

**Maine Department of Inland Fisheries & Wildlife**  
Roland D. Martin, Commissioner

# **Wildlife Division**

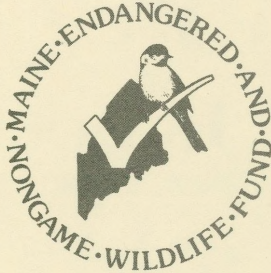
## **Research & Management Report**

### **2004**





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



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



## **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.





# INTRODUCTION

The Humane Society of the United States and the Fund for Animals have formed a political action committee called Maine Citizens for Fair Bear Hunting, which seeks to ban the taking of bears over bait, with hounds, and by trapping via a statewide referendum this November. The referendum threatens the Department's ability to effectively manage bears by eliminating critical management tools and discouraging the wise use of the bear resource by eliminating traditional, time-tested harvest methods.

The Department believes the loss of these bear hunting methods in Maine is unwarranted.

Black bears are widely distributed in Maine, numbering approximately 23,000 animals - the highest black bear population of any state in the lower forty-eight. Bear management in Maine reflects the species' rise in status from a pest to a big game species. Concurrently, they have received increased protection and monitoring over the last one hundred years. Bears were hunted year round for much of the first half of the century and were bountied until 1957. Bear seasons were shortened to a 6-month period in the 1960s. Since 1982, a 3-month fall-only season has been in place.

The Department began monitoring bear harvests in 1969, with more formal studies in 1975. In 1982, the Department intensified its efforts to gather information from live and hunter-killed bears in a continuing effort to improve its understanding of the species. Since 1983, biologists have tracked 40-50 radio-collared bears annually, recording detailed information on their survival, reproduction, behavior, and condition. The Department's bear work is one of the most extensive, comprehensive, and long-standing bear studies in North America. Information from research bears is combined with data from hunter-killed bears to refine management programs.

The Department uses a public planning process to establish its bear population objectives; and it employs regulated hunting as the primary tool to meet these objectives. Traditional harvest methods are tools that allow the Department to respond to changing habitat conditions, variations in interest in hunting, and social expectations about bear population levels - their loss will reduce the Department's flexibility to address these variations and may force liberalizations in Department policy regarding nuisance bears.

By statute, Maine's bear season currently extends from late August through November. Hunters may take one bear annually: bait, hound, still-hunting, stalking, and trapping are legal methods with restrictions on timing and methods. From 1990-2002, bear harvests averaged 2,673 and the bear population increased during this period. The Department has closely monitored Maine's bear harvest for nearly 35 years and has structured the harvest to ensure the viability of the bear population, and to provide hunting and viewing opportunities.

Bears have a role in Maine's forest ecosystem - both the hunting and non-hunting public alike recognize this fact. The Department's bear management program maintains the long-term viability of the bear population. In recent years, the public's interest in viewing bears has increased, but Maine's dense forests provide few opportunities to view bears. Nevertheless, bears remain popular with campers, fishermen, and other outdoor enthusiasts who are able to catch a glimpse of them.

In the pages that follow, we've outlined several aspects of the Department's bear management efforts. I think we can all be proud of Maine's state-of-the-art, scientific bear management program, which is guided by public input.

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





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# SPECIES PLANNING

## Public Input Determines Black Bear Management Objectives in Maine

Black bears are widely distributed in Maine. The Maine Department of Inland Fisheries and Wildlife (MDIFW) estimates that Maine has approximately 23,000 bears, the largest bear population in the eastern United States and one of the largest populations in the continental U.S. Maine's bear population has increased 28% since 1990.

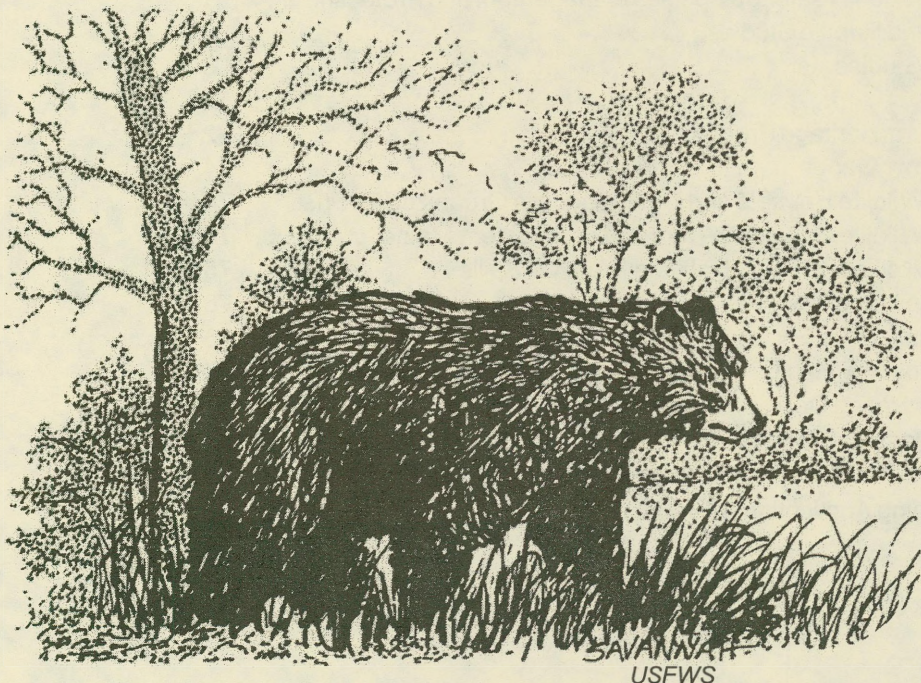
Maine's large bear population provides a range of benefits to residents and visitors of the State. Bears are considered by many as a symbol of "wildness" and just knowing that they are present in the forest is important. Bear hunting supplies successful hunters with excellent table fare and hunting experiences and sustains a guiding and outfitting industry that helps to support Maine's economy. In recent years, the public's interest in opportunities to view bears has been on the rise, largely fueled by the increased bear population and visibility of bears along roadsides. Others regard bears as a species that causes conflicts with other land uses, primarily agriculture (e.g., crop and livestock depredation, nuisance in campgrounds and backyards). MDIFW receives about 300 nuisance bear complaints each year.

The Department uses a publicly driven planning process to establish bear population objectives for each of 30 Wildlife Management Districts. The most recent update of that plan was completed in 1999, with input generated from a public working group representing a wide array of stakeholders interested in bear (landowners, forest industry, sportsmen, environmentalists, etc.). In 2000, MDIFW's Fish and Wildlife Advisory Council, a 10-member citizen's advisory board, approved new management goals and objectives to drive the Department's bear management program through 2015. The Department's bear management goal is to provide hunting, trapping, and viewing opportunity of bears. Three management objectives include:

- 1) Stabilize the bear population by 2005 at no less than levels experienced in 1999 (23,000 bears statewide), through annual hunting and trapping harvests.
- 2) Create information and education programs that target specific audiences and promote traditional hunting and trapping methods as valid and preferred tools to manage black bear populations in Maine.
- 3) Create information and education programs that target specific audiences and promote public tolerance of bears in Maine.

MDIFW's bear management program is based on extensive collection of detailed scientific data and structured, in-depth public involvement, and seeks to maintain the long-term viability of the bear population balancing the needs of the species with those of the public.

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





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

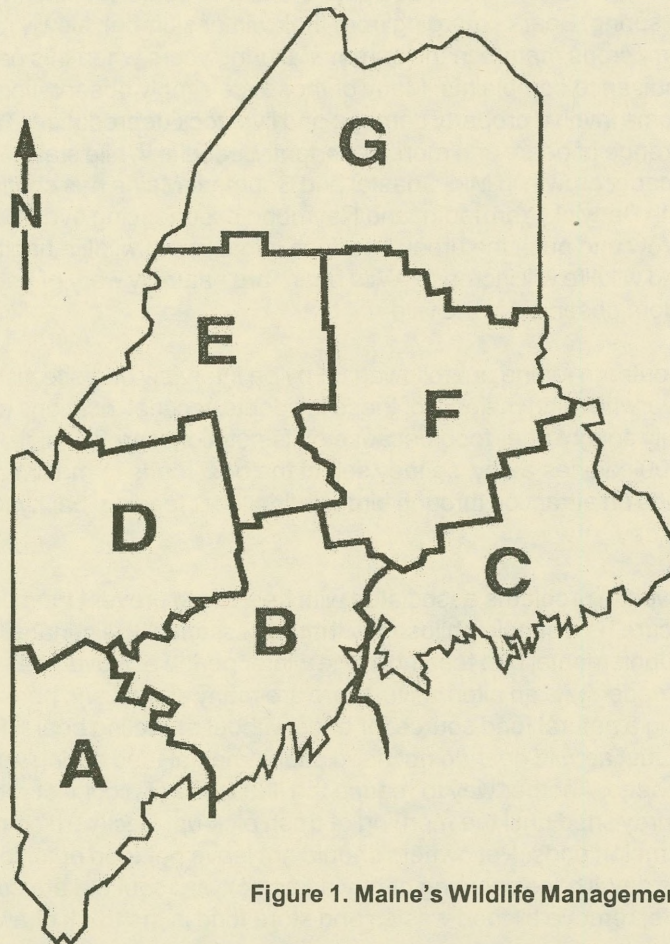


Figure 1. Maine's Wildlife Management Regions

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 Regions. The newest addition to the Wildlife Management Section is our Lands Management Biologist. Centrally located in the Sidney regional headquarters, the Lands Management Biologist assists regional biologists in habitat enhancement projects on the Department's Wildlife Management Areas as well as with developing a land management database to help track these efforts.

One of the most time consuming functions of the Wildlife Management Section is the administration of the Department's Animal Damage Control (ADC) program. Our Nuisance Wildlife Policy guides this program, designed to assist the public with their nuisance wildlife problems. The regional wildlife staff and District Game Wardens receive a multitude of requests by landowners and concerned citizens who wish to have assistance for various nuisance wildlife issues.

Because of the upcoming bear referendum issue in the fall of 2004, we thought it was pertinent to offer an overview of the Wildlife Management Section's involvement with nuisance bears in Maine.

--Eugene Dumont, Wildlife Management Section Supervisor



## ***REGION A – GRAY***

### **Urban Bear Management**

Many people living in southern Maine believe that since they have never seen a bear in the southern counties of York and Cumberland that there are no bears living in this part of the state. This is far from the truth. While the population level is much lower than in Northern and Downeast parts of the state, all of southern Maine is now considered within bear range. Of the nearly 4,000 bear harvested annually, the number taken in Wildlife Management Districts (WMDs) within York and Cumberland Counties have consistently been in the single digits. The most active pursuit of bears in Region A, with a 2003 harvest of 29, takes place in WMD 15 in Southern Oxford County: a function of more bears and more opportunity and space to hunt them.

Nuisance complaints in Region A have slowly increased over the last 15 years with the majority occurring as bears emerge from hibernation in the spring. Bears emerging from their winter slumber, slowly resume feeding on grasses, buds, catkins and ants until berry crops mature in the summer. During years when this natural progression of foods is delayed, we tend to get more nuisance complaints. Many of these are simply observations of bears in places where they are not expected to be, while some involve property damage and livestock depredation. The explanation for this trend is the increase in population and range of bears and more importantly, people. While statewide human population growth has leveled off over the last decade, growth in Mid-Coastal and Southern Maine has continued to increase, with many towns such as Waterboro, South Berwick, Yarmouth, and Raymond experiencing over a 30% increase in population from 1990–2000. As communities grow and push the urban interface into existing wildlife habitat, it is only natural that interactions between people and wildlife will increase. Wild bears are naturally wary of people. Given this tendency and their keen senses they are seldom observed in the wild.

Reports of nuisance bears in Southern Maine are followed up by an interview or a site visit by Region A Biologists or District Game Wardens. The overwhelming majority of these incidents occur at locations where landowners are providing seed for birds. Bird seed is highly sought after food because of its nutritional profile; high in calories, much of it from fat. Bears can consume up to 20,000 calories a day, so they select the best foods to maximize foraging efficiency, and residential neighborhoods provide an attraction through bird feeding, deer feeding, backyard composting, commercial dumpsters, cookouts and trash day.

The most effective way to resolve the problems associated with bears is to prevent them in the first place. “An ounce of prevention is worth a pound of cure” is a simple philosophy that will essentially eliminate the majority of these problems. I encourage people to restrict supplemental bird feeding to the winter period of November – April and clean up all residual feed from site upon removal of feeders. As an alternative, there are many annual and perennial plantings that will enhance your property as well as providing a natural food source for birds without attracting bears. Providing water such as birdbaths will also attract birds. Just as wild deer do not need supplemental feed during winter, birds have done just fine for millions of years without our seed. Another way to reduce the likelihood of a conflict with a bear is to keep garbage secured in your basement or sturdy shed until the morning of trash pick-up. Backyard composting should be contained and not include meat scraps or melon rinds. Pet owners should not leave pet food outside. Dogs should eat in the morning before you leave for the day. Those camping or having a backyard cookout are advised to take a little extra time to scrape clean the cooking grate, remove all food wastes and store food in the trunk or away from and downwind of the tent.

Another consequence is the greater probability of physical contact between the bear and people. Black bears are not normally aggressive toward people. They have evolved in wooded habitats that allow for escape up a tree versus a fight. Despite this, they are large, powerful, fast and not always predictable, as is the case with all wild animals. All wildlife should be observed from a respectable distance. All bears have a personal space that, if entered, could elicit a charge or attack.

Interaction with wildlife can and should be a positive interaction. Considering the size of the population and the extent of their range, the number of nuisance bear complaints is small, but there is much room for improvement. As development forces people and bears to share more habitat in Region A, our continued role in management of the population and more public tolerance through adherence to the above recommendations, will enable people and bears to coexist.

*--Scott Lindsay, Assistant Regional Wildlife Biologist*



## **REGION B – SIDNEY**

### **Using the Nuisance Bear Database for Tracking Bear Problems**

One of the most important issues in dealing with the management of a wildlife species is having good, reliable information about the factors affecting that species. One piece of information that is essential to managing a wildlife population is having an understanding of how different mortality factors impact that population. In Maine, many people and organizations encounter bears through hunting, trapping, viewing, and sometimes as a nuisance problem. This makes having a standard way to record information about these encounters vital. All hunters and trappers, who take a bear during bear season, must register or “tag” that bear at a check station. This gives us information on the legal harvest, or take of bears by licensed hunters and trappers. IFW regulates the legal harvest through our rule-making processes. In addition, we have a reporting process that is used by law enforcement officers who respond to vehicle collisions with bears as well as deer, moose, or turkeys. The forms filled out by these officers provide a record of the bears that die as a result of motor vehicle accidents. Finally we track nuisance bear complaints and the fate of the bears that are involved. Information on nuisance bear problems can provide us with an index to changes in the bear population or to changes in people’s attitudes towards bears. The Department also uses this information to identify individual problem bears, locations experiencing problems with bears, and for setting management goals.

Our policy is to inform the general public, beekeepers, and farmers on how to avoid problems. Once we receive a report of a nuisance problem, we start by suggesting measures to secure property and livestock, clean up food sources, and utilizing deterrents such as electric fencing. The next step might be to use volunteers and their hounds to “run” the bear, thus chasing it away. Should that not be an option, trap and relocation first, and then finally lethal removal is considered. The Department’s goal is to step down through the options to resolve the problem. The preference is to use education of landowners and regulated hunting to keep the bear population in check, thus minimizing nuisance problems. A new database, which was implemented this summer tracks each step of the nuisance complaint and how it is being handled. This enables us to make sure each complaint is addressed and lets us know what the outcome is of each encounter.

In order to have hunting or trapping seasons on a species we must ensure that mortality doesn’t exceed recruitment. The Maine black bear population is increasing. The Department continues to gather information that tracks the status of the bear population. This data is used in our management system to ensure a bear population exists that is able to provide opportunity for regulated hunting and trapping while minimizing conflicts with other land-users.

*--Jim Connolly, Regional Wildlife Biologist*

## **REGION C – JONESBORO**

### **Downeast Bear Problems**

Regional wildlife biologists and district wardens in downeast Maine (Region C) probably receive more bear complaints annually than any other part of the State. Being a region, which is sparsely populated, except for human population centers in Brewer, Ellsworth, and Bucksport, one might expect a minimum number of human-bear conflicts, especially to the east in Washington County. The opposite is true. While we have our fair share of residential and other types of human-bear conflicts, the high volume of complaints is related to the fact that Washington County annually produces over 80 percent of the world’s supply of low-bush blueberries cultivated by both commercial and private growers.

Low-bush blueberries are an intensively managed agricultural crop that are grown on open, relatively flat, well drained fields; or in the case of commercial holdings, expansive barrens which are hundreds of acres in size. These lands are managed to maximize crop yield, and are, in effect, a monoculture. Intensive practices are focused on eliminating competing plant species as well as insect and fungal pests. Extensive irrigation systems have been developed on many of the barrens to assure adequate water supply for full development and swelling of berries just prior to harvesting. The result is vast acreages of land that transition from green to a dark blue color in August as lush, ripened berries dominate the ground cover over a significant portion of the landscape.

The evolution of intensive agricultural practices now includes the enhanced pollination of blueberry blossoms through the use of honeybees. Every spring, tractor-trailers loaded with hives make their way from southern states headed for eastern Maine. It is estimated that 45,000 hives were brought into the state this past spring. One of the major growers in Washington County alone has leased 24,000 hives for deployment on their 40,000-acre ownership. Groups of 96 hives are clustered in what is referred to as a “yard.” The numbers of established yards on a given barren, or hives in a field, is dependent on the acres to be pollinated.

One can imagine the attraction factor to bears with this massive distribution of hives; each filled with honey-laden comb in the spring when bears have only recently emerged from dens and are in need of replenishing body reserves.



Bears are as attracted to the bees and developing larvae in the hive, a rich protein source, as they are the honey. Bee yards placed close to wooded edges are more prone to being marauded by bears, and any yard established without deterrents are sure to be damaged or destroyed.

Early efforts using transported bees to pollinate blueberries did not include provisions to protect the hives. It soon became evident that with a generally expanding bear population (estimated at 28% growth statewide between 1990-1999) and learned behaviors by bears, there was an increasing problem with their attraction and movement to blueberry fields in response to the arrival of hives. The initial response of growers was lethal control. Through the efforts of regional wildlife personnel, district game wardens, and US Department of Agriculture-APHIS (USDA-APHIS) staff, the use of electric fences to protect hives became standard procedure. Other incentives to use electric fences included changes in lease requirements by beekeepers, and increasing costs to lessees for destroyed hives. But electric fencing is not foolproof. The fencing must be installed correctly and erected at the same time that the yard is established. If a bear gets a free feed, it is likely it will not be repelled on subsequent visits and will charge through a fence without hesitation. Techniques are employed to encourage contact with a bear's nose or sensitive mouth on a first attempt. With a properly installed and adequately charged fence, an initial attempt will usually result in an "educated" and repelled bear. Minimum output must be 7,000 volts with 10,000 volts preferred. Batteries need to be maintained to assure maximum charge. If a yard is hit, the hives must be salvaged if possible, the site cleaned up, and the fence and charger restored. This is an extremely labor-intensive undertaking by commercial growers and obviously constitutes a significant investment. Currently, the cost assessed for each damaged or destroyed hive is just shy of \$100. One commercial grower reports that the trend in annual losses of hives has continued to steadily increase over the past several years.

In the past, regional wildlife personnel have invested a significant amount of time in addressing these and other bear complaints, including active response to minimize the levels of lethal control. With the cooperation of USDA-APHIS, electric fencing materials have been loaned and leased, pyrotechnics have been provided, chemical repellents have been tested and supplied, and many bears have been live-trapped and relocated. The recent elimination of funding for the Department's ADC program has severely compromised these efforts. The costs to resolve nuisance problems through the use of private ADC contractors are the sole responsibility of a landowner; a reality that is likely to result in an increase in lethal controls. We have continued to consult with many of the commercial growers, and most have been very cooperative in continuing efforts that stress prevention and minimize the killing of bears. Some companies have registered qualified employees with this Department as certified ADC agents, and have live-trapped and relocated bears under our direction.

Certainly, lethal removals still occur and are likely to increase where bears are perceived to present a risk to a commercial or private grower's crop. Overall, there has been a notable change in the public's general attitude about bears downeast over the past 25 years. This undoubtedly is related to the bear's elevation in management status to that of a big game animal during this period. In fact, the black bear is the number one big game species in Washington and eastern Hancock County, replacing the white-tailed deer in attracting resident, out of state, and alien hunters (and dollars) that support many local services and businesses.

*--Tom Schaeffer, Regional Wildlife Biologist*

## **REGION D – STRONG**

### **Equipment Used to Relocate Nuisance Bears**

Every spring and summer, both regional wildlife biologists and district game wardens respond to a variety of nuisance bear complaints. Most bears exit their winter dens in April when they are at their poorest physical condition of the year. This coincides with a time when natural foods are in very short supply. Bear are opportunists and will routinely exploit easy food. When that food is a beehive, unsecured dumpster, loose garbage, or a greasy barbeque grill, conflicts between bears and humans can occur.

Bear complaints associated with agricultural damage can be complicated. Bears that develop a habit of destroying crops or livestock often need to be caught and moved, hazed (chased off with hounds), or lethally removed. Cornfields can't be fenced and not all livestock can be put in barns. In these circumstances, culvert traps can be effective tools to both capture and safely transport bears to where they are less likely to cause problems. As their name implies, these traps are made from short sections of metal road culverts, 3-5 feet in diameter, and about 6 feet long. A sliding door is on the top-front of the culvert entrance. A trigger to which bait is attached is inside and to the rear of the walled off end. The bear enters the culvert and goes to the bait at the far end. Grabbing the bait triggers the door, positioned on tracks above the opening. It slides down with a quick thud, trapping the bear inside. Most of our culvert traps are mounted on boat trailers for easy hauling to both the set-up and release sites.



A bear captured in a culvert trap poses little danger to the handler or anyone who ventures near. Additionally, both the process of live trapping and transportation is fairly easy on the bears. They can be handled without drugging, unless it is necessary to ear tag an individual. However, there are downsides to live-trapping bears. First, moving bears is labor intensive. It is necessary to take the bears about 60 miles (straight line) away from the problem site in order to minimize the chances of their return. It can take all of a day to handle one bear if dirt roads are the primary route. Second, it is very important to relocate a problem bear where it is least likely to become a problem for someone else. Third, though sows with cubs are very wary and may not enter a culvert trap, and it is important to avoid splitting up a family group. This consideration sometimes makes hazing with hounds a better option.

Maine wildlife biologists who capture bears for study usually use foot snares. A foot snare has a loop of cable at the business end and is attached to a tree at the other. The loop is placed flat, over a carefully crafted depression and supported with small sticks. The loop is covered with fine, natural material. Bait is placed leading to and away from the snare placement. The real skill is getting a bear to place one of its feet (usually a front foot) exactly in an 8"x8" spot on the forest floor. The disadvantage of foot snares vs. culvert traps is that bears must be chemically immobilized and put under anesthesia in order to be released from the snare and handled. It takes far more skill to catch a bear in a foot snare vs. a culvert trap, and every bear must be drugged. However, bears that have graduated from Culvert Trap University may be too wary to catch again in the same manner. And seriously, some bears are smarter than the average bear and just won't enter a culvert trap. For them, foot snares are the other practical live-capture alternative. Unlike culvert traps, foot-snares cannot be used where people may intentionally or accidentally get near a trapped bear.

Live-trapping and moving bears can resolve bear-human conflicts while at the same time conserve the bear resource. Often the effects are more temporary than long-term. Alternatively, getting humans to change their habits is easier than getting bears to change theirs. Elimination of food attractants is always the best bear proofing remedy for home and property owners because it dissuades both the current bear as well as future bears from becoming unwelcome visitors.

*--Chuck Hulsey, Regional Wildlife Biologist*

## **REGION E – GREENVILLE**

### **Maine Bear Hunting**

Although bears in Maine are highly valued as a big game species to hunt and to view, high bear numbers can translate to significant numbers of bear/human interactions, conflicts and nuisance situations. In 1999, a diverse public working group with representatives from the forest industry, small woodlot owners, sportsmen groups, and concerned environmentalists worked with our Department to update our black bear management system. At that time, the group voiced a clear message that we should cap bear numbers and stabilize the population at about 23,000 animals (i.e., our current estimate). To maintain bear numbers at this level, we estimate that 3,500-4,000 bears need to be harvested annually.

Extensive logging during the last several decades in northern Maine has caused a marked transformation of extensive stands of mature and over mature trees to thousands of acres of regenerating forest. These changes, frequently a result of fairly large clearcuts, have greatly improved habitat conditions for black bears. As these stands start to grow back they often go through a herbaceous stage of grasses and forbs, followed by a flush of berry producing species such as blueberry, raspberry, blackberry, pin cherry and bristly sarsaparilla. In addition, ants, another preferred food of bears during mid summer, often colonize remaining woody debris. Since 1990, we estimate that bear numbers have increased in Maine by nearly 30 percent.

Since 1999, we have harvested about 3700 animals each year in Maine. The composition of the bear harvest by method has been about 78% by bait hunters; 10% by hunters using trained bear dogs; 10% by deer hunters who opportunistically harvest a bear; and roughly 2% by trappers. As wildlife managers, we are fortunate that the demand for hunting bears in Maine remains high, especially by those using bait. This technique in particular is critical as a tool because much of the "bear woods" in Maine is extremely thick forestland where visibility is poor and frequently limited to less than 100 feet. Although bears in Maine are still revered by many, both from away and at home, as one of our treasures and symbols of the wild, significant annual hunter harvests are necessary to keep the population at tolerable levels.

*--Doug Kane, Regional Wildlife Biologist*

## **REGION F – ENFIELD**

### **Chemical Immobilization of Black Bears and Other Wildlife**

People often believe that when a large, potentially dangerous, wild animal wanders into centers of human activity, wildlife biologists, wardens, or police can easily grab a dart gun, dart the animal, and move it back to "the woods". Various media create the misconception of the relative ease of such action, most likely resulting from editing videotape or staging of events. The reality of chemical immobilization of free ranging wildlife is much different from the perception.



MDIFW's chemical immobilization protocol provides for training, as well as procedures and policy that guide the highly specialized task of chemically immobilizing free ranging wildlife. Within our protocol, anyone handling a remote delivery dart gun must be trained in their use; trained in handling of immobilizing drugs, including personal safety, dosage calculations for wildlife species, drug effects on wild animals; and they must be currently certified in First Aid and CPR.

Periodic training and certification is required for wildlife biologists conducting immobilization tasks. Maine Wildlife Biologists, currently certified to chemically immobilize wildlife, recently attended a two-day training/refreshers session in June 2004. Safe Capture International presented the training session. Keith Amass, Doctor of Veterinary Medicine, was the lead instructor. Safe Capture International has trained over 5,000 professionals on three continents. A comprehensive 110-page training manual was covered during the training session, and given to each biologist taking the course. In addition to the Maine biologists, professionals from other state and federal agencies and non-governmental organizations attended the training course.

Dr. Amass explained the various factors that influence the outcome of chemical immobilization (e.g., crowd control, stress of capture, condition of the animal, and weather and temperature conditions). Considerable time was spent discussing drug characteristics, the loading of darts, monitoring immobilized animals, and procedures for dealing with animal and human emergencies. Perhaps the most enjoyable event for participants was the live fire training where biologists had the opportunity to practice with a wide range of dart rifles, pistols, and blowguns.

Additionally, under MDIFW's protocol, Department personnel are not to respond to requests for assistance to capture domestic livestock, or native or exotic species held in captivity. All equipment must be inventoried and stored in a secure location. Accurate records must be maintained and inspected periodically. To provide adequate time for the wild animal's system to eliminate any drug residue, no chemical immobilization occurs within a time frame specified by the veterinarian of any open season on that particular wildlife species.

The primary issue when confronting a situation involving a wild animal is safety - safety for the public, safety for the wildlife biologists conducting the immobilization, and safety for the wild animal being immobilized. Here is a typical scenario from my experience:

We get a call from the police department; a black bear is roaming downtown, and is currently in a tree in a backyard. I contact my assistant, gather my equipment, load my truck, and drive to the site, which might be up to 80 miles or more from my location. When I arrive; there are 75 or more interested bystanders, police, and news media, interested people - people wanting to help.

The bear has been excited and is stressed from the unusual human contact. So the drugs may not work as well, due to the physical and mental state of animal. The bear probably is also somewhat dehydrated, and may act unpredictably.

If the scene is determined to be safe enough, the next step in the process occurs. The animal's weight is estimated, a drug dosage is calculated, and the delivery system is prepared for loading. Now to deliver the dart to the best spot on the animal, preferably in large muscle mass to protect the animal and have rapid drug induction. The animal tends to shift around a lot, making the shot difficult. I have to keep in mind the background behind the animal in case of a missed shot. I also have to anticipate where the animal may fall when it comes out of the tree and prepare a safe landing spot.

All of the components of the dart delivery system need to work properly to get the full dose of the drug into the animal in the selected spot. The drugs we use don't immobilize wildlife immediately. It takes typically 4 to 6 minutes for a calm animal to become immobilized (induction of drug). The induction time may increase substantially due to the physical/mental condition of the animal. What happens after the animal is darted can be highly unpredictable. The animal may not have received enough drug to immobilize it. Consequently, the animal may bolt from the tree, attack me, or run a great distance, into water, a crowd, or a busy highway. Or, the animal may stay in the same spot and eventually fall from the tree.

Once the animal has been immobilized, we monitor its physical condition. We are responsible for that animal's well-being and life. It cannot protect itself from other animals or the elements, such as the sun, or drowning in a brook or lake. We need to monitor its condition from the moment the drug is administered until the animal is fully recovered. Animals may become overheated or too cool very easily while immobilized because the drugs interfere with an animal's ability to regulate its own temperature. We have to be prepared to handle basic medical emergencies should they occur.



Our care of the animal extends to its transportation. Moose and deer, for instance, have to be kept upright on their sternum otherwise they risk becoming bloated. A safe release location needs to be identified, and the animal requires monitoring until fully recovered from the effects of the immobilization. At the end of the immobilization procedure, complete and accurate records of all activities associated with the immobilization are sent to our Bangor office.

In summary, chemical immobilization of free ranging wildlife is a highly complex, specialized skill, requiring extensive training, practice, and record keeping to be safe and successful. Chemical immobilization of free ranging wildlife is almost always a tool of last resort, due to the number of risks involved. The risks to public safety, safety of the biologist, and safety of the animal being immobilized must be evaluated before any chemical immobilization procedure occurs. If any of these risks are deemed too great, the animal needs to be handled in some other manner.

*--Buster Carter, Regional Wildlife Biologist*

## **REGION G - ASHLAND**

### **Northern Maine Bear Problems**

Black bears are prevalent throughout the 4.2 million areas within Region G, with all potential black bear habitats being fully (or nearly fully) occupied. The landscape is unique with about 75% of the region designated as industrial timberlands within unorganized territory, and 25% within organized territory having some form of municipal government. Land use within organized territory is primarily centered on agriculture in the form of potatoes, grain crops, flax, broccoli, and canola.

Maine bear populations have increased 28% since 1990, and as a result bears and people are coming into contact with each other more frequently. It is not unusual in the early spring of the year to travel the back roads within the region and note numerous bears feeding roadside. Although, the department promotes public tolerance with bear, the challenge is educating the public on how problems with bear can be avoided before conflicts occur.

Bears have an excellent sense of smell, and will naturally investigate food odors and many different types of food. The majority of bear problems throughout the state revolve around food and odors, which may be agriculturally produced as in crops, or promoted through everyday situations, such as garbage, bird seed and suet, pet foods, compost piles, and grease on barbecue grills. In the North Country, with considerable agriculture, the regional office receives very few complaints about bears in oat or wheat fields, which are both highly desirable food sources. Potatoes, flax, broccoli, and canola are rarely touched by bear, but may be desirable to other wildlife species. The reason the biologists hear little about bears in grain crops, is due to the fact that the problem is "out of sight", quite simply if no one observes the problem, it never gets reported. On the other hand, when bears come in close contact with people, around residential locations, problems arise.

Most bear problems start occurring in spring when bears are emerging from their dens and start visiting places where they have historical knowledge of food from past feedings. These learned behaviors are strong and are passed down to new generations year after year. Places most often visited may be beechnut trees where remnants of nuts from the past fall remain under the leaf litter, or perhaps the local dumpster, or garbage can. Another time that bears tend to get themselves into problems is during breeding season in June and July when male bears tend to roam more in search of mates, and young males are dispersing to new territories and often wander into camps or residential areas. By keeping artificial foods away from bears during these times of increased travel, many problems may be avoided. Bear complaints tend to drop off during early summer once berries ripen and the natural food supplies are more nutritious and available.

In the past, the regional staff moved large numbers of nuisance bears, but moving a bear does not address the problem. If the problem is not fixed, other transients will move into the vacant site to take advantage of the food source, and bears that are moved may return to become a problem bear once again. So what's the solution? The solution to most bear problems is to remove the source of attraction before conflicts occur.

Here are a few points to remember about Black Bears to avoid conflicts. Most important is to minimize or eliminate the chances that bears will get into garbage or become a problem in an area.

- ♦ Do not allow bears access to garbage. Store garbage inside buildings or place in plastic bags while in camp, until the day of garbage pickup or you leave camp. Keep all garbage cans and sites clean, by washing with bleach, ammonia, or Lysol solution each week.
- ♦ Never feed bears under any circumstances.



- ♦ Clean up or burn off outdoor grills after each use. Never pour used cooking grease outside of camp.
- ♦ When leaving camps, make sure all foods, and materials that have strong odors are stored in airtight containers. Store meat scraps in refrigerator or freezer until the day of garbage pickup, and seal in plastic bags before disposal.
- ♦ Do not leave dirty diapers or diaper pails outside.
- ♦ Never put meat or leftovers in your compost pile.
- ♦ Never leave pet food outside; even an empty dish can attract bear.
- ♦ If bears have visited bird feeders, discontinue feeding birds for 2-3 weeks, and clean up waste seed under feeders.
- ♦ Dumpsters should be retrofitted with heavy metal locking lids to make them bear proof, while offering a sliding door with latches on the side.
- ♦ There are presently no repellents that are registered for use on bears. Some bears are deterred by ammonia or other strong disinfectants that are sprayed on garbage which mask the odor of the food. Tabasco sauce or Cayenne pepper are reported to have positive results deterring bear when sprinkled around an area. Camphor disks (available from some drugstores), mothballs, air fresheners, Lysol, and ammonia-soaked rags have all worked to deter bear from garbage cans.

Whatever is done, it is best to implement these actions as soon as the problem starts, or better yet, before the problem begins. Remember, a little prevention requires much less effort than dealing with the bear problem.

*--Rich Hoppe, Regional Wildlife Biologist*

## **BUREAU OF PARKS AND LANDS**

### **Beechnuts and Bears**

Northern hardwood stands, of all age classes, provide food and cover for many species of resident and migratory wildlife. Mature northern hardwood stands are particularly valuable, for they contain nut-bearing beech trees that provide an abundant late-fall food source for many birds and mammals. American beech (*Fagus grandifolia*) is the predominant nut-producing tree in the interior forests of Maine.

In seasons of abundant beechnut crops, the nuts are a primary component of the diet of many species, including: black bear, white-tailed deer, squirrels, pine marten, microtine rodents, and ruffed grouse. Maintenance of mature, nut-producing trees in hardwood stands will enhance the survival and reproduction of these species and will benefit species such as pine marten and fisher, which prey on rodents.

Research has demonstrated a strong relationship between the abundance of beechnut crops and cub production by black bears in northern Maine (McLaughlin et al., 1994, McLaughlin, 1998). In much of northern Maine, bears do not have ready access to agricultural crops, and beechnuts are the primary source of late-fall food (Hugie, 1982, Caron and McLaughlin 1983). Here, the winter weight of female bears and their production of cubs is strongly correlated with beechnut abundance. In a fifteen-year period, 124 of 132 litters of cubs (ninety-four percent) were produced following abundant beechnut crops. When beechnuts were scarce, female bears gained less weight, entered winter dens earlier in the fall, and rarely produced cubs.

American beech (*Fagus grandifolia*) is generally susceptible to the insect/disease complex known as beech bark disease (BBD). The small, sucking scale insect (*Cryptococcus fagisuga*), introduced through Halifax, Nova Scotia about 1890 punctures the smooth bark of beech trees to feed on thin-walled inner bark cells. *Nectria* fungus organisms subsequently invade these physical injuries. The tree's defense mechanism is to wall off or compartmentalize the injury, which produces the classic lesions on the bark. Often either the insect or the fungus does not reach the cambium layer. Consequently, many tree boles show outward signs of the disease, such as raised circular lesions and blocky bark, but their growth and survival is minimally affected. However, if significant portions of the cambium layer are killed by the fungus serious growth loss, decay, internal defect and eventual death may occur. Sunken lesions and large dead patches of bark indicate significant cambium mortality (Burns and Houston, 1987). Infected trees may produce abundant "stress crops" of beechnuts, but they are often sterile.



The long-term goal of beech management for mast is to encourage landowners to recognize the importance of beech to wildlife and to commit to managing a portion of their land to provide sufficient beech mast to help support current wildlife populations. Landowners can accomplish this by employing the principles of sustained-yield management to ensure that adequate numbers of sapling and pole-sized beech are present in the current stand to provide sawtimber-size, mast-producing trees in the future

Beech can be managed under both the even-aged and uneven-aged silvicultural systems. Uneven-aged management is highly preferred because this system can continually maintain a component of beech of a size and age capable of producing mast. Beech mast exceeds all other mast as a high-octane food for wildlife; therefore more beech is better. Retaining mature, full-crowned, mast-producing beech trees in the residual stand following timber harvesting will ensure that beech is a viable component of northern hardwood stands. To maximize wildlife values, landowners should dedicate as much growing space to beech of good form and vigor as their overall goals will allow.

This article was adapted from *Beech Management Guidelines for Mast Production* edited by the author.

--Joe Wiley, BPL Biologist

## **LANDS MANAGEMENT PROGRAM**

### **Accomplishments and Plans**

Traditionally, directed activities on the department's Wildlife Management Areas (WMAs) have consisted of maintaining existing developments and structures while planning and implementing habitat diversity projects to benefit wildlife. Division biologists are quietly working behind the scenes advancing the three WMA objectives: Provide the highest quality upland and wetland habitat possible, promote public recreational use compatible with specific plan goals and demonstrate sound habitat management techniques suitable for small and large private landowners.

Most development and structure maintenance in recent years has been limited to activities imperative to WMA operation, such as dam maintenance and bridge and road repair. However, many private sportsman's clubs, societies and groups have worked with Regional Biologists to develop hiking trails, ATV trails, mow fields, maintain duck boxes and even pick up illegal dump sites and other trash. With the facilitation of a department biologist, these groups bring together a collection of similar interests producing outstanding examples of multiple-use and recreational opportunities.

Three habitat diversity projects highlighted this year's Lands Management Program. Last winter's harvest operations at Lt. Gordon Manuel and Frye Mountain WMAs centered on grouse cover management. In total, 150 acres of openings were created adjacent to other distinct shade intolerant (poplar and birch) age classes to promote grouse nesting, brood rearing and foraging covers. Grouse management also enhances the uplands for a multitude of other species by encouraging an insurge of herbaceous soft mast-producing plants (mainly berries) and other forbs. Several species of birds glean insects from the developing greenery on the new forest floor openings, while small mammals and large mammals alike opportunistically seeking their favorite fare.

A spring harvest, coordinated with The Nature Conservancy's Maine Chapter at Kennebunk Plains WMA, occurred the second and third week of April. Early successional habitat was created for the Maine endangered eastern black racer snake and the locally rare New England cottontail. In a portion of the pitch pine forest, the understory was cleared and the upper canopy thinned in preparation for future prescribed burning activities. These practices are all part of a managed interface between the plains and the neighboring community, which reduces the risk of wildfire and releases large diameter trees for the benefit of both game and non-game species.

Next year is going to be very exciting for the Lands Management Program. Revenues generated from last year's habitat enhancement activities will support fifty miles of boundary line maintenance, pay for new aerial photography covering 76,000 acres, delineate timber and habitat types for half of the photographed wetlands and uplands, purchase equipment to update the Lands Program's geographical information system (GIS), and provide funding for much needed road maintenance. Further plan development has commenced on the Brownfield Bog, Vernon S. Walker, and Frye Mountain WMAs. These comprehensive plans compile compartment natural resource features enabling biologists to plan opportunities for wildlife, recreation, and habitat demonstration. Stay tuned...

--Jeff Williams, Lands Management Biologist



# WILDLIFE RESOURCE ASSESSMENT SECTION

Compared to the regional biologists, who are generalists, the Wildlife Resource Assessment Section (WRAS) is comprised of biologists who specialize in specific species or groups of species. Our work is typically done on a statewide or species range-wide level. WRAS is located in Bangor and includes 20 full-time wildlife biologists and 2 secretaries. Most of our staff is assigned to one of four groups, each with specific areas of responsibility: Bird Group, Habitat Group, Mammal Group, and Endangered & Threatened species staff.

The overall theme of the 2004 Wildlife Division Research and Management Report is black bear. The Mammal Group staff takes the lead in assessing black bear populations and habitat and in developing management plans for black bear in Maine. Our highly trained and experienced staff has been instrumental in providing bear "facts" during the debate on the referendum to eliminate some of the current bear hunting practices. Numerous presentations have been given to groups throughout Maine to provide information about our bear management program. The work of our staff trapping and radio-collaring bear has been a high profile effort over the years with many observers tagging along on these field expeditions.

While black bear have been very much a focus of our efforts this past year, we are responsible for assessing the status and trends of **many 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, a major commitment of all of our staff was to continue to support the wildlife planning process by writing species assessments, participating in the public working group process, and developing management systems. **Species assessments** describe the current status of a species (or group of species) and its habitat, and makes predictions as to where the species' population is expected to be in 15 years. Species assessments are used in the species planning process to help the public working groups establish reasonable goals and objectives. Our staff develops **species management systems** to: document how the Department will meet species' goals and objectives recommended by the public working groups; outline how data will be collected, analyzed, and interpreted; and describe what management actions will be recommended under various scenarios. To implement the management systems, we also continued to conduct wildlife research and surveys, helped collect and analyze harvest data, and provided input to season recommendations, permit reviews, etc. The rest of this report summarizes many of these activities.

This raises the question: "Where does the money currently come from to support this important 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, handguns, ammunition, and archery equipment. Other sources of money include federal Section 6 funds, Federal State Wildlife Grants (SWG), the Oil Spill Conveyance Fund, contributions to the **Nongame and Endangered Wildlife Fund** ("Chickadee Check-off"), 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. This need was also recognized in the recently submitted Management Assistance Team report evaluating the Department and the Wildlife Division. Various strategies need to be explored to provide increased funding and staffing to meet our Legislative mandates and the needs of the citizens of Maine.

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



## **MAMMAL GROUP**

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

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

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

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

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

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

**Shannon Crowley**, Bio Specialist - Coordinates field activities for the lynx research project, including field camp operations, trapping, and chemical immobilization of research animals, and assists the lynx project leader with grant writing and data analysis.

**2003-04 Contract Workers & Volunteers – Contract Workers:** Sarah Boyden – lynx project; Megan Brown – bear project; Anna Maria Easley – lynx project; Andrew Jennings – lynx project; Kendall Marden – bear project and CWD sample collection; Holly Shepley – lynx project; Adam Vashon – lynx project; Chris West – lynx project; Cameron Widdoes – lynx project; **Volunteers:** Valerie Crowley – lynx project; Jamie Haskins – lynx project; David Pert – bear project; Eric Rudolph – bear project; Lynnea Shunta – lynx project; Dana Smith – bear project; Linda Thurston – bear project; and Dan Wagner – bear project.

### **Black Bear**

#### ***The 2003 Bear Season***

The general hunting season for black bear in 2003 opened August 25 and closed November 29. 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 25 through September 20. The hound season overlapped the bait season, opening September 8 and closing October 31. The bear trapping season opened September 1 and closed October 31.

The 2003 harvest of 3,900 bears exceeded the 2002 harvest of 3,512 bears but was similar to recent harvest levels (e.g., 1999 bear harvest was 3,483, in 2000 it was 3,951, and in 2001 it was 3,903 bears). Of the 3,900 bears harvested, 3,128 were taken over bait (81%), 450 bears were taken by hound hunters (12%), 130 bears were taken in traps (3%), and 192 were taken by unreported methods (5%) (Table 1). Most bears were taken early in the season, with 3,582 bears (92%) harvested before the end of September. Bears denned early last fall, which limited the number of bears available for deer hunters. Only 76 bears were harvested by deer hunters in November, despite approximately 175,000 deer hunters being afield. The late fall harvest of bears in far northern Maine is closely tied to beechnut crops. Beech trees typically produce heavy nut crops in alternate years. When nuts are scarce bears will usually den early, sometimes before the start of the firearm season for deer. Conversely, when beechnuts are plentiful, bears delay their entry into dens and deer hunters have more opportunity to harvest bears. The late-season bear harvest usually comprises 5% to 25% of the total bear harvest.



Table 1. Number of bears harvested in Maine in 2003 by Wildlife Management District (WMD).

WMD	Method of Take				Total Harvest	Assisted by			
	Hunting with bait	Hunting with dogs	Trapping	Unknown		Archery	Guide	Residents	Nonresidents
1	249	6	3	5	263	17	253	16	247
2	193	2	6	3	204	23	187	15	189
3	187	13	2	21	223	37	165	61	162
4	256	1	0	10	267	27	229	29	238
5	193	20	2	2	217	18	189	35	182
6	278	27	6	16	327	35	225	97	230
7	109	39	9	7	164	11	118	54	110
8	164	52	33	6	255	18	177	85	170
9	128	3	3	5	139	15	82	52	87
10	186	14	1	9	210	17	164	38	172
11	311	32	5	11	359	45	244	66	293
12	135	66	16	7	224	28	92	127	97
13	48	19	9	9	85	6	47	41	44
14	77	24	7	2	110	7	78	32	78
15	47	27	2	17	93	12	31	65	28
16	4	2	0	2	8	1	0	8	0
17	48	9	3	10	70	4	27	37	33
18	208	9	4	8	229	28	117	92	137
19	130	42	5	6	183	19	132	38	145
20	4	0	0	9	13	1	1	12	1
23	1	0	1	2	4	0	0	4	0
24	0	0	0	1	1	0	0	1	0
26	20	1	0	2	23	7	6	20	3
27	46	6	1	8	61	12	14	54	7
28	78	26	5	10	119	16	67	56	63
29	28	10	7	4	49	7	20	30	19
<b>State Totals</b>	<b>3,128</b>	<b>450</b>	<b>130</b>	<b>192</b>	<b>3,900</b>	<b>411</b>	<b>2,665</b>	<b>1,165</b>	<b>2,735</b>

The number of bear permits sold decreased considerably in 2003 (Table 2). We have not documented the reason for the decrease, but note that the fee for bear permits also increased in 2003. Non-resident hunters (6,183) purchased 55% of the permits that were issued in 2003, while resident hunters (5,146) purchased 45% of the permits.

#### *Geographic Distribution of the Harvest*

Bears were harvested in 26 WMDs (Table 1). No bears were taken in WMDs 21, 22, 25, and 30 (Figure 2). WMDs 3, 6, 10, 11, and 12 had the highest number of bears harvested based on available habitat (forested land). Harvest in these WMDs ranged between 24-30 bears/100 mi<sup>2</sup> of habitat. In all other WMDs, hunters harvested less than 19 bears/100 mi<sup>2</sup> (statewide average was 14/100 mi<sup>2</sup>).

#### *Residence of Successful Hunters*

Maine's reputation for producing high-quality bear hunting is reflected in the harvest distribution by hunter residency. Visitors to Maine killed 2,715 bears (70%) of the 3,900 bears tagged during 2003. Visitors took most of their bears over bait (86%) and with the aid of hounds (11%). Maine trappers accounted for most of the trapped bears (70%).

Table 2. Hunter participation and harvest levels 1990 - 2003.

Year	Number	
	of Permits	Harvest
1990	11,803	2,088
1991	10,204	1,665
1992	10,133	2,042
1993	10,195	2,055
1994	9,991	2,243
1995	10,929	2,645
1996	10,928	2,246
1997	10,716	2,300
1998	10,871	2,618
1999	12,542	3,483
2000	12,811	3,951
2001	14,036	3,903
2002	15,252	3,512
2003	11,331	3,900



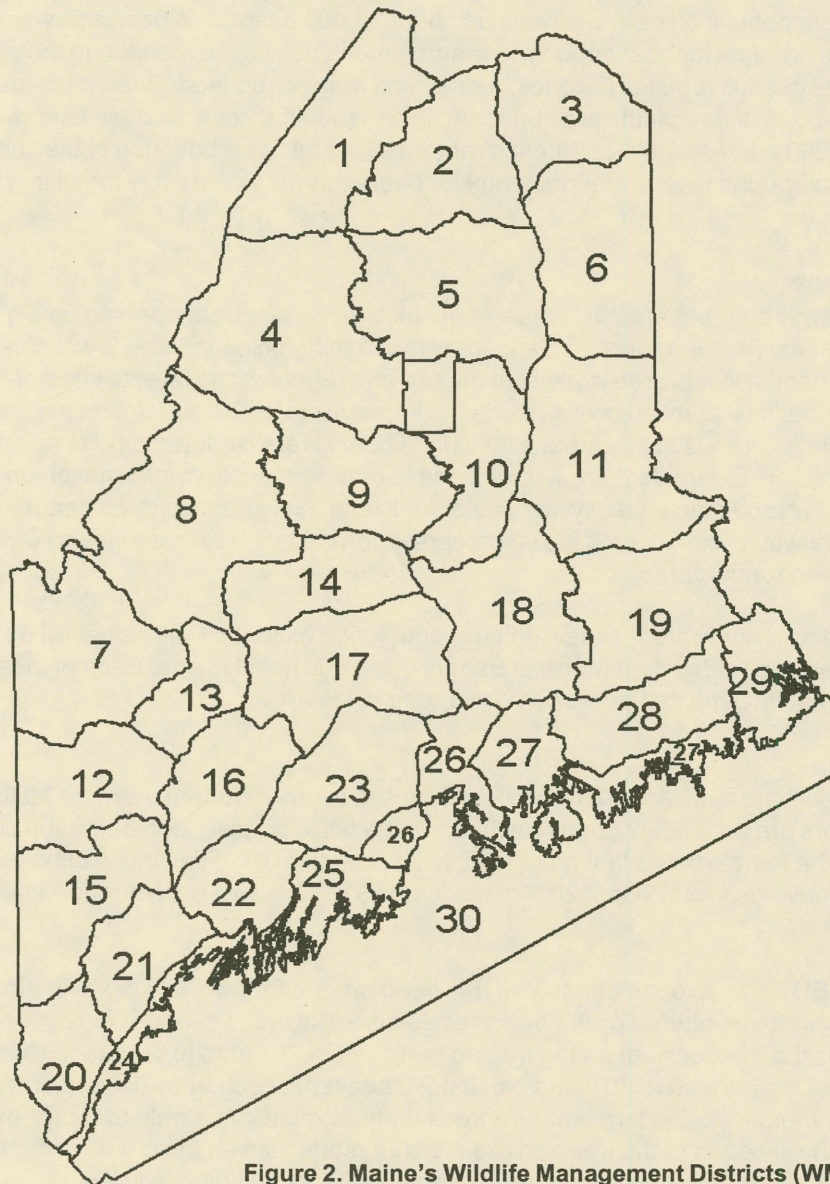


Figure 2. Maine's Wildlife Management Districts (WMDs)

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

Maine guides are most frequently employed by out-of-state hunters wishing to hunt bears over bait or with hounds. In 2003, 78% of bears shot by hunters using hounds, 73% of the bears harvested over bait, 38% of bears taken in traps, and 4% of the bears harvested by unreported methods (mostly deer hunters) were taken by hunters assisted by registered Maine guides. Overall, guides assisted 226 residents and 2,439 nonresidents with their successful hunts in 2003.

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

Males made up 54% (2,132 bears) of the 2003 harvest. Adult bears accounted for 93% (3,637 bears) of the 2003 harvest and age was not reported for an additional 14 bears (<1%).

#### ***Prospects for the 2004 season***

The dates of Maine's bear seasons vary little from year to year, since the Department adopted a generic bear season framework. However, if bear management concerns are raised, the Department has the option to change the lengths of hunting or trapping periods. In 2004, the season will remain similar to those in recent years. Under our current bear season framework, the season begins on the last Monday in August and closes on the last Saturday in November. However, in some years the season is one week longer based on when the last Monday in August falls in the calendar; during 2002 and 2003 the season was 14 weeks. In 2004, the general season for bear hunting will return to a 13-week season; opening on August 30 and closing on November 27.



Maine's spring 2003 bear population estimate remained near 23,000 bears. The harvest levels experienced since 1999 do not appear to pose a problem for bear population management, but we are monitoring the survival of adult female bears closely. If survival of adult females declines, restrictions may be required. Beechnuts may be abundant in the woodlands of Maine in 2004. If beechnuts are abundant, bears should enter their dens later, which should increase the late season harvest in 2004. Interest in bear hunting may increase this year because of the coming bear referendum. The higher interest in bear hunting and later den entry for bears this fall would likely result in a harvest exceeding 4,000 bears.

### ***New Bear Study Area***

During the spring and early summer of 2004, Department biologists were busy opening up a new bear study area in downeast Maine. The study area is located in Hancock and Washington counties in townships T29 MD, T30 MD, T35 MD, and T36 MD. The habitat in this area is a mix of mature and regenerating forests interspersed with blueberry barrens. Biologists felt that this study area was needed to improve statewide and downeast bear population estimates and to track bear population trends in this area. A total of 66 bears were captured using bait and foot snares. Radiocollars were placed on 25 females. We will track these females to collect information on cub production, cub survival, and age of first reproduction. Ideally, we would like to use these radiocollared bears to obtain a population density for this area. We would like to thank the volunteers, International Paper, and the many other people who helped get this study area up and running.

With the addition of the new study area, statewide bear population estimates will be based on data from 3 study areas: Spectacle Pond (near Ashland), Bradford (north of Bangor), and downeast Maine. Each of these study areas is representative of a different habitat type that bears commonly use in Maine.

### ***Beech Bark Disease***

The management of beech trees in Maine's forests continues to be an important issue for Maine's northern bears. In far northern Maine, bears are dependent upon beechnuts in the fall to prepare for hibernation and cub production. Approximately 80% of the female bears that are available for breeding, will give birth to cubs during winters following a good beechnut crop. Conversely, only about 20% of the females will produce cubs during winters following poor beechnut crops.

Beech bark disease (BBD) is an exotic disease that has been around for over 100 years in the northeast. The disease results when bark, attacked and altered by the beech scale insect, is invaded and killed by fungi. The fungi can eventually girdle and kill the tree, or weaken the tree so that its trunk is prone to breakage ("beech snap"). Beech trees do not produce nuts until they are 40 to 60 years old. If not diseased, beech trees live hundreds of years and produce many nut crops. Unfortunately, it's the large mature trees that are most vulnerable to attack by scale insects and BBD. The disease shortens the life span of the tree and reduces nut production as the crown of the tree dies back. Thus, BBD can have a direct effect on the amount of nuts available for bears and other wildlife.

Perhaps the most challenging aspect of BBD is what it does to the composition of the forests that are commercially harvested. Beech trees produce root suckers in high numbers when the parent tree is removed or the roots are damaged (such as may occur during logging operations). Because many beech trees will succumb to BBD before they reach merchantable size, timber companies are inclined to remove these trees, at an early age, to make room for other more merchantable species. This practice, of course, reduces the number of trees that might have escaped the disease to produce beechnuts for wildlife. It also can backfire and produce "beech hell" or dense thickets of beech that are not easy to get rid of. Techniques need to be developed to identify resistant trees so that they can be left on the landscape to provide food for wildlife. In addition, leaving more resistant trees in commercial forests may eventually reduce the amount of unmerchantable beech on the landscape that competes with other tree species. Finally, biologists need to determine the number of nut producing trees that need to be left on the landscape to support bears and other wildlife species, and work with foresters to develop beech management guidelines.

### ***Issues in Bear Management***

Management of Maine's large bear population provides a range of benefits to residents, as well as visitors to the state. Maine's tradition of bear hunting is a recreational activity that supplies successful hunters with excellent table fare and memories of days afield. It also drives a guiding and outfitting industry that helps support rural economies. However, abundant black bears, as they search for food, may often come into conflict with people by damaging agricultural crops, beehives, and personal property. The Department works with landowners to remove attractants that may lead to bear nuisance problems, but also needs to manage bear populations to minimize these problems. Our current bear management goal, which is determined by a public working group, is to maintain the bear population at its current level.



The Department requires the full range of hunting options to achieve this goal and to reduce human conflicts, keep the bear population healthy, and provide recreational opportunity. ***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).***

--Wally Jakubas and Jennifer Vashon





## Furbearers and Small Game Mammals

Furbearers include all mammals harvested for their pelts. In Maine, these include coyote, red and gray fox, bobcat, fisher, marten, raccoon, skunk, short- and long-tailed weasels, mink, otter, beaver, muskrat, and opossum. Although Canada lynx are harvested for their pelts in Canada and Alaska, in the lower-48 states lynx are protected as a federally threatened species. MDIFW agents, or staff, tag the pelts of all furbearers, except weasel, raccoon, muskrat, skunk, and opossum. The annual number of pelts tagged (i.e., the recorded furbearer harvest) is one of the primary indices used in our furbearer management systems. Some furbearers and small game mammals can be taken by hunting. Hunted furbearers include fox, coyote, bobcat, raccoon, and skunk. Small game that can be hunted includes snowshoe hare, gray squirrel, woodchuck, porcupine, and red squirrel. ***Funds for managing Maine's furbearers primarily come from the sale of hunting and trapping licenses, and from federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), and funds from Loon Conservation Plate funds.***

### 2003-2004 Fur Harvest & Hunting Seasons

Trapping for all furbearers except beaver began November 2 and ran through December 31. Maine has two trapping seasons that start earlier than the general trapping season. These are the early fox and coyote trapping season, which started October 19 and ran through November 1, and the early muskrat season (WMDs 1-6, and 9-11 only), which opened October 26 and closed November 1 (Figure 2). Last year's beaver season was lengthened in a number of WMDs and ran from November 1 through April 30 for WMDs 1, 2, 4, and 5; from December 1 through April 30 for WMDs 3, 6, 9, 10, and 11; from December 1 through April 15 for WMDs 18, 19, 28, and 29; from December 1 through March 31 for WMDs 7, 8, 13, and 14; December 1 through February 28 for WMDs 12, 15-17, and 23; December 15 through February 28 for WMDs 25-27, and 30; and January 1 through February 28 for WMDs 20-22 and 24.

Hunting seasons were as follows: October 1 through December 31 for raccoon and gray squirrel, October 1 through March 31 for cottontail and snowshoe hare (except on Vinalhaven where the season was Oct. 1 - Feb. 28), October 20 through December 31 for skunk and opossum, October 20 through February 28 for fox, and December 1 through January 31 for bobcat. Hunting was allowed year-round for coyote, woodchuck, porcupine, and red squirrel. All Sundays are closed to hunting in Maine.

**Table 3. Harvest of furbearing animals from Maine's pelt-tagging records - Fall 1998 to Spring 2004. Pelts may not be tagged when nuisance animals (e.g., coyote and beaver) are lethally removed, thus pelt-tagging records may under-represent the harvest of some species.**

Species	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Beaver	10,482	9,850	9,803	11,757	7,709	8,222
Bobcat	150	194	308	269	331	273
Coyote	1,915	1,823	1,977	2,741	2,287	2,459
Fisher	1,807	2,578	2,028	3,117	2,630	2,526
Red Fox	1,539	1,248	1,272	2,056	1,469	1,535
Grey Fox	75	82	89	164	172	196
Marten	2,160	4,396	1,832	5,529	2,908	5,088
Mink	1,519	1,545	1,606	2,031	935	904
Otter	838	737	943	1,103	803	931

### Beaver

The Department lengthened the beaver season in parts of northern and downeast Maine in 2003 to make better use of the beaver fur resource and to address beaver nuisance problems in the face of a major cutback in the Department's Animal Damage Control program. The longer season for beaver trapping (i.e., more WMDs opened in November and closed in April) did not result in a significant increase in the number of beaver that were harvested (Table 3). We do not know exactly why the longer trapping season did not result in more beaver being taken. Beaver prices were slightly above the 5-year average price of \$15.70 (Table 4), but remained relatively low compared to historical pelt prices. It could be that most of Maine's trappers only have a certain amount of time they can devote to beaver trapping or that they are only interested in trapping certain beaver flowages. Lengthening the beaver season may give trappers more flexibility on when they can trap, but it may not increase the number of beaver taken. More time is needed to determine the effect of longer seasons on beaver harvest rates.

Currently, the Department is proposing to further lengthen the beaver season. **The proposed season would run from November 1 through April 30 for WMDs 1, 2, 3, 4, 5, and 6; from December 1 through April 30 for WMDs 9, 10, 11, 18, 19, 28, and 29; from; from December 1 through March 31 for WMDs 7, 8, 13, 14, and 17; December 1 through February 28 for WMDs 12, 15, 16, 23, 25, 26, 27, and 30; and January 1 through February 28 for WMDs 20, 21, 22, and 24.** This new season would result in WMDs 3 and 6 opening one month earlier, WMD 17 closing one month later; WMDs 18, 19, 28, and 29 closing 15 days later; and WMDs 25, 26, 27, and 30 opening 15 days earlier. The Commissioner's Advisory Council will decide on whether to accept the Department's proposal later this year.



## Bobcat

The number of bobcat harvested during the 2003-2004 trapping and hunting seasons (Table 3) was lower than last year and just under the upper harvest limit (275) called for in the bobcat management system. In 2003 and 2004, trapping success continued to be high, snowshoe hares were abundant, and the bobcat population was likely increasing. High pelt prices for bobcat (Table 4) continue to offer additional incentive to trappers and hunters who wish to pursue this species. This year, trappers took 149 bobcat, while bobcat hunters harvested 124 cats.

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

Maine's bobcat management system uses trapping success, harvest rates, and snow conditions to assess the status of the bobcat population. Trapping success rates have steadily increased over the last 10 years, which likely reflects an increase in the bobcat population. Our Department proposed lengthening the bobcat hunting season by 2 weeks this year to allow hunters to take advantage of the high bobcat population. It is our hope that the bobcat population will remain high as long as there are plenty of snowshoe hare around.

**Table 4. Average pelt price offered by Maine fur dealers over the last 6 trapping seasons. Prices over \$5 are rounded to the nearest dollar.**

Species	2003-04	2002-03	2001-02	2000-01	1999-2000	1998-99	Average Price 1998-99 to 2002-03
Beaver	\$16.00	\$14.00	\$18.00	\$19.00	\$15.00	\$13.00	\$15.70
Bobcat	\$50.00	\$61.00	\$30.00	N/A	\$30.00	\$28.00	\$41.82
Coyote	\$21.00	\$20.00	\$13.00	\$14.00	\$12.00	\$ 9.00	\$13.53
Fisher	\$21.00	\$23.00	\$20.00	\$16.00	\$15.00	\$22.00	\$19.12
(Female)							
Fisher	\$25.00	\$24.00	\$20.00	\$16.00	\$15.00	\$21.00	\$19.16
(Male)							
Grey Fox	\$14.00	\$10.00	\$10.00	\$ 8.00	\$ 8.00	\$ 7.00	\$ 8.63
Red Fox	\$22.00	\$24.00	\$16.00	\$15.00	\$14.00	\$11.00	\$15.77
Marten	\$19.00	\$18.00	\$16.00	\$17.00	\$17.00	\$13.00	\$16.15
Mink	\$ 8.00	\$ 6.00	\$ 9.00	\$ 8.00	\$ 8.00	\$ 6.00	\$ 7.58
(Female)							
Mink	\$10.00	\$10.00	\$12.00	\$12.00	\$13.00	\$10.00	\$11.30
(Male)							
Muskrat	\$ 2.15	\$ 2.64	\$ 2.29	\$ 2.27	\$ 1.65	\$ 1.18	\$ 2.01
Otter	\$65.00	\$51.00	\$41.00	\$49.00	\$36.00	\$32.00	\$41.87
Raccoon	\$10.00	\$ 9.00	\$ 9.00	\$ 8.00	\$ 4.00	\$ 7.00	\$ 7.57
Skunk	\$ 2.54	\$ 2.33	\$ 3.50	\$ 2.67	\$ 2.50	\$ 2.75	\$ 2.75

## Coyote

A total of 2,459 coyote pelts were tagged (Table 3) during the 2003-2004 season. The number of coyotes tagged was similar to the number tagged during the last two trapping seasons (Table 3). Pelt prices continue to be good for coyotes this year and well above the average pelt price for coyotes for the previous 5 seasons (Table 4). This year, coyote snaring was suspended out of concern of possible conflicts between the State's coyote snaring program and federal endangered species laws dealing with incidental take. The Department is continuing with the U. S. Fish and Wildlife Service to structure a coyote snaring program that is compatible with federal regulations protecting lynx, bald eagles, and wolves.

## Fisher

Fisher harvests and trapping success, although high, have declined somewhat the past two years. We will watch this closely as it may indicate a leveling-off of the fisher population. Previously, we suspected that the fisher population had increased for about 10 years. This year's decrease in harvest occurred despite pelt prices for male fisher being above the mean pelt price for the last 5 seasons (Table 4), and a slight increase in the number of upland trappers.





## **Red and Grey Fox**

The red fox harvest was similar to last year; however, the harvest rate for their southern cousin, the grey fox, has increased dramatically the past 3 years (Table 3). Harvest rates for grey fox are now more than double what they were 4 years ago. The grey fox harvest surpassed last year's harvest, and was the second highest harvest recorded since 1980, when the state began keeping track of the grey fox harvest.

## **Marten**

Marten harvest rates fluctuate considerably each year, with high harvest rates occurring during odd numbered years when beechnut crops are poor. In contrast, low harvest rates coincide with good beechnut crops or even numbered years. Last year, this alternate year cycle of good and poor harvests was broken when the marten harvest failed to drop to its normal alternate year low (Table 3). One hypothesis for this break in the alternate year cycle is that the drought of 2001 and 2002 caused a beechnut crop failure in 2002. A beechnut crop failure would leave marten very vulnerable to baited traps and a high harvest should occur. Although the marten harvest has been high for 3 years now, the odd-year harvest rate appears to be very stable along with the number of marten caught per marten trapper. Therefore, the marten population is considered stable.

## **Mink**

The mink harvest hit a record low this year with only 904 animals being harvested (Table 3). Pelt prices for mink this year were near their 5-year average and offered little additional incentive to trappers to harvest the species (Table 4). Drought conditions in 2001 and 2002 may have affected trapping conditions for mink and other wetland species.

## **Otter**

Maine's otter harvest did not increase much from last year's low harvest (Table 3). This is surprising since pelt prices were very good for otter, often surpassing the average price being offered by Maine furbuyers (Table 4). The high pelt price being offered for otter resulted in a number of trappers targeting otter. The drought of 2001 and 2002 raises the question of whether water conditions had an effect on the otter population or on trapping success.

--Wally Jakubas

## **Rare Species Research and Management**

### ***New England Cottontail***

The New England cottontail (NEC) (or cooney) has become a rare animal in New England. The U. S. Fish and Wildlife Service recently accepted a petition to list the NEC as a federally threatened or endangered species. During the next 12 months, the status of the species will undergo further review; following which, a determination will be made on its status.

Unlike the eastern cottontail or snowshoe hare, the NEC has a limited distribution, and only occurs from southern Maine to the Hudson River in New York. The New England cottontail is Maine's native cottontail. Most of the cottontails to our south are eastern cottontails and have been introduced into New England. No eastern cottontails have been found in Maine.

The NEC lives in brushy areas that provide adequate cover. This type of habitat often develops several years after a disturbance, such as a fire, forest cutting, or the abandonment of farmland. The habitat used by NEC has a short life span; unless another disturbance occurs, brushy species are overgrown by trees and the habitat becomes unsuitable for NEC. Overall, the habitat preferred by NEC has become scarce throughout its range. Where it does occur, it usually occurs in small (less than 5 acres) isolated patches. These isolated patches of habitat make it difficult for NEC to safely move to other areas of good habitat if the patch becomes unsuitable. The decrease in available habitat has led to a sharp decline in NEC numbers in Maine and throughout its range.

In the 1950s, NEC were common in Maine and were reported as far north as Fryeburg, Lewiston, and Belfast. However, recent surveys located NEC in only 53 patches in just 19 towns (Figure 3). The current distribution of NEC in Maine is about 17% of its former occupied range.

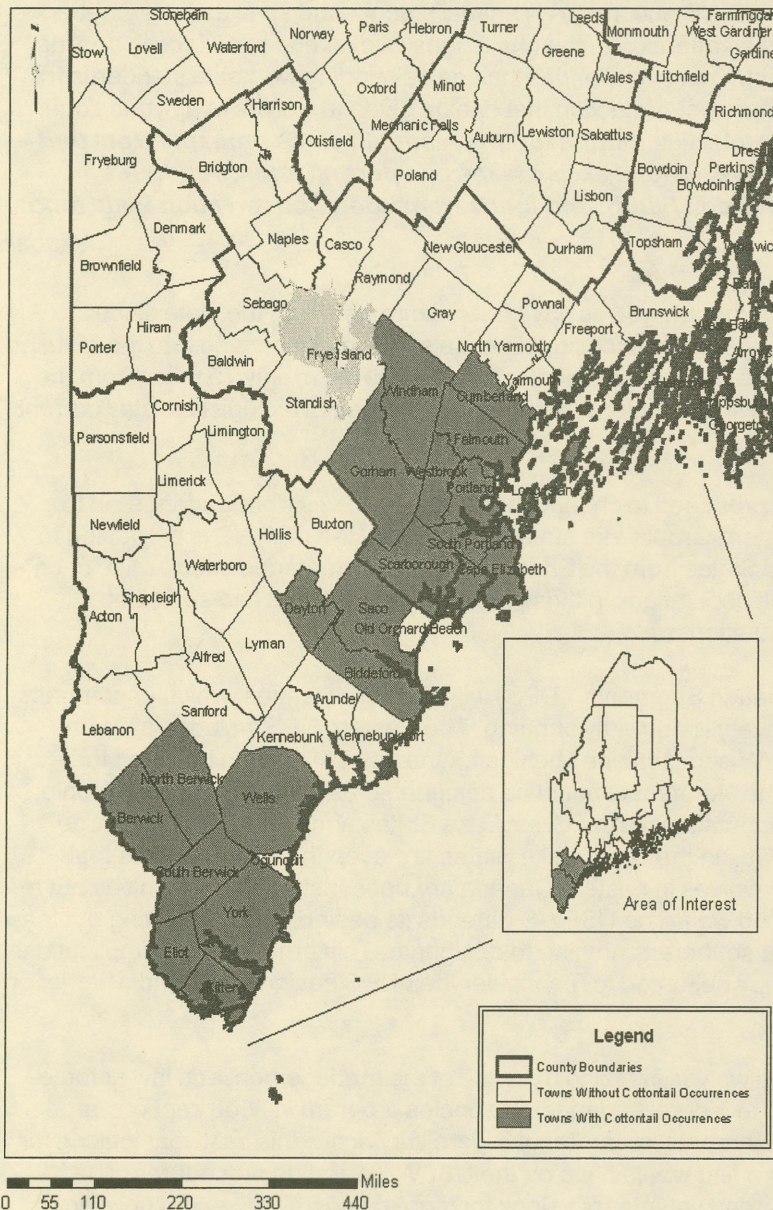
As NEC numbers have declined, hunting regulations in Maine have become more restrictive. Prior to 1999, snowshoe hare and cottontails were included in the same regulations with a 6-month season and a daily bag limit of 4 hares and rabbits, in any combination. Beginning in 1999, the daily bag limit remained 4 hares and rabbits but only one could be a cottontail. MDIFW proposed to close the season on cottontail rabbits in 2004. No change to the snowshoe hare regulations is planned.



### Tips on How to Avoid Shooting New England Cottontails

It is easy to distinguish NEC from snowshoe hare during much of the hunting season. Snowshoe hare will have patches of white fur or be all white from late in the fall until late winter, while NEC will remain brown, except for the white underside of its tail, throughout the year. However, in October and March, when snowshoe hare are mostly brown, other physical features (e.g., body-size, ear-length, foot-size) may be more reliable than color for distinguishing the two species. For snowshoe hare, the feet and ears are the first appendages to turn white in the fall and the last to turn brown in the spring.

**Figure 3. Maine Towns with New England Cottontail Occurrences**



The simplest and most effective means to avoid shooting NEC is to not shoot an all brown rabbit in York or Cumberland counties. Hares and cottontails are rarely found in the same patch, so if you do want to hunt in southern Maine during the beginning or end of the season use the following methods to avoid shooting a New England cottontail.

Pick an area that you know has snowshoe hare. If you're not sure if the area has hare or rabbits, use the following tips:

- ♦ Both NEC and hares like thick brushy areas, but hares prefer softwood cover (e.g., balsam fir) while NEC prefer hardwood cover.
- ♦ If there is snow, check the tracks. The hind foot tracks of snowshoe hare are wider than 1½" and longer than 4 ½", while the tracks of NEC are that size or smaller.
- ♦ Be alert for behavioral differences. Hares rest in "forms" or low depressions in the ground and do not use burrows. Cottontails use both forms and burrows. Therefore, if you find that the rabbits in a patch are using burrows, they are almost certainly cottontails.
- ♦ If you are uncertain whether an animal is a cottontail or snowshoe hare, hunt in another patch until the hare have turned white or you can check tracks in the snow.
- ♦ If you think you inadvertently shot a cottontail, and you are not sure, measure the length of the hind foot. If it is a cottontail, it will be less than 4 ½" long. Please report your mistake to a Game Warden and do not hunt rabbits in that immediate area.

-- Karen Morris & Wally Jakubas

### Coyote/Wolf Study

The Maine Department of Inland Fisheries and Wildlife 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. Dr. Paul Wilson, Trent University, who is one of the leading experts on wolf genetics cooperated in this effort. The original objectives of the study were to (1) characterize the types of Canis in Maine – i.e., coyotes, eastern Canadian wolves, gray wolves, or hybrids; (2) determine the geographic origin of these canids; and (3) locate historic specimens of New England wolves and determine their genetic profile. In addition to these objectives, we tested the hypothesis that wolf genes have not introgressed into the eastern coyote population. A final report was submitted to the Maine Outdoor Heritage Fund Board, who helped fund this study in February 2004.



Based on statistical analyses and estimates of ancestry, 93% (n = 100) of Maine's canids had ancestries greater than 50% eastern coyote, 22% had wolf ancestries greater than 5%, one animal had a wolf ancestry of 89%, and only 4% of Maine coyotes had ancestries similar to western coyotes (i.e., > 50% western coyote). The genetic profiles of coyote populations from Maine, New York, and New Brunswick were closely related and shared similar genetic ancestries, which included hybridization with eastern Canadian wolves. There were limitations to using genetic profiles and the physical appearance of the animal to differentiate eastern Canadian wolves from eastern coyotes, because both canid groups have hybridized. One Maine animal, with an ancestry of 89% eastern Canadian wolf, was one of the smallest canids (27lb. adult female). Canids having small body stature (< 40lb.) and having various amounts of eastern Canadian wolf ancestry were also identified from specimens collected in Algonquin Park. We identified six body and skull measurements that could be used to determine (79.6% accuracy) an animal's origin and species (i.e., Quebec wolf, Quebec coyote, or Maine coyote). This study called attention to the challenges wildlife agencies face in dealing with hybrid coyote and wolf populations in the Northeast. These challenges include developing workable standards for identifying canids in the Northeast, determining the degree of protection that can be given to wolves in a hybrid zone, and devising management plans that will provide that protection. ***Funds for this research came primarily from the Outdoor Heritage Fund; hunting and trapping licenses; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund); and funds from Loon Conservation Plate funds.***

-- Wally Jakubas

## Wolves

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

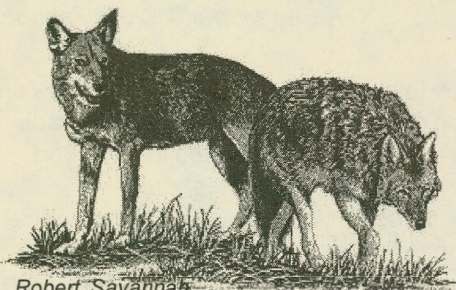
The U.S. Fish and Wildlife Service (USFWS) recently proposed to change the status of wolves from Endangered to Threatened in the northern Rocky Mountains and western Great Lake states. In addition, the USFWS is proposing to remove gray wolves in the western and eastern United States from the Endangered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

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

The Department is interested in whether or not we have wolves in Maine because of the management and law enforcement implications. Unfortunately, a lack of funds from the federal endangered species program in 2003 kept our large canid investigations to a minimum. However, non-governmental organizations were very active this past year looking for wolf sign in Maine, in part, because of the implications a find would have on the USFWS delisting procedures. The National Wildlife Federation sent out staff, contractors, and volunteers to look for large canid tracks, record howling events, and set up cameras near carcasses to take pictures of any scavenging canids. Large canid scats were also collected for DNA testing.

These tests determine the species the scat originated from by cells that normally slough off from the intestine of the animal. To date, there is no conclusive evidence that wolves are in Maine. ***Funds for administering wolf monitoring activity in Maine come primarily from hunting and trapping licenses; federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund); and funds from Loon Conservation Plate funds.***

--Wally Jakubas





## **Canada Lynx**

Historically, lynx occurred in 16 states and in Canada. Today, the stronghold of the lynx population remains in Canada and Alaska but the number of states in the "Lower-48" supporting lynx populations has dropped to 5 (including Maine). Within the historical range of lynx, surveys are being conducted to determine where lynx occur and research is being conducted to better understand the needs of lynx at the southern edge of their range.

## **Maine's Lynx Investigations**

In January 1999, MDIFW began a field study of lynx in partnership with the USFWS, several conservation organizations, and owners of industrial forestlands in northern Maine. The current study site is located in south-central Aroostook County in a four-township area near the Musquacook Lakes.

Radiotelemetry is one of the most important tools we use to study lynx. We have captured 120 lynx, including 41 adults and subadults that were fitted with radiocollars. We use the locations of radiocollared lynx to determine the size of their home ranges and the habitats types used by lynx for foraging, producing kittens, and raising young. We estimate the home range (the area an animal uses to carry out its daily activities) size for lynx to be 19 mi<sup>2</sup> for females and 35 mi<sup>2</sup> for males. Radiocollars also help us locate animals to study mortality factors and long-range movements. Our radiocollars are designed to transmit their radio signal at a different rate when the animal stops moving. This alerts us to when an animal has died, and allows us to investigate the cause of death. We use this information to determine which mortality factors are important to Maine's lynx population. To date, other predators killed 5 lynx, 9 lynx starved to death, 5 died of unknown causes, and 1 was illegally shot. Occasionally, lynx will disperse, or travel long distances outside of their home range. Only four of our radiocollared lynx have made extensive movements. Finally, radiocollars make it possible for us to locate the dens of female lynx and collect information on litter size and the condition of kittens. Female lynx establish dens in mid-May, and by mid-June, the kittens have grown large enough for us to safely examine. Over the last 6 springs, we have located 30 dens and handled 84 kittens. Litter size ranged from 1 to 5 kittens and averaged 2.7 kittens per litter. The newborn kittens are too small to carry radiocollars, but 83 of them have been marked with numbered eartags.

Lynx population levels in other areas of North America fluctuate with the snowshoe hare population – their primary prey. Therefore, we are interested in keeping track of the status of Maine's snowshoe hare population and learning more about the habitat conditions that influence their population levels. Information on snowshoe hare abundance is determined from pellet counts (groups of fecal material), which are conducted each spring on numerous permanent plots located in the study area. From past studies, we know the relationship between the number of pellets on a plot and the number of snowshoe hare in an area. We use this information to track trends in the snowshoe hare population and relate these trends to the movements and mortality rates of lynx. Graduate students and faculty in the Wildlife Ecology Department at the University of Maine, work closely with staff in the Mammal Group on studies that compliment the work MDIFW is doing on snowshoe hares and lynx.

## **Status of Lynx in the United States**

The U.S. Fish and Wildlife Service listed lynx as threatened under the federal Endangered Species Act in 14 of the lower-48 states. However, Maine, Washington, Montana, Minnesota, and Colorado are the only states, outside of Alaska, where lynx currently have resident populations. Reasons given for listing the lynx are complex and include range restrictions and habitat concerns. In some western states, lynx are associated with old growth forests at high altitudes, which are being cut for timber. Because these are high profile habitats of environmental concern, environmental groups are advocating greater restrictions on land-use to protect western lynx habitat. In the East, lynx occur on large tracts of woodlands, including areas of young regenerating forests that supply habitat for snowshoe hares. Maine's lynx are found across the northern part of the state. ***This work is supported by federal Section 6 funds, federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund), hunting and trapping license revenues, the Maine Outdoor Heritage Fund, Loon Conservation Plate funds, the National Fish and Wildlife Foundation, the National Council of the Paper Industry for Air and Stream Improvement, the Wildlife Conservation Society, Davis Conservation Foundation, Sweet Water Trust, Wilma K. Wilensky, Lynx System Developers, Defenders of Wildlife, Clayton Lake Woodlands, Irving Woodland, LLC, International Paper, and Seven Islands Land Co.***

--Wally Jakubas and Jennifer Vashon

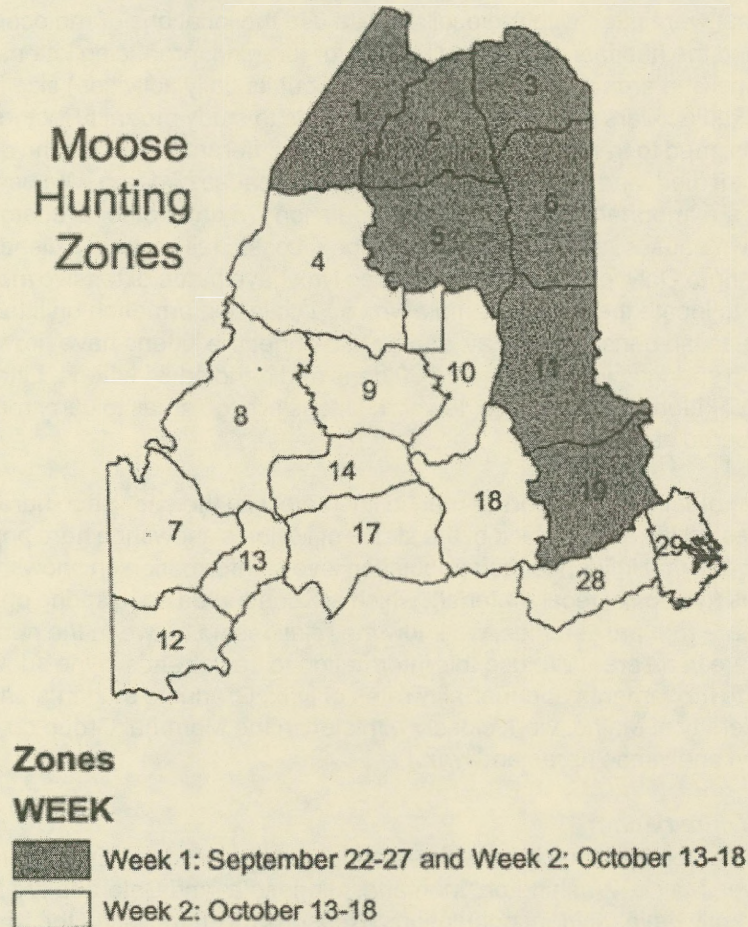


## Moose

### 2003 Maine Moose Season

In 2003, there were 19 open Wildlife Management Districts (WMDs), 2 permit types (Anterless Only and Bulls Only), and 2 seasons (late September and early October). Overall, success rate was 80%, but success rate varied from 20% to 95% for the 38 possible combinations of WMD, permit type, and season (Figure 4, Table 5). All of the WMDs that were open to moose hunting in 2002 were open in 2003. Season timing for the moose hunt was similar to the past 2 seasons. All WMDs had a 6-day season starting October 13, and the 7 WMDs that had a split season in 2002 also had a split season in 2003 (weeks of September 22 and October 13).

Figure 4. WMDs open to moose hunting in 2003.

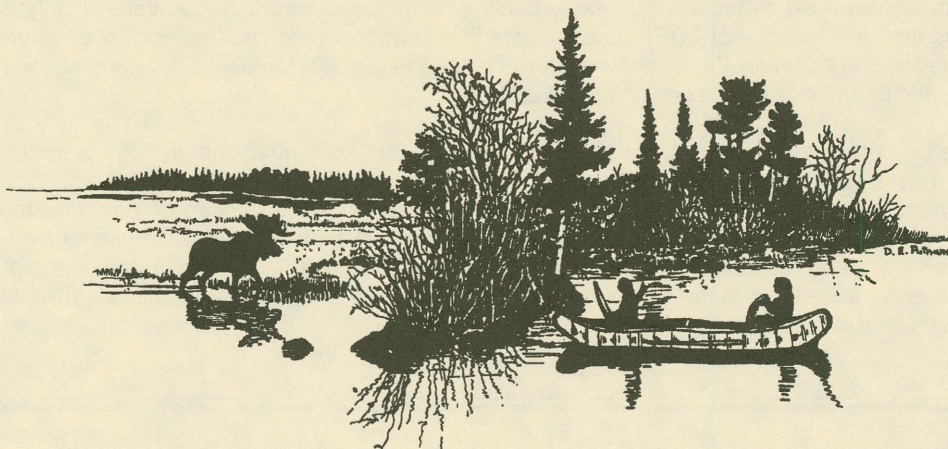


Several aspects of the moose hunt changed in 2003, including opening WMD 17 for the first time (October only hunt). Wildlife Management District 17 was opened to address the moose management goal for this WMD, which is to reduce the number of moose to improve road safety. The biggest change in 2003 was in the number and type of permits issued. This was the first year that the number of permits was reduced since the moose season was reopened in 1980. New management goals for moose called for the number of moose to be increased in the Recreation Management Area. To increase the number of moose in the Recreation Management Area (Figure 5), we needed to reduce the number of cows killed. Formerly, Any-Moose Permits (AMPs) allowed hunters to take a moose of either sex. Because approximately 20% of AMPs were used to harvest female moose, we would have had to reduce the AMP allocation to mid-to-late 1980s levels to reduce the cow kill to desired levels. This would have reduced the total permit allocation by nearly one third, thus reducing hunting opportunity. A change in permit types was needed. We needed permits that specified the sex of the moose that could be harvested to better control the number of cows that were being harvested and yet maintain hunting opportunity. In 2003, AMPs were done away with and we managed the bull harvest by a new type of permit that allows hunters to only shoot a bull (BOP = Bull-Only Permit). We retained the use of Anterless-Only Permits (AOPs) to achieve our cow-harvest goals in certain WMDs. In 2003, 2,585 hunters were issued moose permits, 2,060 BOPs and 525 AOPs (Table 5).



Table 5. 2003 Maine moose season registered kill by WMD, season, and permit type.

WMD	Season	Permit Type	No. of Permits	2003 Registrations				Total	Success %
				Bull	Cow	Male Calf	Female Calf		
1	Oct.	BOP	65	53	0	0	0	53	82
	Oct.	AOP	20	0	14	1	2	17	85
	Sept.	BOP	55	38	0	0	0	38	69
2	Oct.	BOP	50	46	0	0	0	46	92
	Sept.	BOP	40	37	0	1	0	38	95
3	Oct.	BOP	85	74	0	0	0	74	87
	Oct.	AOP	150	7	117	7	9	140	93
	Sept.	BOP	75	55	0	0	0	55	73
4	Oct.	BOP	255	200	1	1	0	202	79
5	Oct.	BOP	60	52	0	0	0	52	87
	Sept.	BOP	60	54	0	0	0	54	90
6	Oct.	BOP	115	104	0	0	0	104	90
	Oct.	AOP	140	8	96	8	9	121	86
	Sept.	BOP	105	89	0	0	0	89	85
7	Oct.	BOP	125	115	0	0	0	115	92
8	Oct.	BOP	290	254	0	0	0	254	88
9	Oct.	BOP	80	72	0	0	0	72	90
10	Oct.	BOP	100	79	0	0	0	79	79
	Oct.	AOP	10	0	7	0	0	7	70
11	Oct.	BOP	70	49	0	0	0	49	70
	Oct.	AOP	100	3	54	5	3	65	65
	Sept.	BOP	60	33	0	0	0	33	55
12	Oct.	BOP	35	29	0	1	0	30	86
	Oct.	AOP	20	1	15	1	0	17	85
13	Oct.	BOP	45	28	0	0	0	28	62
	Oct.	AOP	10	1	5	1	1	8	80
14	Oct.	BOP	35	29	0	0	0	29	83
17	Oct.	BOP	15	13	0	0	0	13	87
	Oct.	AOP	15	0	7	3	0	10	67
18	Oct.	BOP	80	47	0	0	0	47	59
	Oct.	AOP	20	1	10	2	1	14	70
19	Oct.	BOP	50	32	0	0	0	32	64
	Oct.	AOP	15	1	9	0	4	14	93
	Sept.	BOP	40	24	0	0	0	24	60
28	Oct.	BOP	45	30	0	1	0	31	69
	Oct.	AOP	20	0	11	1	0	12	60
29	Oct.	BOP	25	7	0	1	0	8	32
	Oct.	AOP		0	1	0	0	1	20
<b>Totals</b>			<b>2,585</b>	<b>1,665</b>	<b>347</b>	<b>34</b>	<b>29</b>	<b>2,075</b>	<b>80</b>





## 2004 Moose Season

The 2004 season framework will be similar to 2003 (also see text box). The early season will start on September 27 and the late season will start October 11. There will be no change in the WMDs that will be open for moose hunting. After a reduction in permits in 2003, permits will increase in 2004 (Table 6). However, the increases will only be in WMDs 3, 6, and 11, part of the road safety management area, due to citizens' requests to have the population reduced more quickly.

--Karen Morris

**Table 6. 2004 Moose Permit allocation by WMD, season, and permit type.**

WMD	BULL ONLY PERMIT		ANTLERLESS ONLY PERMIT		TOTAL	
	Sep	Oct	Sep	Oct	Sep	Oct
1	90	30	5	15	95	45
2	68	22	0	0	68	22
3	169	56	55	165	224	221
4	0	255	0	0	0	255
5	90	30	0	0	90	30
6	165	55	66	199	231	254
7	0	125	0	0	0	125
8	0	290	0	0	0	290
9	0	80	0	0	0	80
10	0	100	0	10	0	110
11	120	40	30	90	150	130
12	0	35	0	20	0	55
13	0	45	0	10	0	55
14	0	35	0	0	0	35
17	0	15	0	15	0	30
18	0	80	0	20	0	100
19	67	23	4	11	71	34
28	0	45	0	20	0	65
29	0	25	0	5	0	30
<b>Total</b>	<b>769</b>	<b>1,386</b>	<b>160</b>	<b>580</b>	<b>929</b>	<b>1,966</b>

### Brief History of Moose Hunting Regulations and Management in Maine

Maine moose hunting regulations have undergone many changes in recent years in response to changes in population status and the desires of Maine citizens. From 1985 through 2000, the moose management goal was to maintain the population at 1985 levels. Through 1999, the legislature limited the number of moose hunting permits that were issued. Although the number of permits gradually increased, the most liberal seasons allowed were not enough to keep the population from exceeding 1985 levels. In 1999, citizens concerned about the number of moose-vehicle collisions in the state presented a petition to the legislature to reduce moose numbers. The legislature responded by increasing moose hunting permits and introducing Antlerless-Only Permits (AOPs). It was hoped that the issuance of AOPs would reduce the cow population, thus lowering the reproductive potential of the population and hopefully the overall number of moose in problem areas. AOPs were issued in the NE zone (WMDs 2,3, and 6) and in the SW zone (WMDs 8 and 7).

In 2000, the Department was given authority over the moose hunting regulations. In 2001, permit allocations changed to meet new goals established by a Public Working Group. AOPs were removed from WMDs in the Recreation Management Area because the new objective was to increase rather than decrease the population. AOPs were retained and increased in WMDs in the Compromise Area and Road Safety Management Area where the population was to be reduced for traffic safety (Figure 5). After the 2002 season, it was apparent that the population was not increasing in the Recreation Management Area, and the permit allocation was changed in 2003 to reduce cow harvest further.



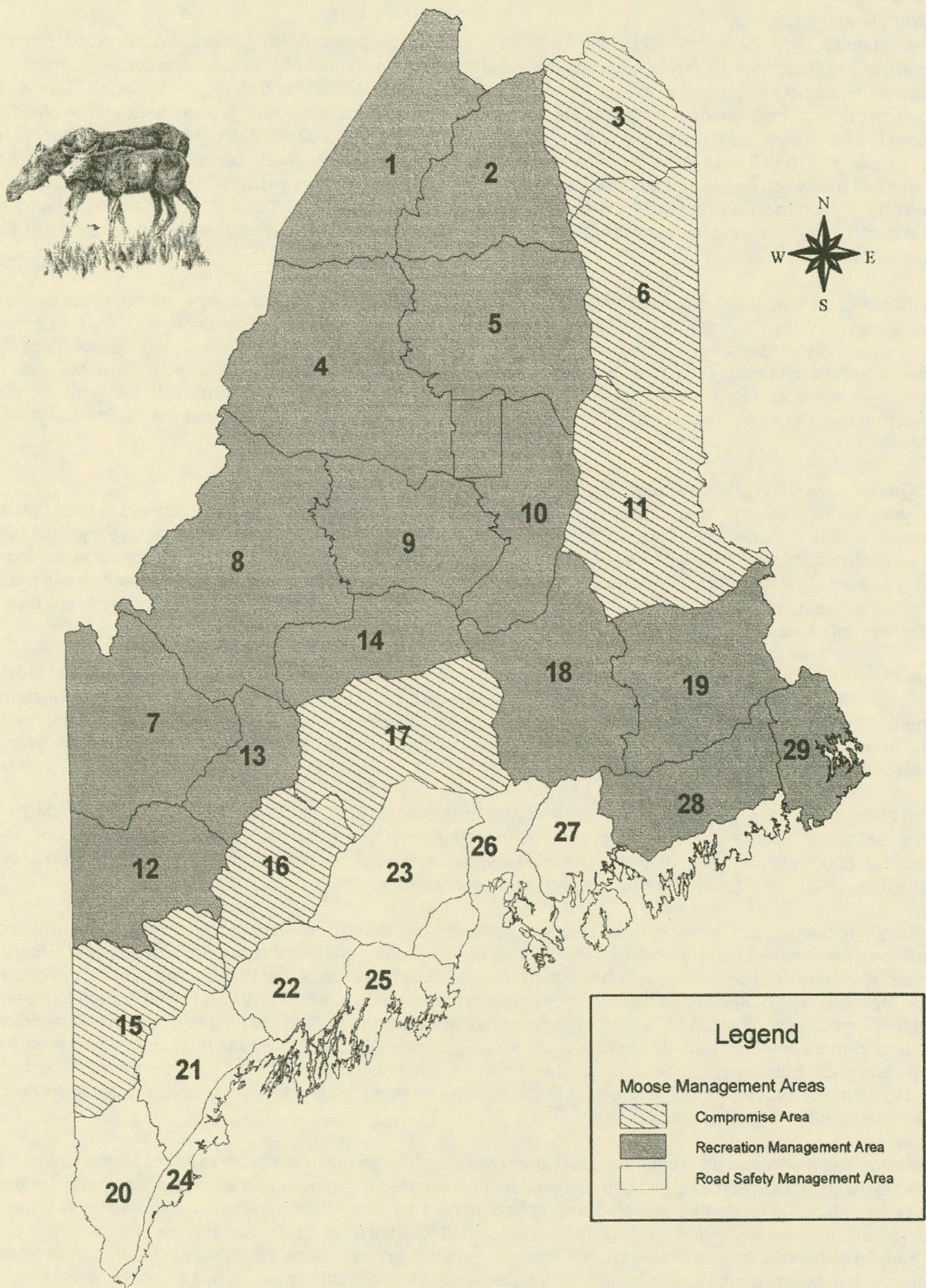


Figure 5. Wildlife Management Districts included in the Three Moose Management Areas.



## Deer

### 2003 Deer Harvest

#### *Season Dates and Structure*

Maine hunters could pursue white-tailed deer for 85 days within five separate hunting seasons during 2003. From September 6 to December 13, bowhunters could harvest an unlimited number of deer (with appropriate permits) during the expanded archery season. This limited area hunt encompassed WMDs 24 and 30 (Figure 2, page 17) and 9 other predominantly urban locations in central and southern Maine. The regular (statewide) archery season took place October 2-31 (26 days); deer of either-sex were legal quarry. October 25, 2003 marked our second youth deer hunting day. Hunters must be 10 to 15 years old to be eligible to participate in this statewide either-sex deer hunt. The regular firearms season, which began for Maine residents on November 1, and for all hunters on the following Monday (November 3), ended on November 29 (25 days). Black powder enthusiasts had 6 days (December 1-6) to hunt white-tails in eastern, western, and northern WMDs. Elsewhere; the special muzzleloader season spanned a total of 12 days (December 1-13).

Regardless of season, deer could not be hunted on Sunday. The limit on deer was one per hunter per year for the statewide archery, regular firearms, special muzzleloader seasons, and youth hunt combined. The 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. Hunters who received a bonus any-deer permit could harvest an additional antlerless deer in the designated WMD.

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

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

Generally, the number of does that can be harvested by hunting without decreasing the population increases following mild winters. The opposite situation prevails following severe winters. During 2003, doe quotas in eastern, western, and northern WMDs were kept very conservative to allow deer populations to rebuild after losses sustained in the previous winter. In contrast, more liberal quotas were set in central and southern Maine WMDs to stabilize or reduce deer populations.

During 2003, doe quotas ranged from zero in 10 WMDs (districts 1-3, 5, 6, 11, 19, and 27-29) to 2,213 in WMD 17. Among the 20 WMDs in which a doe harvest was desired, the doe quota tallied 10,295. Since any-deer permittees and archers can choose to kill a fawn (young of the year) instead of an adult doe (or a buck), we also anticipated a harvest of more than 5,800 fawns (both sexes) during the 2003 deer seasons.

Generally, 3 to 8 any-deer permits must be issued to achieve a registered harvest of one adult doe. Some any-deer permittees may choose to take a buck or a fawn instead, while a great many others are not successful in killing a deer. The number of any-deer permits we allocate in a given district is a reflection of that WMD's doe quota. Consequently, WMDs that can sustain only limited doe mortality (e.g., northern, western, eastern WMDs) are allocated relatively few any-deer permits. In contrast, WMDs that can support higher doe mortality (and still maintain herd size) are allocated considerably more any-deer permits (central, southern, and coastal WMDs). Finally, the number of does taken in our archery and youth hunts count against doe quotas. This tends to reduce the number of any-deer permits that can be issued to firearms hunters, in order to meet adult doe quotas. However, firearms season hunters typically account for 85% of total deer hunting effort and harvest.

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. Beginning in 2002, hunters could apply for an any-deer permit in up to 3 WMDs, in addition to designating one WMD for a bonus any-deer permit, if these become available.

Any-deer and bonus permits are allocated to qualified applicants in a random computer lottery. Both the application and the any-deer permits are free; bonus permits cost \$13. During 2003, we issued 71,653 any-deer and 947 bonus any-deer permits (WMDs 23 and 30). Combined, these 72,600 permits represent a 6% decrease in antlerless deer hunting opportunity, compared to 2002 (76,989 permits). Permit allocations ranged from zero in the 10 WMDs with a zero doe quota, to 15,550 permits in WMD 23. The top 5 WMDs receiving any-deer permits on a per 100 square mile basis were: WMD 23 (1,703 permits per 100 sq. mi.), WMD 24 (1,268 permits), WMD 17 (1,134 permits), WMD 22 (1,027 permits), and WMD 16 (905 permits). Maine residents drew 65,988 permits (91%) and nonresidents drew the remaining 6,612 any-deer permits (9%). A total of 10,164 any-deer permits (14%) were awarded to qualifying landowners in a separate, early computer lottery. It is worth noting that only about one-half of our resident deer hunters, and less than 40 % of our nonresident hunters apply for an any-deer permit each year. Overall, 89,219 people applied for an any-deer permit during 2003 (79,839 residents; 9,380 nonresidents).

### Statewide Statistics for 2003

Overall, 30,313 deer were registered during 2003, of which 1,751, 713, 827, 25,663, and 1,359 were taken during the expanded archery, regular archery, youth day, regular firearms, and muzzleloader seasons, respectively (Table 7). Compared to 2002, the deer take during the regular firearms season dropped by 26%, while harvest for the other four seasons increased by 19% to 50%. Total deer harvest in 2003 declined by 21% from 2002 (38,153). Poor hunting conditions (warm, rainy, windy weather), and low hunter effort during much of the November firearms season were the primary causes of the low overall deer harvest during 2003.

**Table 7. Sex and age composition of the 2003 deer harvest in Maine by season type and week, statewide<sup>1</sup>.**

Season	Sex/Age Class				Total Deer	Total Antlerless Deer	Percent by Season & Week		
	Adult		Fawn				Total	Adult	
	Buck	Doe	Buck	Doe				Buck	Antlerless
Archery	724	1,095	312	333	2,464	1,740	8	4	12
Expanded	446	807	234	264	1,751	1,305	6	3	9
October	278	288	78	69	713	435	2	1	3
Youth Day	217	332	140	138	827	610	3	1	4
Regular Firearms	14,623	6,900	2,259	1,881	25,663	11,040	85	91	79
Opening Saturday	1,433	775	253	209	2,670	1,237	9	9	9
November 3 - 8	2,960	1,724	512	479	5,675	2,715	19	18	19
November 10 - 15	3,217	1,402	513	405	5,537	2,320	18	20	16
November 17 - 22	3,652	1,181	414	298	5,545	1,893	18	23	14
November 24 - 29	3,361	1,818	567	490	6,236	2,875	21	21	20
Muzzleloader	621	502	116	120	1,359	738	4	4	5
December 2 – 6	240	131	27	27	425	185	1	1	1
December 8 - 13	381	371	89	93	934	553	3	3	4
Total	16,185	8,829	2,827	2,472	30,313	14,128	100	100	100

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

### Buck Harvest

The statewide harvest of antlered bucks (16,185) in 2003 represents a 22% drop from the previous year (20,694), and the lowest buck kill in a decade. The top 5 buck-producing (per sq. mi. basis) WMDs in 2003 were (in descending order) districts 24, 21, 23, 17, and 22, all in central and southern Maine (Table 8). Among the 16,185 antlered bucks taken in 2003, roughly 7,000 (43%) were 1 ½ year-olds (yearlings), while nearly 3,100 (19%) were mature bucks (4 ½ to 15 ½ years old). Male fawns are reported with antlerless deer.

Maine is nationally known for producing trophy bucks (age 4½ and older). This is possible because, unlike the situation in many other states, Maine's bucks are subjected to relatively light hunting pressure. In our state, a healthy number of bucks annually survive to older (mature) age classes. In more heavily hunted states, yearling bucks comprise as much as 70% - 90% of the bucks available, and in those states, bucks rarely survive beyond 3½ years! In a sense, deer management in Maine has long adhered to the "Quality Deer Management" principles that so many other states desire to achieve. In Maine, deer populations subjected to hunting are held well below carrying capacity, allowing individual deer to obtain adequate nutrition and reproduction. Harvests are closely regulated, resulting in favorable buck-to-doe ratios. Finally, hunting effort on bucks (to date) remains light enough to allow a significant number of bucks to attain maturity, even old age (4 ½ to 15 ½ years). In 2003, 666 bucks were entered in the "Biggest Bucks in Maine Club"



which requires a dressed weight of at least 200 pounds. In addition, 146 bucks were entered in the Maine Skull and Antler Trophy Club (minimum B&C score of 140 points for gun or 120 for bow). Six of these bucks qualified for the national Boone and Crockett Record Club during 2003.

**Table 8. Sex and age composition of the 2003 deer harvest in Maine by Wildlife Management District<sup>1</sup>.**

WMD	Adult		Fawn		Total		Harvest Per 100		Harvest Per 100	
	Buck	Doe	Buck	Doe	Antlerless Deer	All Deer	Adult Bucks		Sq. Miles Habitat	
							Adult Does	Antlerless	Adult Bucks	All Bucks
1	302	13	3	1	17	319	4	6	21	23
2	130	7	3	1	11	141	5	8	11	12
3	125	10	4	2	16	141	8	13	13	15
4	234	18	2	0	20	254	8	9	12	13
5	281	16	4	6	26	307	6	9	18	20
6	292	33	11	9	53	345	11	18	21	25
7	438	95	29	19	143	581	22	33	32	43
8	508	76	38	25	139	647	15	27	25	32
9	154	34	11	9	54	208	22	35	16	22
10	124	31	9	6	46	170	25	37	14	19
11	351	29	18	13	60	411	8	17	21	25
12	510	211	96	61	368	878	41	72	54	94
13	530	227	70	65	362	892	43	68	94	158
14	299	57	21	16	94	393	19	31	38	49
15	996	597	197	168	962	1,958	60	97	100	197
16	1,176	789	251	223	1,263	2,439	67	107	164	340
17	2,407	1,614	546	480	2,640	5,047	67	110	177	370
18	355	49	16	19	84	439	14	24	27	34
19	94	1	1	2	4	98	1	4	8	8
20	647	524	118	135	777	1,424	81	120	108	237
21	893	616	229	191	1,036	1,929	69	116	183	395
22	898	673	226	192	1,091	1,989	75	121	172	382
23	1,626	1,315	451	405	2,171	3,797	81	134	178	416
24	644	677	173	165	1,015	1,659	105	158	233	601
25	536	363	73	84	520	1,056	68	97	111	218
26	869	493	128	110	731	1,600	57	84	140	258
27	336	31	9	6	46	382	9	14	41	47
28	107	3	4	0	7	114	3	7	13	14
29	124	7	1	1	9	133	6	7	26	27
30 <sup>2</sup>	199	220	85	58	363	562	111	182	-	-
<b>Statewide</b>	<b>16,185</b>	<b>8,829</b>	<b>2,827</b>	<b>2,472</b>	<b>14,128</b>	<b>30,313</b>	<b>55</b>	<b>87</b>	<b>55</b>	<b>104</b>

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

<sup>2</sup>Area of deer habitat in WMD 30 has not been determined.

### *Antlerless Deer Harvest*

The magnitude of Maine's harvest of does and young of the year depends on the number and success rate of bowhunters and youth day participants, the number of any-deer permits issued to firearms deer hunters, and also on hunting conditions (e.g., availability of tracking snow). The statewide harvest of adult (older than fawn) does during 2003 was 8,829, or 15% below the pre-set quota (~10,400 does). During 2003, any-deer and bonus permittees also tagged 4,376 fawns, while archers and youth day hunters tagged 923 young of the year. Overall, 14,128 antlerless deer were registered by hunters during 2003. With fewer does killed than desired, we carried about 1,600 more does into the winter than we initially wanted. With good winter survival in 2004, these additional does will help to enhance deer population recovery in our northern and eastern WMDs. However, in the southern and central districts, these additional does will hamper our efforts to reduce or stabilize deer populations, unless we achieve higher doe harvests in 2004.

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

### *Harvest by Season and Week*

Of the five separate deer hunting seasons, Maine's regular firearms season attracts the most hunters (about 169,700), and accounts for the greatest share of the total harvest. In 2003, 85% of the total deer take occurred during the 4-week



firearms deer season (Table 7). Within that season, after a strong initial burst of hunting pressure on opening Saturday by residents (which accounted for 9% of the total harvest), hunter effort and deer harvest remained remarkably stable during each week (18 – 21%). 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 7). Black-powder hunting is also growing in popularity. Yet, our 1 to 2 week late muzzleloader deer season accounted for only 4% of the 30,313 deer tagged in Maine during 2003. The relative contribution of firearm vs. archery vs. black powder seasons to total deer harvest noted in 2003 is typical of long-term trends in harvest distribution by season.

We are uncertain how many of the 17,578 youth license holders participated in our second-ever youth deer hunting season on Saturday, October 25, 2003. Based on likely rates of hunting success, however, we estimate that at least 13,000 10 to 15 year olds contributed to the 827 deer harvested. This was an either-sex hunt, and youth hunters capitalized on that opportunity. The adult doe harvest exceeded the antlered buck kill, and nearly as many young of the year were taken as adult does. The addition of the youth day to our deer hunting season line-up did not adversely affect deer management objectives in most WMDs, since the 610 antlerless deer harvested were spread over 30,000 square miles of deer habitat. The youth day kill comprised only 3% of the total Maine deer harvest. However, in several northern and eastern WMDs, where we are attempting deer population recovery, the youth day and archery harvests did put the doe harvest above the desired level (0 does) called for by the management system.

### *Harvest by Hunter Residency*

Among deer hunters, Maine residents outnumbered nonresidents by more than 6 to 1. Not surprisingly, residents tagged 88% (26,709 deer) of the total harvest during 2003 (Table 9). Among seasons, the proportion of the harvest registered by Maine residents was highest for youth day (98%), followed by expanded archery (97%), muzzleloader (96%), regular archery (93%), and regular firearms (87%). During the past decade, Maine residents' share of the deer kill has been increasing. Formerly, residents consistently accounted for about 80% of Maine's deer harvest. Evidently, nonresident participation in deer hunting has declined over the past 10 – 15 years. This is particularly apparent among Canadians (primarily from Quebec); sales of alien big game licenses have steadily dropped from 2,900 to 500 since 1990. Despite some declines in “out-of-staters”, Maine deer hunting still attracts hunters from 40 to 43 other states and Canadian provinces annually.

Regional differences occurred in the distribution of the harvest by residents and visitors to Maine. In the more populous central and southern WMDs, most successful deer hunters were residents. However, in the largely unpopulated “North Woods” of Maine, nonresidents accounted for a much larger share of the deer harvest. At one extreme, 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, 99% of the deer killed in heavily populated WMD 21 (south-coastal Maine) were registered by Maine residents (Table 9).

**Table 9. Deer registrations by season type and residence of successful hunters, statewide in Maine during 2003.**

Season & Week	Deer Registrations By:		Total	Percent by Residents
	Residents	Nonresidents		
<b>Archery</b>	<b>2,370</b>	<b>94</b>	<b>2,464</b>	<b>96</b>
Expanded	1,707	44	1,751	97
October	663	50	713	93
<b>Youth Day</b>	<b>807</b>	<b>20</b>	<b>827</b>	<b>98</b>
<b>Regular Firearms</b>	<b>22,229</b>	<b>3,434</b>	<b>25,663</b>	<b>87</b>
Opening Saturday	2,670	0	2,670	100
November 3 - 8	4,808	867	5,675	85
November 10 - 15	4,656	881	5,537	84
November 17 - 22	4,488	1,057	5,545	81
November 24 - 29	5,607	629	6,236	90
<b>Muzzleloader</b>	<b>1,303</b>	<b>56</b>	<b>1,359</b>	<b>96</b>
December 1 - 6	385	40	425	91
December 8 - 13	918	16	934	98
<b>Total</b>	<b>26,709</b>	<b>3,604</b>	<b>30,313</b>	<b>88</b>

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



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

During 2003, 223,110 licenses that permit deer hunting were sold in Maine; 84% were bought by residents. License sales in 2003 were about 2% below sales recorded in 2002 (228,379). Not all hunters who purchase big game hunting licenses actually pursue deer. According to recent (1988 and 1996) and past (1970-1984) 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 2003 was approximately 172,000. Hunter density, therefore, averaged nearly six per square mile, statewide, and this hunter force expended an estimated 2.13 million hunter-days effort pursuing deer over the course of our 85-day hunting seasons. The 4-week regular firearms season accounts for 85% of total deer hunting effort (1.81 million hunter-days).

Hunting pressure on deer has steadily increased since the 1970s, when deer of either-sex seasons were the norm. During 1976-1982, deer hunting effort averaged 1.57 million hunter-days, statewide. In contrast, effort during 1997-2003 has averaged 2.07 million hunter-days, despite a marked drop in hunter numbers (about 172,000 deer hunters today vs. 207,000 hunters in the late 70s to early 80s). Individual hunters today spend 3-4 more days pursuing deer than they did 20 years ago. Prior to 1981, we offered no separate black powder season, no youth hunt, no expanded archery season (just the October hunt), and we limited the firearm deer season to 3 weeks in the southern half of the state. Overall, we offered only 48 days of hunting opportunity in the late 1970s vs. 85 days in 2003. Hunter effort is cumulative; adding new deer seasons and more hunting days results in higher overall pressure on the deer herd. This fact has consequences regarding maintenance of trophy buck availability, and it impacts the number of any-deer permits we can allocate.

Deer hunting pressure varies dramatically between northern and eastern WMDs vs. central and southern WMDs. The more lightly hunted northern and eastern WMDs accommodate only 3-5 hunters per square mile over Maine's 85-day deer seasons. Hunters there expend only 14-31 hunter-days per square mile of effort on the deer herd. In central and southern WMDs, hunter density ranges from 10-18 hunters per square mile, and hunting pressure ranges from 80 to nearly 225 hunter-days per square mile on the herd. Since there is 5-10 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 7th year, the expanded archery season attracted roughly 6,000 participants (97% residents). During the first three years, hunter participation in the expanded archery season had doubled each year. Since 2000, participation seems to have stabilized. As noted earlier, this season was limited to WMDs 24, 30, and 9 smaller sites in southern Maine.

Archery license sales increased dramatically (+27%) during 2003 (15,323 licenses) compared to 2002 (12,098). This was the first year in which the regular archery license was required for both the statewide (October) archery season and the expanded archery season. Over the past 25 years, sales of archery licenses have nearly quadrupled, reflecting a strong trend toward greater participation in the sport of bowhunting for deer. Over the past decade, the Department has increasingly relied on bowhunters to harvest deer in parts of Maine where residential sprawl and other development preclude deer population control using firearms hunting. This transition from purely recreational to more management-oriented bowhunting is evident from harvest records. Archery harvests have increased from less than 100 deer in the 1970s to 2,464 deer in 2003.

Compared to the regular firearms season, which attracts nearly 170,000 participants, relatively few deer hunters currently participate in Maine's late black powder deer season. Still, sales of special muzzleloading season permits nearly doubled during 2003 (17,584) compared to 2002 (9,089). Hunter dissatisfaction with the poor hunting conditions that characterized the November firearms season, combined with widespread availability of tracking snow during the black powder season probably explain the dramatic increase in muzzleloader season effort in 2003. Since its inception in 1981, the black powder deer season has increased steadily in the number of participants. In its first year (1981), only 415 hunters purchased a muzzleloading permit. The number of deer registered during Maine's muzzleloader season has grown from 7 in 1981, to 1,359 in 2003. This hunting season is expected to continue to grow in popularity.

Deer hunting success in Maine averaged 18%, overall, during 2003. Success rate among nonresidents (13%) was lower than success rate experienced by residents of Maine (19%). Apparent success rate among hunters who drew an any-deer permit (27 to 39%) is typically higher than among hunters who were restricted to "bucks-only" (8-16%) during the regular firearms season. Since any-deer permittees could harvest either a doe, a fawn, or a buck, they would be expected to achieve higher success. Unfortunately, some hunters evidently pool their antlerless deer kill with any-deer permittees, which is illegal. Success rate among bow hunters differed markedly between the expanded archery season (29%), and the statewide October archery season (6%). Deer are very abundant in much of the expanded archery hunt area. This, coupled with no limit on antlerless deer, account for the exceptional degree of success hunters enjoyed during the expanded archery season. In recent years, black powder enthusiasts have experienced increasing success



during the late muzzleloader season. During most seasons prior to 2000, 2-5% of black powder hunters had tagged a deer. Success rates increased to 8-11% during 2001-2003. Increased availability of any-deer permits and healthy deer populations in central and southern WMDs likely contributed to higher success during recent muzzleloader seasons. Success rate among youngsters who participated in the youth deer hunting day could not be directly calculated, but it may have been roughly 5-6%, based on data for individual days during regular firearms seasons.

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

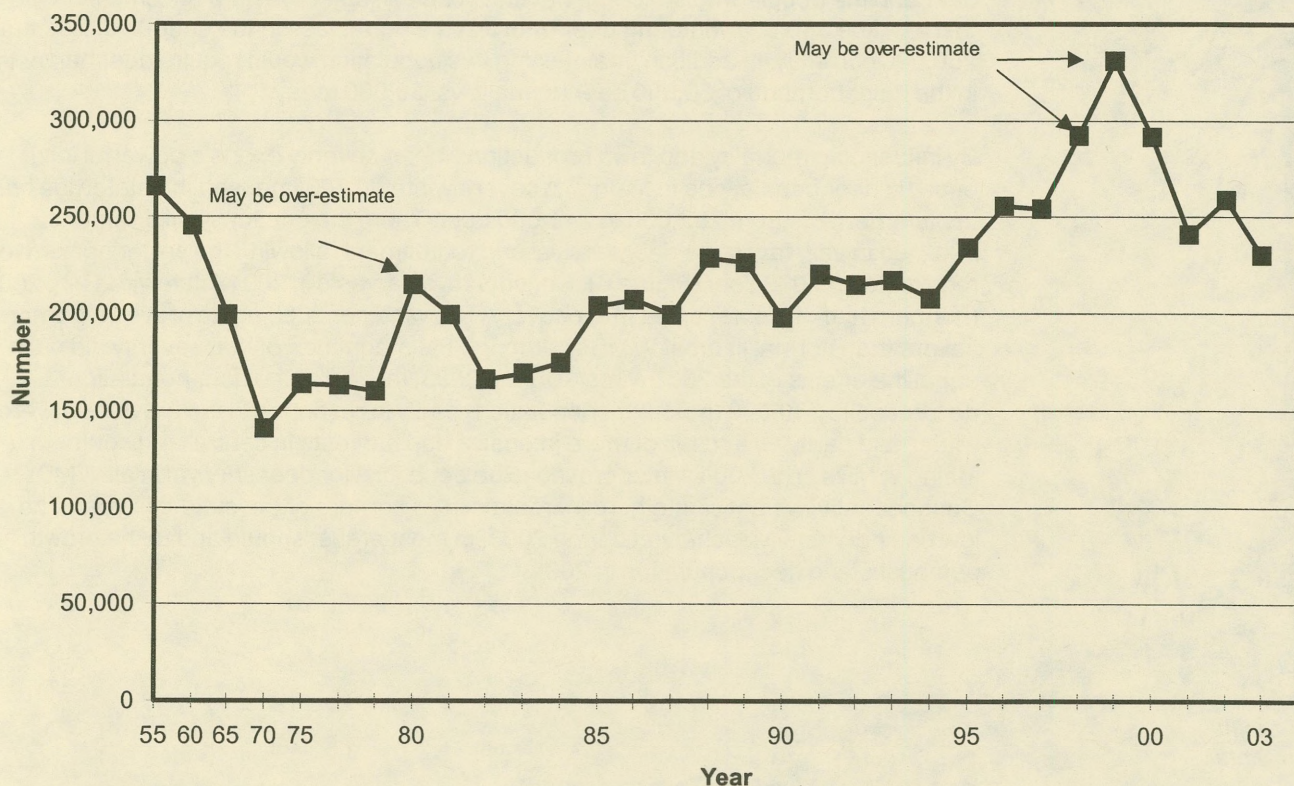
### ***Maine's Deer Population and Strategic Plan***

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

The deer plan was most recently updated in 2001; attainment of our new objectives will drive our harvest strategies for 2000 through 2015. 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 (1986-1997), 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 6). Regionally, we noted wide variation in our success at increasing deer populations. We were most successful in central and southern Maine where winters generally remained favorable, overall habitat was productive, and deer populations were highly responsive to changes in doe harvest rate. In contrast, we were largely unsuccessful in getting deer populations to increase in the big woods sections of northern, eastern, and western Maine during the past 20 years, despite very conservative doe harvests. Reasons for our failure to turn populations around in this half of the state include a progressive loss in the quality and quantity of wintering habitat, frequent severe winters, relatively high natural losses of adult deer, and diminished recruitment of young deer.

**Figure 6. Maine's Statewide Wintering Deer Herd.**

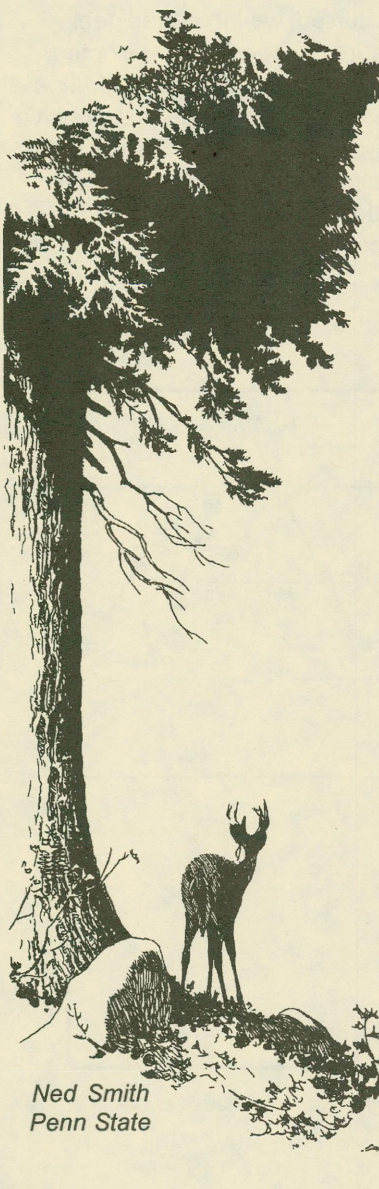




In the current planning cycle (2000-2015), we recognize that central and southern Maine deer populations are capable of increasing well above levels tolerated by people who share the land with deer and other wildlife. When deer populations exceed 25 deer/mi<sup>2</sup>, deer impact plant diversity, farm crops and ornamental plantings, and they increase the risk of motor vehicle collisions and human Lyme disease. Therefore, we have set population objectives of 15 or 20 deer/mi<sup>2</sup> for each central and southern Maine WMD. Currently, deer populations range between 15 and 25 deer/mi<sup>2</sup> 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 greater than 100 deer/mi<sup>2</sup>.

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

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 eventually enable us to maintain deer populations of 10 to 15 deer/mi<sup>2</sup>, compared to the 2 to 8 deer/mi<sup>2</sup> at present.



Ned Smith  
Penn State

Until we succeed at increasing the wintering habitat base, we must avoid overpopulating existing winter deeryards. With that in mind, we have set a short-term objective to always maintain deer in northern and eastern Maine at no more than 50% of the capacity of the existing deer wintering habitat. All things considered, antlerless deer harvests in eastern, western mountain, and northern Maine WMDs will have to remain rather limited for the foreseeable future.

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

By influencing mortality and fawn production, winter severity exerts a powerful influence on deer populations in Maine. A severe winter in 2001 caused the statewide herd to plummet 18% from 292,000 to 241,000 deer. Then, the unusually mild winter of 2002 led to very favorable deer survival and recruitment, allowing the wintering herd to recover to 259,000 deer (Figure 6). Conservative harvests in 2001 (statewide) and 2002 (northern half of Maine) aided the recovery. The winter of 2003 again proved a bit more severe than normal in most WMDs, although the magnitude of that severity did not equal the effects of the 2001 winter. During 2003, the statewide deer population decreased to 230,000 (post-hunt population) partly in response to the previous severe winter and partly as a result of more intensive doe harvests in central and southern Maine WMDs. The 2004 winter proved to be beneficial for deer survival in all WMDs. Consequently, we anticipate herd increases in all corners of the state this year. The low doe harvests we achieved during 2003, in most areas, should add to the growth potential of the deer population in 2004.



## ***Prospects for the 2004 Deer Season***

As in 2003, we will offer 5 separate deer hunting seasons in Maine during 2004. The expanded archery season will span September 11 to December 11 (79 days). This season is limited to WMDs 24 and 30, as well as 9 other locations, primarily in firearms discharge-residential sprawl areas. To participate in this season, hunters must now purchase a regular archery license and purchase permits to legally kill deer. An either-sex permit (\$30) entitles the holder to kill one antlered buck or a doe or fawn. Only one of these permits can be purchased per hunter. In addition, bow hunters hunting the expanded archery zone can purchase an unlimited number of antlerless deer permits (\$10), each allowing the taking of one doe or one fawn (including buck fawns, whose nubbins are less than 3" long). With this dramatic increase in bowhunting opportunity, we hope to greatly increase the harvest, particularly among does and fawns. In the expanded archery zone, deer populations can only be reduced if the limited number of archers that can gain access to huntable land are each able to harvest substantial numbers of deer. Too often, these bow hunters focused their time and efforts on killing a buck, while passing up killing opportunities for antlerless deer. The new regulations should help reverse that trend.

The regular archery season, as always, will be statewide in scope and will span September 30 - October 29 (26 days). Youth day will be Saturday, October 23. It is reserved for hunters between 10 and 15 years old, who are accompanied by a licensed adult (who is not allowed to carry a hunting implement). The 25-day regular firearms season opens for Maine residents on Saturday, October 30, and for nonresidents the following Monday. This season ends the Saturday following Thanksgiving (November 27). Finally, the muzzleloader season will begin in all WMDs on November 29, but will end on December 4 (6 days) in WMDs 1 – 11, 14, 19, and 27 – 29. Elsewhere, the muzzleloader season will continue until December 11 (12 days).

As always, availability of any-deer permits among our 30 WMDs reflects deer management objectives. Very conservative doe harvests are required in eastern and northern WMDs, as we continue to facilitate herd recovery from the severe winters of 2001 and 2003. In contrast, does must be more heavily harvested in central and southern WMDs as we strive to stabilize or reduce deer populations to the 15 or 20 deer per sq. mi. abundance targets we set in the strategic plan.

To accomplish deer management objectives in 2004, we have set doe harvest quotas ranging from zero to 2,175 among our 30 WMDs. Totalling 10,818 statewide, the 2004 doe quota is 23% above the doe harvest we achieved in 2003. The desired increase in doe harvest reflects the improved survival deer experienced during the 2004 winter, along with the need to maintain or reduce deer numbers in central and southern WMDs.

In addition to doe harvest to be achieved during the archery and youth seasons, we will issue a total of 76,150 any-deer permits statewide in 2004. No any-deer permits will be available in WMDs 6, 19, 28, and 29. Elsewhere, any-deer permits range from 25 (WMD 3) to 15,225 in WMD 17. The 2004 allocation of any-deer permits is the 2<sup>nd</sup> highest ever.

Last year, undersubscription (too few applicants) led to issuance of bonus any-deer permits in WMDs 23 and 30. This year, applicants may select up to 3 WMDs to be entered in the any-deer lottery. Hence, hunters who live (and normally hunt) in a part of the state with limited antlerless deer hunting opportunity, now would have a better chance to be drawn for an any-deer permit in districts with high permit allocations, but insufficient applicants. **Since any-deer permits are WMD-specific, only hunters who are willing to travel to other WMDs are encouraged to select 2<sup>nd</sup> or 3<sup>rd</sup> choices for the any-deer permit lottery.** This year, applicants may also select one WMD for entry into the bonus any-deer lottery, if that lottery becomes necessary.

The allocation of 76,150 any-deer permits, along with the archery and youth seasons, should result in the statewide harvest of roughly 10,800 does and an additional 6,500 fawns in 2004. Antlered buck harvests should approximate 19,300, slightly below the buck kill of 20,694 in 2002. If normal hunting conditions and hunter effort prevail, the statewide deer harvest in Maine should be in the vicinity of 36,600 whitetails. This compares favorably to the 38,153 deer taken in 2002 and it would be a substantial improvement over the 30,313 deer harvested in 2003.

## ***Deer Feeding Video Available***

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



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

The Maine Department of Inland Fisheries & Wildlife acknowledges that most people feeding deer are well intentioned. As the agency responsible for the stewardship of Maine's wildlife resources, it is our duty to alert people to the problems winter feeding can place on white-tailed deer and their habitat. **We feel that winter feeding of deer in Maine is not necessary for maintaining a healthy, abundant deer population.** In the video, which is patterned after the Department's policy statement on deer feeding, we suggest more appropriate ways that Maine people can safeguard the health and abundance of deer. Rather than feeding expensive, and unnecessary food supplements, we believe that improving the amount and quality of wintering habitat will better ensure viable, healthy deer populations anywhere in Maine. We point out several ways in which all interested people can participate in ensuring that quality wintering habitat is protected and maintained in perpetuity.

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

### ***Chronic Wasting Disease***

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

Chronic wasting disease is known to occur in mule deer, elk, and white-tailed 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 caused by an infectious protein called a prion, which upon entering the body, causes the host's normal proteins to take on a diseased form. In ways that are not well understood, these diseased prions accumulate in the brain and spinal cord, as well as lymph nodes, spleen, eye tissues, bone marrow, saliva, feces, and urine in diseased deer.

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

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

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

Until the mid-1990s, CWD was thought to be restricted to a small portion of the western US, primarily in northeastern Colorado. Since that time, we have learned that CWD is becoming more widespread, in part, because of natural dispersal of infected deer or elk, and by inadvertent importation of CWD-infected captive deer and elk among



commercial farms and ranches. As with so many other facets of CWD and other TSE diseases, mode of transmission of infective prions among susceptible deer remains incompletely understood.

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

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

At this time, we have no indication that CWD is present either in farmed red deer, elk, sika deer or fallow deer, or in free-ranging whitetails or moose in Maine. In 1999, nearly 300 hunter-killed deer from western Maine were tested for CWD. In 2002 and 2003, samples of 831 and 810 deer from throughout the state were also tested. In the past 3 years, more than 850 captive elk and red deer from Maine farms were tested at slaughter. To date all Maine samples have been negative for CWD.

We intend to monitor captive and wild cervids, as needed, to be confident we remain disease-free. During 2004, we will again be testing roughly 800 whitetails for CWD. We will continue to coordinate with other state agencies (commercial deer farms are regulated by the Maine Department of Agriculture) to ensure that CWD is not inadvertently introduced into the state as a result of deer farming, slaughter, or hunting practices. Preventing the introduction of CWD into Maine is a high priority. Steps are being taken to ensure that livestock producers do not inadvertently introduce clinically ill captive deer into the state.

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

At this time, we do not know whether any captive/farmed deer or elk used by the lure industry have ever contracted CWD. To date, urine-based deer lures are not being checked for the presence of CWD prions. Until more is known about whether commercial deer lures pose a risk of spreading CWD, **we recommend that hunters use caution in spreading urine-based lures in the environment, and avoid placing the lures on their clothing or skin. Avoid placing deer lures on the ground or on vegetation where deer can reach them.** Deer lures can be safely placed above deer height, allowing air circulation to disperse the scent.

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

—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 "all bird" issues, including certain Endangered and Threatened birds. The breadth of the Bird Group's programmatic responsibilities involve stewardship of approximately 200 bird species that nest in Maine.

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

**Lindsay Tudor**, Wildlife Biologist - Assists in all facets of Bird Group field and office activities, and coordinates the Department's Migratory Shorebird Program, with current emphasis studying the distribution and ecology of purple sandpipers wintering in Maine. Lindsay also works with harlequin ducks and ospreys.

**Tom Hodgman**, Wildlife Biologist - Works closely with partners to develop and implement programs and surveys to assess the status of nongame birds and conduct priority research. Tom's responsibilities include all passerines (song-birds), hawks, owls, herons, other nongame marshbirds, and loons. Tom's current focus is on the conservation status and volunteer monitoring of Maine owl populations, working with Maine Audubon on the Important Bird Areas Project, and investigations of marshbirds and rusty blackbirds.

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

### **Upland Birds**

#### **Wild Turkeys**

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

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

In Maine, we have had the benefit of work done by biologists in other states to reestablish wild turkeys into former and new ranges of suitable habitat. Researchers in these states discovered the key to success was to remove a small number of wild birds from one site and release them as soon as possible into suitable, unoccupied habitat.

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

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



In 1977 and 1978, Vermont Fish and Game biologists trapped 41 turkeys, which MDIFW biologists released in the towns of York and Elliot. By the early 1980s, the York County population had become large enough to serve as a source of birds for new release sites in other areas. In the spring of 1982, 33 birds were captured in York County and released in Waldo County in an attempt to establish a turkey population in the mid-coast region. In the winter of 1984, 19 additional birds were captured in York County and released in Hancock County, but poaching was believed to be the demise of these birds. During the winters of 1987 and 1988, MDIFW biologists, with the help of individuals from the Maine Chapter of the National Wild Turkey Federation (NWTf) and Connecticut Department of Environmental Protection, trapped 70 wild turkeys in Connecticut and released them in Maine to augment our turkey population.

Since 1990, in-state trapping and transfer by regional biologists has expanded the range of the wild turkey in Maine to the east and north. Today, reports of wild turkeys well inland of the coast and eastward into Hancock and Washington County are common.

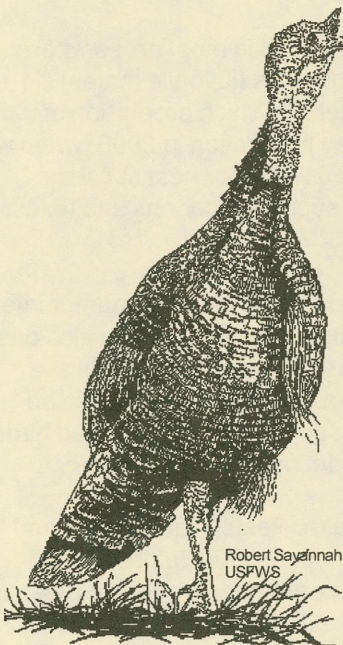
Wild turkeys eat a wide variety of grasses, seeds, fruits, and insects. In the Northeast, turkey populations reach their highest densities in agricultural areas, particularly around dairy farms. Food in the form of soft mast (berries), seeds, waste agricultural grains, as well as corn silage and undigested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

### IMPORTANT!!

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

### *Spring Turkey Hunting Seasons*

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



By 1986, a sufficient number of wild turkeys occurred in southern Maine to support a limited spring hunting season. Five-hundred hunting permits were issued in York County, resulting in a harvest of 9 male turkeys. As the turkey population has grown and spread into new habitat, both the number of permits and area of the turkey hunting zone have been increased in a conservative manner to assure a safe and high quality hunting opportunity (Table 10). 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).



**Table 10. Wild turkey spring hunting effort and harvests in Maine, 1986-2004.**

Year	Number of Applicants	Number of Permits	Wild Turkeys Harvested	Season Notes
1986	605	500	9	York County
1987	536	500	8	York County
1988	355	355	16	York County
1989	464	463	19	York County
1990	500	499	15	York County
1991	508	500	21	York County
1992	886	500	53	York/Cumberland County
1993	1,079	500	46	York/Cumberland County
1994	1,185	500	62	York/Cumberland County
1995	1,712	750	117	York/Cumberland County
1996	3,952	1,250	288	North/South hunting zones
1997	5,091	1,750	417	North/South hunting zones
1998	6,449	2,250	594	North/South hunting zones
1999	9,294	3,000	890	1 Zone, WMDs 15-17, 20-26
2000	14,909	4,000	1,559	1 Zone, WMDs 15-17, 20-26
2001	18,685	7,000	2,544	1 Zone, WMDs 12, 15-17, 20-27; 3,500 permits in season A: May 1-5, 21-28; and B: May 7-19
2002	25,954	9,000	3,391	1 Zone, WMDs 12, 15-18, 20-27; 4,500 permits in season A: April 29-May 4, and May 20-June 1; and season B: May 6-18, and May 27-June 1.
2003	26,505	12,000	3,994	1 Zone, WMDs 12, 15-18, 20-27; 6,000 permits in season A: April 28-May 3, and May 19-31; and season B: May 5-17, and May 26-31.
2004	24,040	15,600	4,675*	1 Zone, WMDs 12, 13, 15-18, 20-27; 7,800 permits in season A: May 3-8, and May 24-June 5 and season B: May 10-22, and May 31-June 5. Youth Turkey Day, May 1.

\*preliminary harvest totals

This past spring (2004), 15,600 hunters were permitted to hunt wild turkeys in Maine during two, over-lapping 3-week seasons: 7,800 hunters during season A, May 3-8 and May 24 through June 5; and 7,800 hunters during season B, May 10-22 and May 31 through June 5. 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 2004, 30% more hunters had the opportunity to hunt turkeys than in 2003. In addition to the 15,600 permitted hunters, an unknown number of landowners and their families took advantage of the new landowner "privilege" rule to hunt turkeys. New in 2004 was Maine's first Youth Turkey Day on May 1, the Saturday preceding the opening day of season A of the spring wild turkey hunting season. Youths age 10-15 who possessed a valid spring turkey hunting permit and a junior hunting license were allowed to hunt on Youth Turkey Day if accompanied by a parent, guardian, or adult having a hunting license or hunter safety course certificate.

In 2004, the hunter success rate remained high - 34% - owing to an abundant turkey population in most areas where they are hunted in Maine (Table 11). Turkey hunters killed 2,813 toms (adult males), 1,836 jakes (juvenile males), 11 bearded hens, and 15 registered birds of unrecorded sex or age, for a total of 4,675 turkeys. The high proportion of jakes in the kill relative to toms (1.5 toms per jake) probably reflects generally good turkey production in 2003, when we had less than average rainfall in May. Wet weather during the nesting season is correlated with poor nest success among wild turkeys, because moist conditions are believed to aid mammalian predators such as raccoons and foxes, which rely on their keen sense of smell, in finding nests.

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

We receive input from turkey hunters through MDIFW's annual Turkey Hunter Questionnaire. Results tabulated from these questionnaires give us information on hunting effort, harvests, and trends in turkey populations (Tables 10 and 11). We now have 19 years of wild turkey hunting behind us in Maine; data from the 2004 survey were received recently and should be considered "preliminary". The turkey population continues to increase and expand its range, and interest in turkey hunting continues to increase as well.



Table 11. Results of the spring turkey hunter questionnaire, 1993-2004.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004*
Permits Issued	500	500	750	1,250	1,750	2,250	3,000	4,000	7,000	9,000	12,000	15,600
Questionnaires Rec'd	417	424	628	1,075	1,546	1,961	2,517	3,350	5,776	5,451	2,072	2,186
Participation Rate	73%	78%	72%	82%	87%	85%	86%	88%	88%	92%	92%	89%
Success Rate	13%	16%	22%	28%	27%	31%	34%	44%	41%	41%	36%	34%
Avg. Hours Hunted	21.1	23.3	21.5	20.6	23.4	20.8	21.7	20.8	15.2	16.5	17.0	16.6
Gobblers Seen/hour	0.073	0.106	0.123	0.196	0.176	0.219	0.235	0.235	0.33	0.44	0.38	0.41
Hens Seen/hour	0.131	0.125	0.167	0.286	0.228	0.311	0.288	0.290	0.45	0.73	0.57	0.66
Used Shotgun	283	305	429	825	1,260	1,564	—	—	—	—	—	—
Used Bow	32	42	24	39	52	41	—	—	—	—	—	—

\*preliminary results

### *Fall Turkey Hunting Seasons*

Archers who took advantage of Maine's second-ever fall archery turkey season during fall 2003 were successful in bagging 246 turkeys. The turkey kill for Maine's fall season, which ran October 20-31, bettered 2002's inaugural mark of 151 turkeys. Brunswick accounted for the greatest number of turkeys registered, with 8 birds. Other top turkey towns were Jefferson with six, and Saco, Waldoboro, and Whitefield each with five. The hunting success rate of the 2,009 hunters who purchased permits for the fall 2002 season was 8%. The total number of fall turkey permits sold in 2003 has not yet been tallied. Only a bow and arrow may be used to hunt turkeys during the fall season, which is open in WMDs 15, 16, and 20-26. During the fall season both hens and toms are legal quarry, with a season bag limit of 1 bird. Similar to 2002, the kill this past season was composed nearly half of adult females (48%), with lesser numbers of juvenile birds (28%) and adult males (19%), and the remaining 5% being of undetermined sex or age. Permit fees are \$13 for Maine residents, and \$43 for nonresidents.

The establishment of a limited fall turkey hunting season is in accordance with the goals and objectives established by the Wild Turkey Public Working Group. The goal for Maine's wild turkey management is to increase the size and distribution of the turkey population within suitable habitat, with a primary objective being to provide unlimited spring hunting opportunity, as long as the wild turkey population can support it and current (2000) hunt quality (i.e., hearing, seeing, working, and hopefully harvesting a turkey without interference from others) is maintained. A secondary objective was to implement a limited fall hunting season by 2003 in areas where the wild turkey population can support it, and without adversely affecting the primary objective of an unlimited spring hunt. For this reason, the fall hunt will be limited to archery so as to not compromise the primary goal and objective.

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

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

—Andrew Weik and R. Bradford Allen

### *Ruffed Grouse Hunting Seasons*

The ruffed grouse, or partridge, is considered by many to be the premiere upland game bird in Maine. In 1987, approximately half of all licensed hunters in Maine hunted grouse and/or woodcock. Maine data from early 1980s show an estimated 100,000 hunters harvested over 500,000 grouse annually. Although no data exist on recent harvests, except by moose hunters (see below), successful bird hunters reported grouse in excellent (1995), fair (1996-97), and good (1998-2003) numbers in recent years.

### *Grouse Reports From Maine Moose Hunter Survey*

For the last 11 moose hunts (1993-2003), moose hunters were asked to report the number of grouse they and their party saw or harvested during the moose hunting season (Table 12). 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 12. Grouse harvests by moose hunters and others in their hunting party, 1993-2003.**

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Permit holders reporting	888	1,069	1,252	1,321	1,323	1,739	2,542	1,887	2,673	2,251	1,428
Number of grouse seen	4,624	5,804	18,069	4,880	6,868	11,604	17,754	11,731	28,723	16,636	11,802
Grouse seen/100 hrs hunting	-	35	107	20	25	43	37	33	48	31	34
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 34 birds per 100 hours of moose hunting. In 1995, a banner grouse year in industrial forests by all accounts, the average of 98 grouse seen per 100 hours of hunting was nearly three times that of the previous year. In 2003, moose hunters reported seeing 34 grouse per 100 hours, which was up from the previous year's mark of 31.

The average grouse harvest by this sample of moose hunters and their hunting parties over 1993-2001 was 4,057 (Table 12). The last statewide grouse harvest estimate was reported for the 1988 hunting season. That year, an estimated 579,100 grouse were taken in Maine. If we assume that current harvests are similar to those of the late 1980s, then the average total grouse harvest reported by moose hunting parties is less than 1% of this total.

### **Management and Research**

Despite its importance as a quality game bird in Maine, little management and research effort is devoted to this species because of limited dollars and personnel time. Although this species appears to have done well despite a lack of management attention, there are a number of important harvest management issues facing wildlife managers today as more hunting pressure is directed toward grouse in Maine's vast, but increasingly accessible, industrial forests. Further, annual information on the status of the statewide grouse population, hunting pressure, and harvests is needed. Over the last three years, we have increased hunting opportunity for ruffed grouse by extending the hunting season through December in most Wildlife Management Districts. To do this, we have had to rely on information provided by wildlife agencies in other northern states that have invested more in research and monitoring of their ruffed grouse resource.

Ruffed grouse are a product of the forest. The amount and quality of Maine's forest is constantly changing, and the impact of these changes as they relate to statewide grouse numbers is difficult to predict. Fortunately, however, the future for ruffed grouse appears bright. Although maturation of some forest stands likely represents a decline in the quality of grouse habitat, timber harvesting can and does revitalize grouse habitat. Harvest practices, such as clear cutting in small blocks or strips that create an uneven-aged forest composed of even-aged stands of aspen, birch, and mixed wood, will improve or sustain habitat for ruffed grouse and other wildlife species that use early successional hardwood forests. ***Ruffed grouse research and management is funded primarily by hunting license and permit revenues and federal excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Andrew Weik and R. Bradford Allen

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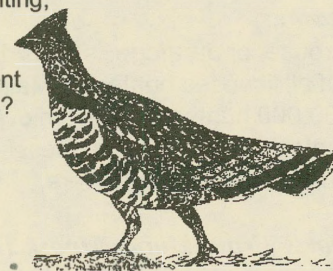
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## Waterfowl Management and Research

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

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

Habitat protection and enhancement efforts are another form of management that the Department is using to increase waterfowl breeding populations. Revenues generated from the sales of state waterfowl hunting stamps and art prints have, in addition to supporting waterfowl banding activities, been dedicated to acquisition and development of wetland habitat and coastal nesting islands.

### ***How Hunters Benefit Many Migratory Bird Species***

As our appreciation of migratory birds and our understanding of their role in the natural world grow, it is important to recognize the contributions of sportsmen to migratory bird conservation. For more than 60 years, hunters have provided a steady stream of revenue to build the National Wildlife Refuge System, and to restore waterfowl habitat on millions of acres of public and private lands across the country. These habitat projects also benefit migratory songbirds and other wildlife.

In the early 1930s, with a handful of farsighted conservationists leading the way, organized sportsmen were instrumental in the creation of two programs that changed the course of wildlife conservation. ***These two programs are the Duck Stamp Program described below and the Federal Aid in Wildlife Restoration Act, better known as the Pittman-Robertson Act, described in the Wildlife Resource Assessment Section of this publication (page 14).***

### ***The Duck Stamp Program***

In 1934, Congress passed the Migratory Bird Hunting Stamp Act, popularly known as the Duck Stamp Act. It required all waterfowl hunters 16 years or older to buy a Migratory Bird Hunting and Conservation Stamp. In the years since its enactment, the Federal Duck Stamp Program has generated more than \$671 million that has been used to preserve nearly five million acres of waterfowl habitat in the U.S. Many of the more than 500 national wildlife refuges have been paid for all or in part by Duck Stamp money. Waterfowl are not the only wildlife to benefit from Federal Duck Stamp dollars. Numerous other birds, wildlife, and plants have similarly prospered because of habitat protection made possible by the program. An estimated one third of the nation's Endangered and Threatened species find food or shelter in refuges preserved by these funds. For every dollar you spend on Federal Duck Stamps, ninety-eight cents go directly to purchase vital habitat for protection in the National Wildlife Refuge System. The source of this information is USFWS Administrative Report titled, "*Hunting and Migratory Birds- How Hunters Benefit Many Migratory Bird Species*".

### ***Current Waterfowl Populations***

Again last winter, biologist Andy Weik and USFWS pilot-biologist John Bidwell conducted Maine's annual Mid-winter Waterfowl Survey (Table 13). They surveyed coastal waters and estuaries from Kittery to Eastport during January 9-15, 2004. They recorded 46,371 ducks and geese wintering along Maine's coast, a number considerably lower than normal. Extremely cold temperatures contributed to extensive ice conditions, causing many waterfowl to migrate south prior to the survey. Additionally, some of the offshore islands that are usually surveyed were not included this year due to budget shortfalls within the USFWS. All species except goldeneye were found in lesser numbers this year in Maine compared to usual; the goldeneye count was the highest recorded since 1998. As usual, the most frequently observed duck was the common eider; but the count of approximately 17,000 was substantially less than the 26,000 counted last year, and was considerably lower than the most recent 10-year average of nearly 42,000. The black duck count (10,799) was also lower than the 10-year average. Mallards and Canada geese continue to winter in generally improving numbers in Maine, with sizeable concentrations of both species showing up in eastern Maine this past January.



Table 13. Mid-winter Waterfowl Survey data for Maine, January 1996 – 2004.

Species	Total Recorded by Year								
	1996	1997	1998	1999	2000	2001	2002	2003	2004
Mallard	480	556	995	1,849	892	1,162	3,224	2,857	2,055
Black Duck	15,848	14,597	24,027	32,600	20,666	12,971	21,368	17,283	10,799
Northern Pintail	0	0	0	0	0	0	0	0	10
<b>Total Dabblers</b>	<b>16,328</b>	<b>15,153</b>	<b>25,022</b>	<b>34,449</b>	<b>21,558</b>	<b>14,133</b>	<b>24,592</b>	<b>20,140</b>	<b>12,864</b>
Ruddy Ducks	0	0	0	0	0	0	508	60	0
Scaup	1,052	1,175	581	1,830	1,790	1,080	370	450	0
Common Goldeneye	3,776	5,429	4,543	7,416	3,392	2,510	5,577	3,912	6,783
Bufflehead	2,613	3,175	9,270	7,099	3,252	4,472	6,950	5,104	4,012
Common Merganser	1,244	1,662	4,028	5,451	4,948	5,550	7,802	3,600	1,944
<b>Total Divers</b>	<b>8,685</b>	<b>11,441</b>	<b>18,422</b>	<b>21,796</b>	<b>13,382</b>	<b>13,612</b>	<b>21,207</b>	<b>13,126</b>	<b>12,739</b>
Common Eider	35,716	39,001	31,809	38,735	38,351	28,664	46,036	26,347	17,240
Scoter	5,134	2,804	2,755	3,198	4,611	1,941	2,710	2,857	337
Long-tailed Duck	954	1,797	1,739	2,861	1,120	2,389	2,311	1,759	846
Harlequin	3	24	0	0	15	0	25	5	51
<b>Total Sea Ducks</b>	<b>41,807</b>	<b>43,626</b>	<b>36,303</b>	<b>44,794</b>	<b>44,097</b>	<b>32,994</b>	<b>51,082</b>	<b>30,968</b>	<b>18,474</b>
<b>Unidentified Ducks</b>	<b>12</b>	<b>90</b>	<b>246</b>	<b>254</b>	<b>210</b>	<b>425</b>	<b>248</b>	<b>18</b>	<b>0</b>
<b>TOTAL DUCKS</b>	<b>66,832</b>	<b>70,310</b>	<b>79,993</b>	<b>101,293</b>	<b>79,247</b>	<b>61,164</b>	<b>97,199</b>	<b>64,252</b>	<b>44,077</b>
Canada Goose	1,090	1,911	1,986	3,071	3,139	2,769	3,377	2,603	2,290
Brant	13	15	0	21	0	0	0	0	4
<b>Total Geese</b>	<b>1,103</b>	<b>1,926</b>	<b>1,986</b>	<b>3,092</b>	<b>3,139</b>	<b>2,769</b>	<b>3,377</b>	<b>2,603</b>	<b>2,294</b>
<b>GRAND TOTAL</b>	<b>67,935</b>	<b>72,236</b>	<b>81,979</b>	<b>104,385</b>	<b>82,386</b>	<b>63,933</b>	<b>100,506</b>	<b>66,855</b>	<b>46,371</b>

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

North American duck populations in 2003 remained at good levels for most of the species annually counted by USFWS biologists. The USFWS recently reported in an administrative report titled "*Trends in Duck Breeding Population, 1955-2003*" that the total duck population estimate, excluding sea ducks, was 36.2 million birds, 16% above the 2002 estimate and 9% above the 1955-2002 long-term average. They also reported that habitat conditions for breeding waterfowl improved over the previous year in most of the North American prairie survey area. These improved conditions are reflected in the numbers of ponds counted during the 2003 surveys. The estimate of "May ponds" was 91% higher than in 2002. This is good news but, years of dry conditions in part of the U.S. and Canadian prairies, combined with aggressive agricultural practices during periods of drought, have reduced the quality and quantity of nesting cover in many regions.

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

In Maine, surveys of duck broods on 39 wetlands across the state provide an index to production of Maine's waterfowl populations. This long-term brood count survey has provided a means of following trends in waterfowl breeding populations since the mid-1950s. The number and proportion of broods, by species, has changed over time (Table 14). The number of black duck and wood duck broods observed declined precipitously from the mid-1950s to the late 1970s, but recovered somewhat during the 1980s and early 1990s. Since the mid-1980s, the numbers of broods observed of most species, except mallards, have declined. One goal of the state waterfowl management plan is to restore the relative proportions of species found breeding in Maine to historical levels.



**Table 14. 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 1996-2000, 2003<sup>1</sup>.**

	1966-76		1980-84		1986-90		1991-95		1996-2000		2003	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%		%
Black Duck	37	29	34	19	56	24	50	24	24	16	14	10
Ring-necked Duck	31	24	44	25	49	21	39	19	30	20	39	27
Wood Duck	15	12	24	13	38	17	43	21	32	22	25	18
Goldeneye	23	18	36	20	39	17	31	15	27	19	33	23
Hooded Merganser	10	8	19	11	26	11	24	12	21	14	13	9
Green-winged Teal*	1	1	2	1	1	1	1	<1	1	1	0	0
Blue-winged Teal	5	4	4	2	1	1	1	<1	0	0	3	2
Common Merganser	4	3	11	6	12	5	8	3	6	4	6	4
Mallard	1	1	5	3	7	3	11	5	7	4	10	7
<b>Total Observed</b>	<b>127</b>	<b>100</b>	<b>179</b>	<b>100</b>	<b>229</b>	<b>100</b>	<b>208</b>	<b>100</b>	<b>148</b>	<b>100</b>	<b>143</b>	<b>100</b>

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

<sup>1</sup>Mallard x black duck hybrids and Canada geese were excluded from analysis.

### Waterfowl Hunting Seasons

Waterfowl harvests in the United States have declined since 1978, when 15.1 million ducks were recorded in federal harvest surveys. This has been partly by design - as regulations became more restrictive - but it also reflects declining hunter numbers and lower waterfowl populations during the 1980s. The number of Maine's waterfowl hunters has also declined since 1978, when the high of 18,650 federal migratory bird-hunting stamps were sold. The average number of stamps sold in Maine has changed from 14,545 (1981-85) to 11,612 (1986-90) to 9,908 (1991-95) to 10,319 (2002). Recent estimates indicate that the number of waterfowl hunters in Maine remain stable at approximately 10,000 hunters.

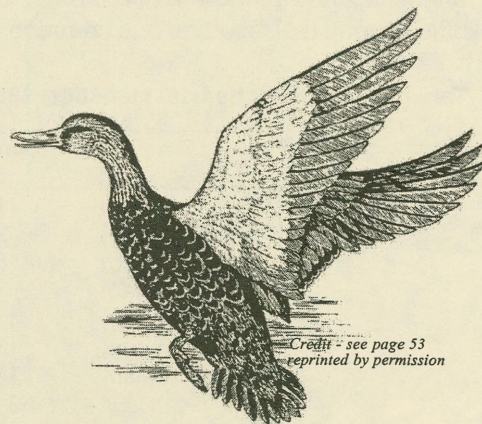
In response to drought conditions in U.S. and Canadian prairies (the "duck factory" of North America), season lengths were shortened significantly between 1985-1993 (from 50 days to 30 days in the Atlantic Flyway). This, in concert with declining numbers of hunters, led to a plunge in the estimated number 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 1997-2003.

Restrictions in harvest regulations during the 1980s also resulted in: reduced daily bag limits from 5 birds to 3 per day; species restrictions for black ducks, pintails, wood ducks, and hen mallards; and curtailed framework opening and closing dates (from October 1 to October 5, and from January 15 to January 5). Framework opening dates were moved back to October 1 in 1994, and bag limits were increased to 4 per day in 1994 and 1995, 5 per day in 1996, and 6 per day in 1997-2002.

In addition to recent extended season lengths, 1997 marked the first time that states with Sunday hunting prohibitions, such as Maine, were allowed additional week days to compensate for lost opportunity. The 1998 season in Maine was the most liberal (51 days) available to our hunters since 1958, when a 60-day federal framework also allowed 51 days of hunting. The 2002 and 2003 regular duck seasons allowed 60 hunting days in the north and south waterfowl hunting zones, for a total of 72 hunting days that did not overlap.

Since 1997, Maine has held a Youth Waterfowl Hunt during which hunters between the ages of 10-15, when accompanied by an adult, are now allowed to hunt Canada geese and all duck species (except harlequins). The one-day hunt takes place on a Saturday in September within two weeks of the start of the regular duck season. A 2001 mail survey indicated that approximately 9% of waterfowl hunters take a youth hunting on Youth Waterfowl Hunt day.

In response to a burgeoning resident Canada goose population, Maine established a September goose hunting season in 1996. The purpose of this special season is to target the harvest of Maine's abundant resident goose population and provide hunting opportunity, while avoiding overharvest of migrant geese that pass through Maine later in the fall. Harvests of geese during the September season have increased annually to approximately 5,000 birds in recent years. Participation in the September goose hunt has increased as well. The 2001 mail survey indicated approximately 18% of waterfowlers may be participating in this special season. The September Canada goose season typically begins the day after Labor Day and runs through September 25.





## Past Hunting Effort and an Overview of the Harvest

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

**Table 15. 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	14,972	11,903	5,222	843	15,074	---	---	1,140	4,075	1,803

A 30+ year perspective of the waterfowl species composition in the Maine harvest shows that the relative importance of some ducks has changed over this period (Table 15). Harvests of mallards have increased from fewer than 1,000 birds per year (1961-65 mean) to nearly 15,000 birds in 2001. The common eider is another bird that has increased in the annual Maine waterfowl kill (Table 16). Showing sizable declines in the Maine harvest in recent years are black ducks, blue-winged teal, scoters, and common goldeneyes.

**Table 16. Sea duck harvest statistics, 1961-2001.**

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

\* formerly known as oldsquaw.

The declines in both the annual kill (Table 15) and the Mid-winter Waterfowl Survey estimate (Table 13) of common goldeneyes in Maine and other northeastern states have waterfowl managers concerned about this species. The breeding trend among goldeneyes in eastern Canada during 1990-2003 has been increasing. Common goldeneyes, and their close relative Barrow's goldeneyes, are cavity nesters that breed predominantly along small lakes in Canada, where they may be increasingly affected by timber harvest practices. Common goldeneyes breed in Maine, but the less common Barrow's goldeneye is strictly a wintering or migrating bird in Maine.

Reasons for these changes in species composition are variable, and in many cases, different for each species. Some explanations for these changes include duck population increases and decreases, duck population distribution shifts, changes in the number of duck hunters, hunter effort shifts from one waterfowl species group to another, and specific



regulatory management designed to restrict harvest opportunity on some species or allow more on others. All of these causes, and others, have resulted in the observed changes in the Maine waterfowl harvest.

### **Recent Harvest Data – A Different Way of Estimating Waterfowl Harvests**

Since the early 1950s, the USFWS has conducted a survey of Federal Duck Stamp purchasers to estimate waterfowl hunter activity and harvest in the U.S. That survey was conducted annually through the 2001-02 hunting season, after which it was replaced by a new migratory bird harvest survey system referred to as the Harvest Information Program (HIP). This cooperative, State-Federal program requires licensed migratory bird hunters to annually identify themselves to the State licensing authority by providing the State with their name and address, and it asks each hunter a series of screening questions about their hunting success the previous year. The USFWS is then responsible for using these data to annually conduct national hunter activity and harvest surveys for all migratory game birds.

Each year from 1999-2001, the USFWS conducted both the Federal Duck Stamp-based survey and a HIP waterfowl harvest survey concurrently, with the objective of comparing and evaluating the results of both surveys. The purpose of Table 17 is to present the results of the HIP waterfowl harvest surveys for the 2001-2002 through 2003-2004 hunting seasons. All harvest estimates herein are preliminary, pending (1) final counts of the number of migratory bird hunters in each state, and (2) complete audits of all survey response data.

**Table 17. Maine duck harvest estimates based on Harvest Information Program, 2001-2003.**

	<b>2001</b>	<b>2002</b>	<b>2003</b>
Black Duck	5,868	9,717	5,045
Mallard	7,839	15,744	12,025
Mallard x Black Duck Hybrid	422	861	510
Green-winged Teal	2,723	9,287	5,248
Blue-winged Teal	469	185	459
Northern Shoveler	0	62	0
Northern Pintail	94	554	357
Wigeon	47	185	306
Wood Duck	7,323	7,319	3,822
Greater Scaup	0	123	0
Lesser Scaup	0	123	0
Ring-necked Duck	610	1,845	459
Bufflehead	1,925	1,661	764
Common Goldeneye	704	431	357
Hooded Merganser	1,643	1,415	764
Other Mergansers	845	1,292	1,783
Total dabbling/diving duck harvest:	30,512	51,804	32,000
Seasonal duck harvest per hunter:	4.7 (+/- 40%)	8.1 (+/- 41%)	5.2 (+44%)
Canada Goose	5,165	12,800	9,637
Snow Goose	0	0	463
Seasonal goose harvest per hunter:	1.3 (+/- 62%)	2.8 (+/- 52%)	2.1 (+61%)
<b>(Maine sea duck harvest estimates based on Harvest Information Program, 2001-2003)</b>			
	<b>2001</b>	<b>2002</b>	<b>2003</b>
Common Eider	17,257	20,600	28,967
Long-tailed Duck	1,371	2,800	2,612
Scoter species	5,371	6,400	14,721
Total sea duck harvest:	23,999	29,800	46,300
Seasonal sea duck harvest per hunter:	9 (+/- 76%)	10 (+/- 117%)	17 (+86%)

### **Black Duck**

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



During the 40- and 50-day seasons of 1983-1987, MDIFW met the harvest reduction target for black ducks by prohibiting their killing during the early portion of the duck season. Restrictive seasons (30 days) in the U.S. during 1988-1993, coupled with a 1 bird daily bag for black ducks for the entire 30 days, essentially accomplished the harvest reduction strategy for this species through 1993. Since 1994, with the return to 40-, 50-, and now 60-day seasons, MDIFW's challenge has been to maintain the reduction in harvest of Maine black ducks while providing abundant opportunity for waterfowl hunting in Maine during longer hunting seasons. This has best been accomplished by prohibiting the killing of black ducks during the first few days of the season; the alternative would be to allow the killing of black ducks from the start of the duck season, but for a much shorter period than the full duration of the regular duck season. In fact, the Maine harvest of black ducks was higher during the period of 30-day seasons (1988-1993) than levels attained between 1983 and 1987. Sparing black ducks during the first few days increases the survival probabilities of our locally breeding and locally produced ducks, and enables Maine to attain the harvest reduction target for this species during long duck hunting seasons.

The return to 60-day duck seasons since 1997 has challenged Atlantic Flyway waterfowl managers, because the need to maintain low black duck harvests still exists. However, recent seasons have been successful as Maine's estimated annual black duck harvest since 1988 has been maintained at approximately 51% below those measured prior to black duck harvest restrictions. In fact, black duck kill estimates in the Atlantic Flyway during 1994-1996 were 16 percent lower than those measured during 30-day seasons (1983-1987) and 58% below those measured prior to 1983. During the 2002 hunting season, Maine waterfowl hunters could hunt black ducks for 55 days in each zone and took a reported 9,717 black ducks statewide. The black duck population seems to be responding slowly. The count of black ducks in the Atlantic Flyway during the Mid-winter 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 14).

### ***Sea Duck Management and Conservation Concerns***

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

Concern over the status of sea ducks in Maine has increased over the last two decades, as some populations appear to be declining. In Maine, over the last 50 years, sea duck bag limits and season lengths have been considered liberal and relatively unchanged. Historically, hunters tended to pursue inland ducks, and the reported annual harvests of sea ducks were low. Major shifts in hunting effort occurred from the 1960s to the 1980s when populations of inland ducks (particularly black ducks) and Canada geese were low, and hunting seasons for these species were restricted. However, a short time later, concerns over the status of scoters (black, white-winged, and surf) in the Atlantic Flyway led to a reduction in the daily bag for the group from 7 to 4 a day, beginning in 1994. Despite this change, hunting pressure on sea ducks, particularly on common eiders, continued to increase in eastern North America. In Maine, hunter interest in eiders continues to be strong. The percentage of eiders in Maine's waterfowl harvest has increased from 3-4% in the mid-60s, to over 20% in the mid-80s through present (Table 16). There are indications that harvests of eiders in Nova Scotia and the New England States had doubled to levels that may no longer be sustainable. For this, and other reasons, Nova Scotia, Newfoundland, and Rhode Island proposed and adopted changes in their 1998 hunting seasons designed to reduce the eider harvest between 15-25%. In 1999, Maine and Massachusetts reduced their daily eider bag limits to 5 and 4, respectively.

### ***Waterfowl Research in Maine***

Current waterfowl research efforts are aimed at measuring and tracking trends in breeding populations and the harvests they support. An aerial waterfowl population survey is now an operational USFWS survey in Maine and the Maritimes in April and May. Further, Maine brood production information is collected on 39 wetlands, and several priority duck and goose banding efforts are conducted each year in the summer and early fall.



Banding is the cornerstone of waterfowl harvest management. Pre-hunting season (i.e., late summer) banding is necessary to provide information on harvest rates, survival rates, and source of harvested ducks and geese, and for evaluating changes in hunting regulations. MDIFW is striving to establish a sound waterfowl banding program that will enable us to adequately monitor harvests of ducks and geese produced in Maine. We are working with colleagues in the USFWS and USGS toward banding sufficient numbers of each species of waterfowl that breed in Maine.

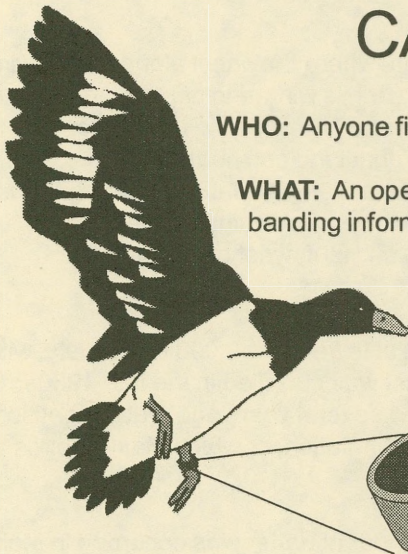
--Andrew Weik, Lindsay Tudor, and R. Bradford Allen

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

### ***Common Eider Study***

Working with waterfowl researchers with the Patuxent Wildlife Research Center (USGS) and Petit Manan National Wildlife Refuge (USFWS) staff, the Department is collaborating on a study to determine survival, recruitment, and band recovery rates of common eiders along the Maine coast. In 2003, we captured nesting females from colonies on 7 islands. Captures included 344 new birds banded and 39 returns. Weather and rough sea conditions made drive trapping efforts difficult last year. We captured and banded 186 new eiders at Metinic Island and 1,945 new birds at Green and Petit Manan Islands. In addition, we had 123 recaptures of our birds and 15 foreign retraps. Captures included 62 ducklings, 1,011 adult females, and 873 adult males. Our total bandings for the past two seasons is 4,328 new birds banded! ***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).***

--R. Bradford Allen



## ***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 have been two priority regions selected for projects in Maine to date. Efforts in these regions 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 Downeast focus area (Penobscot Bay east), the West Coast focus area (west of Penobscot Bay), and the Inland Wetlands planning area is planned as implementation of the North American Waterfowl Management Plan proceeds. Funding limitations have, to date, slowed progress on habitat initiatives in these focus areas. Money from two other programs, the **Loon Conservation License Plate** and the **Maine Outdoor Heritage Fund**, are now available and can be used to continue and expand these efforts.

## ***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 environments. In the Atlantic, there are three wintering populations with some evidence of genetic differences: Iceland, Greenland, and eastern North America. The eastern North American wintering population breeds from southern Labrador and southern Quebec to Newfoundland and northern New Brunswick, and winters from Newfoundland to North Carolina. The eastern North American population of harlequins is currently estimated at 1,800 individuals, of which about 1,200 winter in Maine. In Maine, harlequins are seldom observed, because they inhabit remote rocky shores on outer islands, including Isle au Haut, west of Mount Desert Island.

In the mid-1980s, the eastern North American wintering population was estimated at fewer than 1,000 individuals, with numbers declining at 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 listed status of the eastern North American harlequin population, of which Maine's birds are part, was changed recently from Endangered to "Special Concern".

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

In 1999, MDIFW completed an assessment of harlequin ducks in Maine. In 2001, harlequin management goals and objectives were developed by a public working group and was approved by the Advisory Council. A Harlequin Duck Management System was written and reviewed by the Wildlife Division in May 2004. In order to meet these goals and objectives, this document outlines three strategies for harlequin management: 1) population monitoring, 2) habitat protection, and 3) public outreach. Pending adequate funding, the Department will begin an annual monitoring effort in 2005. ***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

## ***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.

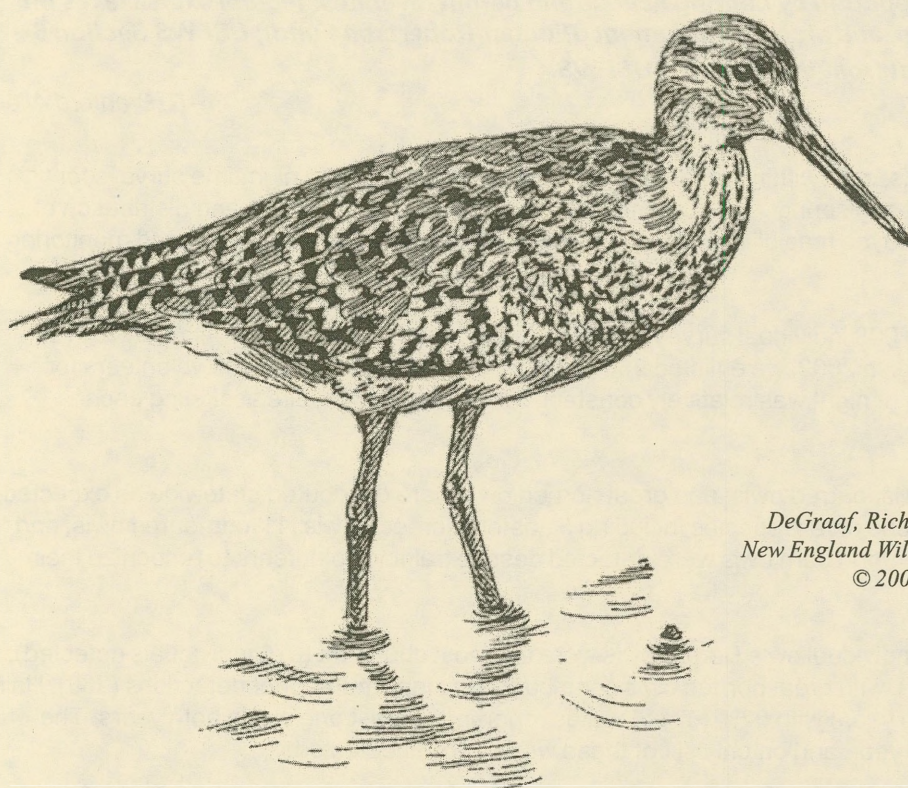
To achieve management goals and objectives developed by a public working group, the Coastal Migratory Shorebird Management System was updated and reviewed by the Wildlife Division in April 2003. This document outlines criteria used to select a subset of shorebird feeding and roosting areas that is critical to migratory shorebirds in Maine. Presently, 96 roosting areas and 120 feeding areas qualify as "Areas of Management Concern." Management recommendations are also prescribed to help biologists and landowners cooperatively protect and enhance shorebird habitats and meet the goals and objectives developed by the public working group.

Maine has only one species of shorebird that is a regular winter resident, the purple sandpiper. Eastern Maine supports the largest known wintering purple sandpiper population in North America. Most of the wintering areas important to purple sandpipers are offshore islands and ledges where they feed on invertebrates in the rockweed. Previously, the only survey that touched upon wintering purple sandpiper numbers was Audubon's Christmas Bird Count. This survey covered only selected areas along the mainland and did not cover offshore habitats. With threats from oil spills and consequent damage to shorebird habitats or shorebirds themselves, the Department identified the need to map purple sandpiper offshore habitats and acquire baseline data on population and distribution of wintering sandpipers.

In collaboration with the Maine Natural History Observatory, Acadia National Park, and Petit Manan National Wildlife Refuge, the Department completed its second year of a three-year study to determine numbers and distribution of purple sandpipers in Maine. This year, survey routes were expanded to include Frenchman's Bay, Blue Hill Bay, Jericho Bay, and Outer Penobscot Bay. Boat surveys were conducted from mid-December through March and over 7,000 purple sandpipers were recorded.

To determine seasonal movements and site fidelity, banding efforts continued this winter and 113 purple sandpipers caught and banded at 25 different locations. Birds were banded with USFWS metal bands and colored plastic leg bands uniquely coded by capture location. Morphometric body measurements taken on these birds may eventually identify the breeding origin and subspecies of Maine purple sandpipers. ***In Maine, the shorebird fieldwork is supported by hunting license and permit revenues, federal excise taxes on guns and ammunition (Pittman-Robertson Fund), Oil Spill Funds, State Wildlife Grant, National Park Service, the Outdoor Heritage Fund, and the Gulf of Maine Project (USFWS).***

--Lindsay Tudor



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## Maine Colonial Waterbird Inventory

Nineteen species of island-nesting wading birds, seabirds, and common eiders nested on approximately 10% of Maine's coastal islands in 2003. These birds are extremely vulnerable to human disturbance during the spring and early summer nesting season. For these reasons, close monitoring of nesting colonies is warranted. Survey results from 1976-77 (for comparison) and the period between 1994-2003 are provided in Table 18.

**Table 18. Nesting waterbirds, seabirds, and eider populations and number of colonies occupied, 1976-77 and 1994-2003.**

	1976 – 1977		1994 - 2003	
	Pairs	Colonies	Pairs	Colonies
Arctic Tern (ARTE)	1,640	9	3,225	8
Atlantic Puffin (ATPU)	125	1	573	4
Black-crowned Night Heron (BCNH)	117	8	118	7
Black Guillemot (BLGU)*	2,668	115	12,273	166
Cattle Egret (CAEG)	0	-	0	0
Common Eider (COEI)*	22,390	241	29,000	321
Common Tern (COTE)	2,095	24	5,632	22
Double-crested Cormorant (DCCO)*	15,333	103	19,680	125
Glossy Ibis (GLIB)	75	3	182	3
Great Black-backed Gull (GBBG)*	9,847	220	15,800	231
Great Blue Heron (GTBH)	903	18	644	14
Great Cormorant (GRCO)	0	-	136	8
Great Egret (GREG)	0	-	5	1
Herring Gull (HEGU)*	26,037	223	28,290	183
Laughing Gull (LAGU)	231	6	3,200	4
Leach's Storm-petrel (LHSP)	19,131	17	10,370	33
Little Blue Heron (LBHE)	4	2	8	2
Razorbill (RAZO)*	25	2	353	6
Roseate Tern (ROST)	80	3	285	3
Snowy Egret (SNEG)	90	4	213	5
Tricolored Heron (TRHE)	1	1	0	0

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

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

--R. Bradford Allen

## Owl Monitoring

As part of its broader mandate for all birds, staff within the Bird Group, have been conducting nighttime surveys for several years for owls in late winter and early spring. Our purpose has been to evaluate the status and distribution of several species, and secondly, to examine the feasibility and best methods for setting up a volunteer-based monitoring program in Maine.

During our two-year study, we conducted 608 individual surveys on 146 unique routes. An additional 44 routes were assigned, but no surveys were conducted. In 2002, we enlisted 260 volunteers for 166 routes and 192 volunteers for 138 routes in 2003. Survey effort by time of night was relatively constant, for both years, despite assigning each volunteer three different time periods.

Our data indicated northern saw-whet owls, barred owls, and great horned owls were distributed statewide as expected. Volunteers also recorded several detections of rare species including 5 eastern screech-owls, 11 long-eared owls, and 3 short-eared owls. No boreal owls or common barn owls were detected despite training volunteers to recognize their vocalizations.

We recorded nearly 1,500 detections of individual owls. Barred owls were the most abundant (670 individuals detected), followed by northern saw-whet owls (502), with great horned owls contributing the least number of detections (266). Half of the survey routes (73) were run in both years with 92% (67) of routes reporting at least one owl in both years. The remaining 73 routes were run just in one year, and on only six of these were no owls detected.



Environmental conditions had little overall effect on owl detectability. Neither moon phase nor cloud cover influenced the number of owls heard on surveys. Temperatures below 10°F appeared to be associated with a reduction in detections. However, we asked volunteers specifically not to conduct surveys below 0°F, so admittedly, our data were limited at cold temperatures.

Seasonal timing clearly affected the number of owls heard along our roadside routes. In general, numbers of northern saw-whet owl calls heard increased from a low in late January (both years) to a high in mid-March. In both years, numbers of northern saw-whet owl calls began to decline from early to mid-April. Barred Owls, however, displayed an opposite pattern with a generally slow steady increase in the number of calls heard per route from late January through late April in both years. Great horned owls peaked in late February/early March followed by a second increase in detections in early April.

The time of night when surveys were conducted was an important influence on the number of detections recorded. For all three species, the number of detections was greater in the late (0100-0400 h) time period. This relationship was most striking for barred owls and great horned owls, but slightly less so for northern saw-whet owls. Peak period for the latter species may occur slightly earlier in the evening than for other species.

Owl response to broadcasts varied greatly by species. northern saw-whet owls exhibited a strong positive response to playback of taped vocalizations of their own species. The number of individuals responding increased approximately two-fold over the initial passive listening period and nearly three-fold when their vocalization was broadcast as the third species in the sequence. Barred owls also increased their vocalizations nearly to two-fold after the taped broadcast. Great horned owl detections increased little and only in the final three minutes suggesting that playback order somehow may affect their response.

The order in which species are broadcast influenced the number of owls responding. This was most striking for northern saw-whet owls, but evident in other species as well. Total detections of northern saw-whet owls were greater when their vocalization was broadcast first than when it was the third species broadcast. Barred owl detections should not differ because they were always the second species broadcast. However, more were detected when the northern saw-whet was the first species in the sequence. Great horned owl detections increased markedly when we broadcast their vocalization third (i.e., northern saw-whet owl first). Interestingly, great horned owls also appeared to increase their responses about three to five minutes after broadcast of the barred owl vocalization.



The conclusion of our project takes place as other States have expressed interest in starting similar projects and an initiative known as Coordinated Bird Monitoring (CBM) is starting to take hold nationwide. As a result of this outside interest, our project has been identified as one that might be used as a model for other States. We will continue to conduct volunteer owl surveys for at least the next few years using a slightly modified protocol based on the results of our study. ***This work is being supported by the Loon Conservation Plate Funds, Outdoor Heritage Funds, USFWS, Maine Audubon, and hundreds of volunteers.***

--Thomas P. Hodgman

## Important Bird Areas

The idea of identifying the most significant sites for conservation of all bird species is not unique to Maine. In fact, it's a concept that has been ongoing worldwide for about a decade. In the United States, National Audubon Society has led the effort by engaging state-based partner organizations. In Maine, staff from the Bird Group and from Maine Audubon form a three-person coordinating team to lead the project. In addition, other members of MDIFW staff, as well as over a dozen outside individuals, serve as a panel of bird experts on the technical committee. The coordinators and technical committee have been working together to identify the top spots for birds in Maine. To date, we have received nominations for 41 sites and identified over 50 areas, which are typically made up of a cluster of important sites and often, but not always, centered around existing conservation lands. The intent of the project is to identify these areas, work cooperatively with landowners to maintain them in bird-friendly habitat, and to encourage that the areas remain open to public access for birding and other traditional outdoor activities. Currently, the technical committee is assembling data from state archives that can be used to objectively evaluate an area's potential, statewide importance to bird conservation. This project will continue through 2005. ***This work is being supported by the Loon Conservation Plate Funds, Outdoor Heritage Funds, National Audubon Society, and Maine Audubon.***

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

Species	Habitat	1966-03	1966-79	1980-03
Red-winged Blackbird	Marshes/Wetlands	-2.5*	-4.8	-0.2
Tree Swallow	Fields and Marshes	-1.1*	+2.5	-2.5*
Savannah Sparrow	Fields and Pastures	+0.8	+1.9	+0.6
Bobolink	Fields and Pastures	-1.2	+1.7	-2.6
Eastern Meadowlark	Fields and Pastures	-6.6*	-8.1*	-5.7*
Eastern Bluebird	Fields and Pastures	+8.1*	-3.6	+6.5*
Chestnut-sided Warbler	Brushy Areas	-2.6*	+1.1	-3.1*
Gray Catbird	Brushy Areas	-1.7*	-1.6	-1.5*
American Robin	Yards and Edges	+0.1	-1.4	+0.5
Baltimore Oriole	Forest and Edges	+1.5	+4.0	-0.6
Wood Thrush	Forest	-2.5*	+8.7*	-4.1*
Blue-headed Vireo	Forest	+5.6*	+19.3*	+3.3*
Ovenbird	Forest	+0.3	+4.3*	-0.1
Scarlet Tanager	Forest	+3.0*	+13.8*	+2.0*
Black-capped Chickadee	Forest	+1.6*	-7.1*	+1.3*

Each state, or group of states, has a working group comprised of individuals dedicated to conserving bird populations. Maine Partners In Flight has 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 MDIFW's Wildlife Resource Assessment Section. Bird Group personnel serve as Maine's representative to the regional Partners In Flight Working Group. Partners In Flight, at the regional and national levels, has encouraged state working groups to take responsibility for priority species within their borders, before they become rare, by using cooperative management approaches based on the best scientific data available.

Within the Maine working group, members are: participating in a mountaintop bird monitoring program; working with Maine Audubon Society to develop an Important Bird Areas program; and expanding participation in International Migratory Bird Day, the North American Migration Count, and the North American Breeding Bird Survey, as well as other bird conservation/outreach activities statewide. More information about Partners In Flight in the United States including a link to all the landbird conservation plans can be found at [www.partnersinflight.org](http://www.partnersinflight.org).

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 Management

### ***Roseate Tern***

Roseate terns nest with common and arctic terns on coastal islands in Maine. The islands are critical to survival of the species in Maine, since they typically provide undisturbed, predator-free nest sites. With an increase of gull populations (a predator and competitor of the terns), and human disturbance on the islands, tern numbers and reproductive success have declined so that the species is now listed as Endangered. In the 1980s, 50-80 pairs of roseate terns nested in Maine. Their numbers have increased in response to management; now 240 pairs nest in Maine on three islands. 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, 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, and recently on Outer Green Island in Casco Bay. Populations of common terns and arctic terns are also benefiting from these and other seabird restoration efforts. Common terns have increased from 4,361 pairs in 1994 to 5,632 in 2003; however, arctic terns have declined during the same time period from 5,029 to 3,225 pairs. A Gulf of Maine arctic tern study is in its last year 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).**

--R. Bradford Allen

## 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.

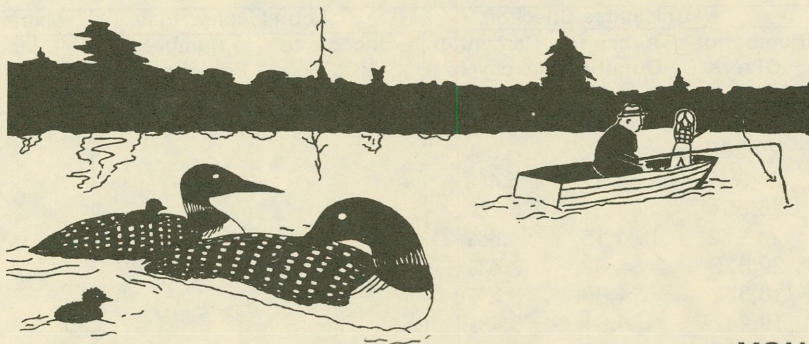
Bird Group personnel have also become involved in a number of other projects to broaden our participation in bird conservation and management activities. We participate in the North American Breeding Bird Survey, mourning dove surveys, seabird censuses and management activities, Partnerships for Wildlife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

## 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*



## **ENDANGERED AND THREATENED SPECIES GROUP**

Endangered and Threatened Species staff's primary responsibilities are to develop and implement recovery and management plans for assigned Endangered and Threatened wildlife and to coordinate amphibian, reptile, and invertebrate conservation initiatives. They also assist the Bird and Mammal Groups on assessment and management of Endangered and Threatened birds and mammals and regional biologists in the protection and conservation of Endangered and Threatened species and their habitats. Populations of Endangered and Threatened species are small and vulnerable, and they need special attention if they are to remain viable. Some, like the Katahdin arctic butterfly, Clayton's copper butterfly, and Tomah mayfly, are called endemics - they are found nowhere else in the world, but Maine. Much like emergency room patients, these species need immediate attention and treatment if they are to survive. To address the growing needs of the state's Endangered and Threatened species and to address state and federal mandates, the Wildlife Division has committed significant resources and the Endangered and Threatened species staff are specialized, key players in this effort. The following individuals are a highly dedicated group of experienced professionals:

**Charlie Todd**, Wildlife Biologist - Charlie has devoted over 25 years of his life to the recovery of bald eagles in Maine, and he serves on the national Bald Eagle Recovery Team. Charlie also leads MDIFW's peregrine and golden eagle recovery programs, and works closely with the Mammal Group on wolf and Canada lynx issues.

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

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

**Allen Starr**, Biology Specialist - Allen provides technical assistance on a variety of Endangered and Threatened species projects, including bald eagle Essential Habitat and Landowner Incentive Program. He is also involved in the ecoregional surveys for rare and special concern species.

### **Funding**

Stable funding to address nongame and endangered wildlife programs is desperately needed. Unfortunately, there has never been a stable and secure source of funding for nongame and endangered wildlife programs. The Nongame and Endangered Wildlife program began in 1983 with establishment of the Maine Endangered and Nongame Wildlife Fund, which is based on the "Chickadee Checkoff," a voluntary tax check-off on the state income tax form (Table 20).

**Table 20. A history of income derived from the "Chickadee Checkoff," Loon Plate, and Maine Outdoor Heritage Fund to benefit nongame and endangered wildlife programs.**

Year	Total Given	Chickadee Checkoff			Loon License Plate		Maine Outdoor Heritage Fund	
		Number of Givers	Average Donation	Percent of Taxpayers Giving	Income to MDIFW	Number of Registrations	Income to MDIFW	Number of Projects Funded
1984	\$115,794	25,322	\$4.57	5.3%				
1985	\$129,122	29,200	\$4.42	6.0%				
1986	\$112,319	26,904	\$4.17	5.4%				
1987	\$114,353	26,554	\$4.31	5.2%				
1988	\$103,682	24,972	\$4.15	4.8%				
1989	\$93,803	20,322	\$4.62	3.6%				
1990	\$88,078	18,332	\$4.80	3.2%				
1991	\$92,632	19,247	\$4.81	3.4%				
1992	\$95,533	18,423	\$5.18	3.2%				
1993	\$82,842	15,943	\$5.20	2.8%				
1994	\$84,676	10,863	\$7.79	2.0%	\$335,042	59,829		
1995	\$81,775	10,014	\$8.17	1.8%	\$457,307	81,662		
1996	\$90,939	11,024	\$8.25	2.0%	\$535,679	95,657	\$112,232	3
1997	\$77,511	8,686	\$8.92	1.5%	\$588,364	105,065	\$133,971	5
1998	\$48,189	4,065	\$11.85	0.7%	\$617,484	110,265	\$184,109	7
1999	\$47,908	3,775	\$12.69	0.7%	\$569,610	101,716	\$121,436	5
2000	\$44,496	3,297	\$13.50	0.6%	\$499,486	89,194	\$323,884	11
2001	\$49,348	3,713	\$13.29	0.6%	\$458,057	81,796	\$148,408	5
2002	\$50,412	3,661	\$13.77	0.6%	\$446,342	79,704	\$172,191	8
2003	\$55,348	3,792	\$14.60	0.6%	\$425,147	75,919	\$184,129	5

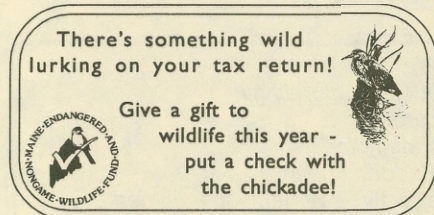


This was followed in 1993 by the Conservation Registration Plate (Loon Plate), a voluntary vehicle plate registration. Finally, the Maine Outdoor Heritage Fund, established in 1996, allocated proceeds from a lottery ticket sale to conservation, including 15% allocated to Endangered and Threatened species.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

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

### Chickadee Checkoff

Income from the Chickadee Checkoff dropped dramatically (40-50%) in 1998 (Table 20), because the check-off was unexpectedly moved from the primary tax form to a supplemental form. The checkoff has remained on a supplemental form since then. Income in 2003 (2002 tax returns) remained at a reduced level and, as in the past several years, only 0.6% of taxpayers contributed. Participation rates 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 \$14.60 in 2003. If participation levels could be increased to just the 3% range, income from the checkoff would increase about \$270,000 at 2003 average levels of giving. This could provide substantial increases for nongame and endangered programs.



### Conservation Registration Plate (Loon Plate)

The Loon Plate has been very successful, but competition with the free, general issue Chickadee Plate, introduced in July 1999, has significantly reduced this important source of funding. Loon plate sales rose from nearly 60,000 in 1994 to over 110,000 in 1998, providing MDIFW with up to \$617,000 annually for nongame and endangered wildlife projects (Table 20). 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. The introduction of the chickadee plate in 2000 resulted in about a 20% decline in the sales Loon Plate. Revenue to MDIFW dropped by another 9% (\$41,429) in 2001. In the 2002 legislative session, many new license plate designs were introduced - all of which may have reduced revenues from the Loon Plate. A new lobster plate was introduced in 2003. Since 2001, revenues from the Loon Plate to MDIFW have dropped another 7%. We believe that all new plate designs will result in a measurable loss of Loon Plate revenues.



### Outdoor Heritage Fund

In 2003, MDIFW received \$184,129 from competitive grants from the Outdoor Heritage Fund for 5 wildlife diversity projects. Sales of Outdoor Heritage Fund lottery tickets have fluctuated, but income generated to the Fund was lower and competition was greater for Outdoor Heritage funds in 2003. Fifteen percent of the revenues are dedicated to endangered species projects. This important new source of funding is benefiting many nongame and endangered species.



These voluntary means of contributing provide the core funding for Maine's nongame and endangered species programs. All money donated, whether through the tax checkoff, vehicle registrations, grants, or direct gifts, are deposited into the Maine Endangered and Nongame

Wildlife Fund - a special, interest-bearing account from which money can only be spent for the conservation of Maine's nongame and endangered species.

**Given our limited resources, Maine can be proud of the accomplishments made for nongame and endangered wildlife in the last 20 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, 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!

## Endangered Species Listing

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 21), and the growing threats to wildlife habitat, we cannot afford to be complacent.

What follows is a summary of the programs and major accomplishments for Endangered and Threatened wildlife, and herptiles and invertebrates that have not already been covered under the "MAMMALS" and "BIRDS" sections in this report. More information on Maine's endangered species and nongame wildlife projects can be found on MDIFW's website by selecting "wildlife" at [www.mefishwildlife.com](http://www.mefishwildlife.com).

**Table 21. Maine and Federally listed Endangered and Threatened species (as of June 10, 1997).**

### Maine Endangered Species:

Golden Eagle - *Aquila chrysaetos*  
Peregrine Falcon - *Falco peregrinus* **B**  
Piping Plover - *Charadrius melodus* \*\*  
Roseate Tern - *Sterna dougallii* \*  
Least Tern - *Sterna antillarum*  
Black Tern - *Chlidonias niger*  
Sedge Wren - *Cistothorus platensis*  
American Pipit - *Anthus rubescens* **B**  
Grasshopper Sparrow - *Ammodramus savannarum*

### Maine Threatened Species:

Bald Eagle - *Haliaeetus leucocephalus* \*\*  
Razorbill - *Alca torda*  
Atlantic Puffin - *Fratercula arctica*  
Harlequin Duck - *Histrionicus histrionicus*  
Arctic Tern - *Sterna paradisaea*  
Upland Sandpiper - *Bartramia longicauda*  
Northern Bog Lemming - *Synaptomys borealis*  
Spotted Turtle - *Clemmys guttata*

Blanding's Turtle - *Emydoidea blandingii*  
Box Turtle - *Terrapene carolina*  
Black Racer - *Coluber constrictor*  
Roaring Brook Mayfly - *Epeorus frisoni*  
Ringed Boghaunter (dragonfly) - *Williamsonia lintneri*  
Clayton's Copper (butterfly) - *Lycaena dorcas claytoni*  
Edwards' Hairstreak (butterfly) - *Satyrrium edwardsii*  
Hessel's Hairstreak (butterfly) - *Callophrys hesseli*  
Katahdin Arctic (butterfly) - *Oeneis polixenes katahdin*

Loggerhead Turtle - *Caretta caretta* \*\*  
Swamp Darter (fish) - *Etheostoma fusiforme*  
Tidewater Mucket (freshwater mussel) - *Leptodea ochracea*  
Yellow Lampmussel (freshwater mussel) - *Lampsilis cariosa*  
Tomah Mayfly - *Siphoniscia aerodromia*  
Pygmy Snaketail (dragonfly) - *Ophiogomphus howei*  
Twilight Moth - *Lycia rachelae*  
Pine Barrens Zanclognatha (moth) - *Zanclognatha martha*

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

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

Sei Whale - *Balaenoptera borealis* \*  
Leatherback Turtle - *Dermochelys coriacea* \*  
Atlantic Ridley Turtle - *Lepidochelys kempi* \*  
Shortnose Sturgeon - *Acipenser brevirostrum* \*  
Atlantic Salmon - *Salmo salar* \*  
American Burying Beetle - *Nicrophorus americanus* \*?/  
Karner Blue - *Lycaeides melissa samuelis* \*?/

note: \* = Federally listed Endangered Species;  
\*\* = Federally listed Threatened Species;

? = current presence uncertain in Maine.  
**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)



## Endangered and Threatened Species 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 (see page 56), piping plovers, and least terns.

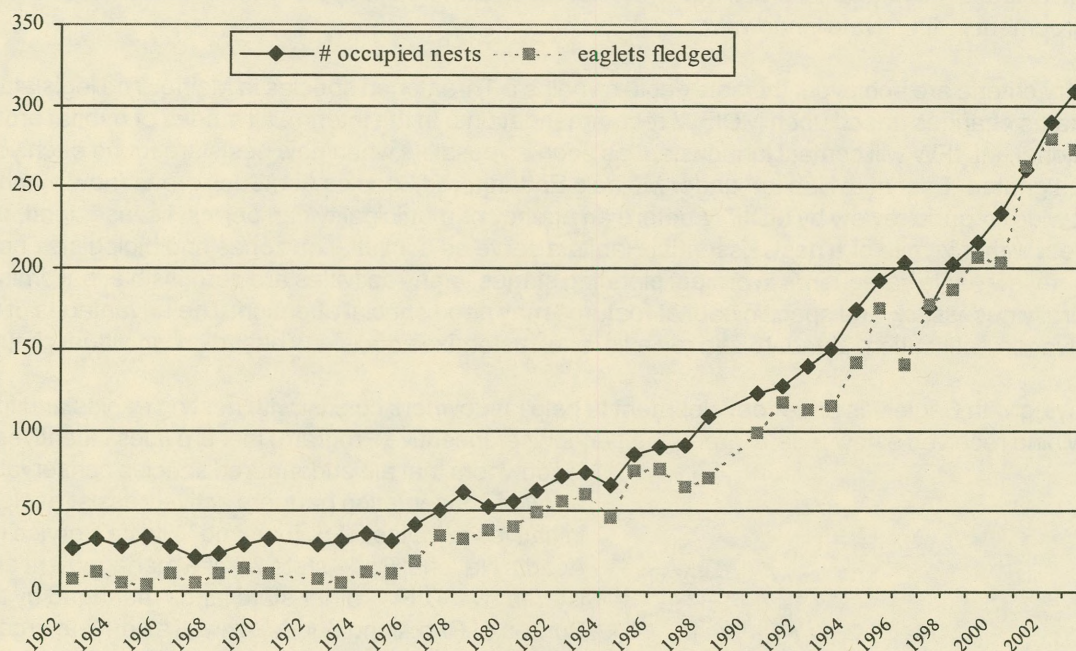
In 2001, the Endangered Species Group developed a new book entitled "Maine's Endangered Wildlife," which was printed in 2003. It was distributed to most of the school libraries in Maine and was also sold to the public. The book was very well received and quickly sold out. It has now gone to the printer for its second printing, and should be available shortly for purchase through the Department's website at [www.mefishwildlife.com](http://www.mefishwildlife.com) or by contacting the Department at (207) 287-8000.

--George Matula

### Bald Eagle

Continued progress in bald eagle recovery throughout the U.S. has led to renewed discussions about removing them from federal and state lists of Threatened Species. The statewide population census identified 309 nesting pairs in 2003. Surveys are still underway in 2004, but the preliminary total already exceeds 325 pairs. Annual increases in the count have averaged 8% each year since 1990 (Figure 7) when Essential Habitat regulations were adopted in Maine to minimize disturbance impacts to breeding eagles. This was one of several management strategies important to eagle recovery across the state.

Figure 7. Bald eagle recovery trends in Maine.



In 1978, the bald eagle was designated an Endangered Species in Maine and 42 other states. The state's remnant population was the last hope for the species in the northeastern U.S. The future of Maine's eagles was very much in question following marked declines of breeding numbers, reproductive success, and nest distribution. Annual counts dropped as low as 21 nesting pairs and 4 young eaglets in the mid-1960s. By the late-1970s, the only stronghold for Maine eagles was in eastern Washington County.

The small, relict population became vulnerable to other threats. Disturbances from new land uses, increasing recreational pressures, and waterfront development became problematic along many coastal waters, rivers, and lakes that provide habitat to nesting bald eagles. Human-related eagle deaths were an additive problem. A variety of environmental contaminants impacted reproduction of Maine eagles and subjected the population to decades of decline.

Empty nests and unoccupied eagle habitats prevailed across the state. Environmental contaminants impaired eagle nesting for three decades. DDE (a by-product of the insecticide DDT) caused shell thinning and frequent egg breakage before hatching. Harmful levels of PCBs and mercury sometimes killed developing embryos. The limited supply of young eaglets was not enough to offset eagle deaths. Following controls on these environmental contaminants, steady improvements during the 1980s and 1990s enabled initial recovery of the species. A total of 273 young eaglets took flight from Maine nests last year.



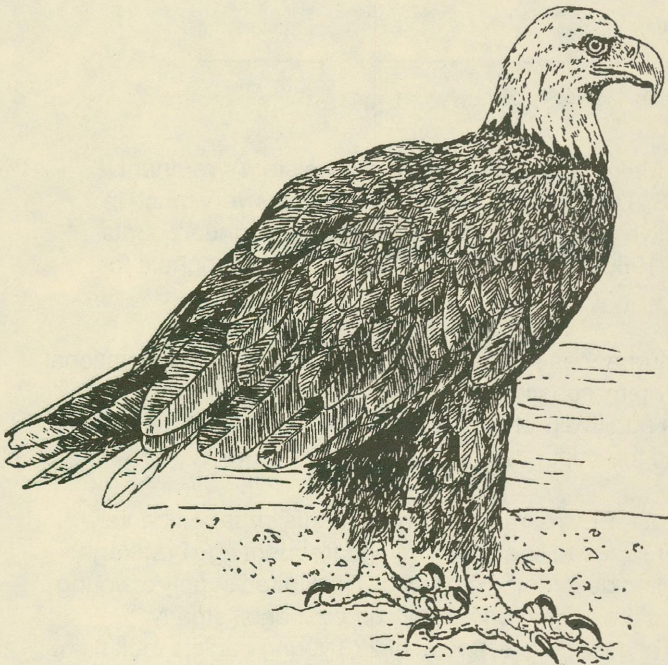
This comeback was symbolized by a downgrade of bald eagle status to that of a Threatened Species across the lower 48 states in 1995. The Maine legislature similarly reclassified bald eagles to a Threatened Species under state law in 1996. "Downlisting" does not reduce the legal protection afforded by these laws. Both state and federal agencies are now evaluating future delisting of bald eagles altogether. Several initiatives are currently underway to minimize future threats to eagle habitat and other potential setbacks once special regulations related to the Endangered Species Act no longer apply. A federal statute, the Bald Eagle Protection Act, will still prohibit direct harm to eagles and their nests.

Most eagles nest in undeveloped settings, but some live close to human activities. It is not yet certain that these "tolerant" eagles can persist in more populated regions without special efforts. Stewardship of eagle 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, current state objectives for delisting bald eagles in Maine include both biological criteria and habitat safeguards:

- ◆ The breeding population exceeds 150 nesting pairs for 3 consecutive years - achieved: 1996.
- ◆ Annual eaglet production exceeds 150 fledglings for 3 consecutive years - achieved: 1999.
- ◆ No annual population declines of 5% or more for 3 consecutive years - achieved: 2000.
- ◆ Federal "delisting" from Endangered/Threatened status - pending.
- ◆ Habitat "safety net" to maintain species recovery (efforts ongoing through 2004-2005), including
  - At least 50 nesting areas in conservation ownership or appropriate easements - achieved 2004;
  - And at least 100 additional areas under conservation ownership, appropriate easements, or cooperative agreements with private landowners.

Until all recovery criteria are achieved, the bald eagle remains a Threatened species in Maine. The legislature holds authority for status changes based upon MDIFW recommendations. In the interim, all modes of habitat protection remain operational. MDIFW will contact landowners as soon as possible when new nests are found each year. Qualified sites will be designated "Essential Habitat" under Maine's Endangered Species Act. Such areas (now numbering 462 locations statewide) require review by MDIFW before an agency or municipality can permit, license, fund, or carry out a proposed project within ¼ mile of a nest. Essential Habitats serve as consultation zones and biologists encourage landowners to review eagle safeguards in project planning stages. Many activities are permissible, but timing modifications are generally necessary, and specific habitat features may need special attention. The advantages of this regulation include advance notification, standardized reviews, and customized decisions based on individual circumstances.

A pamphlet "Living with Eagles" is under development to help landowners coexist with nesting eagles and foster their stewardship. Maine received a new federal grant (the Landowner Incentive Program) that provides incentives to private landowners that aid endangered species conservation. A wide array of conservation partners actively assist eagle habitat initiatives in Maine: U.S. Fish and Wildlife Service refuges, Acadia National Park, state wildlife management areas administered by MDIFW, other state lands managed by the Maine Bureau of Parks and Lands, as well as private organizations like The Nature Conservancy, Maine Coast Heritage Trust, and local land trusts. A broader initiative "Beginning with Habitat" allows owners and communities to consider the mosaic of important wildlife habitats, including those used by bald eagles, during town planning.



The progress achieved in bald eagle recovery programs is indeed remarkable. Improvements in Maine are mirrored across most of the species range. Bald eagles now nest in 48 different states. Maine provided 3 young eaglets for a reintroduction effort in Vermont during June 2004. The U.S. Fish and Wildlife Service will reexamine removal of the Threatened Species designation for bald eagles after a national monitoring strategy is completed, and after "delisting" and clarification of "harassment" prohibitions under the Bald Eagle Protection Act are resolved. ***This work is supported by federal Section 6 and Pittman-Robertson funds, as well as state revenues from the Loon Plate and Chickadee Checkoff funds.***

--Charlie Todd



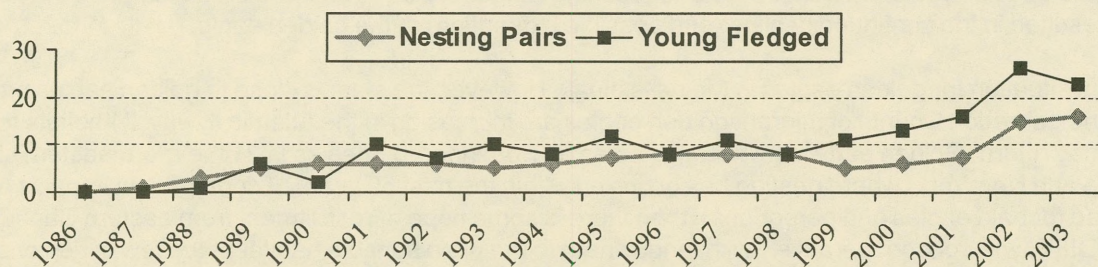
## Peregrine Falcon

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

More than 35 nations have since conducted active programs to restore peregrine falcons. A total of 144 young peregrines produced in captive-breeding programs were successfully released at 8 different locations in Maine during 1984-1997. More than 93% of young peregrines released in Maine have successfully made the transition into the wild. The Peregrine Fund, U.S. Fish and Wildlife Service, Acadia National Park, and MDIFW jointly conducted this venture using methods based upon traditional falconry techniques. Some peregrines reintroduced in Maine were encountered as breeding birds in New Hampshire, Massachusetts, and New York. Others have been documented as migrant visitors to points as far away as Cuba and Venezuela!

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

Figure 8. Trends of Peregrine Falcon recovery in Maine, 1986 - 2003.



Significant improvements finally occurred in 2002. The statewide breeding population doubled in a single year. Peregrines inhabited 15 eyries in 2002 and rose to sixteen in 2003. The preliminary 2004 count fell slightly to 14 nesting pairs. A closer look reveals some instability in the small, recovering population. A total of 21 different eyries were occupied during the last 3 years, but 7 vacancies may reflect the loss of an individual adult: one of the inherent risks from small numbers and special needs typical of endangered species such as the peregrine. Most of Maine's steady gains have been in southern Oxford County near the state's western border. This area may benefit by recruitment from neighboring populations in New Hampshire and Vermont.

A record high of 26 young peregrines fledged from ten eyries in 2002. Small declines in the last 2 years are not yet cause for alarm unless the trend continues. There is no evidence of persisting contaminant impacts on Maine's re-established peregrines but the population needs careful attention to monitor for this or other related problems.

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., Mead Paper Co., and especially Acadia National Park have championed stewardship of peregrines nesting on their property. Biologists can advise rock climbers where breeding peregrines are present. Hikers and rock climbers have assisted by reported peregrine sightings during their recreational pursuits. Peregrines have proven quite adaptable, and managers have successfully maintained peregrines in some high profile settings with only modest precautions. Although major improvements in their status in the western U.S. are largely responsible for federal delisting of peregrines in 1999, they are still recognized as Endangered Species under state jurisdictions throughout the eastern U.S. **State revenues from the Loon Plate and Chickadee Checkoff funds support this work.**

--Charlie Todd



## **Golden Eagle**

Long considered the rarest breeding bird in the eastern U.S., there is no evidence of nesting by golden eagles in Maine since 1999. This species once inhabited mountainous cliffs in the Appalachian Mountain corridor from the mid-Atlantic States to Labrador and northern Quebec. Two successful golden eagle eyries were last found in Maine during 1984. There are natural habitat limitations for this species in the East, which have made them rare throughout recorded history. Golden eagles are relatively numerous in the West, where open terrestrial habitats favor their normal lifestyle of preying upon small mammals.

A single nesting pair persisted in Piscataquis County from 1985 to 1998, but only a single adult occupied the site during 1999 - 2000. The nesting territory appears abandoned since 2001. Throughout this period, the Piscataquis pair had the only breeding record for the species in the northeastern United States, although nesting failure plagued them. The site had been occupied by golden eagles as far back as 1736. Unhatched eggs recovered in 1996 revealed significant contaminant burdens: a repeat of the same toxic problems that once impaired reproduction among bald eagles and peregrines.

Golden eagle sightings are reported sparingly across the state during migration periods in fall and spring. For the past two winters, a golden eagle has mixed in with bald eagles along the mid-coast region. All suspected sightings of golden eagles are welcomed, especially during the late-spring or early summer when adults should be close to nests.

Only eleven golden eagle eyries are historically known in Maine, but historical perspectives are not always accurate for birds of prey, like eagles, that favor remote settings. All were cliff nests, although one pair built an alternate nest in a white pine tree more than a mile away from their cliff nest. Tree nesting should be more commonplace in a heavily wooded state such as Maine.

Suitable foraging areas are perhaps more limiting. Wading birds, such as great blue herons and bitterns, are foremost among golden eagle diets in Maine, but these wading birds were heavily tainted with contaminants. Other than the 1996 eggs from Piscataquis County, there is no other direct evidence that environmental contamination was a primary culprit behind the decline of golden eagles in the East. Only 3 young goldens were produced in Maine eyries during the last 25 years. As the species vanished from its historic breeding range to the south, there is little surprise that low productivity in Maine resulted in the continued decline (and possible extirpation) of the golden eagle.

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

—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 sandplain grasslands are rare in Maine, and require special vegetation management.

The largest nesting population of grasshopper sparrows in Maine occurs on 600 acres of sandplain grassland and blueberry barrens on the Kennebunk Plains in West Kennebunk. This site annually supports 30 - 60% of the statewide breeding population. The 2003 census conducted by The Nature Conservancy identified 39 singing males, the best indicator of territorial pairs. This is somewhat below previous high counts of 49 singing males recorded there in 2001 and forty-six in 2002. Insufficient funds precluded monitoring at other sites last year.

Funds from Lands for Maine's Future and The Nature Conservancy were responsible for the previous purchase of the Kennebunk Plains, the premiere setting for this species in the Northeast. It is now a Wildlife Management Area managed by MDIFW and The Nature Conservancy. The vegetation must be actively managed to sustain suitable habitat for grasshopper sparrows, other grassland birds, and rare plants. Prescribed burns and brush-hogging have been regularly conducted to maintain this grassland. MDIFW provides technical assistance to the U.S. Navy and the City of Sanford to maintain grasshopper sparrow habitat at the Brunswick Naval Air Station and Sanford Municipal Airport, respectively.



Conservation efforts for grasshopper sparrows benefit a suite of bird species nesting in grasslands: most notably upland sandpipers (a state Threatened Species); vesper sparrows and eastern meadowlarks (both are recognized as Species of Concern); and several others experiencing regional declines like bobolinks, horned larks, savannah sparrows, short-eared owls, and northern harriers. Maine is a stronghold in the Northeast for upland sandpipers and vesper sparrows. Guidelines for managing grassland birds in the Northeast during agricultural practices, delayed mowing of hayfields, and airfield operations were developed by the Massachusetts Audubon Society and distributed to interested landowners by MDIFW. Additional work is being done by MDIFW to map priority grasslands in Maine and to develop guidelines for early successional habitat, including grasslands, in cooperation into other northeastern states. ***State revenues from the Loon Plate and Chickadee Checkoff funds support this work.***

—Charlie Todd

### ***Black Terns***

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

Nokomis students have continued their annual survey of black terns, thus providing the state with 13 years of continuous information on this species' distribution and status. In 2003, a total of 98 nesting pairs were documented from 6 sites. This represents the highest count of black terns on record for Maine (Ten-year average = 79.9 pairs). However, breeding activity is concentrated at relatively few marsh locales, primarily in the Sebasticook River watershed, with no activity documented in 2003 from three previously occupied breeding sites.

In 1998, Dr. Fred Servello and graduate students Andrew Gilbert, from UMaine Department of Wildlife Ecology, began a study of black tern ecology and populations in central Maine. This work has provided considerable insights into the breeding, feeding, and habitat ecology of Maine's black tern population. In 1999 and 2000, nests were located and observed from blinds to determine productivity. Over 200 adults and chicks were captured and color banded to determine survival rates, movements between colonies, and year-to-year fidelity to nesting areas. 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 were 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. Shannon Kearney, another graduate student, began fieldwork in 2001 to investigate sources of predation of black tern chicks and nests and his results will be available soon. ***Funding for this work comes from Loon Conservation Plate, Chickadee Checkoff funds, U.S. Fish and Wildlife Service, and Maine Outdoor Heritage Fund.***

—Phillip deMaynadier

### ***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 2003, 61 pairs of piping plovers nested in Maine, at 19 sites, and produced 78 fledglings. 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 2003 was 1.28 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, and count fledglings. As a result of a new beach



management plan with residents of Wells and Drakes Island beaches, over 20 volunteers monitored plovers on their beach. ***This work is supported by federal Section 6 funds; Loon Plate and Chickadee Check-off funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Phil Bozenhard, Region A

### **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 156 pairs at 5 sites in 2003. Since 1979, total productivity in Maine has ranged from 12 to 123 young fledged annually. In 2003, 156 pairs nested at 5 sites and produced 66 fledglings. Productivity in 2003 was .42 chicks per pair.

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 have developed management recommendations for each of the nesting beaches to aggressively confront predation and disturbance problems.

***Funding for this work comes from the Outdoor Heritage Fund; Loon Plate and Chickadee Checkoff funds; hunting license and permit revenues; and excise taxes on sporting arms, handguns, ammunition, and archery equipment (Pittman-Robertson Fund).***

--Phil Bozenhard, Region A

### **Amphibian and Reptile Studies**

#### **Partners in Amphibian and Reptile Conservation**

MDIFW is cooperating with an initiative entitled Partners in Amphibian and Reptile Conservation (PARC). Modeled partly after the successful Partners in Flight (PIF) bird conservation program, PARC's mission is to forge partnerships among diverse public and private organizations in an effort to stem recent declines of amphibian and reptile (herptile) populations worldwide. MDIFW participates in PARC meetings designed to improve communication on efforts to conserve threatened herptile species in the Northeast, and to identify new projects of regional priority for implementation. To date, PARC-Northeast has made progress on drafting model state regulations, compiling a list of regional species of conservation concern, and publishing Habitat Management Guidelines for habitats of special importance to northeastern herptiles. For more information on herptile conservation efforts, or to join the northeastern working group, visit the PARC website at [www.parcplace.org](http://www.parcplace.org). ***Funding for this work comes from Loon Conservation Plate and Chickadee 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). During a 4-year period, over 250 volunteers from around the state contributed approximately 1,200 records of observations of amphibians and reptiles. This initiative culminated in the 1992 publication of the book, *The Amphibians and Reptiles of Maine*. The first edition sold out within two years of publication.

By 1998, considerable new information had been compiled since publication of the first edition, and there was increasing demand for updated information on the state's amphibians and reptiles. Editors Malcolm Hunter, Aram Calhoun, and Mark McCollough revised a second edition, incorporating information from 1,300 new records into updated range maps and species narratives, and added color photographs, and a CD of the calls of the frogs and toads of Maine. Copies of the book, *Maine Amphibians and Reptiles* (published in 1999), can be ordered for \$20.05 plus \$3.50 S&H from the Information Center, MDIFW (207 287-8000).

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

-- Phillip deMaynadier



## ***Amphibian Monitoring***

Since 1989, scientists have been concerned that amphibian populations may be declining worldwide. Maine, like many other states, had little data to assess trends in amphibian populations. In 1996, MDIFW and Maine Audubon received an Outdoor Heritage Fund grant to initiate a statewide amphibian-monitoring program, which was launched in 1997. Maine's Calling Amphibian Survey is part of a nationwide survey organized by the U.S. Geological Survey. Sixty-one frog and toad road monitoring routes were randomly established across the state. Each spring, volunteers drive their routes 3 times, recording the diversity and intensity of calling frogs and toads. Several vacant routes still exist with new volunteers especially needed in northern Maine. New volunteers are provided training materials to assist them with the identification of calling amphibians in Maine. With seven years of data collected we anticipate the potential for determining preliminary population trends for several species of frogs and toads within the next few years. Currently leopard frogs, pickerel frogs, and mink frogs are among the state's least commonly reported species. Those interested in participating in this citizen-science initiative should contact Maine Audubon's Susan Gallo at 207-781-2330 or Dr. Aram Calhoun at 207-581-3010, or visit the website at: [www.maineaudubon.org/conserve/citsci/mamp.shtml](http://www.maineaudubon.org/conserve/citsci/mamp.shtml). **Funding for this work comes from Maine Audubon Society, Loon Conservation Plate, and Chickadee Checkoff funds.**

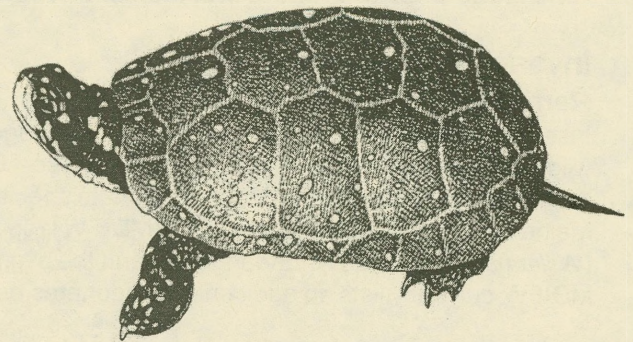
*--Phillip deMaynadier*

## ***Blanding's and Spotted Turtles***

Two of Maine's rarest reptiles, the spotted and Blanding's turtles, are semi-aquatic species preferring small, shallow wetlands in southern Maine. Spotted turtles are small (5 to 6 inches long), have yellow spots on the head, tail, and legs and a somewhat flat, yellow-spotted upper shell. Blanding's turtles are medium-sized turtles (7 to 10 inches long) with a yellow throat and light-colored flecking on a domed, helmet-shaped shell. Little was known about either of these species until the Maine Amphibian and Reptile Atlas Project (MARAP) was conducted in the 1980s. With financial support from the U.S. Fish and Wildlife Service and the Environmental Protection Agency, MDIFW has intensified efforts to learn more about the distribution of these rare turtles over the past 14 years. To date, more than 2,600 wetlands have been surveyed yielding over 100 new locations for these rare species.

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

In addition to habitat loss, Maine's Blanding's and spotted turtles regularly face the threat of road mortality during their nesting and inter-wetland migrations. While road-killed wildlife is a common sight on our back roads and highways, there is probably no group of organisms in Maine for which roads represent a more serious threat to long-term population viability than turtles, and no place more threatening than southern York County where road density and traffic volumes reach their peak. For millions of years the turtle's shell has proven to be a successful adaptation, conveying high adult survivorship and longevity by offering a deterrent to would be predators. Unfortunately, a strategy of freezing and withdrawing into a shell is not successful against vehicle tires. Recent population analyses of several freshwater turtle species indicate that as little as 2-3% additive annual mortality of adults is unsustainable, leading ultimately to local population extinction. In short, the attrition of just a few breeding adult turtles every year to road-kill has no natural precedent, and may rank among the most important factors threatening the extinction of Blanding's and spotted turtle populations in Maine. In light of this issue, MDIFW and the University of Maine initiated a cooperative research project in 2004 to investigate the extent and significance of road mortality to rare turtles in southern Maine. Doctorate candidate Fred Beaudry has radio-tagged 30 turtles to date and is using information from their nesting and wetland movements to assess the future viability of endangered turtles in Maine in light of estimated road mortality rates. MDIFW hopes to work with cooperators - including Maine Dept. of Transportation, The Nature Conservancy, and local towns - to apply results from this research toward designing mitigation measures for problem road sections (e.g. "turtle crossing" signage, barrier fencing, and turtle underpasses), and conversely, identifying those remaining roadless remnants of the southern Maine landscape where turtle population viability remains strongest.





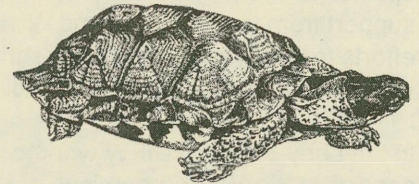
MDIFW is committed to working with landowners and towns to help conserve remaining large blocks of habitat needed to sustain viable populations of these rare turtles. Southern Maine's landscape is rapidly developing, and one of the best remaining locations to achieve turtle conservation goals is on a 35,000-acre area surrounding Mt. Agamenticus in York County. MDIFW is working closely with the Mt. Agamenticus Conservation Coalition - including the U.S. Fish and Wildlife Service, The Nature Conservancy, local land trusts, water districts, and towns - to protect habitat for turtles and other rare species in this area, the largest remaining contiguous coastal forest ecosystem between Acadia National Park and the New Jersey Pine Barrens. To learn more about progress on habitat conservation in the Mt. Agamenticus area visit <http://www.tnc.org/maine/>. **Funding for this work comes from Loon Conservation Plate, Chickadee Checkoff funds, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Maine Dept. of Transportation, The Nature Conservancy, and the Maine Outdoor Heritage Fund.**

—Phillip deMaynadier

## Wood Turtles

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

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



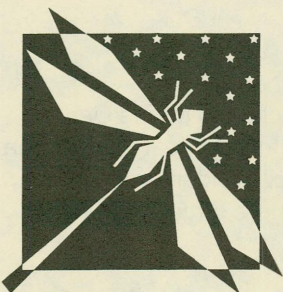
Dr. Judith Rhymer, a University of Maine faculty member, is now completing work on the conservation genetics of wood turtles. Preliminary results suggest that one of Maine's downeast watersheds, the Narraguagus, hosts unique wood turtle populations that may have been isolated from other populations for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

—Phillip deMaynadier

## Invertebrate Studies

### Rare Dragonflies

Insects in the order Odonata, damselflies and dragonflies, are a significant and conspicuous component of Maine's wildlife diversity. Presently, 165 species have been documented in the state, comprising nearly 38% of the total North American fauna. Several of Maine's odonate species are of regional and national conservation concern. In 1997, at Maine Inland Fisheries and Wildlife's (MDIFW) request, the Legislature designated the ringed boghaunter dragonfly (*Williamsonia lintneri*) as Endangered, and the pygmy snaketail dragonfly (*Ophiogomphus howei*) as Threatened. MDIFW currently lists an additional 30 odonates as Species of Special Concern.



There is increasing demand for information on the status, distribution, habitat relationships, and conservation of damselflies and dragonflies in Maine. Forest industry, hydroelectric, land-trust, and municipal interests are requesting information from MDIFW concerning these and other species of conservation concern for environmental permitting, relicensing projects, voluntary habitat protection, and land acquisition. Demand for information is also growing from the scientific community and the general public as interest in statewide biodiversity issues increases. While odonates are considered highly sensitive to freshwater habitat degradation and experiencing declines nationwide, baseline information for the group has been lacking in Maine, until recently.



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

1. Public Outreach and Involvement:

⇒ Volunteer participation statewide:	>200
⇒ Volunteers trained in MDDS training seminars:	95
⇒ Newsletter issues published ("Mainensis"):	4
⇒ Major press articles covering the MDDS project:	5
⇒ Website hits ( <a href="http://mdds.umf.maine.edu/~odonata/">http://mdds.umf.maine.edu/~odonata/</a> )	>13,000

2. Scientific Contributions:

⇒ New U.S. species records:	2
⇒ New state species records:	9
⇒ New Rare, Threatened, and Endangered species records:	297
⇒ Total records submitted (% increase over 1999 baseline):	17,264 (229%)

**Funding for this work comes from Loon Conservation Plate, Chickadee Checkoff funds, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the Maine Outdoor Heritage Fund.**

--Phillip deMaynadier

### Rare Butterflies

Hessel's Hairstreak, Clayton's Copper, Bog Fritillary, and Crowberry Blue are just some of the state's rarest butterflies that are both colorful in name and on the wing, if you are fortunate enough to see one. In an effort to improve our knowledge of the status and habitat preferences of these and other rare butterflies MDIFW is actively studying the group during statewide regional surveys. A conspicuous and ecologically important insect, butterflies have attracted increasing attention from scientists and the general public. By documenting the distribution and habitat relationships of the state's butterfly fauna MDIFW hopes to improve its understanding of the group and prioritize conservation efforts towards those species most vulnerable to state extinction.

Further supporting this goal, MDIFW recently received a grant from the Maine Outdoor Heritage Fund to contract a professional lepidopterist, Dr. Reginald Webster from New Brunswick, to help assemble a baseline atlas and assessment of the state's butterfly fauna. Drawing from published literature and specimen records located in museums and amateur collections throughout the Northeast, Reggie will assemble the first comprehensive atlas and statewide database of Maine's butterfly fauna – an essential tool for future conservation and management of the group by MDIFW and cooperators. Scheduled for completion in 2004, the baseline atlas project has added 11 previously undocumented species to the state list for a total of 114 butterflies known from Maine. Five of the 114 species are believed extirpated from the state and ten have been listed as state endangered or special concern. Contact MDIFW to receive an updated checklist of the butterflies of Maine ([phillip.demaynadier@maine.gov](mailto:phillip.demaynadier@maine.gov) or call 207-941-4239). **Funding for this work comes from Loon Conservation Plate, Chickadee Checkoff funds, The Nature Conservancy, Maine Dept. of Conservation, and the Maine Outdoor Heritage Fund.**

--Phillip deMaynadier

### Roaring Brook Mayfly

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

Unofficially dubbed the "Roaring Brook mayfly", this little insect remained a big mystery to MDIFW biologists now responsible for ensuring its conservation. Nothing was known about its life history, habitat requirements, or conservation



needs. Its current status and distribution on Katahdin were also unknown, since no one had looked for it there since its original collection at "Roaring Brooks". To complicate matters, the species' taxonomic validity had come under question. Its similarity to a closely related species had led at least one mayfly expert to suggest that the original specimen might be just a variant form of a more common *Epeorus* found in Maine. This growing uncertainty surrounding the status of *E. frisoni* took another turn in 2001, when a second record was reported based on a specimen collected in New York in 1932. This newly documented occurrence now cast doubt on the species' status as a Maine endemic, as well.

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

In 2003, with special permission from Baxter State Park, MDIFW surveyed Roaring Brook and two of its tributaries to collect specimens of the *Epeorus* species that occur there. In order to get good coverage of mayfly emergence periods, twelve surveys were conducted from mid-June to early October. Using a net stretched between two poles, biologists were able to collect aquatic larvae as they were manually disturbed from the substrate and washed downstream. Because the original species description was based on a single adult, only those *Epeorus* larvae that were within days of becoming adults were collected. These were then placed in special containers and left in the stream until the winged adults emerged and the species could be accurately identified.

With the expert help of Dr. Steven Burian, a mayfly taxonomist from Southern Connecticut State University, MDIFW was able to confirm that some of the specimens collected from the two tributaries of Roaring Brook matched the specimen collected by Frison in 1939. By comparing them to other species of *Epeorus* found in Maine, we were also able to confirm that *Epeorus frisoni* was indeed a distinct and valid species! Dr. Burian also looked at the specimen collected from New York and determined that it had been misidentified. Sixty-five years after its discovery, *Epeorus frisoni* is still known from only one place in the entire world - Mt. Katahdin, Maine! Its status as a "narrow endemic" (i.e., having an extremely limited distribution) is very rare, and *E. frisoni* is the only endemic mayfly known in all of New England! Its single occurrence also continues to support the species' listing status as state-endangered - allowing MDIFW to confidently advance an investigation of the mayfly's life history and conservation needs. Already, we know a little bit more - it emerges throughout the summer from mid-July to early October, and it occurs in small, cold, high elevation streams. And now we can identify it from both larvae and adult! All of this information will help MDIFW to more effectively survey for new occurrences statewide and further investigate the species' rarity. **Funding for this work comes from the Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), "Loon Plate" revenues, and "Chickadee Checkoff" contributions on the State income tax form. Thank you!**

--Beth Swartz

### **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 know much more about the status of our 10 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 2003, MDIFW continued collaboration on two research projects with Dr. Judith Rhymer of the University of Maine and Dr. Cyndy Loftin of the Maine Cooperative Fish and Wildlife Research Unit to advance the understanding and conservation of Maine's two rarest freshwater mussel species - the yellow lampmussel and tidewater mucket. Graduate student Morgan Kelly continued her studies to research the genetic structure of their populations within and between watersheds. This information will be an important tool for resource managers to consider in the conservation and management of individual populations of these two listed species. A second graduate student project was also funded to study the effects of dam removal and mussel relocation on yellow lampmussels and tidewater muckets. Proposals to remove both small and large hydro-power dams are becoming increasingly common in Maine, yet we have no way of knowing what the long-term effects will be on these two species - both of which are found in impoundments. When a dam is removed where rare mussels are present, the only conservation tool available to MDIFW biologists at this time is to move or relocate the stranded mussels to new habitat. However, we have no post-monitoring data to let us know if our efforts were successful, or if we need to change or improve our mussel relocation techniques. All of the information learned from these University research projects will greatly assist MDIFW in conserving these rare species.

Much of MDIFW's management activities involving freshwater mussels in 2003 centered on reviewing numerous project proposals and permit applications, and working with applicants to avoid or minimize any loss of listed mussel species as a result of project activities. For example, MDIFW worked closely with the FPL Energy Maine Hydro to develop and approve a plan to minimize the loss of yellow lampmussels and tidewater muckets that would be affected by the proposed removal of the Fort Halifax Dam on the Sebasticook River.

More information on Maine's mussels can be found in *The Freshwater Mussels of Maine* by Ethan Nedeau, Mark McCollough and Beth Swartz. This book is a comprehensive guide to freshwater mussels, written in non-technical language, and includes species accounts, range maps, distribution tables, and identification guides for all of Maine's freshwater mussel species. It is available through the Information Center at MDIFW headquarters in Augusta and costs \$10. **Funding for this work comes from the U.S. Fish and Wildlife Service (State Wildlife Grants), Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), University of Maine, U.S. Geological Survey, "Loon Plate" revenues, and "Chickadee Checkoff" contributions on the State income tax. Thank you!**

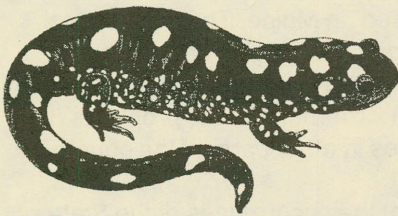
--Beth Swartz



## 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 or foraging habitat. Some, like spotted salamanders, blue spotted salamanders, and wood frogs, breed more successfully in these fishless habitats than in any other wetland type. Additionally, vernal pools provide habitat for a variety of small mammals, wading birds, waterfowl, aquatic invertebrates, and several state-listed animal species in Maine including Blanding's turtles (Endangered), spotted turtles (Threatened), wood turtles (Special Concern), four-toed salamanders (Special Concern), ribbon snakes (Special Concern) and ringed boghaunter dragonflies (Endangered).

At this time, MDIFW is actively working with cooperators at UMaine and Maine Audubon Society to promulgate voluntary protection measures for these valuable wildlife habitats. Workshops on vernal pools have been held throughout the state for land managers, educators, land trusts, and land owners. In 2003, a *Maine Citizen's Guide to Locating and Documenting Vernal Pools* was updated and republished in cooperation with Maine Audubon Society and University of Maine and is currently available from MDIFW (207-287-8000). Following extensive input from experts in Maine's wildlife and forest management community, a new document entitled *Forestry Habitat Management Guidelines for Vernal Pool Wildlife* was recently published by the Wildlife Conservation Society and is now available from the Maine Audubon Society (207-781-2330, ext. 222). A companion document for developed landscapes, *Best Development Practices:*



*Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*, is also now available from Maine Audubon. Together, these publications provide techniques and recommendations designed to help maintain functioning vernal pool landscapes throughout Maine and the glaciated Northeast. Additionally, a vernal pool fact sheet, describing threats and management considerations, is available upon request from MDIFW for use by landowners, municipalities, land trusts, and other cooperators.

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 University of Maine doctorate student, Robert Baldwin, to research the wildlife use and characteristics of vernal pools in four southern Maine townships – Falmouth, Biddeford, Kennebunkport, and North Berwick. Preliminary results from Rob's work suggests that wood frogs and other pool-breeding amphibians range widely in the forested landscape following breeding and that intact upland forests and forested swamps provide important habitat outside of the pool-breeding season. Rob also developed a landscape model that highlights the vulnerability of vernal pools to habitat loss and fragmentation from a lack of sufficient conservation lands and wetland regulatory protections in southern Maine.

Finally, 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. Criteria for designating "significant" vernal pools are still being evaluated but are likely to include a) the presence of a state-listed species, or b) evidence of exceptionally high diversity and abundance of pool-breeding amphibians. Designating a subset of pools as "significant" could help MDIFW and the Department of Environmental Protection provide regulatory guidance on development activities within a critical upland buffer zone surrounding the state's highest value vernal pools. ***Funding for this work comes from Loon Conservation Plate, Chickadee Checkoff funds, U.S. Environmental Protection Agency, Maine Audubon Society, and the Maine Outdoor Heritage Fund.***

—Phillip deMaynadier

## 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.

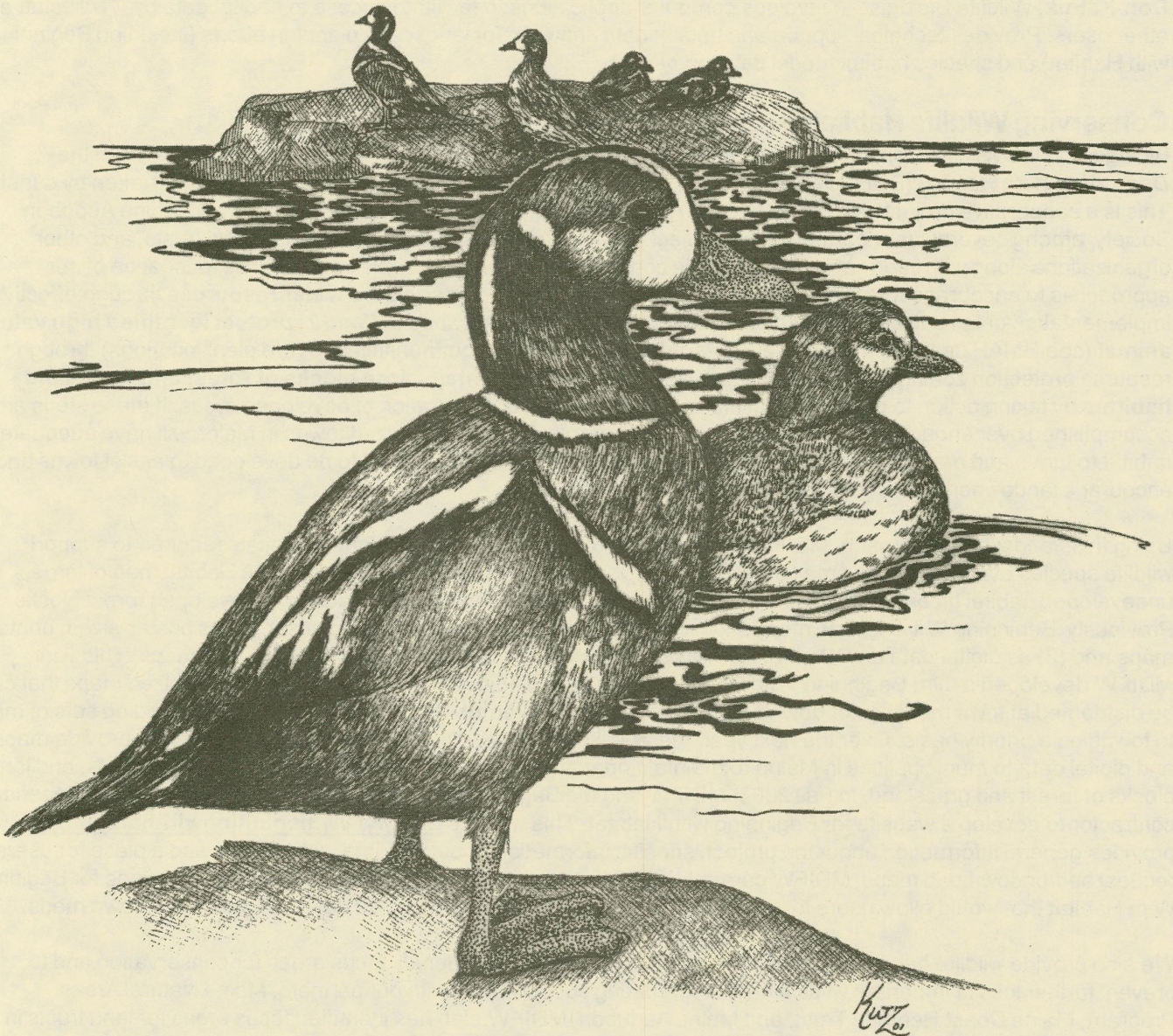
At the heart of every Natural Heritage Program is a complex data management system designed to track information on the status, life history, conservation needs, and occurrences of rare species and natural communities. As a partner in the Natural Heritage network, MDIFW is responsible for maintaining the zoological portion of this database for Maine, while the Natural Areas Program (Maine Department of Conservation) maintains the rare plant and natural community components. MDIFW's zoological database currently contains information on more than 1,100 animal species native to our state. It also tracks more than 2,500 existing and historical occurrences of rare species in Maine, ranging from bald eagle nest sites and roseate tern nesting islands to rare freshwater mussel areas and black racer snake sightings. This



information is invaluable to MDIFW for status assessment, species management, and habitat conservation for endangered, threatened, and other rare species. The 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 2003, over 100 new occurrence records were entered into the database bringing the total number of rare species locations tracked to 2,560. Statewide data were also provided for the Department's *Habitat Mapping Application* (HMAP), an updated digital version provided to all seven MDIFW regional offices to assist with environmental permit review, information requests, habitat protection, and conservation planning initiatives. Also in 2003, MDIFW continued working to upgrade its information system for rare species by developing and updating files that document the life history, status, conservation needs, and occurrences of our rare animal species, and by incorporating new data management and mapping standards being developed and adopted throughout the Natural Heritage Network. **Funding for this work comes from the U.S. Fish and Wildlife Service, Maine Outdoor Heritage Fund (Maine's conservation lottery ticket), The Maine Chapter of The Nature Conservancy, "Loon Plate" revenues, "Chickadee Check-off" contributions on the State income tax form, hunting license and permit revenues, and the Pittman-Robertson Fund (excise taxes on sporting arms, handguns, ammunition, and archery equipment).** Thank you!

--Beth Swartz





## WILDLIFE HABITAT GROUP

Conservation and management of wildlife habitats continues to be a high priority for MDIFW Wildlife Biologists. Lands owned by the state or our Department are managed by our Regional Biologists in the Wildlife Management Section. The Wildlife Biologists in the Resource Assessment Section in the Bangor office address statewide wildlife habitat issues. The Wildlife Habitat Group in our Bangor office spearheads these efforts.

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

**MaryEllen Wickett**, Wildlife Biologist – Manages wildlife habitat data and develops computer databases to store and analyze these data. 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 and provides GIS support for a variety of projects.

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

### Conserving Wildlife Habitats and Open Space in Organized Towns

Biologists in the Wildlife Habitat Group have played a major role in the development and implementation of the **Beginning with Habitat** (BwH) project that continues to be one of the most important projects undertaken by our staff. This is a cooperative project with Maine Natural Areas Program, U.S. Fish & Wildlife Service, and Maine Audubon Society, among several other partners. This project provides habitat data to municipalities, land trusts, and other organizations along with information to help guide conservation of these valuable habitats. The foundation of our approach is to encourage towns to 1) **protect riparian habitats and associated water resources** through effective implementation of the current Shoreland Zoning regulations and prescribed buffers, 2) **protect identified high value animal** (see HMAP 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 organized towns in Maine will have adequate habitat to thrive and maintain their populations. We recognize more “tools” need to be developed to assist towns and encourage landowners to participate in this effort.

Using this “landscape” approach, MDIFW has completed a series of maps to identify habitats required to support wildlife species over Maine’s diverse landscape. This year, MDIFW used the Beginning With Habitat map of large, undeveloped habitat blocks to develop a new map that specifically shows the location of undeveloped forest blocks. Previously, Beginning With Habitat information has been provided to towns in two formats; (1) as poster-sized, printed maps and (2) as digital data on CDs that towns with GIS software can incorporate into their own maps. This year, MDIFW developed a third Beginning With Habitat product; small (8½ x 11”) versions of the poster-sized maps that can be distributed at town meetings or downloaded easily over the Internet. We are in the process of providing sets of maps to towns on a priority basis. Over the next year, the Wildlife Division will continue to work proactively to provide maps and digital data to municipalities in Maine to maintain riparian habitats, high value plant and animal habitats, and large blocks of forest and grassland. In Fall 2003, MDIFW and the Beginning With Habitat group worked with an independent contractor to develop a website for Beginning with Habitat. This website <http://www.beginningwithhabitat.org/> provides general information about the project, specific information about the data in the maps, and a place for users to request and/or download maps. MDIFW currently is helping develop an Internet Mapping Service webpage for Beginning With Habitat that would allow users to interactively combine and examine habitat data and create their own maps.

We also provide 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 our partners, Maine Natural Areas Program, Maine Coast Heritage Trust, and Maine Audubon, MDIFW staff has identified focus areas for land trusts in downeast, mid-coast, central, and southern Maine. **Maine’s Outdoor Heritage Fund and Maine citizens who purchase Maine’s Loon License Plate provided partial funding.**



## Conserving Wildlife Habitats in Northern and Eastern Maine

Currently, MDIFW has mapped, or is mapping, Deer Wintering Areas (DWA), Essential Habitats, other Endangered, Threatened, or special concern species locations, and inland Waterfowl and Wading Bird Habitats (WWH) in northern and eastern 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 and eastern 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.

As indicated above, MDIFW has been working on a landscape approach to protection of habitat in southern Maine (Beginning with Habitat). Now we have turned our attention to developing a landscape approach to protection of habitat in northern and eastern Maine, particularly for the largely forested areas in unorganized towns. Our staff has been working with other interested parties, including landowners, to develop a landscape approach based on cooperation.

## Protecting Wildlife and Their Habitats From Oil Spills

### ***Oil Spill Response and Natural Resource Damage Assessment/Restoration Planning***

With over 6 billion gallons of petroleum products shipped into Maine on an annual basis, and much more on ships traveling along Maine's coast with crude oil bound for refineries in St. John, New Brunswick or gasoline, diesel, or heating oil bound for eastern cities, the risk for a catastrophic oil spill in Maine is not inconsequential. Fortunately, with the exception of the Julie N oil spill in 1996, when almost 200,000 gallons of oil spilled in Portland Harbor, the oil spills that we encounter are usually in the 1000 to 10,000 gallon range. Recent spills include the 6000 gallon tanker truck spill in Brooks, the 8000 gallon tanker truck spill in South Portland, the Viking Lady spill in Portland, and the Pete spill in Portland. These spills do not result in "Exxon Valdez"-like environmental impact, but they do have an adverse and accumulative impact to Maine's natural resources. Therefore, we have begun to assess the damage to natural resources resulting from these smaller spills and to work with the spiller to either restore the damaged natural resources or to contribute to a fund to be used for various projects to compensate for the loss. Recent projects include a fringing marsh study, a PAH assessment in Portland harbor, an educational program to involve students in studying the Fore River, and a bilge pump-out facility at the Portland Fish Pier.

Because the risk to our coastal natural resources from an oil spill is so great, we coordinate our planning efforts with the Department of Environmental Protection, the Department of Marine Resources, the Department of Conservation, the U.S. Fish and Wildlife Service, the U.S. Coast Guard, the Environmental Protection Agency, and the National Oceanic and Atmospheric Administration. We provide input to the State of Maine Marine Oil Spill Contingency Plan and the federal Maine-New Hampshire Area Contingency Plan; identify and map ecologically sensitive habitat along the coast and work with others to develop prevention strategies to protect these areas in the event of a spill; and, participate in response drills within the state, with the State of New Hampshire, and with Canada. We also maintain a contract with the International Bird Rescue Research Center to assist us during oil spills and to provide training for our staff and volunteers.

**If you are interested in volunteering to help rehabilitate oiled birds and wildlife during a marine oil spill, please mail your name, address, and daytime phone number to:**

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

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

### ***Coastal Waterbird Surveys Underway to Identify Sensitive Areas***

To improve oil spill response capabilities and provide species management information, MDIFW staff in cooperation with the U.S. Fish and Wildlife Service, initiated a 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 are used to provide habitat updates for a variety of coastal bird species to generate revised Environmental Vulnerability Index (EVI) oil spill response maps. Vulnerable areas will be given the highest priority during cleanup operations following an oil spill.

***This work is partially funded by Maine citizens who purchase Outdoor Heritage lottery tickets with additional funding from Maine's Oil Spill Fund.***



## Facilitating Environmental Review

MDIFW regional staff has access to the digital (computer) version of wildlife habitat data maintained in our Bangor office, which allows them to complete timely project reviews from their desktop computer (see HMAP description below). We also produce hard copy maps for various users. These habitats include:

- Endangered, Threatened, and special concern 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 wildlife habitats of concern.

MDIFW staff will: 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; cooperatively work with landowners for land management or project modifications that will retain the value of important natural features and wildlife habitats; and, share knowledge of these special habitats with landowners for their information, appreciation, and planning. Although inventory of these habitats will never be complete, the information provided is the most current available to MDIFW. ***This work is partially funded by Maine citizens who purchase Outdoor Heritage lottery tickets and by the Outdoor Heritage Fund.***

## Essential Habitats for Endangered Species Webpage

MDIFW's maps of Essential Habitats for Endangered species (bald eagle nest sites; roseate tern nesting areas; and piping plover/least tern feeding, roosting, and brood-rearing areas) change as new information is added by MDIFW biologists and as existing Essential Habitats are resurveyed. Having access to the most current information is critical for MDIFW staff, other agencies, and the general public. This year, the Habitat Group developed an Internet Mapping Service that allows anyone with an Internet connection to access our most current Essential Habitat data at any time. The web page provides an interactive map showing the location of Essential Habitats on top of USGS topological maps and allows users to search the state by township, query information about specific habitats, and print out hard-copy maps. The web page is hosted by the Maine Office of GIS and went online in April 2004 and can be accessed at [http://www.state.me.us/ifw/wildlife/etweb/habitat/ims\\_welcome.htm](http://www.state.me.us/ifw/wildlife/etweb/habitat/ims_welcome.htm).





## 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. and Maine Forest Service's forest resurvey data for the State of Maine collected over the past five years at over 3000 plots throughout the state). These surveys will result in a complete statewide survey every year on a rolling five-year survey basis with more timely data for our wildlife habitat assessments. 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 other agencies to utilize satellite data to develop and update land cover map showing habitats at a statewide scale. Other available data on human population trends, agriculture, development, etc. are being assembled to assess effects of humans on the availability of wildlife habitat.

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

MDIFW staff developed updated computer database applications for Deer Wintering Areas (DWAs), Waterfowl and Wading Bird Habitats (WWHs), and coastal islands & seabird nesting islands. These databases have been installed on the Geographic Information System (GIS) server in the Bangor office and allow more efficient tracking of these important habitats by our staff. Using their local computers, Wildlife Division biologists can access these databases over the State Wide Area Network. Regional biologists will be able to update the files for DWAs and WWHs in their regions as changes occur. Our Bird Group staff will provide 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. *The Outdoor Heritage Fund provided partial funding for some of this work.*

## Using Current Technology to Protect Habitats

Using the GIS based in our Bangor office, the Habitat Group staff is able to track a wide variety of wildlife habitats with digital data, analyze these data, and generate maps of important habitats for protection and management. During the past year, we continued to enter mapped boundaries or point locations into the GIS. This process is referred to as "digitizing," or creating a computerized digital version of the hardcopy maps. MDIFW is using standard base maps generated by the State Office of GIS (MEGIS) on which to locate many of the wildlife occurrences and habitats. In addition to digitizing the mapped features or habitats (DWAs, seabird nesting islands, bald eagle nests, etc.), information about these features or habitats is also being entered so we can determine how and when these locations are being utilized by wildlife. Using the GIS, maps can be produced for Department biologists, other agencies, landowners, conservation groups, etc. for general information, regulatory purposes, planning, and many other uses.

## Habitat Mapping Application (HMAP)

The Habitat Group continues to take advantage of improvements in software to make MDIFW's habitat data more accessible and user-friendly to our staff, other agencies, and the public. The GIS software we use to map habitats now allows us to link directly to databases managed by the Maine Office of GIS and to exchange information between GIS software and other programs like Microsoft Word. To take advantage of these developments, the Habitat Group has completely rewritten the Habitat Consultation Areas and Mapping Program (HCAMP) as a **new application called HMAP (Habitat Mapping Application)**. Regional Biologists now can rapidly search any area for wildlife habitats mapped by MDIFW and automatically generate publication-quality search reports in Microsoft Word. HMAP also serves WRAS biologists as a tool for accessing and querying all of MDIFW's most current habitat data, creating publication-quality maps, and overlaying our habitat data on features mapped by other agencies like road data from the Department of Transportation and the Enhanced 911 project, high resolution aerial photos, and hydrology (rivers, streams, etc.). By creating this application in-house (as opposed to the HCAMP application, which was developed by an independent contractor), the Habitat Group can provide MDIFW staff with complete training, technical support, and the ability to quickly improve and customize the HMAP program to staff needs. This year, the Habitat Group also placed copies of MDIFW habitat data at the Maine Office of GIS so other agencies can access our data directly. This eliminates the need to send new copies to each agency every time we update our data and ensures that other agencies are always using our most current information.

Several major projects (described previously) have required the use of GIS over the past year: continuing work on identification of sensitive coastal wildlife areas for marine oil spill response; entry of DWA regulated by LURC into GIS; digitizing DWA and WWH in southern and western Maine; tracking Essential Habitats for Endangered or Threatened species; and mapping locations of Endangered, Threatened, or special concern species being tracked in the wildlife portion of the Natural Heritage database. Habitat Group staff also provided GIS assistance to analyze habitat information in support of the Canada lynx study in northern Maine. Based on forest stand information and radio-collared lynx locations, we are determining those habitats used by lynx throughout the year.



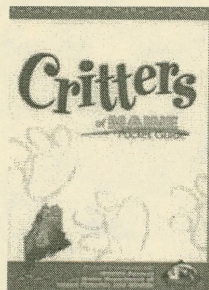
We are continuing to build on our current knowledge of GIS and computer technology to provide the support needed to meet the goals and objectives identified for protection and management of wildlife habitats. We are planning for additional training and integration of new approaches, such as Global Positioning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

*--Habitat Group*

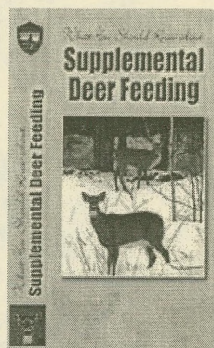




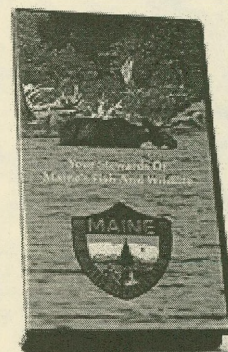
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**Critters of Maine  
Pocket Guide**



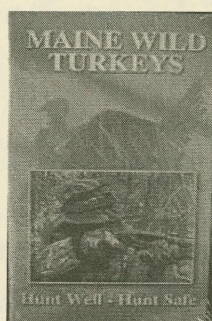
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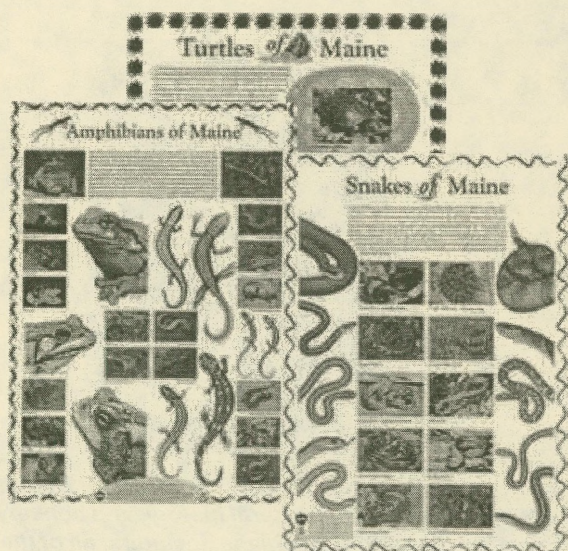
**Moose Hunting in Maine**



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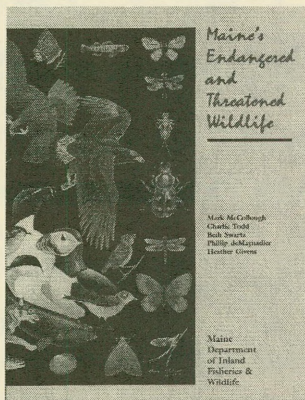
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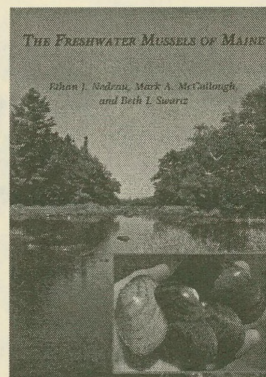
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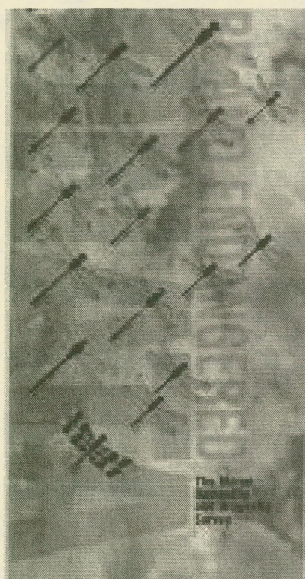
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 284 STATE STREET, 41 STATE HOUSE STATION  
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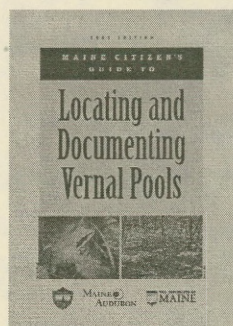
Maine's Endangered and Threatened Wildlife. 2003. by McCollough, et. al. The first and only comprehensive guide to all of Maine's animals on state and federal endangered species lists. Soft cover, 8½"x11", 117 pages with color photographs and original artwork. \$10.00. (cover artwork available as poster).



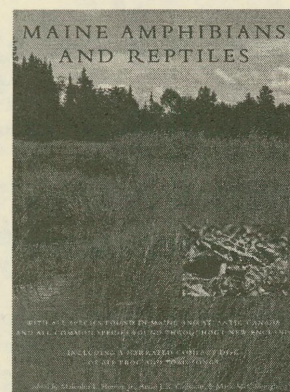
The Freshwater Mussels of Maine. 2000. by Nedeau, et. al. Guide to the biology, ecology, and conservation of freshwater mussels, with species accounts and identification tips for 15 species found in Maine, Atlantic Canada, and New England. Soft cover, 8½"x11", 118 pages with color photographs and original artwork. \$10.00.



**Maine Rare and Endangered Odonata Poster.** Detailed color illustrations of Maine's rare dragonflies and damselflies with species accounts and color diagrams to aid identification. Full color, 17"x 24".



Maine Citizen's Guide to Locating and Documenting Vernal Pools. 2003. from MDIFW, Maine Audubon, and University of Maine. Manual to the location, identification, and monitoring of vernal pool habitat, with information about vernal pool ecology and indicator species. Soft cover, 8½"x11", 96 pages with black and white and color photographs, and original artwork. \$10.00 (includes tax and shipping).



Maine Amphibians and Reptiles. 1999. edited by Hunter, et. al. Guide to the identification, natural history, and conservation of 38 species of reptiles and amphibians, including all of the species that occur in Maine and Atlantic Canada, and all of the common species found in New England. Soft cover, 7"x10", 254 pages with color photographs and original artwork. Includes CD of frog and toad songs with identification tips. \$19.95.



# MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

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

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Robert Savage, York County; telephone: 637-2261

## 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  
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Maine Forest Service  
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