trapper effort survey indicate about 10% of the trappers were targeting bobcat. If trappers begin to target bobcat, it will necessitate changing some of the tools we use to manage bobcat.

Success rates for bobcat trappers have steadily increased the past 10 years, which indicates that the bobcat population has likely been increasing. The combination of mild winters, a high snowshoe hare population, and the institution of a shorter bobcat hunting season 10 years ago, all have helped the bobcat population increase.

Table 3. Average pelt price of Maine furbearers from Fall 1996 to Spring 2002. All prices are rounded to the nearest dollar.

Species	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2000-02
Beaver	\$22.00	\$27.00	\$23.00	\$13.00	\$15.00	\$19.00	\$18.00
Bobcat	25.00	25.00	35.00	28.00	30.00	60.00 ¹	30.00
Coyote	12.00	20.00	17.00	9.00	12.00	14.00	13.00
Fisher:							
Male	15.00	22.00	25.00	21.00	15.00	16.00	20.00
Female	27.00	40.00	34.00	22.00	15.00	16.00	19.00
Fox, Gray	-	12.00	11.00	7.00	8.00	8.00 ¹	10.00
Fox, Red	16.00	20.00	17.00	11.00	14.00	15.00	16.00
Marten	21.00	29.00	23.00	13.00	17.00	17.00	16.00
Mink:							
Male	16.00	24.00	15.00	10.00	13.00	12.00	12.00
Female	14.00	16.00	9.00	6.00	8.00	8.00	9.00
Muskrat	2.00	4.14	3.00	1.00	2.00	2.00	4.00
Otter	42.00	46.00	43.00	32.00	36.00	49.00	41.00
Raccoon	10.00	17.00	14.00	7.00	5.00	8.00	9.00

¹ Price determined from only one fur buyer.

Coyote

More coyote pelts were tagged this year than in any other year (Table 2). A total of 2,741 coyote pelts were tagged, with 564 animals snared. The increase in the number of tagged coyote pelts indicates that either more animals were harvested, or that more people were interested in selling coyote pelts from the coyotes they killed (it is not mandatory to tag every coyote that is killed). Coyote pelt prices were not noticeably higher this year than in past years (Table 3). Therefore, the increase in number of coyotes tagged likely reflects an increase in the number of animals harvested.

Fisher

More fisher were harvested this year (3,117) than in any year since the Department started tagging pelts in 1973 (Table 2). This harvest exceeded mid-1980's harvests by over 1,000 animals, when pelt prices for fisher averaged \$180 per pelt (see Table 3 for recent pelt prices). In general, we are not concerned about the increased fisher harvest. Preliminary analyses on the carrying capacity for fisher indicates that its carrying capacity was underestimated in earlier studies. The fisher population appears to have steadily increased in most areas of the state over the last 13 years. However, in Northwestern Maine, the fisher harvest has leveled off the past three years, and trapping success decreased this year. We will be watching the situation in Northwestern Maine closely, especially if the snowshoe hare population drops from its current level.

Red and Grey Fox

Recent red fox harvests have been at or near a 30-year-low for the species. This year, the red fox harvest reversed this trend with 2,056 fox taken (Table 2). This is the most red fox harvested since the 1994-1995 trapping season. The grey fox harvest (164) was surprisingly high (Table 2); with almost double the number of grey fox taken last year, and the highest 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 2001, the marten harvest was high, as expected, with 5,529 marten taken (Table 2). Looking at even and odd year harvest rates separately, it appears that the marten harvest has been stable the past five years. Trapper success

during odd years did not change significantly over the same time period, but trapping success declined during even years. Pelt prices for marten were slightly lower this year (Table 3).

Mink

The mink harvest increased for the second year in a row, reversing a long-term decline in mink harvest rates (Table 2). A total of 2,031 mink were harvested. Pelt prices for mink were slightly higher this year than last year (Table 3).

Otter

Like this year's beaver harvest, the otter harvest (1,103) was the highest since the 1996-1997 season (Table 2). Otter harvests have increased significantly over the last 4 years. According to the criteria in the otter management system, the otter population is stable. The high price currently being offered (Table 3) for otter pelts is noteworthy in that it may affect the amount of effort trappers are willing to put into harvesting otter next year. Prices for dark otter pelts in the late spring fur auctions were in the \$75 to \$80 range, which was up considerably from the \$40 being offered for these pelts in February.

Research and Monitoring

Marten

Dr. Dan Harrison, University of Maine - Orono, has completed his research on building and testing a habitat based model for predicting marten population levels in Maine. He is planning on presenting results of the project to the Department this September. Results from this study will be used in the marten species assessment, which is currently being prepared, and in a new management system for marten. ***This project was funded in part by Maine's Outdoor Heritage Fund; hunting and trapping license revenues; and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

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.

A total of 108 coyotes were purchased from snarers and hunters for the study in the winter of 2000-2001. These animals were photographed and measured to document their physical appearance, size, and skull characteristics. Female coyote weights ranged from 20 to 35 pounds and averaged 30 pounds. There was a greater spread in weights for male coyotes. The smallest male coyote weighed 22 pounds, while the largest male weighed 47 pounds. As in past studies, male coyotes averaged 35 pounds in weight.

Preliminary genetic 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. Recent anecdotal reports indicate that smaller, more western-like coyotes are increasingly being caught in northeastern U.S. The presence of western-like coyotes in Maine's coyote population may just indicate a normal mixing of coyotes from western states with eastern coyote populations. 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. We continue to analyze data from this project. Specific results from this study will be submitted to a scientific journal for publication.

Necropsy data from this study received a good deal of publicity this past spring as it was used in debates on how efficient snares are in killing coyotes. Although these data do not represent a formal study on the killing efficiency of snares, they pointed to a need to improve the efficiency of killing snares. Our Department is always concerned about the welfare of wild animals and the humanness of harvesting techniques. The Maine Trappers Association and our Department have taken steps to improve snares as a result of these data.

Trapping - Best Management Practices

The nationwide program on Best Management Practices (BMPs) for trapping is currently focusing on publishing BMPs for the species that have been tested, rather than doing additional field tests. The first BMP that will be published will be for the eastern coyote. MDIFW and trappers in Maine participated in field-testing foothold traps for coyotes to determine the trap's humaneness, efficiency, and safety. Results of these field tests will be incorporated in the eastern coyote BMP. It is hoped that BMPs for beaver, red fox, gray fox, western coyote, muskrat, and weasel will also be started this year. The key will be to get enough volunteers from various state wildlife agencies who are willing to participate in the writing of these BMPs. The raccoon BMP will not be prepared for a couple of years in order to conduct additional tests with the 1.5 coil spring trap.

--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 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.

Surveys to determine the distribution of New England cottontails indicated that 53 of the 376 survey sites had New England cottontails. The area that New England cottontails occupy in Maine is now estimated to be 1,600 km², which is an 83% decline in area from the maximum area (9,400 km²) they historically occupied in Maine. Within the occupied range, 23% of the sites surveyed contained New England cottontails, 33% contained snowshoe hare, and 44% were vacant. No eastern cottontails were found in Maine. A total of 244 trap nights resulted in a 14% trapping success rate, and the capture of 27 New England cottontails.

Site and landscape characteristics of habitat patches occupied by New England cottontails were compared to vacant sites to determine which variables influence whether a site will be used. Fifty-three sites occupied by New England cottontails were compared to 53 unoccupied sites. In general, unoccupied sites had more coniferous understory, lower understory stem densities, less land area, and more adjacent bodies of water than sites occupied by cottontails. Patches occupied by New England cottontails tended to be in landscapes with cultivated or old-fields and little forest. The 53 sites occupied by cottontails were also compared to 53 sites occupied by snowshoe hares. Honey-suckle and autumn olive were more prevalent on cottontail sites than snowshoe hare sites. As expected, coniferous trees were more common on snowshoe hare sites than on sites occupied by New England cottontails. Sites that were recently timber harvested were predominately occupied by snowshoe hares.

A monitoring protocol was designed to detect a change in the status of New England cottontail populations. The protocol was designed to detect range expansions or contractions, the abundance of suitable habitat, and the overall abundance of New England cottontails. Surveys that count the number of fecal pellets produced by snowshoe hares are commonly used to determine the density of snowshoe hares in an area. However where more than one species of rabbit or hare occurs, it is very difficult to determine which species produced the pellet. This of course is the situation we have in southern Maine where both New England cottontails and snowshoe hares occur. Other survey techniques, such as snow track counts, are also difficult in southern Maine, because good snow tracking conditions are few and far between. If DNA could be extracted from the fecal pellets of rabbits and hares, biologists could distinguish which species produced the pellet. Dr. Litvaitis' lab developed a technique to extract DNA from fecal pellets that allows reliable determination of which species produced the fecal pellet. This technique should greatly

enhance our ability to monitor New England cottontail populations in Maine and elsewhere in New England. ***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

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 22 pounds for males and 19 pounds for females. Its general appearance is similar to the bobcat in that it has ear tufts, a short black-tipped tail, and tawny-gray fur. However, the lynx has 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 the size of their populations. Lynx are capable of moving extreme distances in search of food or to establish new home ranges.

The U.S. Fish and Wildlife Service (USFWS) has listed the lynx as Threatened in the lower 48 states under the federal Endangered Species Act. Maine, Washington, and Montana are the only states, outside of Alaska, where lynx currently have viable resident populations. Reasons given for listing the lynx are complex and include range restrictions and habitat concerns. In western states, lynx are associated with old growth forests at high altitudes, which are being cut for timber, and environmental groups have advocated greater restrictions on land use to protect western lynx habitat. In the East, lynx occur in large tracts of woodlands, including areas of young forests that supply habitat for snowshoe hares. Maine's lynx are found across the northern part of the state, with a few reports from Down East Maine. They are rarely encountered, and little is known about 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.

The Department has conducted track surveys each winter since 1995 to detect lynx and other furbearers. 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; and we soon moved the study to a 4-township area near the Musquacook Lakes. Since March of 1999, we have captured 65 lynx, including 29 adults and subadults that were fitted with radio collars. Our intensive monitoring of the collared lynx is providing answers to questions about the persistence of lynx in Maine, the types of forest that they use, their reproduction, and mortality factors.

Land use practices on industrial forestlands in northern Maine, such as regenerating clearcuts, provide ideal snowshoe hare habitat and may be beneficial to lynx. However, additional information is needed on the effects that partial cutting and pre-commercial thinning practices have on snowshoe hare populations. Over the last 10 years, partial cut harvesting has become the dominant harvesting technique in Maine's industrial forest. In 1997, partial harvested areas composed 98% of the total acreage harvested in Maine. Several years ago, Dr. Dan Harrison, and Jessica Homyack, University of Maine, began studying the effects of pre-commercial thinning on snowshoe hare populations in northern Maine. This research should give us a better idea of how compatible current forest practices are for snowshoe hare and other animals that depend on early-successional habitat.

Although lynx are known to be long-distance dispersers, capable of traveling hundreds of miles before establishing home ranges as adults, only one of the radiocollared Maine lynx have moved very far from the study site, and several have made short trips. We have located the collared lynx 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 late May, and by late June, the kittens have grown large enough for us to examine safely. So far, we have located 17 dens and handled 37 kittens during 1999, 2000, 2001, and 2002. These kittens represent the first documentation of reproduction by Maine lynx since 1964. The newborn kittens are too small to carry radio collars, but 35 of them have been marked with numbered eartags. We are already learning about the different mortality factors that lynx face in Maine. Ten of the lynx, plus one uncollared juvenile, have died during the study. Although these mortalities are still under investigation, it appears as if another predator killed 5 of the lynx, 3 starved to death, 1 died of unknown causes, and that the other was human related. If adequate funding is obtained, the study will continue for the next 2 to 4 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; Clayton Lake Woodlands; and Irving Woodland, LLC.

The Department continues to cooperate with researchers at the University of Maine in studying lynx and their habitat requirements. In addition to the snowshoe hare study by Jessica Homyack (discussed above), Angela Fuller, a Ph.D. student under the direction of Dr. Dan Harrison, began documenting sub-stand scale habitat use by three radio-collared lynx in our study area this winter. This information will help determine what components of a forested stand are important for lynx.

--Craig McLaughlin and 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.

In 1998, the USFWS announced its intent to remove wolves in the Great Lakes Region from the federal endangered species list. As part of this process, the USFWS intends to classify wolves in the Northeast (including Maine) as Threatened. This category enables federal Endangered Species Act protection to be maintained on any wild wolves that may travel into Maine, but would provide MDIFW with more flexibility to address wolf and coyote management issues. Wolves, and other wildlife species for which no open hunting or trapping seasons exist, are fully protected under State law. If the proposed reclassification of wolves occurs, a federal recovery plan will be drafted for the Northeast to establish recovery goals and options.

A lack of funds from the federal endangered species program for wolves in 2001 kept our large canid investigations to a minimum. There were no snowtrack surveys conducted specifically for wolves this year. However, in Spring 2002, Dana Smith, a volunteer who has helped us considerably over the years in following up reports of wolf sightings, reported seeing two wolf-like animals at close range in the very northwestern part of the state. This report of multiple, wolf-like animals is consistent with other sightings in this area that have occurred over the last two years. We are following up Dana's sighting by trying to obtain physical evidence (tracks, scat, or recordings of howling events) that would confirm that we are dealing with animals larger than the typical coyote. Ideally, if we can confirm that we are dealing with large canids and can determine where the animals are active, the animals would be trapped and radiocollared. By trapping the animals, we could collect biological samples for genetic analyses and determine whether an animal was ever vaccinated before (this would indicate a captive animal that was released).

There has been considerable interest in wolf recovery in Maine (both pro and con!). Wolf recovery has many complex biological, sociological, and economic implications. Because of the complexity of the issues surrounding wolf recovery, MDIFW is producing a "white paper" on wolves that will outline the current state of knowledge on these issues. It is hoped that the public will use this document to make informed choices concerning wolf recovery. Unfortunately, time constraints continue to delay the publication of this document. **Funds for monitoring wolf activity in Maine come primarily from hunting and trapping licenses; and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).**

--Wally Jakubas and Craig McLaughlin



Moose

2001 Moose Season

The 2001 moose season was administered under very different rules than previous seasons. The area open to hunting was about 10% larger than in recent years. In 2000, the hunting area was divided into 7 moose hunting zones. In 2001, permits were issued for 18 WMDs, including some (WMDs 28 and 29 and a small part of 18) that had not been opened in recent years (Figure 3).

In addition, timing of the season was different from any previous moose season. The debate on timing of the moose hunting season has been ongoing since 1980, and is an important issue with various segments of the public. Some hunters prefer to hunt in late September when the bulls are heavier and respond more readily to calls. Others prefer a mid to late October hunt when the leaves are off the trees and there is a better chance of cool weather. A few favor a hunt in late November or December. While moose hunters debate when the season should be, many other groups have strong and diverse opinions of when it should not be. Hikers, bird hunters, leaf peepers, meat cutters, trappers, land owners, camp owners, bear hunters, and fishermen have all expressed concerns that holding a moose season at a given time, will conflict with their activity. In addition, as the number of permits increased, both moose hunters and other groups have become concerned about congestion (on logging roads and at meat cutters) during moose season.

Many possible solutions were considered in developing the season dates for the 2001 season. Most people agreed that a longer season would give hunters more choice in selecting the days they wanted to hunt; however, simply

lengthening the season was not expected to reduce the density of hunters in the field and conflicts with other user groups. Regardless of season length, the majority of hunters prefer to hunt the first few days of a season. Therefore, a split season, with half the hunters hunting one week and half the hunters hunting the other week, was suggested to help alleviate the congestion problem. In a series of public meetings, it became clear that a September season would not be socially acceptable in many WMDs.

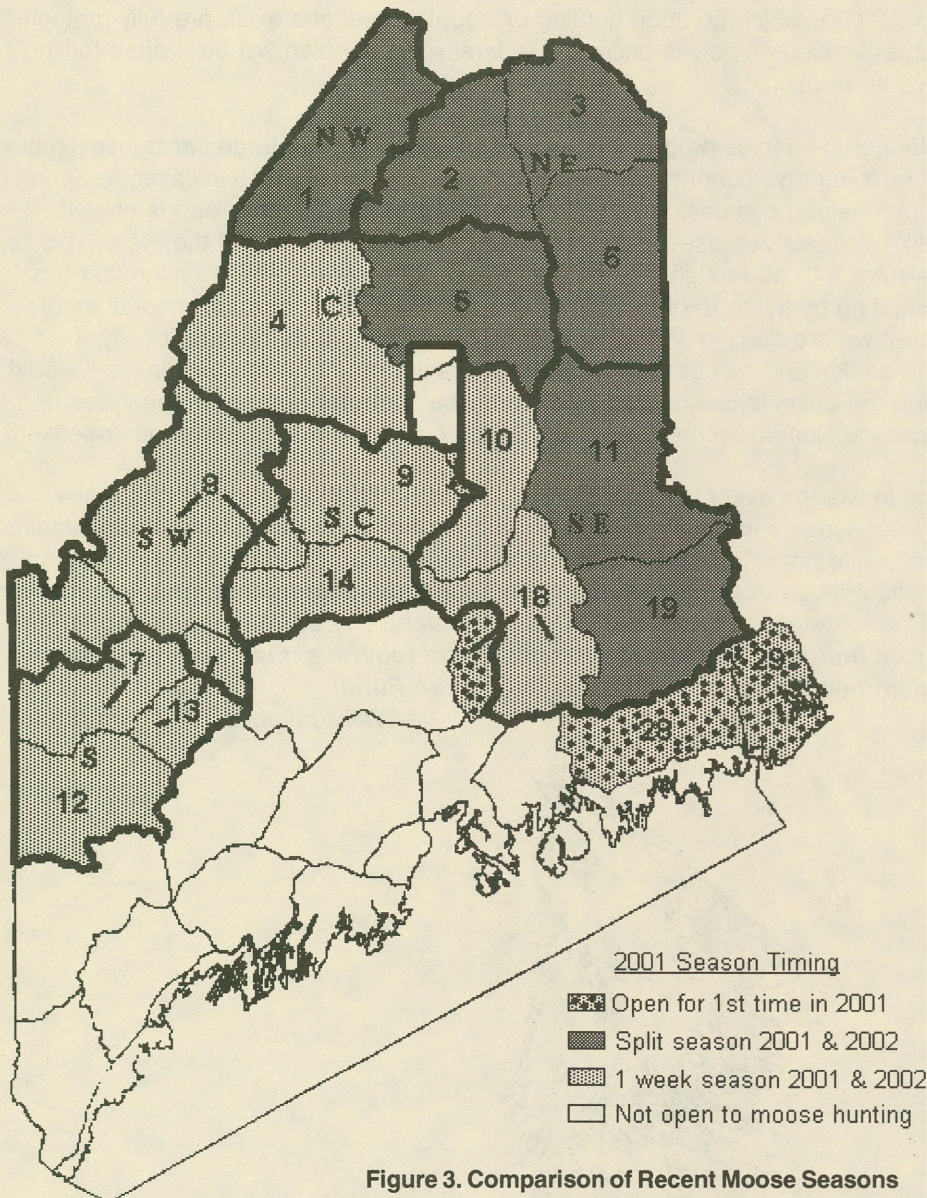


Figure 3. Comparison of Recent Moose Seasons

The 2001 season (Figure 3) reflected the public's input on the regulation process. Some areas had a 2-week split season, with half the hunters hunting during the week of September 24-29 and the other half hunting from October 8-13. All permits issued for the September season were any-moose permits (AMP). All antlerless-only permit (AOP) holders and the remaining AMP holders hunted in October. Finally, in some WMDs, no permits were issued for the September season, and all hunters with permits for these zones hunted from October 8-13. Based on hunter success and responses to the moose hunter survey, hunters did fare somewhat differently under the various regulations.

As expected, bulls were a bit heavier in September. Bulls over 5 years of age weighed an average of 874 pounds in September and 808 pounds in October. The age composition of bulls killed by AMP hunters was virtually the same in September (15% yearling, 57% 2 - 4 year olds, 28% 5 and older) as October (16%, 57%, and 27%).

Two thousand five hundred forty-five moose were registered during the 2001 moose season (Table 4). Hunter success was 85% overall but varied by WMD, season, and permit type (Table 5). AMP holders had slightly higher success in October than in September, although this was not true for all WMDs. AOP holders were somewhat less successful than AMP holders. This was expected, as AOP holders had fewer legal moose available. Antlerless only permit holders did not seem to have much trouble identifying legal moose. Of 436 AOP holders who responded to the survey, 76% did not pass up any moose because they were not sure if they were legal, 15% passed up one, and 5% passed up two. Only 4% passed up more than two animals because they were not sure if they were legal.

Table 4. 2001 Maine moose harvest by WMD.

WMD	Males	Females	Total
1	110	37	148
2	88	44	132
3	124	113	237
4	187	87	274
5	102	41	143
6	173	104	277
7	111	65	176
8	267	153	420
9	73	25	98
10	85	33	118
11	101	65	166
12	27	16	43
13	24	8	32
14	27	17	44
18	47	16	63
19	74	39	113
28	31	8	39
29	18	4	22
Total	1,665	875	2,545

Table 5. Percent success of moose hunters in 2001 by WMD, season, and permit type.

WMD	September Any Moose	October Any Moose	Antlerless Only
1	80	89	N/A
2	88	95	92
3	88	92	82
4	N/A	79	85
5	94	85	80
6	88	83	84
7	N/A	95	82
8	N/A	96	89
9	N/A	97	N/A
10	N/A	91	N/A
11	73	83	44
12	N/A	86	N/A
13	N/A	61	N/A
14	N/A	90	80
18	N/A	63	N/A
19	76	92	N/A
28	N/A	78	N/A
29	N/A	73	N/A
All	80	87	76

Hunters reported about the same degree of difficulty in finding a butcher during the split season in 2001 as in the one-week season in 2000. Of 1,836 hunters who planned to have their moose professionally butchered in 2001, 85% had little or no trouble finding a butcher, 10% reported minor problems finding a butcher, 4% had a difficult time finding a butcher, and only 18 (1%) of the people who wanted to have the animal professionally cut were unable to locate a butcher and had to do the job themselves. For Comparison, in 2000, 82% of the hunters had little or no trouble finding a butcher, 13% minor problems, 4% had a difficult time finding a butcher and less than 1% were unable to find a butcher.

The split season did help reduce hunter crowding. Overall, 12% of the hunters thought the hunting conditions were very crowded and 52% thought they were not crowded (Table 6). The percent who felt very crowded varied by WMD and ranged from 1% in WMD 2 to 38% in WMD 13. As would be expected, hunters generally felt the hunting conditions were more crowded in WMDs with more permits per square mile for any given week. However, land use appears to also have an impact. Hunter's reported feeling more crowded in WMDs 13, 18, and to a lesser extent 12, than would be expected based merely on the density of hunters. These areas tend to have less corporately owned forest, and more individually owned forest, than many other WMDs open to moose hunting. Hunters probably concentrated in forest land under corporate ownership to take advantage of the easy access provided by the extensive interconnected logging roads.

Table 6. Moose hunters assessment of hunter crowding by WMD in 2001.

WMD	Permits/Mi ²	Percent who found conditions		
		Very Crowded	A Little Crowded	Not Crowded
1	0.6	3	25	72
2	0.6	1	21	78
3	1.4	18	42	40
4	1.7	22	45	33
5	0.5	2	20	78
6	1.1	9	35	56
7	1.4	15	38	47
8	2.1	16	45	39
9	1.0	2	46	52
10	1.4	9	41	50
11	0.8	11	30	58
12	0.5	12	46	42
13	0.9	38	26	36
14	0.6	7	29	61
18	0.7	21	35	43
19	0.7	3	23	74
28	0.6	6	29	66
29	0.6	4	11	86
All		12	36	52

*This hunter density for either season: for example, in WMD 1 there were 1.2 permits issued/mi² but because of the split season, hunter density was only 0.6/mi² during either week of hunting.

One would expect people who hunted away from a road to feel less crowded than those who hunted on or near a road. As expected, hunters who chose to hunt from a canoe reported feeling the least crowded. However, hunters who hunted on foot more than ¼ mile from a road were slightly more likely to report that conditions were very crowded than were people who hunted on foot within ¼ mile of a road. Those that walked at least ¼ mile from a road felt no less crowded than those who chose to hunt from a road. There are two likely reasons for this. First, "crowded" is a subjective decision and may depend more on the tolerance of the individual than the density of hunters. Second, one must consider whether the hunting method caused the hunter to feel crowded, or if feeling crowded caused the hunter to select a hunting method.

Moose populations

Moose hunters have reported seeing fewer moose per hour spent hunting in the last 3 years than in the previous decade (Table 7). In addition, many people report they are seeing fewer moose during the summer than in the past. In both 1999 and 2000, a snowstorm during the season may have reduced hunter's mobility, and therefore sighting rate. No such event occurred in 2001, and the sighting rate continued to be low. Many people suggest that the reduced number of sightings is due to decreasing visibility because clearcuts have grown up, or because moose have become more wary. Although these are plausible reasons why folks are seeing fewer moose, we have no concrete evidence that the population has declined.

Table 7. Average number of moose seen/10 hours hunted in Maine by hunting zone by year.

Year	Opening Day	Zones							All
		Northwest	Northeast	Central	Southeast	South Central	Southwest	South ²	
1980	9/22				No Zones				1.7
1982	9/20	0.8	1.4	2.2	1.0	3.8	2.2	-	1.7
1983	9/19	0.7	0.7	1.2	0.7	2.0	2.4	-	1.1
1984	10/8	0.7	1.0	1.6	1.0	3.3	3.1	-	1.4
1985	10/21	1.4	1.9	2.7	1.3	4.4	3.1	-	2.2
1986 ¹	10/20	0.9	1.5	3.0	1.0	4.5	6.4	-	2.2
1987	10/18	0.8	2.0	3.9	1.1	7.5	4.8	-	2.7
1988	10/17	2.2	3.2	5.3	1.3	5.3	8.8	-	3.8
1989	10/16	2.4	3.4	5.5	2.1	11.0	10.7	-	4.5
1990	9/24	1.1	1.5	2.4	0.9	4.0	4.2	-	2.0
1991	10/7	1.2	4.1	4.8	1.7	9.6	10.3	-	4.5
1992	10/5	2.4	2.9	3.7	1.5	7.9	7.7	-	3.5
1993	10/4	1.9	3.5	4.2	1.8	7.7	8.2	-	4.0
1994	10/3	2.3	5.0	5.0	2.4	12.8	9.8	-	5.5
1995	10/2	2.1	4.3	3.0	2.2	10.4	6.8	-	4.3
1996	10/7	2.1	4.3	3.4	2.0	8.0	8.1	-	4.2
1997	10/6	2.8	4.0	3.8	2.1	7.3	5.9	4.8	4.2
1998	10/5	2.7	5.9	4.2	3.1	9.8	7.6	6.3	5.1
1999	10/4	1.6	3.0	2.1	1.3	5.6	3.5	3.3	3.1
2000	10/9	1.5	2.1	2.2	1.4	3.8	3.2	3.0	2.5
2001 ³		1.8	2.3	1.9	1.2	4.2	3.1	2.2	2.1

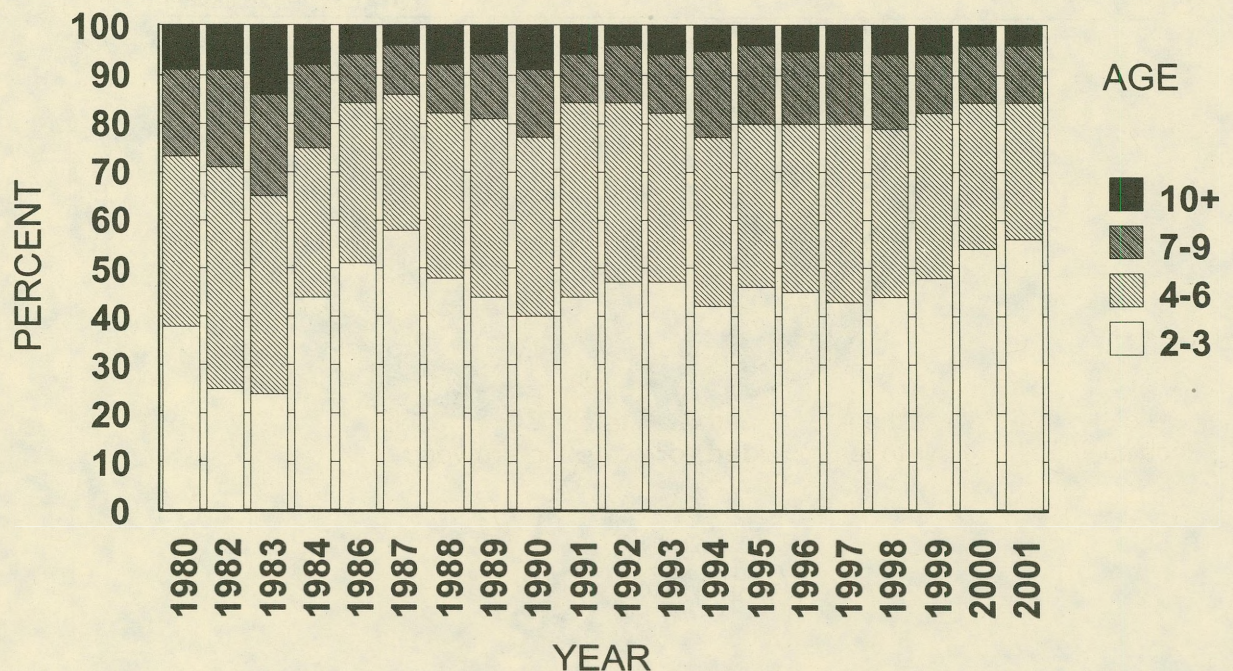
¹ The SW, SC, and SE zones were expanded in 1986.

² The south zone was opened in 1997.

³ The 2001 season was a split season with hunting in September and October. Permits were issued by WMD rather than zone. Because WMD 7 is split between the S and SW zones, sighting rates from these zones should be used with caution.

Maine's seasons have been heavily directed toward bulls. Therefore, if hunting were reducing the number of moose, we would expect to see a large reduction in either the proportion of males or the age of males. In fact, there has been public concern that there are far fewer large bulls than in the past. However, neither hunter sighting reports or harvest data indicates that there has been a great decrease in the number of mature bulls (Figure 4).

Figure 4. Age composition of adult (2+) bull harvest in Maine by year



The sex composition of yearling and adult animals reported by deer hunters was the same in the hunted (51% bulls) and unhunted (52% bulls) parts of the state. The proportion of bulls with palmate antlers in the hunted vs. unhunted areas is the opposite of what one would expect. Slightly more of the bulls from the hunted area (72%) than bulls from the unhunted areas (66%) sported palmate antlers, based on reports by deer hunters. There were slightly fewer older bulls among the adult males in the harvest than there were when the seasons were first opened, but older bulls are still common (Figure 4).

Of course, hunting isn't the only thing that could reduce the number of moose, and it appears that natural mortality has been extraordinarily high. Last winter, and in some previous winters, we received an unusually high number of reports of dead moose (especially calves) and noted moose with very heavy tick loads. There is evidence that over-winter calf mortality is higher than it was 15 years ago throughout the region. In the late '80s, we had radio collared moose in northern Maine. All 11 collared calves survived the winter. This winter, there were radiocollared moose in New Hampshire, and 6 of 9 calves did not survive the winter. Winter tick appears to be the cause of death. Moose sometimes have thousands of ticks on them. In late winter/early spring, the ticks take their last blood meal. The resulting irritation causes the moose to scratch, and some lose huge patches of hair. Large losses of moose have occurred from this parasite in other parts of the moose range in the past.

The 2002 Moose Season

The 2002 moose season will be nearly identical to the 2001 season. Permit allocations (Table 8) and the hunting area (Figure 3) will be identical. The same WMDs will have split seasons. Both the September and October seasons will be 6 days long and will open on a Monday. The biggest change from last year is that the September 23 and October 7 seasons will open 1 day earlier than in 2001.

--Karen Morris

Table 8. 2001 and 2002 moose permit allocations by WMD and permit type.

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



Deer

2001 Deer Harvest

Season Dates and Structure

Maine hunters could pursue whitetailed deer for 79 days within four separate hunting seasons during 2001. From September 8 to December 8, bowhunters could harvest two deer of either sex during the expanded archery season, encompassing Wildlife Management Districts (WMDs) 24 and 30 (see Figure 2) and 8 other predominantly urban locations in central and southern Maine. The statewide archery season took place between September 27 and October 26 (26 days); deer of either sex were legal quarry. The regular firearms season, which began for Maine residents on October 27, and for all hunters on the following Monday (October 29), ended on November 24 (25 days). Black powder enthusiasts had 6 days (November 26 - December 1) to hunt whitetails in northern, western, and eastern WMDs. Elsewhere; the special muzzleloader season spanned a total of 12 days (November 26 - December 8). 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, and special muzzleloader seasons, 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. **Use of an any-deer permit by any hunter other than the one who drew that permit, is a violation of the law!**

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 all does older than fawn that are legally registered during both archery seasons, as well as during the regular firearms and special muzzleloader seasons on deer.

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. Doe quotas for 2001 were set at levels that would help to offset high winter losses our deer experienced during the 2001 winter. The 7th most severe winter of the past half-century, the 2001 winter caused an 18% reduction in Maine's deer population. Deer losses were greatest in eastern, western mountain, and northern WMDs, where deer must contend with inadequate wintering habitat. Central and southern Maine districts also lost deer, but populations generally fared better over winter.

During 2001, doe quotas ranged from zero in twelve WMDs (districts 1 to 8, 11, 19, 28, and 29) to 1,778 in WMD 17. These quotas include anticipated doe harvests from the statewide archery season, but do not include fawns. State-wide, a harvest quota of 8,836 adult does was set during 2001 to achieve deer management objectives among Maine's 30 WMDs. Since any-deer permittees and archers can choose to kill a fawn instead of an adult doe (or a buck), we expected a harvest of nearly 5,300 fawns (both sexes combined) in addition to the 8,800+ adult does.

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 statewide archery hunt counts 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 2001, 88,811 applicants vied for a chance to draw an any-deer permit. Of these, 90% (79,714 applicants) were Maine residents. Among the 9,097 nonresident applicants were individuals who reside in 40 states and 3 Canadian provinces. In keeping with our landowner recognition program, 8,529 any-deer permits were issued to qualifying landowners (people who own 25 or more acres of land which is kept open to hunting) in a separate, early lottery. Landowners not drawn in this lottery (there were 11,645 landowner applicants in 2001) were entered in the regular computer lottery for any-deer permits.

Statewide, we issued 53,597 any-deer and 809 bonus any-deer permits (WMDs 23 and 30) in 2001. Combined, these 54,406 permits represent a 22% decrease in antlerless deer hunting opportunity compared to 2000 (69,715 any-deer permits). Any-deer permit allocations ranged from zero in the 12 WMDs with a zero doe quota, to 12,110 permits in WMD 23. On a per square mile basis, we issued the most any-deer permits in WMD 23 (1,326 permits/100 sq. mi.), WMD 22 (1,005 permits), WMD 21 (950 permits), and WMD 24 (933 permits/100 sq. mi.). Maine residents drew 49,675 any-deer permits (91%), and nonresidents received 4,731 permits (9%). 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 2001

Overall, 27,769 deer were registered during 2001, of which 1,458, 753, 24,763, and 795 were taken during the expanded archery, regular archery, regular firearms, and muzzleloader seasons, respectively (Table 9). Statewide, deer harvest decreased by 25% (9,116 deer) in 2001, compared to the previous year (36,885). Among seasons, harvest increases were noted for the regular archery (20%) and muzzleloader (17%) seasons during 2001. Primary reasons for the decline in statewide deer harvest include reduced availability of bucks, and reduced allocations of antlerless deer permits following the severe 2001 winter, as well as declining hunter participation and poor hunting weather during the firearms season. The statewide deer harvest ranks 43rd overall since 1919 (first year harvest records were kept). Unlike the previous year, no records were set for deer harvest at the county or WMD level.

Table 9. Sex and age composition of the 2001 deer harvest in Maine by season type and week, statewide¹.

Season	Sex/Age Class				Total		Percent by Season & Week		
	Adult		Fawn		Total Deer	Antlerless Deer	Adult		
	Buck	Doe	Buck	Doe			Total	Buck	Antlerless
Archery	861	913	221	216	2,211	1,350	8	5	12
Expanded	552	606	154	146	1,458	906	5	3	8
October	309	307	67	70	753	444	3	2	4
Regular Firearms	15,455	6,162	1,720	1,426	24,763	9,308	89	92	85
Opening Saturday	1,587	761	225	185	2,758	1,171	10	9	11
October 29 – November 3	2,971	1,405	424	359	5,159	2,188	19	18	20
November 5 - 10	2,863	1,093	326	265	4,547	1,684	16	17	15
November 12 - 17	3,891	1,108	309	241	5,549	1,658	20	23	15
November 19 - 24	4,143	1,795	436	376	6,750	2,607	24	25	24
Muzzleloader	482	219	53	41	795	313	3	3	3
November 26 - December 1	289	96	23	18	426	137	2	2	1
December 3 - 8	193	123	30	23	369	176	1	1	2
Total	16,798	7,294	1,994	1,683	27,769	10,971	100	100	100

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

Buck Harvest

The statewide harvest of antlered bucks in 2001 (16,798) dropped 22% below the all-time record buck harvest set in 2000 (21,422). Buck harvests declined in 29 of 30 WMDs (Table 10). Greatest between-year declines (ranging from 30 to 51%) in buck harvest occurred in our eastern, northern, and western mountain WMDs. Buck harvests dropped from 10 to 30% in Maine's central and southern WMDs. The top 5 buck-producing WMDs during 2001 were (in descending order) districts 24, 23, 22, 21, and 17, all in central and southern Maine.

Among the 16,798 antlered bucks taken in 2001, roughly 6,900 (41%) were 1 ½ year olds sporting their first set of antlers, while more than 3,500 (21%) were mature bucks (4 ½ to 15 ½ years old). Button bucks (male fawns) are not included here. They are reported as antlerless deer, since their velvet-covered antler bases (nubbins) never attain legal length (3").

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! A cautionary note: Maine's bucks are also vulnerable to increasing hunting effort. There is already a substantial difference in availability of trophy bucks in heavily hunted southern Maine (10% trophy bucks) vs. lightly hunted northern Maine (30% trophy bucks). Increases in any combination of hunter numbers, season length, or effort per hunter (which increases total hunting pressure on the herd) anywhere in Maine will inevitably reduce the population of mature bucks.

Table 10. Sex and age composition of the 2001 deer harvest in Maine by Wildlife Management District¹.

WMD	Adult		Fawn		Total		Harvest Per 100 Adult Bucks		Harvest Per 100 Sq. Miles Habitat	
	Buck	Doe	Buck	Doe	Antlerless Deer	All Deer	Adult Does	Anterless	Adult Bucks	All
1	199	2	0	0	2	201	1	1	14	14
2	103	3	0	0	3	106	3	3	9	9
3	63	2	2	1	5	68	3	8	7	7
4	142	1	1	0	2	144	1	1	7	7
5	280	9	0	0	9	289	3	3	18	19
6	240	4	3	0	7	247	2	3	17	18
7	459	9	2	0	11	470	2	2	34	34
8	390	7	0	2	9	399	2	2	19	20
9	115	11	9	4	24	139	10	21	12	15
10	149	20	5	5	30	179	13	20	17	20
11	314	15	2	3	20	334	5	6	19	20
12	475	68	33	19	120	595	14	25	51	64
13	470	126	40	23	189	659	27	40	83	117
14	266	33	16	9	58	324	12	22	34	41
15	1,099	469	111	102	682	1,781	43	62	110	179
16	1,202	692	188	165	1,045	2,247	58	87	167	313
17	2,314	1,381	391	340	2,112	4,426	60	91	170	325
18	349	39	21	14	74	423	11	21	27	33
19	100	0	0	0	0	100	0	0	9	9
20	802	283	66	53	402	1,204	35	50	133	200
21	953	588	162	143	893	1,846	62	94	195	378
22	1,035	621	176	157	954	1,989	60	92	199	382
23	2,046	1,331	388	328	2,047	4,093	65	100	224	448
24	825	541	108	108	757	1,582	66	92	299	573
25	643	379	77	62	518	1,161	59	81	133	240
26	939	446	118	102	666	1,605	47	71	152	259
27	410	30	11	5	46	456	7	11	50	56
28	96	1	1	1	3	99	1	3	12	12
29	128	4	2	1	7	135	3	5	26	28
30 ²	192	179	61	36	276	468	93	144	-	-
Statewide	16,798	7,294	1,994	1,683	10,971	27,769	43	65	58	95

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

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

Antlerless Deer Harvest

The magnitude of Maine's harvest of does and fawns depends on the number and success rate of 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 2001 was 7,294, or 18% below the pre-set quota. In addition to the effects of the severe winter on availability of does, we noted poor hunting conditions and below-normal hunter participation in most WMDs during 2001, all of which contributed to low antlerless deer harvests. During the past several years, we have detected a growing tendency for any-deer permittees to forego doe harvesting in favor of buck hunting until late in the firearms season. While it is certainly understandable for hunters to focus on buck hunting in this era of larger deer populations, this evolving change in hunter behavior complicates reliable prediction of required any-deer permits, and reduces our effectiveness in controlling deer populations.

Since we already desired reduced doe and fawn harvests in all WMDs to offset the effects of the severe 2001 winter, the 7,294 does harvested in Maine helped to accomplish that objective in each of our 30 WMDs. Because doe harvests remained below pre-set quotas, more does survived the hunting season to enter the winter population in

2002. Given adequate survival during the 2002 winter, deer populations in Maine's more productive central and southern WMDs are poised to rebound from the losses they sustained in 2001. In our northern and eastern WMDs, holding doe harvests near zero during 2001 certainly helped to partially offset severe winter losses, but it probably did little to bolster herd growth in 2002.

Among WMDs, doe harvests ranged from 0 in WMD 19, to 1,381 in WMD 17 (Table 10). On a per square mile basis, the top 5 WMDs supporting doe harvests were (in decreasing order) districts 24, 23, 21, 22, and 17. Statewide, any-deer permittees also tagged 3,240 fawns (both sexes combined), while bowhunters tagged an additional 437 young-of-the-year in 2001. Harvest rate of fawns in 2001 was a bit below normal, which is typical following a severe winter. Overall, 10,971 antlerless deer were registered in Maine during 2001.

Harvest by Season and Week

Of the four separate deer hunting seasons, Maine's regular firearms season attracts the most hunters (about 171,000), and accounts for the greatest share of the total harvest. In 2001, 89% of the total deer take occurred during the 4-week firearms deer season (Table 9). Within that season, after a strong initial burst of hunting pressure on opening Saturday by residents (which accounted for 10% 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 8% of the total deer harvest in Maine (Table 9). Black-powder hunting is also growing in popularity. Yet, our one- to two-week late muzzleloader deer season accounted for only 3% of the 27,769 deer tagged in Maine during 2001. The relative contribution of firearm vs. archery vs. black powder seasons to total deer harvest noted in 2001 is typical of long-term trends in harvest distribution by season.

Harvest by Hunter Residency

Maine residents claimed the lion's share (88%) of the deer harvest in 2001 (Table 11). Among seasons, the proportion of deer harvest registered by Maine residents was highest for the archery seasons (95%), followed by the special muzzleloader (94%), and regular firearms (87%) seasons. During the past several years, the proportion of the deer harvest tagged by Maine residents has been increasing. Formerly, residents' share of the deer kill had consistently averaged 80%.

Regional differences occurred in the distribution of the harvest by residents and visitors to Maine. In the more populous central and southern WMDs, most successful deer hunters were residents. However, in the largely unpopulated "North Woods" of Maine, nonresidents accounted for a much larger share of the deer harvest. At one extreme, 58% of the deer harvested in remote, unpopulated WMD 1, were registered by nonresidents (primarily Canadians from Quebec). At the other end of the spectrum, 97% of the deer killed in heavily populated WMDs 21, 22, 24, and 25 (primarily south-coastal Maine) were registered by Maine residents (Table 11).

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 four deer seasons. Typically, 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 2001, 222,757 licenses that permit deer hunting were sold in Maine; 83% were bought by residents. License sales in 2001 were 4% less than sales recorded in 2000 (231,888). 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 2001 was approximately 171,000. Hunter density, therefore, averaged nearly six per square mile, statewide, and this hunter force expended an estimated 2.01 million hunter-days effort pursuing deer over the course of our 79-day hunting seasons. 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 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. 79 days in 2001. Clearly, hunter effort is cumulative;

Table 11. Deer registrations by Wildlife Management District (WMD) and hunter residence, 2001.

WMD	Deer Registered By:				Total
	Residents		Nonresidents		
	Number	Percent	Number	Percent	
1	84	42	117	58	201
2	68	64	38	36	106
3	64	94	4	6	68
4	51	35	93	65	144
5	133	46	156	54	289
6	214	87	33	13	247
7	248	53	222	47	470
8	179	45	220	55	399
9	83	60	56	40	139
10	122	68	57	32	179
11	232	69	102	31	334
12	532	89	63	11	595
13	521	79	138	21	659
14	205	63	119	37	324
15	1,598	90	183	10	1,781
16	2,081	93	166	7	2,247
17	3,841	87	585	13	4,426
18	357	84	66	16	423
19	72	72	28	28	100
20	1,104	92	100	8	1,204
21	1,798	97	48	3	1,846
22	1,928	97	61	3	1,989
23	3,635	89	458	11	4,093
24	1,541	97	41	3	1,582
25	1,129	97	32	3	1,161
26	1,519	95	86	5	1,605
27	434	95	22	5	456
28	85	85	14	14	99
29	128	95	7	5	135
30	435	93	33	7	468
Statewide	24,421	88	3,348	12	27,769

adding new deer seasons and more hunting days results in higher pressure on the deer herd. This fact has consequences regarding maintenance of trophy buck availability, and it impacts the allocation of any-deer permits vs. either-sex archery hunting opportunity.

Deer hunting pressure varies dramatically between northern and eastern WMDs relative to central and southern WMDs. The more lightly hunted northern and eastern WMDs accommodate only 3 to 5 hunters per square mile over Maine's 79-day deer seasons. Hunters there expend only 14 to 31 hunter-days per square mile of effort on the deer herd. In central and southern WMDs, hunter density ranges from 10 to 18 hunters per square mile, and hunting pressure ranges from 80 to nearly 225 hunter-days of effort 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 fifth year, the expanded archery season attracted 5,200 participants (97% residents). During the first three years, hunter participation in the expanded archery season had doubled each year; by 2001, participation seems 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 9,333 resident and 1,071 nonresident sales. Since 1983, 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 2,211 deer (2001 harvest).

Compared to the regular firearms season, which attracts at least 171,000 participants, relatively few deer hunters currently participate in Maine's late black powder deer season. Sales of special muzzleloading season permits totaled 9,282 during 2001, 17% less than special muzzleloader permit sales during 2000 (11,221). 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 partici-

pants. 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 795 in 2001. This hunting season is expected to continue to grow in popularity.

Undoubtedly, participation in our muzzleloader deer hunting season would be substantially greater if the season preceded the regular firearm season, and if that season allowed deer of either-sex to be taken (as in neighboring New Hampshire). There, fully one-third of all deer hunters take advantage of the N.H. black powder season. If this were the case in Maine, we would field nearly 60,000 muzzleloader hunters, instead of the current 9,000 to 11,000. These additional hunters would certainly have a negative impact on the availability of any-deer permits and antlered buck survival over time. (Deer harvest administrators in New Hampshire are now facing up to this reality by curtailing black powder hunting opportunity.)

Deer hunting success in Maine averaged 16.3%, overall, during 2001. Success rate among nonresidents (12.8%) was lower than success rate experienced by residents of Maine (16.9%). Apparent success rate among hunters who drew an any-deer permit (27%) was considerably higher than among hunters who were restricted to "bucks-only" (9.8%) 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 bowhunters differed markedly between the expanded archery season (28.5%), and the statewide October archery season (8.6%). 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. Our least successful hunter group are the black powder enthusiasts. Success rate during the special muzzleloader season averaged 8.4% in 2001, which is slightly higher than long-term success rates (5 to 6%).

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 2001 were among the lowest in northern Maine's WMD 3 (6%); they were above average in central and southern WMDs 15 to 17 and 20 to 26 (15 to 28% success rate).

Maine's Deer Population and Strategic Plan

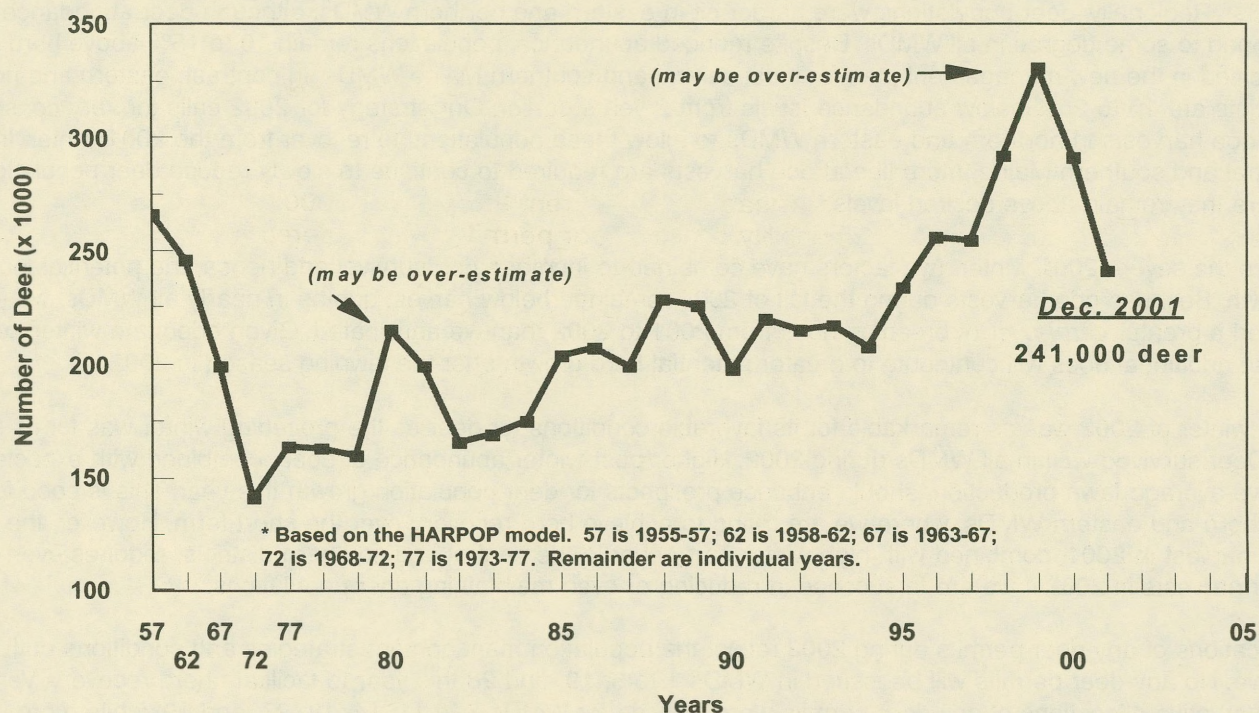
Since the early 1970s, our deer management program has been guided by a strategic plan developed with considerable public input. The deer strategic plan is revised every 10 to 15 years to address changes in public attitudes or changing biological factors relating to deer.

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 5). 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.

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.

Figure 5. Maine's statewide wintering deer population



Attaining our new population objectives in central and southern Maine WMDs will require substantial deer harvests. Where hunting access is restricted, we will need to work closely with landowners and municipalities to find innovative solutions 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, 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 and minimizing conflicts with deer. 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.

Prospects for the 2002 Deer Season

The deer season structure in 2002 is similar to 2001. The expanded archery season will span September 7 to December 14; the limit will be 2 deer of either-sex. In addition to WMDs 24 and 30 (Figure 2), this hunt will take place in eight smaller locations in central and southern Maine, where firearms ordinances, and/or residential sprawl make firearms hunting impossible or impractical. The October archery season will, as always, be statewide in scope, and will span October 3 to November 1. The residents-only opening of the regular firearms season on deer will be Saturday, November 2; all hunters may participate from November 4 to 30. Finally, the special muzzleloader season will begin in all WMDs on December 2, but will end on December 7 in WMDs 1-11, 14, 19, 27, 28, and 29. Elsewhere, the special muzzleloader season will continue until December 14.

The severe winter of 2001 caused the statewide post hunt deer population to decline from 292,000 to 241,000 deer (-18%). Regionally, deer populations were harder hit in eastern and northern WMDs, although deer abundance dropped to some degree in all WMDs. Despite reduced abundance, populations remain 10 to 15% above herd levels specified in the new management plan for most central and southern Maine WMDs. In contrast, eastern and northern districts are 15 to 25% below abundance levels from 2 years earlier. Our strategy for 2002 calls for very conservative doe harvests in northern and eastern WMDs to allow these populations to recover from the 2001 winter. In central and southern Maine, more liberal doe harvests are required to continue to slowly reduce deer populations where they remain above desired levels.

Since the severe 2001 winter, two factors have combined to increase doe survival and hence, the potential for herd growth. Because doe harvests during the fall of 2001 remained below harvest quotas in nearly all WMDs, we experienced a greater carry-over of breeding does from 2001 to 2002 than we anticipated. Given adequate winter survival, these additional does will contribute to greater potential herd growth after the fawning season in 2002.

The winter of 2002 was as remarkable for its favorable conditions for deer as the preceding winter was for its severity. Deer survived well in all WMDs during 2002. Higher post-winter abundance of does, combined with expected above-average fawn production, should enhance prospects for deer population growth this year. This is good for northern and eastern WMDs, where we are trying to achieve herd recovery over the short term. However, the low doe harvest in 2001, combined with high winter carry-over in the central and southern districts, requires even higher deer harvests in 2002 if we are to succeed in reducing or even maintaining deer populations.

Allocations of any-deer permits during 2002 reflect the population management strategies and conditions outlined above. No any-deer permits will be issued in WMDs 1 to 6, 19, and 28 this year to facilitate herd recovery. Very conservative allocations of any-deer permits were justified for WMDs 7 to 11, 14, 18, 27, and 29, while more liberal allocations of any-deer permits were needed in WMDs 12, 13, 15, 16, 17, 20 to 26, and 30. Our doe harvest quotas vary from 0 to 2,138 (WMD 23) among the 30 districts, and total 10,712 statewide. Any-deer permit allocations will range from 25 (WMD 29) to 18,150 (WMD 23). Statewide, any-deer permit allocations in 2002 (76,575) will exceed allocations in 2001 (54,406) by 41%; this is the most we've issued since the any-deer permit system began in 1986. Based on past application rates, we may need to allocate as many as 10,000 of these permits as bonus any-deer permits, distributed among 5 or 6 WMDs.

The allocation of 76,575 any-deer permits, along with the 2 archery seasons, should result in the harvest of ~10,700 adult does and 6,400 fawns (buck and doe fawns combined), statewide. Antlered buck harvests are likely to approximate 18,650, which is intermediate between the record buck harvest set in 2000 (21,422), and the 2001 buck kill (16,798). If normal hunting conditions and hunter effort prevail, the statewide deer harvest in Maine should be in the vicinity of 35,750 deer. In 2000, 36,885 deer were tagged in Maine, while 27,769 were registered in 2001.

Deer Feeding Video Available

"What You Should Know about Supplemental Feeding" is a 30-minute video highlighting the many pitfalls of supplemental whitetailed 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 whitetailed deer and their habitat. We believe 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.

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 Great Britain.

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 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 normally 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 disease in people. However, given the similarities between CWD and other disease agents 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 north-eastern 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 deer and elk among commercial cervid 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, Wyoming, Nebraska, Oklahoma, Kansas, South Dakota, Montana, New Mexico, Wisconsin, Alberta, and Saskatchewan. Detection of CWD in a high density deer population in southwestern Wisconsin has generated considerable interest, since this is 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 (in 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 euthanized 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 affected 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. 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. ***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



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 nongame 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, Group Leader – coordinates group activities within and outside the agency with numerous partners in bird conservation and management. Current fieldwork involves coastal island-nesting waterfowl and seabirds.

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 on purple sandpiper population assessment and research. 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 (songbirds), hawks, owls, herons, and loons.

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.

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 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. 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 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 beard, 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 is timed to begin after most breeding is over, while most hens are sitting on nests; only bearded birds are legal game. Experience has shown that spring turkey hunting provides a quality hunting opportunity without jeopardizing restoration efforts.

By 1986, a sufficient number of wild turkeys occurred in southern Maine to support a limited spring hunting season. Five-hundred hunting permits were issued in York County, resulting in a harvest of 9 male turkeys. As the turkey population has grown and spread into new habitat, both the number of permits and area of the turkey hunting zone have been increased in a conservative manner to assure a safe and high quality hunting opportunity (Table 12). By 1996, the hunting zone was expanded eastward to the Penobscot River, and two zones (north and south) were created. In 1999, 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 (2002), 9,000 hunters were permitted to hunt wild turkeys in Maine during two, over-lapping 3-week seasons: 4,500 hunters during season A, April 29 through May 4 and May 20 through June 1; and 4,500 hunters during season B, May 6-18 and May 27 through June 1. 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 2002, 28% more hunters had the opportunity to hunt turkeys than in 2001. Despite the substantial increase in turkey permits in 2002, the hunter success rate remained high (41%), probably owing to an abundant turkey population, as well as one additional week of hunting opportunity (Table 13).

Table 12. Wild turkey spring hunting effort and harvests in Maine, 1986-2002.

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.

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 17 years of wild turkey hunting behind us in Maine; the turkey population continues to increase and expand its range, and interest in turkey hunting continues to increase as well.

Table 13. Results of the spring turkey hunter questionnaire, 1993-2002.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Permits Issued	500	500	750	1,250	1,750	2,250	3,000	4,000	7,000	9,000
Questionnaires Received	417	424	628	1,075	1,546	1,961	2,517	3,350	5,776	4,963
Participation Rate	73%	78%	72%	82%	87%	85%	86%	88%	88%	92%
Success Rate	13%	16%	22%	28%	27%	31%	34%	44%	41%	41%
Average Hours Hunted	23.1	23.3	21.5	20.6	23.4	20.8	21.7	20.8	15.2	16.5
Gobblers Seen/hour	0.073	0.106	0.123	0.198	0.176	0.219	0.235	0.235	0.33	0.44
Hens Seen/hour	0.131	0.125	0.167	0.286	0.228	0.311	0.288	0.290	0.45	0.73
Used Shotgun	283	305	429	825	1,260	1,564	—	—	—	—
Used Bow	32	42	24	39	52	41	—	—	—	—

*preliminary results

What's new?

Turkey hunters will now get a chance to hunt their quarry during the fall in Maine. The Commissioner's Advisory Council approved a rule calling for a Fall Wild Turkey Hunting season. The season will run from October 21, 2002 through November 1, 2002 in WMDs 15, 16, 20, 21, 22, 23, 24, 25, and 26. Anyone who possesses an archery license may purchase a permit to hunt wild turkey during this fall season. Permit fees will be \$10 for Maine residents, and \$40 for nonresidents. Only a bow and arrow may be used to hunt turkeys during this season. Unlike the spring season, both male and female turkeys are legal in the fall season.

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 (1998-2001) numbers in recent years. Although hunters across much of the state reported good grouse numbers in 2001, wetter than normal weather during nesting and early brood rearing this spring add a touch of uncertainty to an otherwise bright grouse forecast for fall 2002.

Grouse Reports From Maine Moose Hunter Survey

For the last 9 moose hunts (1993-2001), 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.

Table 14. Grouse harvests by moose hunters and others in their hunting party, 1993-2001.

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Permit holders reporting	888	1,069	1,252	1,321	1,323	1,739	2,542	1,887	2,673
Number of grouse seen	4,624	5,804	18,069	4,880	6,868	11,604	17,754	11,731	28,723
Grouse seen/100 hours of hunting	-	35	107	20	25	43	37	33	48
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

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 2001, moose hunters reported seeing 48 grouse per 100 hours, which indicates the highest abundance of grouse since 1995. The average grouse harvest by this sample of moose hunters and their hunting parties over the 9-year period was 4,057 (Table 14).

The last statewide grouse harvest estimate was reported for the 1988 hunting season. That year, an estimated 579,100 grouse were taken in Maine. If we assume that current harvests are similar to those of the late 1980s, then the average total grouse harvest reported by moose hunting parties is less than 1% of this total.

Grouse 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

Woodcock

Hunting Seasons

A range-wide decline in woodcock numbers since 1968 resulted in restrictive hunting regulations in the east in 1985, and again in 1997, when all eastern states were required to shorten their woodcock hunting seasons further (to 30 days) and select opening dates no earlier than 6 October. Researchers with the USFWS report that, despite these hunting restrictions, the range-wide woodcock population is still at a relatively low level compared to populations in the 1960s.

Until recently, there existed no method to identify and survey the activities of hunters who pursue woodcock. To correct this deficiency, the USFWS and state wildlife agencies established the Migratory Bird Harvest Information Program (HIP). First year results from the HIP were encouraging; they indicated Maine had approximately 8,300 woodcock hunters, who, in 1996, harvested an estimated 26,000 birds. Similar data collected and averaged for the 1999 and 2000 hunting seasons indicated that approximately 9,100 woodcock hunters bagged an annual average of 27,750 woodcock during these years, a modest improvement over numbers reported in 1996.

USFWS calculates indices of daily and seasonal hunting success for each state based on wings submitted to USFWS by a sample of hunters. The number of woodcock bagged per successful hunt in 2001 by Maine hunters remained similar to 1999 and 2000, at 2.2 birds. The average seasonal take, however, was up slightly, from 8.5 to 10.0 woodcock killed per season. The recruitment index (the ratio of immatures per adult female woodcock) was 1.5; slightly below the long-term (1963-00) index of 1.7 immatures per adult female, and indicates fair production in 2001 for woodcock breeding in Maine and eastern Canada.

Woodcock Management and Research

Woodcock migrated to Maine this spring only to be faced with lingering cold and wet nesting conditions. Nesting was probably delayed again this year by at least one week, as wet conditions in the nesting covers persisted into May. A slight delay in nesting and wet brood rearing conditions will likely have a negative effect on woodcock production this year. On the bright side, moist soils enable young woodcock to forage for their favorite food item, the earthworm. The number of male woodcock on singing grounds in Maine this spring was lower than last year. However, the most recent ten-year trend (1992-2001) reveals essentially no change in the male woodcock population index. Mid to late May nesting and hatching conditions were only "fair" for female and newly hatched woodcock. Intermittent precipitation, and cool weather through May and June, likely resulted in only fair survival of young. For these reasons, fall woodcock population predictions can only be considered "fair" at this time.

Woodcock biologists suspect that losses of woodcock habitat to industrial development and maturation of forests beyond stages suitable to woodcock are the primary causes of the woodcock population decline. The department is concerned about the status of woodcock and woodcock habitat throughout its range. During the last 25 years, interest in woodcock hunting has remained relatively high, while the amount and quality of woodcock habitat is declining. For these reasons, the USFWS maintains that some type of conservative harvest management strategy is still warranted. However, the USFWS favorably received comments from Maine biologists and their colleagues and voted to allow woodcock seasons in 2002 to open as early as October 1 in the Eastern Region, as it was prior to 1997.

Because indices revealed a long-term decline in eastern region woodcock numbers, wildlife biologists in Maine and other northeastern states believed there was an immediate need to determine the effects of hunter harvest on woodcock populations in the east. We partnered with researchers from U.S. Geological Survey (USGS), USFWS, and the state wildlife agencies of New Hampshire, Vermont, and Pennsylvania to investigate the effects of hunting on woodcock survival across 4 states (ME, NH, VT, and PA) in the breeding range of woodcock during 1998-2000. Results indicated that autumn (September-November) survival rates of woodcock on hunted sites averaged 71 percent in 1998 and 70 percent in 1999. Survival rates on nonhunted sites were slightly lower; 69 percent in 1998

and 67 percent in 1999. Mortality on nonhunted sites was due primarily to predation. It appears, at least on the breeding range in the East, where woodcock hunting seasons are conservative, mortality caused by hunters is not limiting woodcock populations. The importance of hunting mortality during migration will again be addressed this fall by USGS biologists. We are pleased to have several partners on the woodcock research project. In addition to the government agencies listed above, ***Champion International, Inc.; Ruffed Grouse Society; and Maine's Outdoor Heritage Fund provided either logistical or financial support.***

Suitable habitat is the key for healthy wildlife populations. Regarding woodcock habitat, biologists in Maine have turned their attention to the industrial timberlands as the bright spot for improvements in woodcock habitat conditions. Although the soils may not be as productive as abandoned farmland, the vast acreage of young forests created by industrial forest activities warrants attention. Further, our research shows that these timberlands offer a great opportunity for large-scale woodcock management in Maine. The next step is integration of cost-effective wildlife management into timber management plans, because maintenance and creation of woodcock habitat are critical if woodcock populations are to be maintained at, or improved beyond, current levels. ***Woodcock research and management is funded primarily by hunting license and permit revenues; and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Andrew Weik and R. Bradford Allen

Waterfowl

Current Waterfowl Populations

Again last winter, Pat Corr and John Bidwell conducted Maine's annual Midwinter Waterfowl Survey (Table 15). They surveyed coastal waters and estuaries from Kittery to Cobscook Bay during January 4-11, 2002. Somewhat unexpectedly, because of the extremely mild fall weather, waterfowl totals were high. Extremely mild temperatures in December and a cold snap just prior to the survey in early January resulted in little or no coastal ice, which normally translates to modest waterfowl counts. However, this year was an exception. All species except scaup were found in greater or similar numbers this year in Maine compared to last year's unusually low count. As usual, the most frequently observed duck was the common eider; the count of approximately 46,000 was substantially greater than the 28,650 counted last year, and compares favorably with the most recent 10-year average nearly 42,000.

Table 15. Mid-winter Waterfowl Survey data for Maine, January 1996-2002.

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

The black duck count (21,368) was up considerably from last year as well, and edged above the 10-year average of 18,970. Mallards and Canada geese continued their long-term increases, and goldeneyes showed a slight abatement of their long-term declining trend. The survey team counted a total of 97,199 ducks (up from 61,164 in 2001), and 3,377 geese (up from 2,769 in 2001).

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 2002, particularly in the east, remain at good levels for most of the species annually counted by USFWS biologists. However, habitat inventories completed this year showed marked reduction in mid-continent habitat quantity and quality. Most prairie duck breeding populations are expected to decline somewhat from 2001 levels, but remain above the long-term average (1955-2002). Population declines noted during the 1980s had been reversed since 1994 with the return of water (i.e. improved habitat conditions) to the U.S. and Canadian prairies. Currently, only scaup and pintail numbers remain below goals established by the North American Waterfowl Management Plan. These data supported continued liberal harvest regulations during 2001, and Atlantic Flyway waterfowl hunters were again offered a framework that allowed a 60-day season and a 6-bird daily bag limit. Unfortunately 2002 may mark the beginning of the downward trend in some continental duck populations in Canada as early reports of water conditions on the prairies are grim.

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 1956-65, 1966-76, 1980-84, 1986-90, 1991-95, and 1996-2000¹.

	1956-65		1966-76		1980-84		1986-90		1991-95		1996-2000	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
Black Duck	74	44	37	29	34	19	56	24	50	24	24	16
Ring-necked Duck	28	17	31	24	44	25	49	21	39	19	30	20
Wood Duck	33	20	15	12	24	13	38	17	43	21	32	22
Goldeneye	13	8	23	18	36	20	39	17	31	15	27	19
Hooded Merganser	13	8	10	8	19	11	26	11	24	12	21	14
Green-winged Teal*	1	<1	1	1	2	1	1	1	1	<1	1	1
Blue-winged Teal	5	3	5	4	4	2	1	1	1	<1	0	0
Common Merganser	1	<1	4	3	11	6	12	5	8	3	6	4
Mallard	1	<1	1	1	5	3	7	3	11	5	7	4
Total Observed	169	100	127	100	179	100	229	100	208	100	148	100

*Known breeder: assigned 1 brood during 1956-65 and 1966-76 even though not observed in brood counts.

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

Waterfowl Hunting Seasons

Waterfowl harvests in the United States have declined since 1978, when 15.1 million ducks were recorded in federal harvest surveys. This has been partly by design - as regulations became more restrictive - but it also reflects declining hunter numbers and lower waterfowl populations during the 1980s. The number of Maine's waterfowl hunters has also declined since 1978, when the high of 18,650 federal migratory bird-hunting stamps were sold. The average number of stamps sold in Maine has changed from 14,545 (1981-85) to 11,612 (1986-90) to 9,908 (1991-95) to 10,662 (1999). 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 1997-2001.

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 1997-2001.

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 2001 regular duck season allowed 60 hunting days in the north and south waterfowl hunting zones, for a total of 73 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 kid 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 4,800 in recent years and 3,800 in 2001. 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.

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 2001 regular duck hunting season, Maine waterfowl hunters could hunt black ducks for 55 days in each zone and took a total of 11,900 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).

Waterfowl Harvest Management

A review of waterfowl hunter and harvest statistics provides an interesting comparison of Maine's waterfowlers and their success. Study of these figures will 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 10,662 duck stamps sold in 1999, 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).

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. Showing sizable declines in the Maine harvest in recent years are black ducks, blue-winged teal, scoters, and common goldeneyes.

The declines in both the annual kill (Table 17) and the 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.

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

Sea Duck Management and Conservation Concerns

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

history characteristics differ from those of most other North American ducks, effective management requires specific research and monitoring, and directed conservation programs to collect and assess essential data to maintain healthy populations.

Concern over the status of sea ducks in Maine has increased over the last two decades, as some populations appear to be declining. In Maine, over the last 50 years, sea duck bag limits and season lengths have been considered liberal and relatively unchanged. Historically, hunters tended to pursue inland ducks, and the reported annual harvests of sea ducks were low. Major shifts in hunting effort occurred 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 have doubled in recent years 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.

Table 18. Sea duck harvest statistics 1961 - 2001.

	Common Eider	Long-tailed Duck*	White-winged Scurer	Surf Scurer	Black Scurer
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.

Waterfowl Research and Management

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

One method used to increase breeding populations in Maine has been to eliminate, where and when possible, significant forms of non-hunting mortality. Lead poisoning of waterfowl is an example of this type of mortality. This national problem affects many thousands of birds annually, and lead shot use for duck and goose hunting has been banned nationally since 1991 (and since 1999 in Canada). Maine hunters have been required to use steel shot statewide since 1988, three years ahead of the deadline required by USFWS's national plan. Maine hunters have accepted the facts and shouldered the responsibility for using the latest in shot-shell technology. Many have been pleasantly surprised with their results. All should be pleased to know that the ban on the use of lead shot for waterfowl hunting saves one to two million waterfowl annually in North America - ducks and geese that a decade ago would have succumbed to lead poisoning.

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.

Current waterfowl research efforts are aimed at measuring and tracking trends in breeding populations and the harvests they support. A statewide survey of waterfowl pairs was initiated in 1990 as part of a larger study designed and funded by the North American Waterfowl Management Plan's Black Duck Joint Venture. Twenty-five randomly

located plots were surveyed annually between 1990 and 1994 by Maine biologists using a USFWS helicopter flown slowly at 100 to 150 feet above ground level. The experimental helicopter plot surveys proved to be too expensive for annual monitoring, and so were discontinued. Population trends are now measured by more economical airplane surveys, which the USFWS has expanded into eastern Canada. As data from these additional areas are evaluated, the results will be used to establish harvest regulations for the Atlantic Flyway. When these surveys are fully integrated into the regulation setting process, eastern waterfowl hunting season frameworks will be derived independently of results of mid-continent surveys.

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 breeds in Maine. ***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).***

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

Harlequin Duck

The brilliantly colored harlequin duck inhabits both the Atlantic and Pacific Oceans, where they nest along fast flowing streams and rivers and winter in 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 and may be increasing. More than half of that population winters in Maine. In Maine, harlequins are seldom observed, because they winter along 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. 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.

It is not easy to survey this species because of difficulties in accessing Maine's offshore island locations during winter. However, since 1970, harlequins have been periodically counted along Maine's coast. Unfortunately, these surveys were not designed to obtain a coast-wide estimate of harlequins wintering in Maine or to accurately measure changes in populations, because birds were surveyed during December-March, which includes the migration periods. Only limited areas were regularly surveyed, and a variety of survey methods have been used (ground, aerial, boat). The first attempt to conduct a coast-wide estimate of Maine's wintering population was initiated during a 4-day period in February 1995. An estimate of at least 655 harlequins wintering along the coast of Maine was derived, with 86% occurring around Isle au Haut and adjacent islands in Jericho and Penobscot Bays. Boat surveys during the winter of 1999-2000 yielded a single high count of 952 harlequins!

In 1997, MDIFW and the University of Maine received an Outdoor Heritage Fund grant to study the movements, behavior, and habitat use of harlequin ducks wintering in Maine. Graduate student Glen Mittelhauser conducted this research. In 1998, he pioneered a new technique for using floating mist-nets to capture harlequins among the pounding surf and rocky coast of Isle Au Haut. During the last 5 winters, Glen and colleagues captured and marked over 400 birds. Resightings of marked birds, in Labrador, and other Canadian locations, are helping to determine the

origin of harlequins that winter off our coast. Some birds radio-tagged at nesting areas in Labrador have also been monitored off the Maine coast in the winter.

In April 2001, in cooperation with the Canadian Wildlife Service, eight males were captured and implanted with satellite transmitters during the spring banding effort at Isle au Haut. This technique consisted of fitting birds with radios that transmit signals to satellites, which in turn relay information to biologists. Biologists hoped to gain information on breeding and molting sites important for Maine's wintering population of harlequins. By late May all eight birds had migrated north. Three were tracked to possible inland breeding areas, one to eastern Quebec near the Labrador boundary and two to interior Gaspé Peninsula, New Brunswick. Male and immature female harlequins have specific locations used for molting that they occupy in late summer and early fall. Three of the radioed males likely molted at sites along the coast of Labrador. Biologists were surprised when four of the radioed males were recorded mid-summer near Greenland. This may indicate that some Maine birds use molting sites located in Greenland. By early September seven of the transmitters had failed, one however continued transmitting well into December, indicating the bird was back at Isle au Haut. During last winter Harlequin surveys (2001-2002), seven out of the eight radioed birds were observed wintering back in Maine off Isle au Haut. ***The Department's role in harlequin conservation is supported by Loon Conservation Plate funds; the Outdoor Heritage Fund; federal Section 6 Funds; financial assistance from the Gulf of Maine Project (USFWS); hunting license and permit revenues; and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Lindsay Tudor and Mark McCollough

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 **Outdoor Heritage Fund**, are now available and can be used to continue and expand these efforts.

Harvest Information Program

Maine entered the Harvest Information Program during the 1996 hunting season. Hunters are now required to indicate on their Maine hunting license that they are a migratory bird hunter. This item must be checked on the license to legally possess ducks, geese, woodcock, snipe, rails, gallinules, and moorhens in Maine. This list of hunters is used to select a representative sample of hunters for harvest surveys. All states were required to participate in this program by 1998, and now wildlife managers in Maine have statistically valid estimates of migratory bird harvests upon which to base management decisions.

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.

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 2002. 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 1994-2001 are provided in (Table 19).

Table 19. Nesting waterbirds, seabirds, and eider populations and number of colonies occupied, 1976-77 and 1994-2001.

	1976-77		1994-01	
	Pairs	Colonies	Pairs	Colonies
Arctic Tern (ARTE)	1,640	9	2,771	9
Atlantic Puffin (ATPU)	125	1	383	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	6,806	25
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	-	171	7
Great Egret (GREG)	0	-	2	1
Herring Gull (HEGU)*	26,037	223	28,290	183
Laughing Gull (LAGU)	231	6	2,117	4
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	289	4
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.

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.

Bird Group personnel have compiled a computer database of over 400 shorebird feeding and roosting areas coastwide, which are mapped and entered into a Geographic Information System (GIS). The Coastal Migratory Shorebird Staging Habitat Management System 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.

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 they feed on invertebrates in the rockweed. Presently, the only survey that touches 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 March 2001, four days of boat surveys were performed in outer Penobscot Bay and over 2,100 purples were counted on twenty different ledges.

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.

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. In April, thirty-six purple sandpipers were captured and banded at six 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; the National Park Service; and the Gulf of Maine Project (USFWS).***

--Lindsay Tudor

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 continued the second year of our work (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 approximately 15 wetlands 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. In 2001, we visited 15 wetlands where American bitterns and common snipe were the most frequently detected species. Occasionally, we encountered a sora, Virginia rail, or pied-billed grebe, highlighting the seasons field work. 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 Funds.***

--Thomas P. Hodgman

Rusty Blackbird

Also, as part of the 2002 ecoregional survey, MDIFW 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. In 2001, we conducted roadside surveys for this species by stopping at small, beaver-created wetlands, alder-choked stream banks, and pond and lake shores, broadcasting a tape recording of a territorial male's vocalization, then watching and listening for a response. We surveyed over 100 sites in 2001 that appeared suitable, but, detected this species at fewer than 10% of the sites. 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 Outdoor Heritage Funds.***

--Thomas P. Hodgman

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 are underway. However, more detailed sampling of mercury exposure among these sparrows was further evaluated at 5 coastal sites (York, Ogunquit, Scarborough, Phippsburg, and South Thomaston). We found significant differences in the amount of mercury in the blood of sparrows between sites, with Ogunquit and Phippsburg the highest. Surprisingly, we also detected differences in blood mercury levels between the 2 species, suggesting a difference in prey selection. We are working to build 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.***

--Thomas P. Hodgman

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

Species	Habitat	1966-01	1966-79	1980-01
Red-winged Blackbird	Marshes Wetlands	-2.9 *	-4.7	-0.2
Tree Swallow	Fields and Marshes	-0.8	+2.5	-2.1*
Savannah Sparrow	Fields and Pastures	+0.8	+2.0	+0.7
Bobolink	Fields and Pastures	-1.3	+1.7	-3.1
Eastern Meadowlark	Fields and Pastures	-6.4 *	-8.1*	-5.6*
Eastern Bluebird	Fields and Pastures	+8.3 *	-3.9	+6.8*
Chestnut-sided Warbler	Brushy Areas	-2.3 *	+1.1	-2.7*
Gray Catbird	Brushy Areas	-1.9 *	-1.5	-1.7*
American Robin	Yards and Edges	+0.2	-1.4	+0.6
Baltimore Oriole	Forest and Edges	+1.9	+3.9	-0.3
Wood Thrush	Forest	-2.1 *	+8.7*	-3.8*
Blue-headed Vireo	Forest	+5.9 *	+19.1*	+4.0*
Ovenbird	Forest	+0.6	+4.3*	+0.4
Scarlet Tanager	Forest	+3.3 *	+13.7*	+2.7
Black-capped Chickadee	Forest	+2.0*	-7.0*	+1.8*

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 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 by Loon Conservation Plate Funds.***

--Thomas P. Hodgman



ENDANGERED SPECIES GROUP

MDIFW initiated a nongame wildlife program in the mid-1980s to address the conservation needs of thousands of species of wildlife that are not hunted or fished. Special emphasis was placed on endangered and threatened species. The nongame program grew rapidly, and, in 1990, nongame responsibilities were dispersed throughout the Wildlife Division. About the same time, the Legislature clarified MDIFW's mandate to include invertebrate wildlife. Today, the Endangered Species Group's primary responsibilities are to develop recovery programs for Endangered and Threatened wildlife, and to coordinate amphibian, reptile, and amphibian conservation programs. This is no small task, as these animal groups represent over 95% of the wildlife species in Maine. The Endangered Species Group is a highly dedicated group of biologists that collectively have over 80 years professional experience with endangered and nongame wildlife:

Mark McCollough, Group Leader – coordinates group activities, supervises staff, and coordinates endangered and nongame activities with other Division and Department staff, state agencies, the University of Maine, and the U.S. Fish and Wildlife Service. He also coordinates piping plover, least tern, black tern, and island nesting tern conservation.

Charlie Todd, Wildlife Biologist – has devoted over 25 years to bald eagle recovery in Maine and serves on the national Bald Eagle Recovery Team. He also leads MDIFW peregrine, golden eagle, and grassland bird programs and works closely with the Mammal Group on wolf and lynx issues.

Beth Swartz, Wildlife Biologist – works 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 copper butterfly conservation initiatives.

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

Heather Givens, Wildlife Biologist – coordinates Ecoregional Surveys for rare and endangered wildlife. She works closely with the Maine Natural Areas Program and the Bird, Mammal, and Habitat Groups to develop and conduct surveys on everything from Tomah mayflies to lynx.

Endangered and Threatened Wildlife

What makes Maine such a special place to live, work, and recreate? Ask Maine residents and visitors, and our abundant and diverse wildlife and natural areas would undoubtedly be near the top of the list. Maine's wildlife heritage is priceless: 60 species of mammals, 226 species of birds, 17 species of reptiles, 18 species of amphibians, 69 species of fish, 500+ species of spiders, 110 species of mollusks, and 15,000+ species of insects! Fortunately, most of these species are still abundant and widespread, but a few populations are small, vulnerable, and in need of conservation measures if they are to remain a part of Maine's natural heritage. 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! Our state is all the poorer for having lost spectacular animals like the woodland caribou, sea mink, Labrador duck, and great auk. It is the Maine Department of Inland Fisheries and Wildlife's responsibility to ensure that no further losses occur and that our wildlife resources remain viable for future generations.

After 16 years of nongame wildlife programming, many species are responding to increased management attention and have reached record populations in recent years (e.g. bald eagles, roseate terns, piping plover, Atlantic puffins). Although the State has experienced substantial budget problems, there is also hope for solutions for substantial, long-term funding. MDIFW staff and cooperators continued to make progress on a variety of nongame and endangered species planning, recovery, management, and surveys. This report, provided to the Maine State Legislature and the public, provides the results of the year's work in 2001.

Endangered species programs are sometimes likened to the functions of an emergency room: these species need urgent and critical care to ensure their survival. As important as it may be for hospitals to provide emergency care, preventative care is preferable. To fulfill its legislative mandate, MDIFW has developed both endangered and nongame (or wildlife diversity) programs to address the growing needs of state threatened and endangered species and those species that are still common, but could become endangered in the future. "Keeping common species common" is the hallmark of wildlife diversity programs across the country. It is far easier and more efficient state

policy to invest in our wildlife resources and their habitat **before** they decline to the point of requiring listing under the state or federal endangered species acts. Addressing needs of rare species at an early stage of decline often promotes partnerships among public agencies and private interests and provides opportunities to explore innovative solutions. Last minute attempts to save a species may not offer many alternatives.

Funding

Adequate 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 Nongame and Endangered Wildlife Fund and which is based on the "Chickadee Checkoff;" a voluntary tax check-off on the state income tax form (Table 21). This was followed in 1993 by the Loon License 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 species. Unfortunately, these sources of funding have been inconsistent, or, in some instances, have declined because of competing check-offs, placement on tax forms, or competing license plates, 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.

Table 21. 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

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.

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 2001 remained at a reduced level and was \$49,348 (up about \$5,000 from \$2000 - Table 21). 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 \$13.29 in 2001. If contribution levels could be increased to the 3-4% range, income from the checkoff would increase to \$221,098 to \$294,408 at current average levels of giving. This could provide substantial increases for nongame and endangered programs.

Loon License Plate

The Loon License 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 21). 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 most recent legislative session, many new license plate designs were introduced- all of which could further reduce revenues from the Loon Plate.

A new lobster plate will be introduced in 2002. We believe that all new plate designs will result in a measurable loss of Loon Plate revenues.

Outdoor Heritage Fund

In 2001, MDIFW received a record \$148,408 from competitive grants from the Outdoor Heritage Fund for 5 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. In general, available funds were fewer and competition was greater for Outdoor Heritage funds in 2001. Fifteen percent of the revenues are dedicated to endangered species projects. This important new source of funding is benefiting many nongame and endangered species. Projects funded in 2001 included a rare species survey of southern Aroostook County; Important Bird Areas; and least tern, Penobscot meadow vole, and freshwater mussel research projects with UMaine. OHF also funded several raptor rehabilitation centers and an Audubon seabird outreach program in 2001.

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. A nine-member citizens advisory council monitors the fund and the programs it supports.

Given our limited resources, Maine can be proud of the accomplishments made for nongame and endangered wildlife in the last 16 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!

**There's something wild
lurking on your
tax return!**



**Give a gift to
wildlife this year -
put a check with
the chickadee!**



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 \$483,933 from the Wildlife Conservation and Restoration Program (WCRP) and approximately \$780,000 will come in 2002 as part of the State Wildlife Grant Program (SWG).

With many wildlife programs needing funds, MDIFW used input from staff, a recent Legislative review of future funding for MDIFW, and the Nongame Advisory Council to select eight projects for the 2001 WCRP funding. The funds are supporting exciting work we are doing with our conservation partners at UMaine, Audubon, The Nature Conservancy, and the Maine Natural Areas Program and include a mix of research, conservation, outreach, and education.

The eight projects chosen to be funded with the new WCRP funding in 2001 include:

- a joint MDIFW and Maine Natural Areas Program (MNAP) to systematically survey areas in southern Aroostook County for rare and endangered species,
- a joint MDIFW, MNAP, Audubon and State Planning Office landscape planning initiative to provide 30 municipalities in southern and central Maine with detailed maps and guidance on how to protect wildlife habitat and open space,
- a Fisheries and Wildlife Division project with UMaine to study the ecological attributes of fishless ponds.
- expanding the Maine Aquatic Biodiversity Project, an initiative with MDIFW and The Nature Conservancy to develop a comprehensive, statewide database of fish, amphibian, and invertebrate data associated with Maine waters.
- Continuing MDIFW's Canada lynx telemetry project;
- MDIFW projects to distribute wildlife posters and activity guides for all of the state's fourth grade teachers.
- constructing new displays at the Maine Wildlife Park in Gray, and
- providing funding to Audubon to place robotic cameras on Eastern Egg Rock puffin and tern colonies and stream video directly to classrooms via the internet.

Endangered Species Listing

Table 22. 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>Siphoniscia 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 kempi</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 22), 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 nongame and endangered wildlife in that have not already been covered under "*MAMMALS*" and "*BIRDS*" sections in this research and management 2001 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 will be sent to all affected municipalities. Essential Habitat maps for endangered 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 2002.

--Mark McCollough

Endangered and Threatened Species Studies

Bald Eagle

Bald eagles continue their dramatic comeback in Maine. After several decades of decline, the state's population numbered less than 30 breeding pairs by the late-1960s. The risk of extinction here and throughout most of the 48 conterminous states led to the 1978 designation of bald eagles as an Endangered Species. By that time, none were left elsewhere in New England, one pair remained in New York, and the range of the species in Maine had diminished to a small stronghold "Downeast" in eastern Washington County.

Special efforts to bolster populations, offset environmental contaminant problems, and maintain habitats for eagles began in earnest following recognition of the species as Endangered. In 1995, the federal government downgraded bald eagle status to that of a Threatened Species across the lower 48 states, reflecting considerable progress in species recovery. The Maine legislature reclassified bald eagles as a Threatened Species in 1996. Both state and federal jurisdictions 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.

Increases in the number of nesting pairs in Maine have averaged 8% annually since 1990 (Figure 6). Surveys are not yet complete, but at least 289 nesting pairs have been tallied so far in 2002. This preliminary count surpasses the record-shattering statistics for Maine set in 2001: 269 pairs and 263 fledgling eaglets. Recovery rates could accelerate more in upcoming years since bald eagle reproduction in the state has recently reached rates considered normal: 1.0 fledgling/nesting pair. Maine's population was chronically plagued by low productivity due to residual effects of environmental contaminants. Although their influence has lessened, pollutants such as polychlorinated biphenyls, dioxins, and mercury are still problematic in some localities.

Other evidence of recovery includes the return of eagles to their historic breeding range across the state. They now reside in 14 of 16 counties. Frequent sightings in Franklin and York Counties should soon lead to new pairs, which would complete their county distribution. Discovery rates of new nests are rapidly escalating in midcoast regions, central Maine, and Aroostook County. There are several remarkable examples of eagle fidelity to historic nesting territories in Kennebec, Lincoln, and Sagadahoc Counties where pairs returned to sites abandoned for periods of

17 - 35 years. Nesting eagles are well established in 3 "Downeast" counties (Washington, Hancock, and Penobscot), which support 62% of the statewide population. Deer Isle (Hancock County) now boasts 7 nesting pairs and holds title to the most resident eagles of any township in Maine.

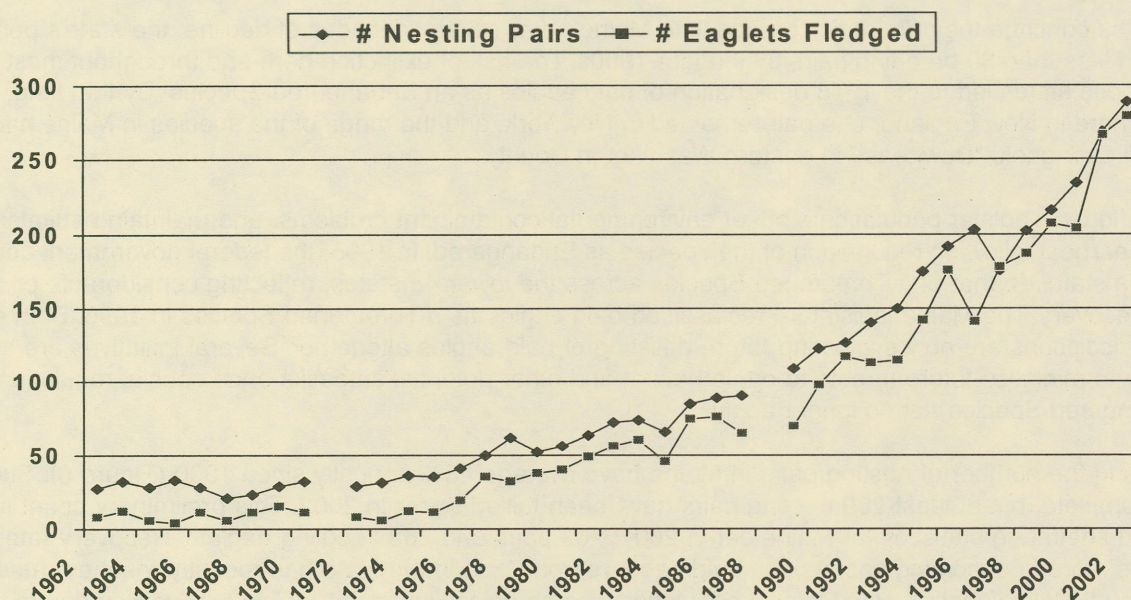
Most eagles nest in undeveloped settings, but some live close to human activities. It is not yet certain that these "tolerant" eagles can persist in more populated regions of the midcoast and central Maine. Stewardship of eagle nests by private landowners has been a key ingredient of program success in the state. Maintaining suitable habitat remains our ultimate challenge for a lasting recovery. Therefore, state recovery objectives for 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 2002-2003), 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. Thus, MDIFW will continue to map qualified eagle nests and designate them as "Essential Habitat" under Maine's Endangered Species Act. Such areas (now numbering 394 locations statewide since the 1990 inception of this regulation) require advance review by MDIFW before an agency or municipality can permit, license, fund, or carry out a proposed project. Essential Habitats serve as consultation zones. Many activities are permissible, but timing modifications and specific habitat alterations may be needed to accommodate the needs of nesting eagles. The U.S. Fish and Wildlife Service proposed removal of the threatened species designation for bald eagles, but that action is awaiting resolution of several concerns: a monitoring protocol for eagle populations after "delisting" and clarification of "harassment" prohibitions under the Bald Eagle Protection Act. ***This work is supported by hunting and trapping licenses, federal Section 6 and PR funds, as well as state revenues from the Loon Plate and Chickadee Checkoff funds.***

--Charlie Todd

Figure 6. Bald eagle recovery trends in Maine



Peregrine Falcon

The peregrine is another species that has benefited greatly from federal/state partnerships in endangered species conservation. Formerly a breeding resident on cliffs in mountainous regions and coastal headlands in the state, 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, USFWS, 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. 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. During 1989 - 2001, numbers of nesting peregrines did not change appreciably: only 5 - 8 eyries were inhabited each year. Seven pairs were located in 2001, and 14 young peregrines fledged from six of these eyries. Nesting success improved notably in interior Maine that year.

Peregrines nested at 13 different locations during 1987 - 2001. Young falcons were raised at 9 different eyries, but there was no steady growth in the population. At least 14 other settings have been "visited" by prospecting peregrines, but nesting did not follow. There were grave concerns that Maine's small, reestablished population was having trouble maintaining itself. Low recruitment likely handicaps the continuing residency of falcons at some of these sites and thus limits statewide increases. The population center of peregrines in the Northeast has been in the mountains of New York, Vermont, and New Hampshire. Maine is on the periphery of this population, and thus periodic setbacks are 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 reporting 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.

This persistence may finally be yielding some further progress in peregrine recovery. Surveys are not yet complete in 2002, but at least 15 eyries have been found thus far! Several recently abandoned eyries have been reoccupied and new eyries have been found at 4 Oxford County locations and one in Piscataquis County. This major advancement gives hope for a lasting recovery in Maine, but peregrines remain an Endangered Species in the state. Major improvements in their status in the western U. S. are largely responsible for federal delisting of peregrines in 1999.

This work is supported by federal Section 6; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).

--Charlie Todd

Golden Eagle

The golden eagle continues to bear the unfortunate distinction as 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 in 2001 and 2002. Throughout this time period, this location had been the only breeding record for the species documented in the northeastern United States, although nesting failure plagued the pair. Unhatched eggs recovered in 1996 revealed a tremendous contaminant burden: a replay of the same assortment of toxins that impaired reproduction among bald eagles and peregrines.

Sightings of golden eagles were more numerous during the past year in Maine, which gives hope that they may return as breeding residents to the state. Unfortunately, an adult golden died following collision with a truck in Aroostook County in October, and a subadult was shot in Lincoln County in November. Human-related losses can be highly influential at this precarious stage of low numbers. However, sightings of an adult golden eagle in Oxford County during May and June 2002 are encouraging, and serves as a strong reminder to be on the lookout for this special rarity of Maine's wildlife heritage.

Only eleven golden eagle eyries are historically known in Maine. 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.

Certainly, the current situation is discouraging for the golden eagle. There are natural habitat limitations for the 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 has occurred among 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. Loyalty to traditional settings is manifest by golden eagle nesting as recently as 1998 at one Maine cliff that had been documented as an eagle eyrie as early as 1736. ***This work is supported by Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Charlie Todd

Grasshopper Sparrows

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 blueberry barrens and sandplain grassland on the Kennebunk Plains in West Kennebunk. This site annually supports 30-60 percent of the statewide breeding population. The 2001 census conducted by The Nature Conservancy identified 49 singing males, the best indicator of territorial pairs. This is a 50% increase in numbers since 2000, the highest tally ever recorded at Kennebunk Plains, and rivaled the total of 52 pairs statewide from the previous year. Unfortunately, inadequate staff and budgets precluded monitoring the other 3 traditional grasshopper sparrow sites in 2001.

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. Prescribed burns are used to maintain suitable habitat for grasshopper sparrows and other grassland birds. A total of 172 acres were treated in 2001. All grassland bird species (including upland sandpipers, a Threatened Species, and Species of Special Concern like vesper sparrows and eastern meadowlarks) increased notably at the Kennebunk Plains in 2001. MDIFW is also working with 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.

Conservation efforts for grasshopper sparrows also benefit a suite of bird species nesting in grasslands. Others (not mentioned above) include bobolinks, horned larks, savannah sparrows, short-eared owls, and northern harriers. Maine is a stronghold in the Northeast for upland sandpipers and vesper sparrows. Many grassland birds are experiencing regional declines. Guidelines encouraging the maintenance of suitable habitats for 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; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Charlie Todd

Piping Plover

Piping plovers are small, sand-colored shorebirds that nest on sandy beaches and dunes along the Atlantic Coast from South Carolina to Newfoundland. The piping plover is listed as Endangered because of its extreme rarity in the State and the threats it faces during the nesting season. Maine's population of piping plovers has been monitored annually since 1981. During this period, the number of pairs reported has fluctuated between 7 pairs at 4 sites in 1983, to 60 pairs at 19 sites in 1998. In 2001, 55 pairs of piping plovers nested in Maine and produced 109 fledglings. This was a record number of young plovers produced. The overall population trend has been one of increase, due largely to intensive management at nesting sites and the cooperation of private landowners and municipalities. Productivity of piping plovers in Maine, measured as number of chicks fledged per nesting pair, has ranged from 0.9

chicks per pair in 1981 to 2.5 chicks per pair in 1991. Statewide productivity since 1984 has been among the highest documented in any Atlantic Coast state or province. Productivity in Maine has exceeded 1.7 chicks per pair in 11 of the past 14 years. Productivity in 2001 was 1.98 chicks/pair.

MDIFW is grateful for the help of many groups that help monitor and manage piping plovers. They include the Maine Audubon Society, The Nature Conservancy, Maine Bureau of Parks and Lands, U.S. Fish and Wildlife Service, Bates Morse Mountain Association, the towns of Wells and Ogunquit, and many others. Collectively, biologists and volunteers complete annual population surveys, fence and sign nesting areas, exclose nests, and count fledglings. As a result of a new beach management plan with residents of Wells and Drakes Island beaches, over 20 volunteers monitored plovers on their beach. This volunteer-based program was expanded to Ogunquit Beach in 2002 and has been a great help to our management of these endangered birds. ***This work is supported by federal Section 6 funds; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Mark McCollough

Least Tern

Least terns are the smallest of four species of terns that nest along the coast of Maine. These endangered birds nest on the same sandy beaches used by piping plovers in southern Maine. Nesting colonies of least terns in Maine are monitored and protected by biologists with the Maine Audubon Society and the U.S. Fish and Wildlife Service. During the past 13 years, the statewide population has fluctuated from 39 pairs at 3 sites in 1982, to 126 pairs at 3 sites in 2000. Since 1979, total productivity in Maine has ranged from 12 to 123 young fledged annually. In 2001, 120 pairs (down 6 pairs from 2000) nested at 3 sites and produced 63 fledglings.

The erratic productivity of these birds in Maine can be attributed to human disturbance; destruction of nests or young by humans, foxes, skunks, raccoons, crows, dogs, and cats; natural events (e.g., tides, storms) and habitat alteration from coastal development. Production of chicks in the last decade likely has not been sufficient to maintain the population. Management of least terns in Maine includes placing fencing and signs around nesting colonies, and predator control. Public education, to inform recreational beach-goers and local residents about the conservation needs of least terns, is another important management activity. MDIFW and Maine Audubon are developing management recommendations for each of the nesting beaches to aggressively confront predation and disturbance problems.

In 2001, Jordan Perkins, a wildlife graduate student working under Dr. Fred Servello at UMaine, initiated a study to better understand the factors limiting least tern populations in Maine. Her first season in 2002 will be devoted to documenting the effects of predators and tides on nesting success. ***Funding for this work comes from the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Mark McCollough

Roseate Tern

Roseate terns nest with common and arctic terns on coastal islands in Maine. The islands are critical to survival of the species, since they typically provide undisturbed, predator-free nest sites. With an increase of gull populations (a predator and competitor of the terns), and human disturbance on the islands, tern numbers and reproductive success have declined so that the species is now listed as Endangered. In the 1980s, 50-80 pairs of Roseate Terns nested in Maine. Their numbers have increased in response to management; now 285 pairs nest in Maine. In the 1930s, 200-300 pairs nested in the state.

Recovery of this species is a cooperative venture among the USFWS Petit Manan National Wildlife Refuge, National Audubon Society, Maine Audubon Society, College of the Atlantic, and MDIFW. In 1992, 21 nesting islands used by roseate terns were protected by Essential Habitat provisions of the Maine Endangered Species Act. An additional island was designated Essential Habitat in 1999. In 1994 and 1995, new tern restoration projects were initiated to benefit roseate terns on Pond Island at the mouth of the Kennebec River, and Ship and Trumpet Islands in Blue Hill Bay. Populations of common terns and arctic terns are also benefiting from these and other seabird restoration efforts. Common terns have increased from 4,361 pairs in 1994 to 6,759 in 2000; however, arctic terns have declined during the same time period from 5,029 to 2,619 pairs. A Gulf of Maine arctic tern study is underway with the University of New Brunswick to determine why arctic terns are not increasing in response to management. ***Funding for this work comes from Section 6 funds; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Brad Allen and Mark McCollough

Black Tern

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

Nokomis students have continued their annual survey of black terns, thus providing the state with valuable information on this species' status. In 2000, 82 pairs nested at 10 sites. In 1998, Dr. Fred Servello and graduate student Andrew Gilbert, from UMaine Department of Wildlife Ecology, began a study of black tern ecology and populations in central Maine. In 1999 and 2000, nests were located and observed from blinds to determine productivity. To date, about 200 adults and chicks have been captured and color banded to determine survival rates, movements between colonies, and year-to-year fidelity to nesting areas. Thirty-nine banded birds were captured or resighted. Andrew constructed exclosures at some nest to document chick provisioning and growth rates. He also used remotely controlled video cameras to document feeding rates and the kinds of foods eaten. Forty-three broods, at 7 clusters of nests, were observed from towers constructed in the marsh to determine productivity.

Water levels and precipitation are being monitored at all sites to understand how fluctuating water levels affect nesting success. Andrew completed a statewide habitat assessment to guide future tern surveys and better understand whether habitat availability may be limiting these Endangered birds. One new site was reported in late summer and will be surveyed in 2001. Shannon Kearney, a new graduate student, will begin fieldwork in 2001 to investigate sources of predation of black tern chicks and nests. **Funding for this work comes from federal Section 6 funds; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).**

--Mark A. McCollough

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. 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. As a result of MARAP, spotted turtles were recorded at about 20 different sites from Kittery to Orrington. Blanding's turtles were known from only about 20 locations in Maine, all in York County.

In 1995, University of Maine graduate student Lisa Joyal completed a study of two populations 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 being used. 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 12 years. To date, over 2,600 wetlands have been surveyed yielding over 100 new locations for these rare species.

In 1999, MDIFW completed a population viability assessment (PVA) for Blanding's and spotted turtles to determine the size of populations that should be conserved. Results from this PVA, combined with data on movements and habitat requirements, suggest that large blocks of relatively contiguous forested and wetland habitat must be conserved to successfully maintain viable populations of these rare turtles in Maine. Southern Maine's landscape is rapidly developing, and one of the best remaining locations to achieve turtle conservation goals is on a 32,000 acre area surrounding Mt. Agamenticus in York County. MDIFW has begun working closely with the Mt. Agamenticus Conservation Coalition - including The Nature Conservancy, local land trusts, water districts, and towns - to initiate conservation planning for the turtles and other rare species in one of the largest remaining contiguous coastal forest ecosystems between Acadia National Park and the New Jersey Pine Barrens. **Funding for this work comes from federal Section 6; Loon Plate and Chickadee Checkoff funds.**

--Phillip deMaynadier

Tomah Mayfly

The "Tomah" mayfly was first collected in the early 1900s from a single location on the Sacandaga River in New York. Unfortunately, construction of the Sacandaga Reservoir in the 1930s altered the river and permanently flooded the mayfly's habitat. The species was presumed to be extinct for nearly 50 years until it was "rediscovered" in Tomah

Stream (Washington County) in 1978 by UMaine entomologist Dr. Cassie Gibbs. It has since been found at 15 other locations in Maine and at one new site in New York. Historically, it was also found in Labrador and Quebec.

This insect is unique in many ways. It is the only representative of the genus *Siphonisca* in the world. Some have described it as a "living fossil," as it has large projections on the abdomen characteristic of ancient Carboniferous Period insects. The nymphal stage of the Tomah mayfly, unlike other species of mayflies, is carnivorous - preying largely upon other mayfly nymphs. This species depends on highly productive, seasonally flooded, sedge meadows along large streams or rivers to complete its life cycle. Although sedge meadows are not an uncommon habitat type in Maine, the Tomah mayfly is found at only a very small number of sites.

In 1997, the Tomah mayfly was listed as Threatened in Maine because of the limited number, size, and distribution of its populations; and its near-endemic status in Maine. In 2001, MDIFW completed an assessment of the Tomah mayfly's status and conservation needs in Maine, and convened a public working group to establish recovery goals and objectives. As part of the ongoing statewide ecoregional surveys for rare species, approximately 15 sites in the St. John River Uplands of northwestern Maine were surveyed for Tomah mayfly in 2001, and three new occurrences were documented. **Funding for this work comes from federal Section 6; the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).**

--Beth Swartz

Clayton's Copper

The Clayton's copper (*Lycaena dorcas claytoni*) is a small, orange-brown butterfly that is known from only eleven sites worldwide - nine in Maine and two just over the border in western New Brunswick. Of Maine's nine known occurrences, most are centered in a ten square mile area around Lee and Springfield in northeastern Penobscot County. Two 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. Studies initiated in 2000 at Dwinal Pond Wildlife Management Area - where a proposal to stabilize water levels could potentially effect the largest known occurrence of the butterfly - were continued in 2001. 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. These surveys will continue in 2002. Also in 2001, consulting botanists Sally Rooney and Jill Weber surveyed and described the Clayton's copper's habitat at Dwinal Pond and prepared management recommendations for shrubby cinquefoil at the site. Management efforts to improve the existing stands of cinquefoil, and potentially to create and maintain new upland stands, will be undertaken at Dwinal in the near future. 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 federal Section 6; the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).**

--Beth Swartz

Amphibian and Reptile Studies

Partners in Amphibian and Reptile Conservation

MDIFW is involved with a new 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 the recent declines of amphibian and reptile (herptile) populations worldwide. MDIFW has participated in several Northeast Working Group 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 Atlasing Project (MARAP)

From 1986-1990, MDIFW, in cooperation with Maine Audubon and the University of Maine, conducted the Maine Amphibian and Reptile Atlasing Project (MARAP). For 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 greatly 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 \$19.95 (Maine residents add \$1.00 tax) plus \$3.50 S&H from the Information Center, MDIFW (207 287-8000).

Note that MDIFW still actively maintains the state's reptile and amphibian database and encourages those enthusiasts who currently possess a copy of *Maine Amphibians and Reptiles* to submit new records (using the blank record sheet at the end of the book) for any species from towns where records do not currently exist (see book's distribution maps). As always, observation records for any of the four state-listed reptiles - box turtle, Blanding's turtle, spotted turtle, and black racer - should be submitted to MDIFW immediately phillip.deMaynadier@state.me.us or call 207-941-4239). ***This work is supported by Loon Conservation Plate and Chickadee Checkoff funds.***

--Mark McCollough and Phillip deMaynadier

Amphibian Monitoring

Since 1989, many herpetologists 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 new Calling Amphibian Survey is part of a nationwide survey organized by the U.S. Geological Survey - Biological Resource Division. Sixty-two frog and toad monitoring routes along roads were randomly established across the state. Each spring, volunteers drive their routes 3 times, recording the diversity and intensity of calling frogs and toads. Vacant routes still exist, and volunteers are needed in the following areas: Corea, Chapman, Penobscot lake, and Bridgewater. All new volunteers are provided training materials and a cassette tape of the calling amphibians of Maine. Thus far, over 100 volunteers are participating with 54 routes completed in 2001. Five years of data have been collected, and, within a few years, we anticipate being able to determine preliminary population trends for many of Maine's frog and toad 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. ***This work is supported by 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 of the species in the United States. Wood turtles spend most of their time in or near streams or rivers throughout the state, while becoming increasingly terrestrial during the summer months when they frequent adjacent riparian habitats. 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 investigated by the Warden Service in Maine 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. Brad completed his master's thesis in 1999, and Dr. Judith Rhymer, a UMaine faculty member, is now studying the conservation genetics of wood turtles in Maine and throughout their range with a new graduate student Joanna Murray. 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 Canadian provinces, thus providing a potential forensic tool useful for identifying the origin of animals collected illegally for the pet trade. ***Funding for this work comes from federal Section 6; the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds.***

--Phillip deMaynadier

Invertebrate Studies

Rare Dragonflies

Maine's clean, free-flowing rivers provide a valuable refuge for some of North America's rarest dragonflies. The pygmy snaketail dragonfly 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, and most with fewer than 50 individuals. Since 1998, and with support from the USFWS, MDIFW has surveyed over 200 wetlands in York and Oxford Counties where six new 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, 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). 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 this project. Aware that few individuals have had experience in collecting these insects, MDIFW provides volunteers with a collecting manual, workshops, newsletters, and webpage-based aids in identification. In the first three years of the survey, 80 volunteers were trained during five workshops held at Eagle Hill Field Research Station in Steuben. In turn, volunteers have collected over 7,000 specimens including hundreds of new county records, seven new state records, and 1 national record (the globally rare Quebec Emerald). The data, in just three years, increased by nearly 150% 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 Outdoor Heritage Fund; Loon 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 distribution and status of these and other state-listed butterflies, MDIFW is actively studying them 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 potentially rare butterfly species MDIFW hopes to improve its understanding of the group and prioritize conservation efforts towards those species most threatened by 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 conduct a baseline 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 other cooperators.

--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, dams and other water control structures, 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 2001, MDIFW continued collaboration on a research project with Drs. Alex Huryn and Judith Rhymer of the University of Maine to advance the understanding and conservation of Maine's two rarest freshwater mussel species – the yellow lampmussel and tidewater mucket. Graduate student Chip Wick is investigating the identity of the mussels' fish host(s), which were previously unknown for both species. Two host species have now been identified for the yellow lampmussel, and work on the tidewater mucket will begin in 2002. Chip is also researching the age and population structures of both species at several sites in each of the three watersheds where they occur. A second UMO graduate study is just getting underway to research the genetic structure of yellow lampmussel and tidewater mucket populations within and between watersheds, as well as identify the effects of landscape level characteristics on the mussels' distribution and occurrence. All of the information learned from these projects will greatly assist MDIFW in conserving these rare species.

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 federal Section 6; the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds.**

--Beth Swartz

Penobscot Meadow Vole

In 1901, Reginald Howe, a biologist, made an unusual discovery on Tumbledown Dick, a small islet off North Haven. There he trapped unusually large meadow voles. Howe used skull and body measurements to name a new subspecies, the Penobscot meadow vole (*Microtus pennsylvanicus shattucki*). Eight other island populations of meadow voles have since been given subspecies status from southern New England to Newfoundland, and at least one subspecies has already gone extinct.

Ninety years later, the U. S. Fish and Wildlife Service listed the Penobscot meadow vole, possibly Maine's only endemic mammal, as a candidate for federal listing. MDIFW did not list the species on the state list because of lack of data on the taxonomic status. Dr. Judith Rhymer and her graduate student Jennifer Lowry initiated a study in 2000 and 2001 to use modern genetic methodology to determine if Howe's observations were correct. They re-examined the measurements of animals on Penobscot Bay islands with those on the mainland and found that they indeed were significantly larger. Genetic studies also demonstrated that they were unique and distinct from mainland populations, thus supporting unique subspecies status. The Penobscot meadow vole may be considered again for future state and federal listing. Its range is apparently limited to just a few islands in Penobscot Bay. Hopefully, additional studies will be forthcoming to better understand its ecology and distribution and to better document its genetic uniqueness.

-- Mark McCollough

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 1999, a Maine *Citizen's Guide to Locating and Describing Vernal Pools* was updated and republished with help from the Environmental Protection Agency and is available from MDIFW (207-287-8000) and Maine Audubon Society. Following extensive input from wildlife biologists and the forest management community in Maine, Habitat Management Guidelines for harvesting timber around vernal pools were recently completed and will be available from MDIFW in 2002. Recommended guidelines for minimizing impacts from urban and residential development surrounding vernal pools have also been completed and are available from Dr. Aram Calhoun at the University of Maine (207-581-3010). Finally, vernal pool fact sheets, describing threats and management considerations, are also now 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, Rob Baldwin, to research the wildlife use and characteristics of vernal pools in three southern Maine townships - Biddeford, Kennebunkport, and North Berwick. This collaborative study between UMaine and MDIFW will provide critical data needed to determine the magnitude of the "Significant Vernal Pool" resource in southern Maine, as well as an evaluation of the effectiveness and feasibility 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 the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; the Environmental Protection Agency; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Phillip deMaynadier

Ecoregional Survey

Since 1997, the Department of Inland Fisheries and Wildlife 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 threatened, endangered, and special concern species. Data collected are being used to better assess the status and distribution of rare species and design conservation strategies to promote their recovery.

The survey is being conducted in each of Maine's 17 ecoregions; each ecoregion unique with regard to its climate, topography, and vegetation. Between 1997 and 2001, surveys were conducted in a broad area along the coast of Maine, from extreme southwestern Maine to the Downeast coast. Beginning in 2001 and continuing to the present, the ecoregional survey has been carried into northwestern Maine, focusing on two ecoregions: St. John Uplands and Boundary Plateau. This is a remote corner of Maine, dominated by private timber holdings and populated by a number of species with northern range distributions, some of which barely come south into Maine. As a result, many of the species surveyed in these two ecoregions are quite different from those targeted in other areas of the state.

Many new locations of rare species have been found thus far in northwestern Maine (Table 23). Most of these are invertebrate findings, primarily because Maine's rare invertebrates are a little-studied group of species with relatively few known locations. The most abundant results from 2001 surveys involved dragonflies and damselflies - 31 new locations were documented, including one new national record, a dragonfly called the Quebec emerald. In addition to dragonfly and damselfly findings, one new site for the bog fritillary (a butterfly), and three new sites for the threatened Tomah mayfly were found. The year 2001 was certainly a good year for invertebrates.

Table 23. New site locations for rare species in northwestern Maine in 2001.

Species or Species Group	No. of new sites for target species
Long-Tailed Shrew	11
Northern Bog Lemming	0
Yellow-Nosed Vole	3
American Bittern	14
Northern Harrier	2
Rusty Blackbird	8
Sedge Wren	2
Sora	2
Virginia Rail	4
Yellow Rail	0
Tomah Mayfly	3
Bog Fritillary (butterfly)	1
Boreal Snaketail (dragonfly)	0
Brook Snaketail (dragonfly)	2
Delicate Emerald (dragonfly)	5
Ebony Boghaunter (dragonfly)	1
Extra-Striped Snaketail (dragonfly)	2
Harpoon Clubtail (dragonfly)	9
Hine's Emerald (dragonfly)	0
Ocellated Darner (dragonfly)	7
Pygmy Snaketail (dragonfly)	0
Quebec Emerald (dragonfly)	3
Single-Striped Clubtail (dragonfly)	0
Subarctic Bluet (damselfly)	2

There was less success in the 2001 bird surveys. No yellow rails, a targeted sedge-meadow species, were documented. Although two sites were found to contain the endangered sedge wren early in the season, this bird was found at neither site later in the summer, indicating that no successful breeding occurred. Other sedge meadow species which were found included American bittern, sora, Virginia rail, great blue heron, and northern harrier. A separate survey was conducted for rusty blackbirds, a species whose southern range limit is in northern Maine. Eight new sites were located for rusty blackbirds. In addition, several fox sparrows were observed; both of these two species may be expanding their range southward, encompassing more of northern Maine.

Northwestern Maine is also home to several rare mammal species. A late summer and fall survey for small mammals yielded 11 new locations for the long-tailed shrew (a 65% success rate!), a species that is

associated with steep, rocky slopes such as occur in northern and western Maine. These data indicate that the long-tailed shrew may not be as rare as originally thought. In addition, we located three new sites for the yellow-nosed vole, another rocky-slope species. Surveys for the endangered northern bog lemming were unsuccessful; no new sites were added to the current list of four locations for this species in Maine. Mist-net surveys for the small-footed myotis, a rare bat that has only been documented a few times in Maine, were also unsuccessful.

A much larger mammal was also surveyed during the winter of 2001: the Canada lynx, which is federally threatened. In cooperation with MDIFW's mammal group, we tested a new method for detecting lynx using remotely triggered cameras. Three photographs of lynx were obtained; although not a high success rate, it indicates that cameras may be useful under the right conditions as an alternative method for finding lynx. A small amount of snow tracking also yielded several sets of lynx tracks in northern Maine.

Ecoregional surveys will continue for the next 4 to 6 years. Future work will encompass the remainder of the state, from eastern Aroostook County to the western mountains of Maine. ***Funding for this work comes from federal Section 6; the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Heather Givens

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 2,400 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 2001, over 100 new occurrence records were entered into the BCD bringing the total number of rare species locations tracked to 2,460. 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. State-wide BCD data was also provided for the Department's *Habitat Conservation and Mapping Project* (HCAMP). Also in 2001, MDIFW began 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 federal Section 6; Maine Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; The Maine Chapter of The Nature Conservancy; hunting license and permit revenues; federal U.S. Fish and Wildlife Service funds; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

—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). The biologists in the Resource Assessment Section in the Bangor office address statewide wildlife habitat issues.

The Wildlife Habitat Group 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. MaryEllen also 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. Conducts field inventories of wildlife habitat.

Conserving Wildlife Habitats and Open Space in Southern Maine

Beginning with Habitat (BwH) project, one of the most important projects undertaken by our staff in cooperation with several other agencies and organizations (Maine Natural Areas Program (MNAP), State Planning Office, U.S. Fish and Wildlife Service, Southern Maine Regional Planning Commission, Maine Audubon, and Wells National Estuarine Research Reserve), is focusing on conservation of wildlife habitats in Southern and Central Maine. This project is based on a landscape, or regional, model developed with the assistance of the University of Maine Cooperative Wildlife Research Unit.

The foundation of our approach is to encourage towns to 1) ***conserve riparian habitats*** through effective implementation of the current Shoreland Zoning regulations, 2) ***conserve identified special animal*** (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.

Beginning With Habitat

An Approach to Conserving Open Space

The most
important first step
to protecting habitat
is knowledge.



Beginning With Habitat is a cooperative effort of agencies and organizations working together to secure Maine's outdoor legacy. Those agencies include the Maine Department of Inland Fisheries and Wildlife, Maine Natural Areas Program, Maine State Planning Office, Wells National Estuarine Research Reserve, Maine Audubon Society, Southern Maine Regional Planning Commission, United States Fish and Wildlife Service, and the Maine Cooperative Fisheries and Wildlife Research Unit.

June 2001

Using this "landscape" approach, MDIFW and MNAP are developing a series of maps to identify habitats required to support wildlife species over Maine's diverse landscape. Based on these maps, we are providing specific guidance to towns for developing open space plans to address the many concerns with the issue of "sprawl" (a pattern of development resulting from dispersed, uncoordinated commercial, residential, and transportation construction in less developed areas of the state). Sprawl usually results in a loss of wildlife habitat. 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 maintain riparian habitats, high value plant and animal habitats, and large blocks of forest and grassland.

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 License Plates; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

Conserving Wildlife Habitats in Northern and 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.

MDIFW has been working on a landscape approach to conserve habitat in southern Maine and we are now turning our attention to developing a landscape approach to conserve habitat in northern Maine.

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. We are now in the process of quantifying the natural resource damage resulting from the spill and will be working with other state and federal agencies to 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 to 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.

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. 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 will be used to provide habitat updates for a variety of coastal bird species to generate revised Environmental Vulnerabil-

ity Index (EVI) oil spill response maps. Vulnerable areas will be given the highest priority during cleanup operations following an oil spill. This work is funded by Maine citizens who purchase Outdoor Heritage lottery tickets, the Oil Spill Conveyance Fund, and the USFWS Gulf of Maine Program.

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 June 2002, 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, 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, highlighting habitats for the public 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 this work comes from federal Section 6; the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson 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 state-wide 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. 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 and Wading Bird Habitats, and 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 for more efficient tracking of these important habitats by our staff. Using their local computers, The Wildlife Division biologists can access these databases over the State Wide Area Network. Regional biologists are able to update the files for DWAs and WWHs in their regions as changes occur. Our Bird Group staff provides updates for coastal islands. Wildlife Resource Assessment Section can use these data for assessing status of these habitats statewide. Supervisors can track efforts of staff biologists.

New Protocol for Inland Wading Bird and Waterfowl Habitats

We recently completed an effort to identify high and moderate value WWHs in all towns in Maine using a computer model developed with data from the National Wetland Inventory and following the protocol previously used to map WWHs manually in organized towns by our staff. Some of the mapped WWHs must be field checked by Regional staff. The results of this effort must also be evaluated further by our Department WWH Committee to determine the appropriate next steps for implementing use of these mapped habitats in our environmental reviews and species planning. As a result of this effort, less time commitment of field staff will be required to complete the WWH mapping and rating statewide. ***Funding for this work comes from federal Section 6; the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; 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 biologists in Bangor; biologists in our regional offices; other agencies; landowners; conservation groups, etc.; for general information; regulatory purposes; planning; and many other uses. HCAMP (see previous description) is one example of such maps 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.

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 lie ahead as the Wildlife Division moves into a more active role of habitat conservation and management to maintain the wildlife populations of Maine. This will require a major effort for the Wildlife Division team.

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

Maine is a very unique place. You can be completely alone in the wild, practicing ethical behavior and no one may be there to notice.

However, the landowner as well as the hunters and anglers that follow you, will appreciate it greatly. Your ethical behavior contributes significantly to Maine's sporting future, and it encourages landowners to keep important habitat property available for all to enjoy.

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

ASK FIRST

ALWAYS SEEK PERMISSION

Before engaging in any form of outdoor recreation on property which belongs to someone else. If you know you are welcome to use someone's land, don't abuse the privilege. If you don't know if you are welcome, find out. If the land is posted or you know you are not welcome, find another location. A hunting or trapping license does not give you the right - stated or implied - to go on another person's land against their wishes.



MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

LEE PERRY, COMMISSIONER
FRED HURLEY, DEPUTY COMMISSIONER

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Harold Brown, Penobscot County; telephone: 942-5916
Sara Dyer, Cumberland County; telephone: 926-4717
Lance Wheaton, Washington County; telephone: 448-7726
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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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Register your car or truck with Loon Conservation License Plates, and a portion of the fee will be used to protect Maine's wildlife and to improve our state parks and historic sites.

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