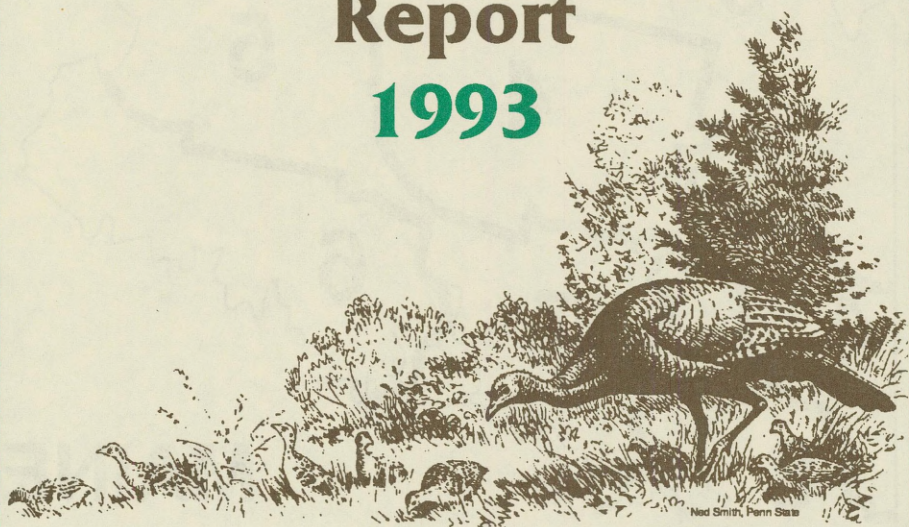


**Maine Department of  
Inland Fisheries and Wildlife**

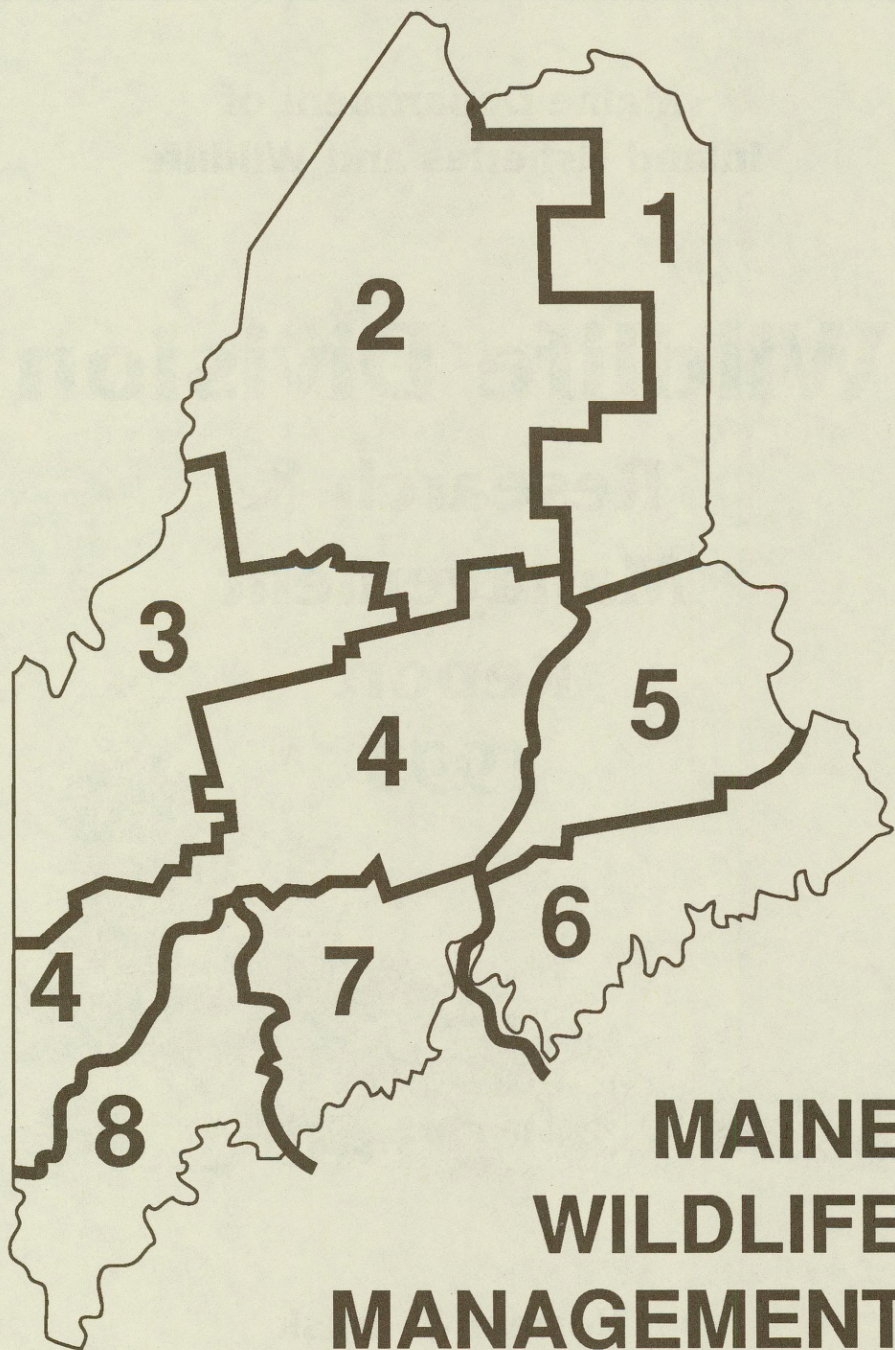
# **Wildlife Division**

## **Research & Management Report 1993**



**Norman E. Trask  
Acting Commissioner**





**MAINE  
WILDLIFE  
MANAGEMENT  
UNITS**



# FOREWORD

Maine's varied landscapes provide a home for a rather unusual blend of wildlife species, many of which occur at the northern or southern limits of their range. Climatic conditions, topography, and the nature of agricultural land, forests, and adjoining wetland and marine habitat change dramatically as one travels from east to west, and north to south. As a result, each region of the state has its own assortment of wildlife conservation problems and needs.

Each year, the Wildlife Division undertakes a broad array of projects designed to monitor the status and needs of the state's wildlife resources. This work includes many traditional game management programs, as well as an increasing number of initiatives directed toward restoration of threatened and endangered species and identification and protection of important wildlife habitat.

This report summarizes the Division's species and habitat management programs. We hope it will give you a better understanding of the status of Maine's wildlife, and the programs that maintain, and hopefully enhance, these highly valued resources.



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

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



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## INTRODUCTION

It is with great pride that this report is being made available to you. Pride in the fact that, in spite of the problems associated with "downsizing" state government over the past four years, the staff of the Wildlife Division remained focused and committed to the wise use and management of our wildlife resources.

They are to be commended for the professional manner in which projects were implemented during this difficult period. I am convinced that this team can resolve any challenge that may confront them.

I hope that you find our "Research and Management Report" a convenient reference of the results of management initiatives conducted over the past year. If you would like additional information about programs addressed in this report, please feel free to contact wildlife biologists at the Wildlife Resource Assessment office in Bangor or Regional Wildlife Management headquarters located in Gray, Sidney, Machias, Strong, Greenville, Enfield, or Ashland.

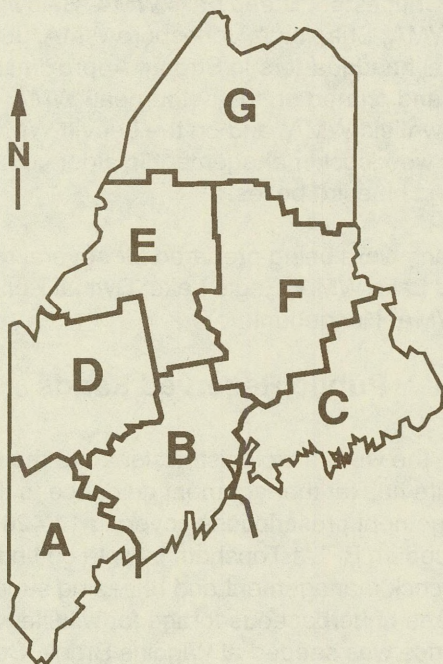
Gary Donovan  
Director, Wildlife Division



# ***REGIONAL WILDLIFE MANAGEMENT***

The Regional Wildlife Management Section of the Maine Department of Inland Fisheries & Wildlife (MDIFW) is made up of seven regional field offices located throughout the state (Figure 1). Each office is staffed by two or three wildlife biologists who are responsible for administering and accomplishing the Department's wildlife management program within their assigned geographic area. The Sidney regional office also has a limited number of support personnel for operations at the Steve Powell Wildlife Management Area (WMA) on Swan Island, and the Letourneau WMA at Frye Mountain. In addition, the Regional Wildlife Management Section employs a wildlife biologist who is assigned to work with the Regional Managers of the Bureau of Public Lands (BPL). It is his responsibility to provide technical assistance to the Bureau regarding wildlife habitat management on the state's 500,000 acres of public reserved lands. He also assists MDIFW with forest management issues on the Department's wildlife management areas.

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





# **SUMMARY OF 1991-1992 WILDLIFE MANAGEMENT ACTIVITIES**

## **Habitat Management**

The MDIFW conducts wildlife habitat management activities on its wildlife management areas, on lands administered by the Bureau of Public Lands, and on some privately owned lands. MDIFW manages approximately 75,000 acres in 69 properties and 26 conservation easements, and 287 coastal islands and ledges.

### **Wildlife Management Areas**

Many activities on MDIFW's wildlife management areas are directed at maintaining existing developments and structures, such as roads, trails, bridges, buildings, signs, boundary lines, fences, and gates. Dams, dikes, and levees also require periodic maintenance and adjustment if they are to continue to provide wetland habitats for a variety of wildlife species. In addition, 1,500 waterfowl nest boxes were maintained on the WMAs. Small fields are also mowed to set back succession and to maintain diversity of habitat types; approximately 500 acres were mowed during the summer of 1992.

Timber management activities to enhance wildlife habitat occurred on 600 acres at the Leavitt WMA, Charleston; Steep Falls WMA, Baldwin; Brownfield WMA, Brownfield; Walker WMA, Shapleigh; Jonesboro WMA, Jonesboro; and at the Department's regional headquarters in Strong. Approximately 1,350 wild apple trees were released and pruned on the Letourneau WMA, Montville; Mendall WMA, Prospect; Brownfield WMA; and on the Leavitt WMA. In addition, biologists also conducted woodcock management in alder coverts, maintained goose pastures, and checked bluebird boxes.

Preliminary WMA plans were being prepared for several recently acquired properties: Dickwood Lake WMA, Eagle Lake; Dwinal Pond WMA, Lee; and the Kennebunk Plains WMA, Kennebunk.

### **Public Reserved Lands**

During the past year, the wildlife biologist assigned to the Bureau of Public Lands provided wildlife habitat management guidance to the Bureau through review of land management prescriptions covering 14,426 acres. Upland management continued on BPL's Topsham lot with cutting of strips through alder cover for woodcock management and releasing suppressed apple trees. Approximately 60 acres of herbaceous forage for wildlife was established on BPL lands, and wild rice was seeded at Wiggins Brook, Seboeis Lake Inlet,



Blanchard Brook, Lost Pond Inlet, and Gassabias Lake. Four experimental potholes were constructed at Thompson Deadwater. Ninety-two waterfowl nest boxes were also maintained on Public Reserved Lands.

## Private Lands

Much of MDIFW's habitat management on private lands is directed at identifying and managing deer wintering areas (DWA). During the winter, when snow conditions force deer to "yard up" in softwood stands, biologists conduct aerial surveys to locate and map deer wintering areas. After DWAs are located, ground surveys are conducted in them to assess the number of deer using the area as well as the characteristics of the softwood stands. For Maine's unorganized towns, this information is then brought to the Land Use Regulation Commission (LURC), which has the authority to zone the deer wintering area if it meets certain established standards. Many land use activities within a zoned DWA, such as timber harvesting, require review and comment by MDIFW. Deer wintering area information collected for organized towns is provided to the municipalities for inclusion in their comprehensive plans.

Based on winter surveys conducted in unorganized towns during previous years, MDIFW submitted 13 deer wintering area zoning petitions to the LURC for their consideration. As a result of this field work, over 10,000 acres of critical winter shelter for deer were placed in Fish and Wildlife Protection Subdistricts by the Commission.

During the winter of 1991-1992, MDIFW biologists surveyed 17,000 acres of deer wintering area throughout the state. Biologists helped various private landowners, including large industrial forest landowners, review and develop prescriptions for land management activities on 2,750 acres within zoned DWAs. At the request of the LURC, MDIFW developed written DWA management guidelines that outline appropriate forest management options for zoned deer wintering areas. These guidelines are to be made available to forest land managers and owners to assist them in planning land management activities within DWAs.

MDIFW continued to develop a management plan for the Tide Mill Farm property in Edmunds; part of the plan addresses the development of hiking trails to Bell and Crane Mountains. This area was one of the many acquisitions made by the Lands for Maine's Future Board. Biologists also worked with a large industrial forest landowner drafting a grouse habitat management plan for a 750 acre parcel. Finally, over 1,000 waterfowl nest boxes were maintained on privately owned wetlands throughout the state.



## **Wildlife Introductions**

MDIFW biologists continued their successful efforts to reintroduce the wild turkey to its historical range in Maine. During 1991-1992, 31 birds were captured from southern Maine flocks; they were relocated to two sites in Lincoln County and to one in Sagadahoc County. Future release sites in Knox and Lincoln Counties were also reviewed. Throughout the year, biologists monitored existing flocks of wild turkeys established by earlier releases. Additional information concerning wild turkey can be found in the Birds section of this report.

## **Animal Damage Control**

Although wildlife generally has many positive attributes and is enjoyed and valued by society, it can, at times, become a nuisance or pose a hazard. It is the function of MDIFW's Animal Damage Control (ADC) program to address and remedy such problems. The vast majority of nuisance wildlife complaints involved problems with beaver plugging culverts or building dams at inappropriate locations and flooding roads and other developments. Numerous other wildlife species were also addressed by ADC: coyotes, bear, deer, Canada geese, and "house and garden" complaints involving raccoons, skunks, and woodchucks. Department biologists respond to hundreds of ADC complaints annually. Much of this work involves administering and coordinating efforts between Regional Biologists, the Warden Service, and approximately 200 registered ADC cooperators.

## **Environmental Evaluation**

Regional wildlife biologists are regularly asked to evaluate the effect of development and changes in land use on wildlife species. They work with various state and federal environmental agencies to encourage land use decisions that are sensitive to the habitat needs of wildlife. Over the last year, 1,500 wildlife evaluations were provided to various entities including municipal governments, the Land Use Regulation Commission, the Department of Environmental Protection, the Department of Marine Resources, the Army Corps of Engineers, the Federal Energy Regulatory Commission, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, the Soil Conservation Service, and the Agricultural and Stabilization Service.

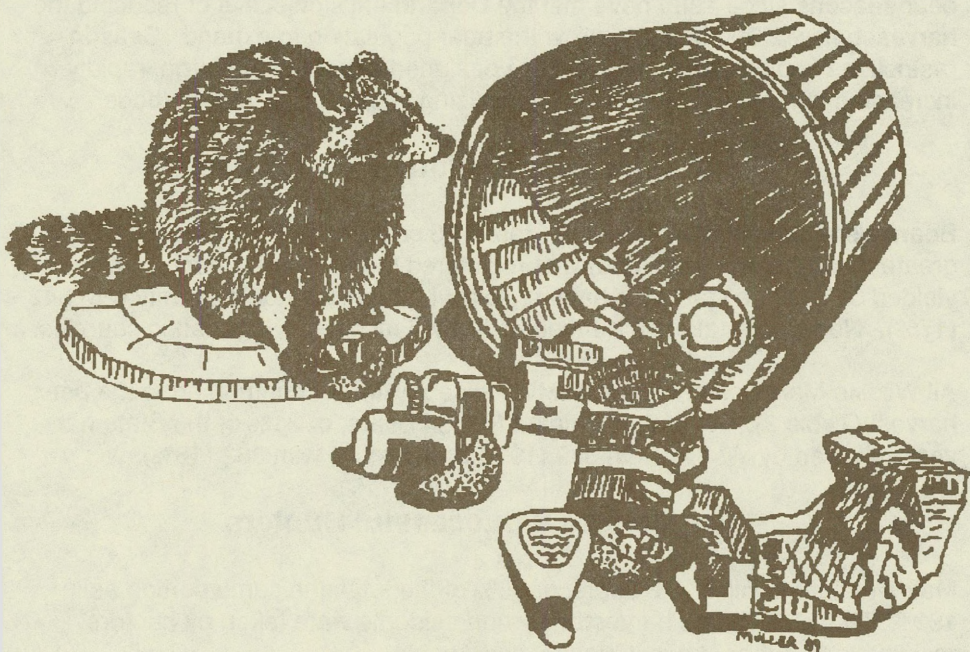
MDIFW's regional wildlife staff continued to assist the Office of Comprehensive Planning, Dept. of Economic and Community Development, with the implementation of the state's Growth Management Act. This act encourages Maine towns to develop a comprehensive growth management plan to guide their future development. The Growth Management Act specifically requires that each plan address important wildlife habitats. Wildlife Division involve-



ment in this statewide planning process has entailed identifying, evaluating, and mapping habitats of endangered or threatened wildlife species; deer wintering areas; waterfowl and wading bird habitats; shorebird nesting, feeding and staging areas; and seabird nesting islands. Last year MDIFW provided wildlife habitat maps and a report entitled Conservation of Inland Fisheries and Wildlife Habitat to 25 towns located primarily in central and eastern Maine. While much of this work may seem unimportant to many sportsmen, it is probably one of the most important functions the Wildlife Division is currently involved in, because this work will insure that important wildlife habitats in Maine will be identified and protected from degradation or loss.

## Wildlife Resource Assessment

Another important task of the regional staff is working with biologists of the Division's Wildlife Resource Assessment Section as they prepare wildlife species assessments and conduct population surveys and inventories. The wildlife species involved include woodcock, mourning doves, waterfowl, deer, moose, furbearers, and threatened or endangered species such as bald eagles and several species of terns. Data collected throughout the state for these species are analyzed by the Wildlife Resource Assessment Section and are summarized in other sections of this report.





# **MAMMALS**

## **BLACK BEAR**

### **1992 Bear Harvest**

Maine's 1992 black bear season included 3 hunting seasons and a trapping season. The early general hunting season opened August 31 and closed September 26. Bears could be hunted over bait or natural food sources, or by stalking/stillhunting during this period. The hound season overlapped the early general season, opening September 14 and closing October 30. Hunters could take bears only by pursuit with dogs from September 26 (when the early general season closed) through October 30. The late general bear hunting season opened with the firearms deer season on October 31, and closed November 28. Hunters were restricted to hunting bears near natural food sources or by stillhunting during the late season. The bear trapping season opened October 1 and closed October 31.

The 1992 harvest of 2,042 bears was 377 bears more than the 1991 harvest (1,665 bears) and slightly less than the 1990 level of 2,088 bears. Shortened bear seasons since 1989 have met the Department's objective of reducing the harvest below 2,300 bears to allow the bear population to expand. Season restrictions implemented in 1990 were designed to control the large, rapidly increasing harvest over bait, while minimizing impacts on other methods.

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

Bears were harvested in 11 of the State's 16 counties in 1992 (Table 1). The greatest number of bears (630) was registered in Aroostook County, which yielded 31% of the statewide harvest, followed by Piscataquis County with 342 (17%). None were taken in Kennebec, Knox, Lincoln, or Sagadahoc counties.

All Wildlife Management Units (WMU), except WMU 7, contributed to the bear harvest (Table 2). WMU 2 accounted for 634 bears, or 31% of the State harvest, followed by WMU 4 with 379 (19%) and WMU 1 with 332 (16%).

### **Residence Of Successful Hunters**

Maine residents killed 712 bears, or 35% of the total, the same portion as in 1991. The 1,330 bears harvested by nonresidents were taken by hunters residing in 33 other states, Quebec, and Austria.



**Table 1. Maine bear harvests by county, 1985-1992.**

COUNTY OF HARVEST	YEAR							
	1985	1986	1987	1988	1989	1990	1991	1992
ANDROSCOGGIN	2	1	1	0	0	2	1	1
AROOSTOOK	454	657	694	876	863	610	517	630
CUMBERLAND	3	0	5	2	4	7	1	5
FRANKLIN	112	123	151	133	171	134	68	92
HANCOCK	48	78	92	141	99	88	90	99
KENNEBEC	3	2	4	1	3	3	3	0
KNOX	0	5	1	0	0	0	1	0
LINCOLN	0	2	0	0	0	0	0	0
OXFORD	90	125	158	195	148	149	112	168
PENOBSCOT	265	228	322	310	351	250	217	261
PISCATAQUIS	229	300	426	424	462	384	269	342
SAGadahoc	0	0	0	0	0	0	0	0
SOMERSET	197	268	315	301	330	276	215	265
WALDO	0	0	2	0	2	3	1	0
WASHINGTON	139	163	220	282	248	164	161	176
YORK	2	3	3	4	4	9	0	3
UNKNOWN	0	0	0	4	0	9	9	0
STATEWIDE	1,544	1,955	2,394	2,673	2,690	2,088	1,665	2,042

**Table 2. Maine bear harvests by Wildlife Management Unit (WMU), 1985-1992.**

WMU	YEAR							
	1985	1986	1987	1988	1989	1990	1991	1992
1	322	367	431	503	528	296	288	332
2	364	618	667	816	779	712	503	634
3	254	329	393	392	443	363	240	307
4	291	288	444	384	429	358	284	379
5	214	263	292	360	328	237	230	271
6	90	77	154	194	171	100	106	112
7	1	8	5	0	3	5	2	0
8	8	5	8	1	6	10	3	8
UNK	0	0	0	23	0	7	9	0
STATE	1,544	1,955	2,394	2,673	2,690	2,088	1,665	2,042

## Methods Used By Successful Hunters

Depending upon the season, bears can be hunted over bait, with dogs, over natural food, trapped, or taken incidentally by hunters pursuing other species (usually deer or birds). Method of take was recorded for 1,412 bears, or 69% of the harvest (Table 3).



**Table 3. 1992 Maine bear harvest by month and method of take.**

SEASON	DATES	HARVEST BY METHOD	SEASON TOTAL
Early General	08/31-09/26	Baiting — 1,123	
		Unreported — 57	1,180
Hound	09/14-10/30	Hounds — 257	
		Unreported — 22	279
Late General	10/31-11/28		551
Trapping	10/1-10/31		32
<b>COMBINED</b>			<b>2,042</b>

## Hunting with Bait

The number of bears taken over bait in 1992 (1,123) increased slightly from 1991. Baiting continued to produce the bulk of the bear harvest, accounting for 55% of the 1992 harvest. Most successful bait hunters took their bears early. Over half (55%) of the bears taken with bait were killed in the first week of the early general season; 77% were registered during the first 2 weeks.

Most successful baiters (407, or 36%) hunted in WMU 2 (Table 4). Baiting accounted for 64% of WMU 2's harvest and for over half of the bears taken in WMUs 1, 3, 5, and 6.

Most successful hunters using bait (860, or 77%) were nonresidents. Resident hunters took 263 bears over bait (40% of the harvest by residents).

## Hunting with Dogs

Hunters using dogs took 257 bears (13% of the harvest in WMUs 1-6 (Table 4)). WMU 3 accounted for 68 bears taken over hounds, and WMU 5 accounted for 63. The harvest by houndsmen remained stable throughout the 7-week season, averaging 37 bears per week (range 26-49 bears/week).

Most successful hunters using hounds (184) were nonresidents. Resident hunters took only 73 bears with hounds (14% of the harvest by residents).

## Trapping

Traditionally, a small percentage of the bear harvest is taken by trappers. In 1992, 32 bears (2% of the harvest) were trapped. Most trapped bears (9) were taken in WMU 4, and WMU 5 produced 7 additional bears for trappers (Table 4). Resident trappers took 30 bears, and 2 bears were reported by nonresidents.



**Table 4. 1992 Maine bear harvest by Wildlife Management Unit and method of take.**

Method of Take	WILDLIFE MANAGEMENT UNIT								STATE
	1	2	3	4	5	6	7	8	
Hunting with bait	174	407	163	163	153	61	0	2	1,123
Hunting with dogs	35	22	68	51	63	18	0	0	257
Trapping	6	1	6	9	7	3	0	0	32
Unreported	117	204	70	156	48	30	0	5	630
<b>Total</b>	<b>332</b>	<b>634</b>	<b>307</b>	<b>379</b>	<b>271</b>	<b>112</b>	<b>0</b>	<b>7</b>	<b>2,042</b>
Archery	25	37	26	21	25	10	0	1	145
Assisted by guide	137	392	167	149	141	34	0	1	1,021

## Harvest By Other Methods

Hunters tagged 613 bears by unreported methods in 1992. Some bears were taken by hunters waiting near natural food sources (berries, beechnuts) and agricultural areas (oat fields, apple orchards). Additional bears were harvested by hunters pursuing deer or birds (Table 3). WMU 2 produced most bears (204) taken by unreported methods (Table 4). Only 5% of the early general season harvest was taken by these unreported means. Method of take was not reported for any of the 551 bears harvested in the late general season. Maine residents registered 55% of the bears taken by unreported means.

## Archery Hunting

The 1992 archery bear harvest was 145 bears. Most successful archers (37, or 26%) took their bears in WMU 2 (Table 4). Archers took 135 bears in the early general season, and 10 bears in the hound season. Bait was used by bowhunters to take 134 bears, 9 reported using dogs, and 2 did not report their hunting method. Although 68% of the archery harvest was taken by nonresident sportsmen, the same proportion of successful resident and nonresident bear hunters used archery tackle to take their bruins.

## Assistance By Registered Maine Guides

About 50% of successful hunters (1,021) employed Registered Maine Guides to assist them during their hunt. Guides assisted successful hunters in all WMU's with a bear harvest (Table 4). They helped take over half of the bears registered in WMU 2 (62%), WMU 3 (54%) and WMU 5 (52%).

Most successful guided hunters (780, or 66%) took their bears in the early general season. An additional 221 guided hunters took bears in the hound season, and 17 hunters were guided to bears in the late general season.



Guides helped take 69% of the bears taken over bait, 84% of the bears taken in front of dogs, 3 trapped bears, and 5% of the bears taken by unreported methods.

Seventy-one percent of successful nonresident hunters employed guides, but only 11% of successful resident bear hunters did. Only 127 successful nonresident hunters took bears over bait without assistance by a guide, and only 3 nonresidents that took bears with dogs hunted without a guide (these hunters were licensed nonresident guides).

## **Sex And Age Distribution Of The Harvest**

The 1992 harvest included 1,200 males (59%), 833 females (41%), and 9 bears of unreported sex. Hunters registered 1,815 bears (89%) as adults, 218 (11%) as cubs, and age was not reported for 9 bears. Sex and age composition of the harvest remained relatively stable throughout the State.

Thirty-six percent of the bears harvested over bait were registered as females, as were 39% of the bears taken with hounds, 50% of the bears taken by unreported methods, and 38% of the trapping harvest. Baiters registered 93% of their harvest as adult bears; houndsmen reported 98% of their bears were adults. Seventy-seven percent of the harvest by unreported methods was adult bears, and adults made up 94% of the trapping harvest.

The low percentage of cubs in the harvest is consistent with percentages reported in recent years, and is considered an overestimate of the actual cub harvest. Aging studies conducted by the Department in the early 1980s indicated that about half of the bears registered as cubs of the year were actually older. This disparity is a result of the slow growth of Maine bears, and the difficulty of estimating bears' ages in the field.

## **Prospects for the 1993 season**

In 1993, the bear season framework will remain similar to recent years. The early general hunting season will open August 30 and close September 25. Bears may be hunted over bait from August 30 until September 25. Bear hunting with dogs will be permitted from September 13 until October 29. The late general bear hunting season will open with the firearms deer season on October 30, and close November 27. The bear trapping season will open October 1 and close October 31. A bear hunting permit (\$2 resident, \$10 nonresident) will also be required before hunting bears during open seasons preceding the firearms deer season. The number of permits is not limited, and hunters may purchase permits throughout the bear season.

Maine's spring 1993 bear population is estimated at approximately 19,500-20,500 animals, slightly below the Department's objective level of 21,000



bears. The current bear season framework should restrict the 1993 harvest below 2,300 bears. Harvests must be maintained below this level to permit the bear population to increase to the 21,000 level.

## **Future Management of Black Bears in Maine**

Maine's black bear resource is being managed to maintain distribution and abundance at 1985 levels. The Department's bear management goal is based on Maine's capacity to produce bears, as well as input from several public interest groups concerned with bears. Sportsmen, registered guides, landowners, and others interested in the welfare of the State's bear resource have assisted in maintaining a strong bear population for all who enjoy Maine forests. Support for current management by these groups has ensured successful population expansion and should continue to provide responsible management of the resource in the future.

Interest in bear hunting remains high in the State. Excessive bear harvests in both 1988 and 1989 reduced the population to about 18,000 bears. Since 1990, season restrictions have curtailed the harvest and provided for population growth toward the management objective of 21,000 bears. Future bear harvests must be closely monitored and controlled to maintain bear densities at desired levels.

During the 1993 season, bear hunters will again be required to obtain a bear hunting permit in addition to a big game license if they intend to hunt bears prior to the firearms deer season. This permit was established by the legislature to allow the Department to obtain information on numbers, distribution, and success rates of bear hunters. Knowledge of success rates of hunters employing various legal hunting methods throughout Maine's bear range is needed to reliably assess the impact of hunting on the bear population.





# FURBEARERS

Furbearers include all mammals harvested primarily for their pelts. In Maine, these are the coyote, red and gray fox, bobcat, lynx, fisher, marten, raccoon, skunk, short- and long-tailed weasels, mink, otter, beaver, muskrat, and opossum. Lynx are present in very low numbers, and are protected year-round. All other furbearers may be trapped during trapping season, and fox, coyote, bobcat, raccoon, and skunk may also be taken by hunting. Although not generally considered furbearers, snowshoe hare, cottontail rabbits, red and gray squirrels, woodchucks, and porcupines can also be hunted in Maine.

## 1992-93 Fur Harvest

Trapping seasons for all furbearers were lengthened in 1991 in response to lower trapping effort and a limit on the number of marten each trapper was entitled to take. Trapping in 1992-93 for all species, except beaver, was allowed from November 2 through December 31. As in past years, there was an additional fox and coyote trapping season that ran from October 25 through October 31. The beaver season ran from December 1 through March 31 in WMUs 1, 2, 3 and 5, and from January 1 through February 28 in WMUs 4, 6, 7, and 8.

Hunting seasons were as follows: October 1 through December 31 for raccoon, October 1 through November 30 for gray squirrel, October 1 through March 31 for cottontail and snowshoe hare, October 26 through December 31 for skunk and opossum, October 26 through February 28 for fox, December 1 through January 31 for bobcat, and no closed season for coyote, woodchuck, porcupine, and red squirrel.

Pelts of all furbearers except weasel, raccoon, muskrat, skunk and opossum, must be tagged by an agent of the MDIFW so an accurate count of the harvest can be obtained.

**Table 5. Furbearer harvests in Maine, 1988-Spring 1993.**

	1988-89	1989-90	1990-91	1991-92	1992-93
Raccoon	6,439	**	**	**	**
Mink	2,550	2,366	1,513	2,068	1,803
Otter	676	753	558	759	887
Beaver	10,311	7,839	7,522	10,636	9,619
Marten	2,698	4,554	3,266	3,292	2,090
Fisher	1,211	1,059	1,181	1,603	1,345
Fox (R & G)	2,454	2,396	2,022	2,039	1,974
Coyote	1,251	1,215	944	1,222	1,356
Bobcat	89	152	113	119	123

\*\* Raccoon pelts are no longer tagged by MDIFW.



**Table 6. Average prices paid for pelts, 1988-Spring 1993.**

SPECIES	1988-89	1989-90	1990-91	1991-92	1992-93
Raccoon	\$ 6.00	\$ 5.00	\$3.00	\$6.00	\$7.00
Mink:					
Male	36.00	28.00	24.00	33.00	29.00
Female	19.00	16.00	13.00	18.00	16.00
Otter	20.00	21.00	11.00	25.00	29.00
Beaver	20.00	18.00	10.00	13.00	9.00
Marten	38.00	32.00	27.00	31.00	22.00
Fisher:					
Male	35.00	15.00	10.00	19.00	12.00
Female	91.00	50.00	44.00	51.00	33.00
Red Fox	15.00	12.00	9.00	13.00	10.00
Gray Fox	14.00	12.00	6.00	8.00	—
Coyote	8.00	7.00	6.00	14.00	20.00
Bobcat	48.00	30.00	23.00	38.00	25.00
Muskrat	2.00	1.00	0.80	1.90	1.50

Harvests of most furbearers were similar or slightly lower than the year before (Table 5). The lower take of marten may be partly due to lower response to bait early in the season when most trappers were trapping for them. There was a heavy beechnut crop in 1992, and marten often move into hardwood stands to eat the nuts and/or other small mammals that are eating nuts. Prices for most furbearers stayed relatively low again this year (Table 6), and trapping effort remained low in response.

## Management and Research

Although trapping effort and harvest for some species has dropped significantly in the past 4 years due to lower fur prices, MDIFW continues to watch marten, fisher, and bobcat trends very closely. Prices for marten pelts have remained fairly high, and marten are relatively easy to catch and handle. Therefore, trapping effort for marten has remained high. The 25 marten per trapper limit was designed to reduce the average take of marten by approximately 15%. The limit helped to achieve this objective again this year. A few more years are necessary to determine if the limit remains effective in preventing excessive marten harvests. Research conducted by the University of Maine, in cooperation with MDIFW, is studying the effects of trapping and timber harvesting on marten populations in northern Maine. Timber cutting practices and associated road building have made marten more vulnerable to trapping, because marten habitat is more fragmented and roads allow greater access to marten habitat by trappers. This research should help MDIFW understand how resilient marten populations are to habitat changes and trapping.

One result of low fur prices has been an increase in beaver populations and, subsequently, the number of complaints of beaver damage to roads, timber,



and fields by flooding. Complaints are handled by Animal Damage Control cooperators in conjunction with MDIFW wardens and biologists. One research project being conducted cooperatively by MDIFW and the University of Maine is studying the effects of different beaver densities on wetland productivity. Beaver create and maintain wetlands that are extremely productive at first, and this provides habitat for many species of wildlife, including waterfowl. Depending on water, vegetation, and soil characteristics, however, these wetlands can grow significantly less productive over time. Beaver normally move around between different wetlands, allowing less productive wetlands a chance to drain as dams wash out. This allows vegetation to grow again in what once was the pond bottom. In time, beaver again move back to the site, rebuilding the dam and reflooding the old pond. The flooded vegetation is nutrient-rich and the cycle begins again. At higher beaver densities, there may not be enough habitat to allow movement of beaver away from stagnating, or unproductive pond sites. Consequently, there may be many wetlands, but productivity and quality as wildlife habitat is low. The research objectives are to identify what levels of beaver density create enough wetlands but do not degrade the quality of the habitat for wildlife.

Future research plans include developing a more reliable method of monitoring bobcat populations across the state and continuing to study fisher reproduction to determine the amount of trapping pressure they can sustain.





# MOOSE

## 1992 Maine Moose Season

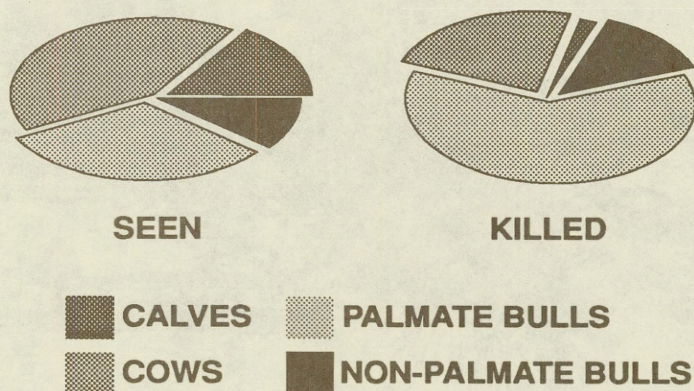
There were no surprises in the 1992 moose kill. As usual, the harvest was made up primarily of bulls (Table 7); however, due to hunter selectivity, this is a poor indicator of the composition of the moose herd. There were only seven calves shot for every 100 yearling and adult cows shot, but hunters reported seeing 35 calves for every cow they saw. Similarly, although hunters reported seeing equal numbers of bulls and cows, they shot three times as many bulls (Figure 2).

**Table 7. Composition of 1992 Moose Kill by Zone.**

Sex & age class	CE	NE	NW	SC	SE	SW	TOTAL
Female Adult	65	61	13	17	22	21	199
Female Calf	1	3	1	0	1	1	7
Male Adult	205	139	64	101	93	93	695
Male Calf	3	1	0	1	2	0	7
<b>TOTAL</b>	<b>274</b>	<b>204</b>	<b>78</b>	<b>119</b>	<b>118</b>	<b>115</b>	<b>908</b>

Although the sex and age composition of the observed moose had some biases (For instance a glimpse of a bull with large antlers is less likely to result in a report of moose of unknown sex than a glimpse of a cow or spike bull), use of these ratios are more likely to reflect real differences between zones than use of harvest ratios. The lowest percentage of bulls seen was in the SW zone (43%) and the highest was in the SE (60%), but virtually the same percentage (82% and 81%) of the harvest from these zones was bulls. The

**Figure 2. Comparison of moose seen to moose killed in 1992.**





SW zone had the most selective hunters with each hunter passing up an average of six moose; the SE zone had the least selective hunters with each hunter passing up an average of one moose. Although selective hunting may be altering the sex ratio in some zones, hunters reported seeing about the same proportion of palmate to non-palmate antlered bulls in all zones.

Hunter success and sighting rates were down from last year's records but were within typical ranges of recent years (Tables 8 and 9), so there is no indication that moose numbers have changed greatly over the past year.

**Table 8. Average number of moose seen/10 hours hunted by hunting zone and year.**

Season (Dates)	Moose Hunt Zone						ALL
	NW	NE	CE	SE	SC	SW	
1986 (10/20-25)	0.9	1.5	3.0	1.0	4.5	6.4	2.2
1987 (10/18-23)	0.8	2.0	3.9	1.1	7.5	4.8	2.7
1988 (10/17-22)	2.2	3.2	5.3	1.3	5.3	8.8	3.8
1989 (10/16-21)	2.4	3.4	5.5	2.1	11.0	10.7	4.5
1990 (9/24-29)	1.1	1.5	2.4	0.9	4.0	4.2	2.0
1991 (10/7-12)	1.2	4.1	4.8	1.7	9.6	10.3	4.5
1992 (10/5-10)	2.4	2.9	3.7	1.5	7.9	7.7	3.5





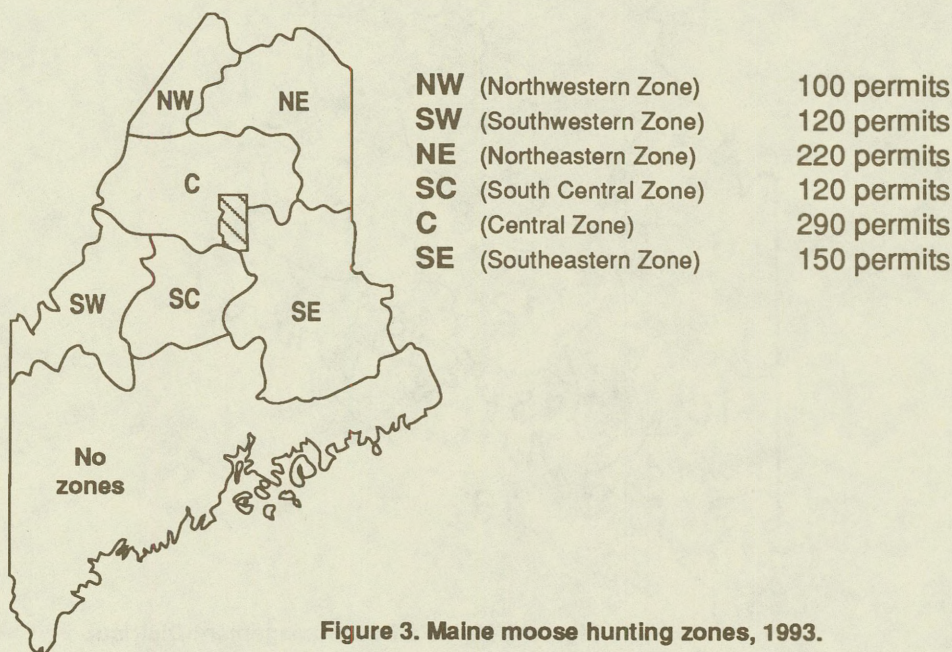
**Table 9. Percent of permittees who registered a moose by zone and season.**

Season (Dates)	Moose Hunt Zone						ALL
	NW	NE	CE	SE	SC	SW	
1986 (10/20-25)	65	85	90	72	100	91	86
1987 (10/18-23)	64	90	96	78	98	98	89
1988 (10/17-22)	84	93	92	82	98	100	93
1989 (10/16-21)	82	95	93	85	99	97	92
1990 (9/24-29)	74	88	93	75	97	98	88
1991 (10/7-12)	90	99	97	89	99	98	96
1992 (10/5-10)	78	93	94	79	98	96	91

## Prospects for Future Seasons

The 1993 season will again be held during the first full week of October. The maximum allowable number of permits (1,000) will be issued, and zone lines and permit allocation will be the same as the last 6 seasons (Figure 3). Success rate in 1993 will depend somewhat on leaf-fall and weather, but it is expected to be similar to recent seasons.

More hunters may get a chance to participate in future seasons. A bill passed by the legislature allows an increase in permits of up to 1,200 in 1994, 1,400 in 1995, and 1,500 in 1996 and later. The commissioner will also be able to open additional areas to moose hunting.





# WHITE-TAILED DEER

## 1992 Deer Season

Hunters in Maine could pursue deer a total of 57 hunting days during 1992. During the special archery season (26 hunting days, October 1 - 30), archers could hunt deer of either sex. The regular firearm season, which began for residents on October 31, and for all hunters the following Monday (November 2), ended on November 28 (25 hunting days). Black powder enthusiasts had 6 days to pursue white-tails during the special muzzleloader season (November 30 - December 5). Deer could not be hunted on Sunday, and the limit on deer remained the same - 1 deer per hunter per year.

During the regular firearm and special muzzleloader seasons, hunters could harvest a buck (a deer with antlers at least 3 inches in length) anywhere in Maine. Those who possessed an Any-Deer permit could choose to harvest a doe or fawn instead but only within the Deer Management District (DMD) specified on the permit (Figure 4).

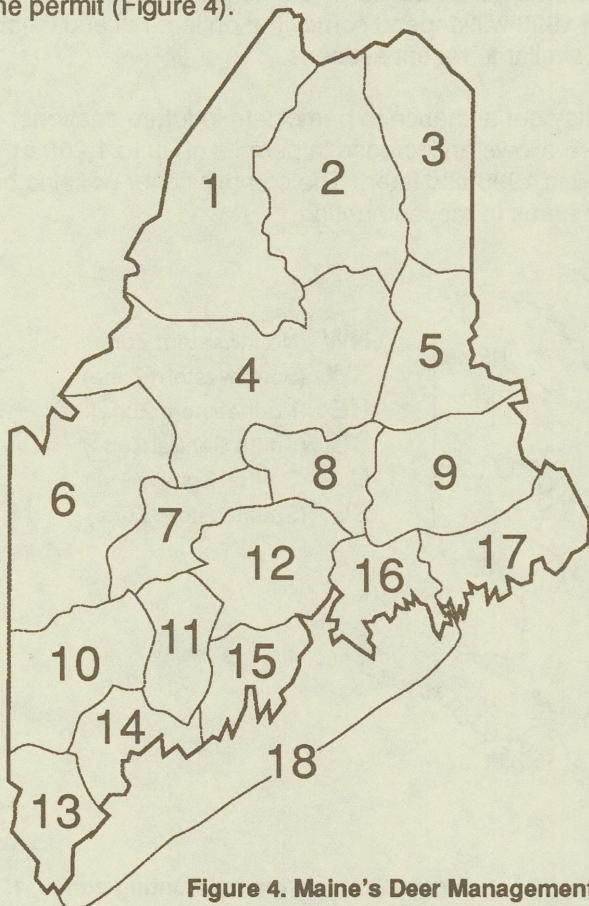


Figure 4. Maine's Deer Management Districts.



First implemented in 1986, the Any-Deer permit system was designed to regulate harvests of does within each DMD in order to achieve and maintain optimum deer population levels. During 1992, 50,035 Any-Deer permits were allocated among 17 of Maine's 18 DMDs. No Any-Deer permits were issued for DMD 17 (Figure 4), continuing a long-term effort to increase the downeast deer herd. Desired harvests of adult does (fawns excluded) ranged from 0 in DMD 17 to 1,568 in DMD 12, and totaled approximately 7,100 statewide. Compared to 1991 (6,400 does), doe quotas were generally higher in 1992, but were set at levels which would encourage slow herd growth in all mainland DMDs. Allocation of Any-Deer permits to hunters in DMD 18 is quite liberal, and this reflects a management strategy to maximize doe and fawn harvests on those coastal islands that are open to deer hunting.

## 1992 Deer Harvest

### Statewide

During 1992, 28,820 deer were registered, of which 694, 28,021 and 105 were taken during the special archery, regular firearm, and special muzzleloader seasons, respectively (Table 10). The total deer harvest in 1992 was 8% more than the deer take registered in 1991, and it ranks 34th highest among the 74 years for which deer kill records are available (1919-1992). Relative to 1991, harvest increases were noted for 2 of our 3 deer seasons. In 1992, the archery kill increased by 194 deer (+39%) relative to 1991 when 500 deer were killed by bowhunters. During 1992, three records were set during the special archery season: record high harvest, record high number of archers;

**Table 10. Sex and age composition of the 1992 deer harvest by season type and week of the regular firearm season, statewide<sup>1</sup>.**

Season	Sex and Age Class				Total		Percent by Week		
	Adult		Fawn		Total Deer	Antlerless Deer	Adult		
	Buck	Doe	Buck	Doe			Total	Buck	Antlerless
Sp. Archery	279	249	95	71	694	415	2	2	3
Reg. Firearm	16,517	7,287	2,328	1,889	28,021	11,504	98	98	96
Open. Sat.	1,848	839	241	210	3,138	1,290	11	11	11
Nov. 2-7	3,971	1,822	609	499	6,901	2,930	24	24	24
Nov. 9-14	4,022	1,507	514	375	6,418	2,396	22	24	20
Nov. 16-21	3,651	1,400	420	320	5,791	2,140	20	22	18
Nov. 23-28	3,025	1,719	544	485	5,773	2,748	20	18	23
Special Muzzleloader	49	35	11	10	105	56	<1	<1	<1
<b>Total</b>	<b>16,845</b>	<b>7,571</b>	<b>2,434</b>	<b>1,970</b>	<b>28,820</b>	<b>11,975</b>	<b>100</b>	<b>100</b>	<b>100</b>

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



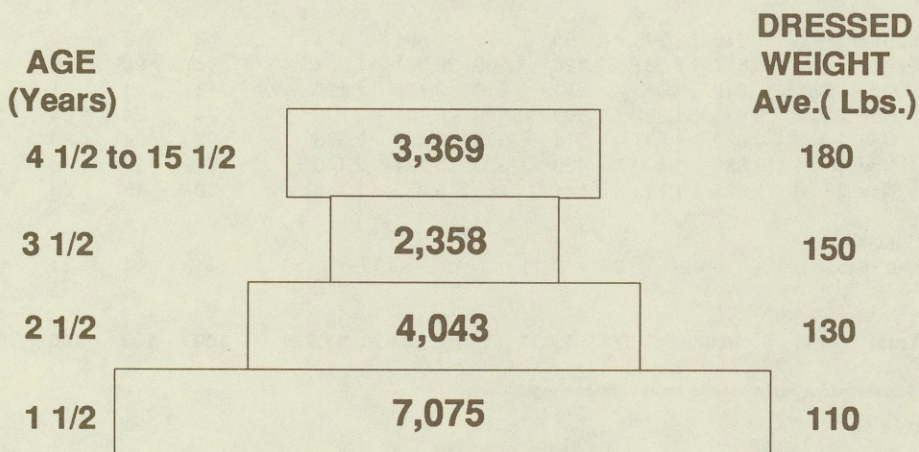
and record high success rate. Deer registrations during the regular firearm season increased by 1,908 white-tails (+7%) in 1992 compared to 1991 (26,113 deer). A between-year decrease of 18 deer (-15%) was noted for the muzzleloader season in 1992 vs. 1991 (123 deer).

Harvest increases in 1992 are directly attributable to Maine's growing deer herd in central and southern DMDs, and to higher allocations of Any-Deer permits. The very mild 1991-92 winter in DMDs 4-18 favored above-average winter survival and fawn production, which translated into a greater number of deer available to hunters. It is significant that the either-sex archery kill increased more than any other season. Although more archers hunted deer in Maine during 1992, success rate of bow hunters also increased, suggesting that the number of deer available for harvest was greater in 1992 than during 1991 in DMDs 7, 8, 10, 11, 12, 13, 14, 15 and 18. Among firearm hunters, the antlered buck kill increased as would be expected following a mild winter. In DMDs 1, 2, 3, 4, 5, 6, 9, 16, and 17, herd increases were generally less than central and southern DMDs; buck harvests reflected that trend.

## Buck Harvest

The registered kill of antlered bucks (buck fawns excluded) totaled 16,845 (Table 10). Ranked fifth highest of the past 50 years, the 1992 buck harvest slightly exceeded the 1991 buck kill (16,804). Buck harvests during 1992 exhibited a typical statewide pattern (Figure 5), with 42% consisting of yearlings (first set of antlers) and 20% consisting of mature bucks (4 1/2 to 15 1/2 years old). The remainder were 2 1/2 and 3 1/2 year old bucks. The number of trophy-age bucks available for harvest is strongly influenced by hunting pressure. Northern Maine deer herds are lightly hunted and offer a

**Figure 5. Estimated distribution of the 1992 harvest of antlered bucks by age class and dressed weight.**





higher proportion ( $\approx 30\%$  of bucks) of trophy-age individuals. More heavily hunted populations in southern Maine feature more younger bucks, since fewer bucks ( $\approx 15\%$ ) survive to trophy age. However, deer abundance also affects the chances of seeing and/or harvesting a respectable buck: deer generally are 2-3 times more abundant in central and southern Maine DMDs than elsewhere.

Currently, the yield of bucks to hunters remains above that which was available during the final years of either-sex hunting (1978-82). During those years, an average of 12,813 antlered bucks were harvested by a hunter force which is roughly the same (190,000 to 210,000 deer hunters) as those pursuing deer today. The higher harvests, and relatively stable age composition of bucks taken since the implementation of the Any-Deer Permit system (average of 16,215 bucks; 18-24% trophy age buck harvest), are directly attributable to growing deer populations, not heavier hunting pressure on bucks.

### **Antlerless Deer Harvest**

The 50,035 Any-Deer permits issued during 1992, combined with the either-sex archery season (249 adult does), resulted in a statewide harvest of 7,571 does (fawns excluded; Table 10). This doe harvest fell within 7% of the statewide doe quota (7,071). A doe kill of this magnitude facilitates our ongoing efforts to increase statewide deer populations by restricting the legal kill of adult does (and fawns). By comparison, doe harvests achieved during the final 5 years of either-sex hunts (1978-82) averaged 9,500 adult does. It is also important to note that doe harvests during 1978-82 were taken from a population that was 40% smaller than current herd levels. If deer population levels were to be stabilized in all DMDs during 1992, the required doe harvest would approximate 11,000 adult does.

Since we began reducing doe harvests in 1983, doe survival to mature age classes has improved. Today, a higher proportion of our does live longer than was the case during the either-sex hunting era. As a result, there now are more does in the population to produce the annual fawn crop which must replace losses to all causes affecting the herd. As long as the herd remains in balance with its food supplies, this higher productivity will directly translate into more bucks (and does) available for harvest and increased viewing opportunities for all who enjoy Maine's outdoors.

Statewide, 2,434 buck fawns and 1,970 doe fawns were registered by holders of Any-Deer permits (and 166 archers) during 1992 (Table 10). Slightly fewer fawns (4,051) were registered during the 1991 season. On average, 59 fawns have been hunter-killed for every 100 adult does since implementation of the Any-Deer permit system in 1986. In contrast, under previous either-sex hunting regulations, hunters registered an average of 89 fawns per 100 does. Since fawn recruitment has fluctuated between 75 to 85 fawns per 100 does in the pre-hunt population since 1978, it is apparent that Any-Deer permit holders are selecting against harvesting fawns, while either-sex hunters killed fawns in



a higher ratio than their relative abundance in the herd. This change in hunter selectivity between the two hunting systems may reflect higher antlerless deer populations and/or the desire among Any-Deer permit holders to maximize the size of the deer to be tagged on these relatively limited permits. Regardless of the cause, a real reduction in relative harvest of fawns benefits all hunters by: 1) increasing potential survival of buck fawns to antlered buck age classes, and 2) increasing potential recruitment of doe fawns to older doe age classes, which in turn increases herd productivity. Both factors would increase the number of antlered bucks available for harvest or merely public enjoyment. Of course, actual survival to these older age classes remains dependent on winter severity patterns.

## **Harvest by Week**

A four-week regular firearm season with unified opening and closing dates statewide was first implemented in 1984. This season structure, combined with the Any-Deer permit system for doe harvest (first implemented in 1986), was designed to reduce unnecessary hunter movement between DMDs. It also reduced the intense daily hunting pressure experienced during past hunts, including either-sex and bucks-only hunts. Hunter shifts and unregulated hunting pressure are undesirable, because they result in unpredictable doe harvests, which may contribute to herd declines.

The current season structure (detailed earlier) has also been successful in distributing hunting effort more evenly throughout the season (Table 10). During the 1992 firearm season, buck harvests were slightly higher early in the season, but then trailed off slightly during the final 2 weeks. Opening Saturday (for residents) accounted for 11% of the total harvest. Nevertheless, compared to past trends, antlerless deer harvest was remarkably similar between weeks. Typically, doe and fawn harvests increased sharply during the final 3 days, when Any-Deer permit holders "cashed in" during the Thanksgiving holiday period.

This weekly kill pattern was roughly comparable to the 1986 to 1991 seasons, but stands in sharp contrast to past either-sex hunts. During the early 1980s, the 3-week either-sex hunts in the southern half of the state encouraged intense hunting pressure early in the season. Opening Saturday typically accounted for 15% of the harvest, and an additional 35 to 40% of the kill occurred during opening week. Consequently, at least half of the harvest occurred during the opening 7 days of those 19-day hunts as hunters scrambled to get "their" deer. Also, does and fawns comprised a large portion of the harvest during the early part of the either-sex season. Bucks typically comprised a higher proportion of the registered kill during subsequent weeks, unless there was a good tracking snow. When snow fell, usually late in the season, the antlerless deer kill would substantially increase, often to the detriment of the herd. As noted in the previous section, the Any-Deer permit system has markedly reduced such extreme fluctuations in the doe harvest



and has provided more predictability in achieving harvest levels necessary to manage the herd.

## Harvest by DMD

Differences in doe and fawn harvests among DMDs largely stemmed from the relative number of Any-Deer permits issued (Table 11). Although antlered buck harvests are influenced to some degree by regional differences in hunting pressure and hunting weather, the size of the buck kill per mi<sup>2</sup> roughly reflects the relative abundance of deer in the DMDs.

Highest buck kills occurred in central and south-coastal DMDs (Figure 4; Table 11). Northern and east-coastal DMDs had considerably lower buck kills and deer numbers. Based on registered kill of adult bucks per mi<sup>2</sup> of habitat, the top 5 deer-producing DMDs during the past 5 years were (in decreasing order): DMDs 12, 14, 13, 11 and 15.

**Table 11. Sex and age composition of the 1992 deer harvest by Deer Management District<sup>1</sup>.**

DMD	Sex/Age Class				Total Deer	Total Antlerless Deer	Adult Does Per 100 Adult Bucks	Antlerless Deer/100 Adult Bucks	DeerKill Per Mi² Habitat
	Adult		Fawn						
	Buck	Doe	Buck	Doe					
1	828	97	37	22	984	156	12	19	0.27
2	586	65	18	14	683	97	11	17	0.26
3	273	40	15	7	335	62	15	23	0.15
4	1,160	327	94	76	1,657	497	28	43	0.47
5	759	251	77	60	1,147	388	33	51	0.64
6	822	259	99	61	1,241	419	32	51	0.49
7	1,019	468	164	120	1,771	752	46	74	2.12
8	1,139	652	211	163	2,165	1,026	57	90	2.19
9	464	100	35	21	620	156	22	34	0.34
10	1,378	680	207	174	2,439	1,061	49	77	1.56
11	1,068	535	160	117	1,880	812	50	76	2.43
12	2,967	1,733	577	469	5,746	2,779	58	94	3.07
13	1,254	892	270	254	2,670	1,416	71	113	2.68
14	841	633	234	213	1,921	1,080	75	128	2.83
15	1,235	588	157	131	2,111	876	48	71	1.97
16	391	64	16	17	488	97	16	25	0.62
17	324	15	9	4	352	28	5	9	0.20
18	337	172	54	47	610	273	51	81	NA
State-wide	16,845	7,571	2,434	1,970	28,820	11,975	45	71	0.98

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

## Harvest by Hunter Residency

Maine residents claimed the lion's share (83%) of the 1992 deer harvest (Table 12). As has occurred during the past several decades, nonresidents registered about one fifth of the total kill while accounting for roughly 15% of deer license sales.



**Table 12. Deer registrations by Deer Management District and hunter residence, 1992.**

DMD	Deer Registered by:				Total 1992	Total 1991	Percent Change
	Residents		Nonresidents				
	No.	%	No.	%			
1	328	33	656	67	984	1,135	-13
2	328	48	355	52	683	799	-15
3	292	87	43	13	335	356	-6
4	1,040	63	617	37	1,657	1,641	+1
5	828	72	319	28	1,147	1,269	-10
6	850	68	391	32	1,241	1,204	+3
7	1,388	78	383	22	1,771	1,531	+16
8	1,772	82	393	18	2,165	1,918	+13
9	496	80	124	20	620	570	+9
10	2,175	89	264	11	2,439	2,135	+14
11	1,782	95	98	5	1,880	1,527	+23
12	5,023	87	723	13	5,746	5,080	+13
13	2,385	89	285	11	2,670	2,388	+12
14	1,880	98	41	2	1,921	1,921	0
15	1,948	92	163	8	2,111	1,931	+9
16	458	94	30	6	488	574	-15
17	317	90	35	10	352	434	-19
18	575	94	35	6	610	323	+89
State- wide	23,865	83	4,955	17	28,820	26,736	+8

Regional differences occurred in the distribution of the harvest by residents and visitors to Maine. Most successful deer hunters in the more populous central and southern DMDs were residents, but nonresidents accounted for a much larger share of the harvest in northern and western DMDs (Figure 4, Table 12). At one extreme, two-thirds of the deer harvested in remote, unpopulated DMD 1 were registered by nonresidents (primarily Canadians from Quebec). At the other end of the spectrum, 98% of the deer killed in heavily populated DMD 14 were taken by Maine residents.

A substantial number of Maine residents typically travel to hunting areas outside their home DMD. Many hunters pursue deer in two or more DMDs, including their home district. Typically, 25% of the statewide deer harvest is registered by residents who travelled to another DMD. Regionally, as little as 10% (DMD 14) to as much as 50% (DMD 2) of the harvest is typically taken by Maine residents who hunted away from their home DMD.

## Hunter Participation and Success Rate

During 1992, roughly 245,500 licenses which permit deer hunting were sold in Maine; 84% were bought by residents. License sales increased by nearly 1% compared to 1991. Of these licensees, 106,724 applied for an Any-Deer permit (90,609 residents and 16,115 nonresidents).



Not all hunters who purchase big game hunting licenses actually pursue deer. According to recent (1989) and past surveys (1970-84), approximately 15% of these license buyers choose not to hunt deer. When these license buyers are subtracted from total hunting license sales, the estimated number of hunters who actually hunted deer in 1992 was approximately 208,500. Of this total, 175,500 were residents and 33,000 were nonresidents.

Among archers, 10,723 residents and 1,066 nonresidents bought licenses that allowed them to hunt during the special archery season. The 11,789 archery licenses sold represents a 14% increase (attributable mostly to residents) above 1991 sales (10,325). During the past 9 seasons, however, archery license sales have doubled, reflecting a trend toward greater participation in the sport of bowhunting. No doubt, the fact that archers could bowhunt deer of either sex may have drawn many new recruits from the ranks of firearm hunters. Even at current bow harvest levels (300-700 deer statewide annually), archery hunting exerts only a minor biological impact on local deer populations.

Sales of muzzleloading hunting permits totaled 4,876 during 1992; 97% were purchased by residents. Participation in Maine's black powder deer hunts has more than quadrupled since the first hunt in 1981. As with archery hunting, the impact of this season on the deer herd has been negligible. Muzzleloader hunters must also comply with Any-Deer permit regulations.

Hunter success averaged 13.8%, overall, during 1992. Success rate for nonresidents (15.0%) was slightly higher than for residents (13.6%). Success rate for holders of Any-Deer permits was considerably higher (32%) than for hunters restricted to bucks only (8.0%), since permittees could harvest either a doe, fawn, or buck. In addition, some hunters pool their antlerless kill with Any-Deer permittees, which is illegal. Only 5.9% of archery hunters and 2.2% of the muzzleloader hunters, were successful. Success rate among archers was markedly higher in 1992 than 1991 (4.8%).

## **Current Deer Population Status**

Since 1983, herds in most DMDs have increased in response to doe harvest restrictions, and some rather mild winters. The estimated post-hunt herd had increased from roughly 160,000 deer prior to 1983 to nearly 250,000 deer during 1988, but had declined to about 215,000 in 1990. Currently, the herd is estimated at 234,000 (posthunt), and at the DMD level, remains in balance with available food supply. Although deer populations are approaching desired levels within a few DMDs, habitat in all DMDs currently is sufficient to support more deer. These increases may be accomplished while maintaining quality (dressed weight and antler development) of harvested deer, and high productivity, if winters remain mild to moderate in severity.

Considering desired herd characteristics, habitat quality, and winter severity, wintering deer population objectives have been set for each DMD. When DMDs



are summed, we estimate that 250,000 to 300,000 deer can winter in good condition in Maine during mild to moderate winters. These objectives will continue to guide our decisions concerning allocations of Any-Deer permits during 1993 and subsequent years.

## **Prospects For The 1993 Season**

Deer season structure will remain similar to 1992. The firearm season will again be tied to Thanksgiving (November 25), opening Saturday for residents will be October 30, and all hunters will be able to pursue deer with firearms through Saturday, November 27. As always, Sundays will be closed to all hunting. The 1993 special muzzleloader season will occur from November 29 to December 4. Archers will be able to pursue deer from September 30 to October 29, 1993.

We are optimistic that the moderate (northern DMDs) to mild (southern DMDs) 1992-93 winter combined with prior conservative doe harvests, will complement each other to result in an increased statewide deer population during the fall of 1993. As before, expected deer populations should be highest in central and southern DMDs, although some level of herd growth is anticipated for all DMDs. Higher over-all deer populations in 1993 should translate into a slightly higher buck harvest. We expect the antlered buck kill to reach about 17,250, statewide. In 1988 and 1989, slightly more than 17,000 antlered bucks were taken. Availability of trophy bucks should remain good, with the statewide buck harvest comprised of 20-25% bucks > 4 years old.

Our strategy in recommending doe quotas remains consistent with past years. We are encouraging slow deer population growth in all but DMD 18. This will require very low doe quotas in northern and eastern DMDs, but more liberal doe harvests will be allowed elsewhere. In DMD 18, we wish to maximize deer harvests on those Maine coastal islands that are open to deer hunting. In contrast, the doe quota for DMD 17 (coastal Washington County) will again be zero to maximize chances for herd recovery. When DMD doe quotas are summed, the statewide adult doe harvest is expected to approximate 6,825 does.

To achieve 1993 doe harvest quotas, we will issue roughly 44,500 Any-Deer permits, or nearly 5,550 less than was issued the previous year. Most of this reduction in Any-Deer permits is targeted for northern and eastern DMDs, and mainly reflects fine-tuning of DMD harvests in relation to current vs. desired deer population growth. If projected buck harvests (17,250) materialize, and our pre-set doe quotas (6,825) are achieved, an additional 4,100 fawns will be tagged by Any-Deer permit holders and archers for a total harvest approximating 28,200 Maine white-tails. As always, these expected harvest levels will be modified by extremes in hunting conditions (excessive rain or prolonged tracking snow).



## Deer-Coyote Relationships

The effect of coyote predation on deer has long been a subject of controversy in Maine and the northeastern U.S. Some contend that predators such as the coyote only kill deer that are severely debilitated by old age, starvation, and disease, while others believe coyotes can kill any deer at any time. In the former case, coyote predation would have little effect on deer management, since they are only culling the unfit deer slated to die anyway. In the latter case, however, coyote predation on healthy, productive deer would potentially reduce the herd, and/or reduce the number of deer that hunters could safely harvest without reducing the herd.

To provide some answers to these questions, MDIFW studied the sex/age composition and physical condition of deer killed in winter by coyotes during 12 years (1977-78 to 1988-89). What was learned from the 863 coyote-killed deer examined during this study was both interesting and important to management of deer in Maine.

As expected, coyotes appeared to be more successful in killing deer during severe winters (long periods of deep snow) than during mild winters. However, coyotes were still able to kill some deer, even during very mild winters. Compared to the age distribution of the wintering herd, coyotes did kill more doe fawns and very old deer than expected. But surprisingly, mature bucks and does were not less vulnerable to winter predation by coyotes. Coyotes were able to capture and kill adult deer in about the same proportion as they occurred in the wintering herd. Although some of the deer killed by coyotes in winter were in very poor physical condition (potential starvation losses), the majority (>75%) of deer were not severely malnourished. During most winters, coyotes were able to kill many deer which could have otherwise survived to contribute to the next fawn crop and/or hunter harvest. Sometimes, deep snow or even glare ice rendered healthy deer vulnerable to predator losses. We also noted that deer yards that were damaged by excessive wood harvest or insect damage (spruce budworm) probably contributed to higher killing success for coyotes because escape trails were inadequate and snow cover was excessive.

One important lesson suggested by this study is that at least a portion of the deer losses to coyotes in winter is additive to losses such as hunting, illegal kill, and road kills. To some degree, coyotes and hunters do compete for a share of the deer resource. As a result, we must account for these losses when designing hunter harvests through the Any-Deer permit system. Failure to do so will result in unwanted herd declines. This study also "hammered home" the importance of providing an adequate quantity of high quality wintering habitat. Without this habitat base, healthy populations of white-tailed deer cannot be sustained here in Maine, near the northern limit of this valuable species' range.



# BIRDS

Reorganization of the Department's Wildlife Resource Assessment Section profoundly affected the Bird Group's mission. Management of all bird species, other than Endangered or Threatened species, is now administered by the Bird Group. In the past, the Bird Group devoted most of its time to management of game birds. Upland Bird and waterfowl work continues, but other bird species are now receiving increasing attention.

## UPLAND BIRDS

### Wild Turkeys

Historical records document the existence of wild turkeys in coastal areas of Maine as far east as the Penobscot Bay area. Unfortunately, the last of Maine's native wild turkeys disappeared in the early 1800s because of unrestricted shooting and extensive forest-clearing. The reversion of thousands of acres of farmland back to wooded habitat has greatly enhanced the prospects for reestablishment of wild turkeys into former ranges.

As early as the 1960s, Maine sportsmen began "thinking turkey". Fish and game clubs in the Bangor and Windham areas made attempts to reestablish turkeys into their areas using birds raised from part wild and part game-farm stocks. The Bangor stocking was unsuccessful, and the Windham population persisted in low numbers into the 1980s.

In the 1960s and 1970s, considerable work was done in other states to establish wild turkeys into former and new ranges of suitable habitat. Researchers noted the key to each success was to remove a small number of wild birds from one site and release them into suitable, unoccupied habitat.

Maine too became involved in a similar program in 1977, when department biologists acquired 41 wild turkeys from Vermont and released them in York County. By the early 1980s, the York County population had become large enough to serve as a source of birds for new release sites. In the spring of 1982, 33 birds were captured in York County and released in Waldo County. In the winter of 1984, 19 additional birds were captured in York County and released in Hancock County.

The Waldo County release was successful and resulted in a stable population that persists today. Unfortunately, the Hancock County wild turkeys failed to produce a self-sustaining population. Several factors appeared to contribute to the failure, but illegal shooting was believed to be the major cause.



## Hunting Seasons

By 1986, the York County wild turkey population had increased to sufficient size to allow a spring (males only) hunting season. Wild turkeys, like white-tailed deer, are polygamous, meaning that only the dominant males in the population mate with the females. The remaining males are considered surplus. Courtship activities for wild turkeys in Maine begin in April and last into early May. The spring hunting season is timed to begin after the breeding period is over, and it is limited to bearded turkeys only. Experience has shown spring turkey hunting provides a quality big game hunting opportunity without jeopardizing restoration efforts.

Each spring, a maximum of 500 hunters are allowed to hunt wild turkeys for approximately 4 weeks in a newly expanded hunting zone in southern Maine. Many hunters have enjoyed this new spring recreational activity, and in 1992, a record 53 birds were taken. This past spring, 46 wild turkeys were harvested (Table 13). The relatively low harvest rate is testament to the wariness of this magnificent game bird.

**Table 13. Wild turkey hunting effort and harvests, 1986-93.**

Year	Number of applicants	Number of permits	Wild turkeys harvested
1986	536	500	9
1987	519	500	8
1988	355	355	16
1989	463	463	19
1990	499	499	15
1991	508	500	21
1992	886	500	53
1993	1,079	500	46

## Management and Research

In recent years, emphasis has been placed on introducing wild turkeys into all suitable habitat between York and Waldo Counties. A "leap frog" trap and transfer technique has been initiated with a goal of eventually joining these two populations. During the winter of 1992-93, biologists continued to move birds into central Maine, utilizing birds from southern Maine and Waldo County. By the year 2000, management efforts will likely focus on programs to improve habitat conditions for wild turkeys throughout their reoccupied range in Maine.

We remain optimistic that this goal-oriented reintroduction program will succeed in reestablishing wild turkeys into all suitable habitat in Maine. We are indeed thankful for all the cooperation, financial support, and hands-on participation we've received in the past from the public, L.L. Bean Inc., and especially the Maine State Chapter of the National Wild Turkey Federation.



## **IMPORTANT!!**

**Rearing and releasing “game-farm” wild turkeys will negatively impact the future success of this program, and it is not allowed by the Department. Birds from these strains do not survive or reproduce well in the wild, and they introduce inferior breeding stock into natural populations.**

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.

## **Ruffed Grouse**

The ruffed grouse, or partridge, is considered by many, the number one game bird in Maine. Data collected in Maine in the early 1980s show that an estimated 100,000 hunters harvest over 500,000 grouse annually. More recent hunter surveys reveals approximately half of all licensed hunters in Maine hunted grouse and/or woodcock in 1987. Although no data exist on recent harvests, successful bird hunters report grouse in fair to good numbers in recent years.

Ruffed grouse are a product of the forest. The amount and quality of Maine's forests are constantly changing, and the impact of these changes on grouse populations are difficult to predict. Fortunately, however, the future for ruffed grouse appears bright. Timber harvesting is revitalizing grouse habitat as more and more commercial timber companies, state and private foresters, and small woodlot owners are utilizing harvesting practices that improve or sustain habitat for this species.

In the recent past, the Ruffed Grouse Society and the Department cost-shared habitat improvement work in Waldo County. Through this cooperative project, more than 1000 apple trees were “released” from competition with encroaching forest growth that competes with apple trees for sunlight and nutrients. The improved conditions for the apple trees will likely benefit ruffed grouse, deer, and other wildlife that eat apples, for many years to come.

Other ongoing work in ruffed grouse habitat improvement in Maine involves the following organizations: MDIFW, Champion International Corp., University of Maine Cooperative Extension, Ruffed Grouse Society, Maine Forest Service, Small Woodlot Owners of Maine, and Maine Tree Farm Program.



# Woodcock

## Hunting Seasons

A rangewide decline in woodcock numbers since 1968 resulted in restrictive hunting regulations. In 1985-86, all eastern states were required to shorten their woodcock hunting seasons, select opening dates no earlier than 1 October, and reduce the daily bag limits from 5 birds to 3. Researchers with the U. S. Fish and Wildlife Service report that rangewide, the breeding woodcock population may have stabilized in the last decade. It appears the restrictions may be helping.

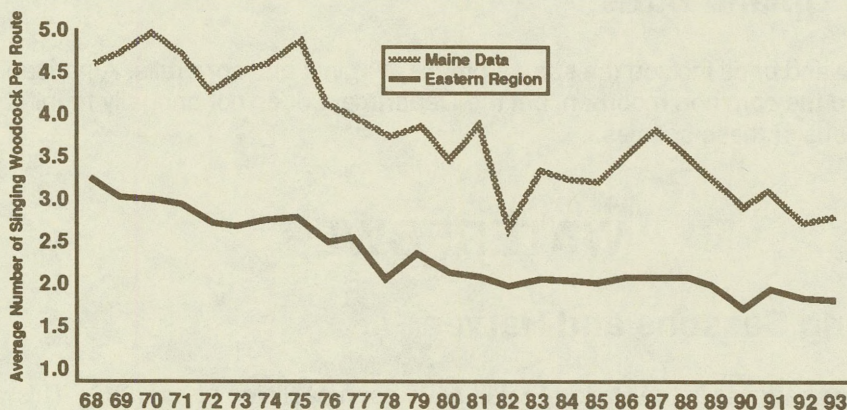
This past spring, although northward migrating woodcock arrived in Maine a little later than normal, they immediately faced very cold, snowy weather conditions. Consequently, we thought the number of male woodcock surveyed would be lower than last year. Surprisingly, record numbers of woodcock were reported during surveys at Moosehorn National Wildlife Refuge. Other survey routes in coastal Maine were also high this past spring. However, when statewide data were combined, the overall trend showed no change from last year.

Although this past spring was cool, the amount of rain that potentially adversely affects young woodcock was absent. With luck, young birds fared well after the hatch.

## Management and Research

We are still concerned for the present status of woodcock throughout its range. During the last 20 years, interest in woodcock hunting has grown, and rangewide harvests remain high. In the northeast, particularly, this increase in

Figure 6. Breeding population index for woodcock, 1968-93<sup>1</sup>





hunting pressure came at a time when woodcock habitat was being lost to urban and industrial development, and a large amount of forestland grew into stages not suitable for woodcock. The rangewide population decline since 1968 can be seen graphically in the Eastern Region's singing-ground survey results for the last 25 years (Figure 6).

In recent years, interest has turned to commercial timberlands as being a potential bright spot for improvements in woodcock habitat conditions. Although the soils may not be as productive as abandoned farmland, the vast acreage of young forests created by commercial clearcuts warrant attention. Preliminary research shows that commercial timberlands offer a great opportunity for large-scale woodcock management in Maine. The next step is integration of cost-effective wildlife management into timber management plans, because maintenance and creation of woodcock habitat is critical if woodcock populations are to be maintained (or improved beyond) current levels.

## **Pheasant**

Pheasant populations currently exist at low levels where food and weather conditions permit winter survival. These limited wild populations are annually augmented by release of game-farm pheasants raised by individuals with game breeders' licenses.

After suspension of the Department's pheasant stocking program in 1991, a one year program was established by the Legislature for 1992 only. A \$16 stamp was required of all pheasant hunters in York and Cumberland counties during 1992. This program raised more than \$8,000 for acquisition of pheasants for release in 1993. These 6 week old birds will be raised by cooperators and released in York and Cumberland counties during September and October 1993. The fate of this program was debated by the Joint Standing Committee on Fisheries and Wildlife, and the Legislature voted to allow it to continue.

## **Other Upland Birds**

Other upland birds include the spruce grouse, Virginia and sora rails, American coot, and the common moorhen, but the Department does not annually monitor populations of these species.

# **WATERFOWL**

## **Hunting Seasons and Harvest**

Waterfowl harvests in the United States have been declining since 1980. This has been partly by design, but it also reflects declining hunter numbers and



**Table 14. Maine and Atlantic Flyway Waterfowl Harvests and Duck Stamp Sales 1976-1992.**

Year	WATERFOWL HARVEST		DUCK STAMP SALES	
	Maine	Atlantic Flyway	Maine	Atlantic Flyway
1976-80 average	83,400	1,941,500	17,444	429,533
1981	74,000	1,889,900	16,657	407,906
1982	75,000	1,608,700	14,470	402,929
1983	85,900	1,669,800	14,685	390,896
1984	61,600	1,810,500	13,634	412,866
1985	69,400	1,400,600	13,280	382,546
1981-85 average	73,200	1,675,900	14,545	399,429
1986	73,400	1,412,500	13,185	387,958
1987	54,800	1,388,800	12,320	385,440
1988	41,800	922,100	10,461	342,269
1989	46,200	1,158,700	10,850	331,580
1990	54,600	1,086,400	11,244	326,403
1986-90 average	54,200	1,202,100	11,612	354,730
1991	73,800	1,182,949	11,298	316,468
1992*	54,503	974,727	10,096	287,523

\*preliminary estimate

lower waterfowl populations. The estimate of waterfowl hunters in Maine has been declining since 1978, when the high of 18,650 Federal migratory bird hunting stamps were sold in Maine. The average number of stamps sold to Maine hunters from 1981 to 1985 was 14,545; by 1991, the estimate dropped to 11,298 (Table 14).

Season lengths have been shortened significantly since the mid-1980s (from 50 days to 30 in the Atlantic Flyway); this, in concert with declining numbers of hunters, has led to a plunge in the estimated number of hunter days afield. In the Atlantic Flyway, the number of adult hunter days has fallen from over 2.6 million during the late 1970s to a little over 1.6 million during 1990.

Restrictions in harvest regulations have also resulted in reduced daily bag limits (5 birds to 3 per day), species restrictions in 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). These flyway restrictions since 1988 have essentially continued the harvest reduction plan for black ducks to the present day.

Black duck population declines, measured by the mid-winter waterfowl survey since the mid-1950s, led to a harvest reduction plan in the United States and Canada between 1983 and 1987 (Table 15, Period 1). Black duck harvests



**Table 15. Maine and Atlantic Flyway Black Duck Harvest Data 1977-1990.**

State	Base Year	Period 1		Period 2		
	1977-81 Average	1983-87 Average	% Change from Base	1988-90 Average	% Change from Base	% Change from Period 1
Maine	20,820	8,080	-61	9,580	-54	+19
Vermont	6,420	4,120	-36	3,660	-43	-11
New Hampshire	6,940	4,940	-29	3,140	-55	-40
Massachusetts	24,540	16,260	-34	15,540	-37	-04
Connecticut	8,140	4,200	-48	5,030	-38	+20
Rhode Island	5,680	2,620	-54	2,600	-54	-01
New York	43,920	28,340	-35	22,910	-48	-19
Pennsylvania	11,040	5,640	-49	4,280	-61	-24
West Virginia	1,120	540	-52	370	-67	-31
New Jersey	37,220	22,760	-39	18,310	-51	-20
Delaware	9,760	5,720	-41	6,390	-35	+12
Maryland	29,400	14,960	-49	13,550	-54	-09
Virginia	19,040	12,760	-33	8,980	-53	-30
North Carolina	11,140	5,900	-47	7,750	-30	+31
South Carolina	7,240	3,500	-52	2,880	-60	-18
Georgia	2,360	1,460	-38	1,150	-51	-21
Florida	860	290	-66	190	-78	-34
Atlantic Flyway	245,640	142,090	-42	126,340	-49	-11

were reduced in the U.S. by 42% (compared to the 1977-81 average) while the black duck kill in Maine for the same period was reduced by 61% (Table 15). Harvest reductions in other Atlantic Flyway states varied from -32% to -66% during this period. Reductions in Canada's black duck harvest were achieved, but to a lesser degree than those measured in the U.S.

The mid-winter waterfowl survey for black ducks has remained relatively stable since harvest reductions have been in place. Although no dramatic turnabout in the black duck's mid-winter population index is obvious at this time, the long standing annual decline of 2.5 percent has been halted since 1983.

Because of record low breeding population estimates for mallards, pintails, and blue-winged teal, the U.S. further curtailed harvest regulations for all ducks in 1985 and again in 1988. Population declines in these prairie breeders was caused by years of drought, which adversely affected breeding habitat quantity and quality. A series of poor production years and lowered recruitment have reduced current continental waterfowl populations to historical lows.

Although restrictive regulations continued in the Atlantic flyway through 1992, Maine hunters have enjoyed expanded hunting opportunity for black ducks since 1988. In that year, the state-imposed prohibition on black duck hunting in early October was eliminated. Since the fall of 1988, Maine duck hunters have had the same opportunity to kill black ducks as hunters in other states. The Maine harvest of black ducks has been higher during period 2 (1988-1990) than levels attained between 1983 and 1987 (Table 15). The estimated annual harvests since 1988 have, however, remained well below those measured prior



to black duck harvest restrictions. The 13,100 black ducks killed by Maine hunters in 1991 was the largest harvest since 1983, when Maine first imposed restrictions on the black duck season.

**Table 16. Waterfowl hunter and harvest statistics: 1961-1992 Maine.**

	Federal duck stamps	Days afield active hunters	Average days hunted	Average daily duck bag	Total duck kill	Canada goose kill
1961-65 (Mean)	9,656	45,580	6.24	1.01	45,980	550
1965-70 (Mean)	15,136	73,020	5.85	1.13	78,360	980
1971-75 (Mean)	17,513	101,140	6.98	0.91	92,360	2,260
1976-80 (Mean)	17,444	105,200	7.36	0.78	83,360	1,840
1981-85 (Mean)	14,545	86,640	7.37	0.88	73,180	1,560
1986-90 (Mean)	11,612	61,840	6.71	0.89	54,160	2,300
1991	11,298	71,100	7.46	0.98	73,800	2,245
1992*	10,096	48,410	6.05	1.05	54,503	2,833

\* preliminary estimates

A review of waterfowl hunter and harvest statistics provides an interesting comparison of Maine's waterfowlers and their success (Table 16). Study of these figures will reveal that the average Maine duck hunter today is doing quite well. This may surprise many of you 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 11,298 duck stamps sold in 1991, is slightly higher than commonly measured in the early 1960s. This is, however, much lower than the average number sold during the 1970s.

**Table 17. Waterfowl harvest statistics: 1961-1992 Maine dabbling duck.**

	Mallard	Black Duck	Green-winged Teal	Blue-winged Teal	Wood Duck
1961-65 (Mean)	960	21,080	5,960	840	4,500
1965-70 (Mean)	2,360	32,060	12,000	4,460	5,500
1971-75 (Mean)	4,600	32,680	13,340	4,640	7,660
1976-80 (Mean)	5,040	23,580	9,620	2,740	9,880
1981-85 (Mean)	4,660	12,740	8,700	1,380	11,240
1986-90 (Mean)	4,700	8,280	7,100	640	6,840
1991	8,808	13,723	5,020	0	7,626
1992*	6,616	9,053	3,107	191	6,829

\* preliminary estimates



**Table 18. Waterfowl harvest statistics: 1961-1992 Maine diving ducks.**

	<b>Greater scaup</b>	<b>Lesser scaup</b>	<b>Ring- necked duck</b>	<b>Common eider</b>	<b>White- winged scoter</b>	<b>Surf scoter</b>	<b>Black scoter</b>
1961-65 (Mean)	125	50	950	1,360	1,660	1,060	560
1966-70 (Mean)	220	100	1,100	2,800	3,120	4,000	1,580
1971-75 (Mean)	200	160	1,550	8,820	4,160	4,440	1,460
1976-80 (Mean)	260	360	2,625	7,580	2,020	2,980	1,680
1981-85 (Mean)	220	300	2,620	11,980	2,340	1,880	740
1986-90 (Mean)	100	180	2,750	13,675	1,500	1,980	400
1991	80	0	1,662	25,928	1,099	1,459	659
1992*	0	93	763	15,160	937	1,045	0

\*These figures are preliminary estimates which will change due to revision of duck stamp sales results.

The average hunter in 1991 spent more days in the field per season (7.46 days) than hunters of the early 1960s and was only slightly less successful than his 1960s counterpart (0.98 ducks per day compared to 1.01 in the 1960s). This daily duck bag is actually higher than the same figure for the 1970s and 1980s.

A thirty year perspective of the waterfowl species composition in the Maine harvest shows that the relative importance of some ducks has dramatically changed over this period (Table 17 and 18). Harvests of mallards have increased from less than 1,000 birds per year (1961-65 mean) to nearly 9,000 in 1991. The common eider is another bird that has shown dramatic increases in the annual Maine kill. Species showing sizable declines in the Maine harvest are black duck, blue-winged teal, white-winged scoter, surf scoter, and common scoter.

Reasons for these changes in species composition are variable and in many cases different for each species. Some examples of these changes include duck population increases and decreases, duck population center shifts, changes in the number of duck hunters, hunter effort shifts from one species group to another, and specific regulatory management designed to restrict harvest opportunity on some species more than others. All of these causes, and others, in combination have resulted in the observed changes in the Maine duck kill.

## **Research and Management**

Since the 1985 species assessment's switch from a harvest oriented goal to a breeding population oriented goal, current management objectives have 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 (1982-1987) that altered traditional seasons enjoyed by Maine waterfowl hunters. More recently, declines in North American waterfowl populations have resulted in further curtailment of waterfowl hunting seasons and bag limits. These recent declines have been caused by prolonged and severe drought in the prairie regions of the U.S. and Canada. The decade of the eighties has not been bright for waterfowl populations or 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 for ducks has been banned nationally since 1991. Maine hunters have been required to use steel shot since 1988, three years ahead of the deadline required by the U.S. Fish and Wildlife Service's National plan. Maine hunters have accepted the facts and shouldered the responsibility for using the latest in shotshell technology. Many have been pleasantly surprised with their results.

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

Coordination of Maine habitat protection efforts among several state and federal agencies, and private organizations, has resulted in some key land purchases that will 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 will initially be directed toward the most significant and vulnerable areas.

The Cobscook Bay focus area, and the Merrymeeting Bay - lower Kennebec River focus area, are the two priority regions selected for projects in Maine. Efforts in these areas have resulted in a coordinated plan to secure protection for these important ecosystems, and, to date, some impressive parcels of habitat have been protected through purchase or conservation easements in Cobscook Bay. More than 20 organizations are working through the Maine Wetlands Protection Coalition to protect the most significant parcels of Cobscook Bay.



The east coast region (Penobscot Bay east), west coast region (west of Penobscot Bay), and inland wetlands focus areas will be considered as implementation of the North American Waterfowl Management Plan proceeds. Personnel and funding limitations are slowing progress in these focus areas.

Current waterfowl research efforts are aimed at measuring and tracking trends in breeding populations and the harvests they support. A statewide survey of inland waterfowl breeding pairs was initiated in 1990 as part of a larger study designed and funded by the North American Waterfowl Management Plan's Black Duck Joint Venture. Twenty-five randomly located plots were surveyed by Maine biologists using a U.S. Fish and Wildlife Service helicopter flown slowly at 100 to 150 feet above ground level. All open waters found within the plots were surveyed, and locations of waterfowl were recorded. Preliminary analyses of these data have provided trend estimates for common inland breeding waterfowl during the first three-years of the study. A slight decline in breeding pairs of black ducks in Maine has been demonstrated.

Statewide surveys of waterfowl production are also continuing to provide an index to the status of our populations. These long-term brood count surveys have provided a means of following trends in waterfowl breeding populations since the mid-1950s. The proportion of broods observed during brood counts in Maine has changed over time (Table 19)). One goal of the state waterfowl management plan is to restore the relative proportions of species found breeding in Maine to historical levels.

**Table 19. Species frequency found in brood counts for Maine 1956-65, 1966-76, 1980-84 and 1986-90.<sup>1</sup>**

	Period 1 1956-65 <sup>2</sup>		Period 2 1966-76 <sup>2</sup>		Period 3 1980-84 <sup>3</sup>		Period 4 1986-90	
	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent
Black Duck	74	44	37	29	34	19	56	24
Ring-necked Duck	28	17	31	24	44	25	49	21
Wood Duck	33	20	15	12	24	13	38	17
Goldeneye	13	8	23	18	36	20	39	17
Hooded Merganser	13	8	10	8	19	11	26	11
Green-winged Teal*	1	<1	1	1	2	1	1	1
Blue-winged Teal	5	3	5	4	4	2	1	1
Common Merganser	1	<1	4	3	11	6	12	5
Mallard	1	<1	1	1	5	3	7	3
Total Observed	169	100	127	100	179	100	229	100

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

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

<sup>2</sup>Spencer, H. E., Jr. 1979. Table 5D.

<sup>3</sup>Allen, R. B. 1984 Annual Performance Report W-62-R-15-131.



# OTHER BIRD PROJECT ACTIVITIES

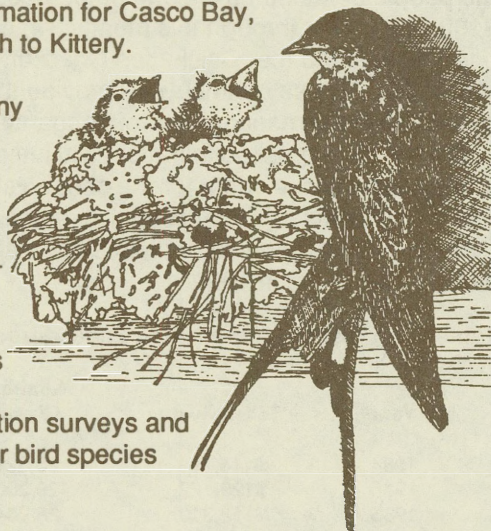
In the late 1980s, the Legislature passed the Natural Resources Protection Act (NRPA). The act consolidated several state laws pertaining to protected natural resources as being of state significance.

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. Currently, we are concentrating on: island-nesting seabirds, wading birds, and shorebirds that depend on Maine's coast during spring and fall migrations. Island-nesting seabirds, wading birds, and shorebirds represent large and diverse groups of birds. Some species occur in Maine in small numbers; others occur in the tens of thousands.

Twenty-one species of island nesting seabirds and wading birds nest on approximately 10% of Maine's islands. These birds are extremely vulnerable to predation, but perhaps more importantly, to human disturbance during the nesting season (spring and early summer). Thirty-six species of shorebirds have been reported along the coast of Maine. They often use discrete areas that are highly susceptible to habitat disturbance and environmental contaminants.

Bird project personnel have compiled a computer database of shorebird feeding and roosting areas located along the coast of Maine, and mapped them for entry into a Geographic Information System (GIS). Field surveys are planned for July and August to update shorebird information for Casco Bay, and the coastline from Cape Elizabeth to Kittery.

We now have the tools to protect many important bird habitats. Species assessments for island-nesting seabirds and shorebirds have been completed, management systems, goals and objectives are being developed, and criteria will be established for identifying and mapping "Significant Wildlife Habitat" for both species groups for NRPA protection. We are now developing standardized population surveys and inventories to track the status of other bird species and the habitats on which they rely.



In an effort to broaden our participation in other management activities, project personnel have become involved in several projects. We participate in Breeding Bird Surveys, Mourning Dove surveys, Eastern Bluebird banding activities, Partners in Flight organization, the Fish and Wildlife Service's cormorant research, and more. Bird management in Maine is both challenging and rewarding.



# ENDANGERED AND THREATENED WILDLIFE

Nearly 18 years ago, the Maine Endangered Species Act was enacted to conserve all species of fish and wildlife found in the state, as well as the ecosystems upon which they depend. The Act authorized the commissioner of Inland Fisheries and Wildlife to gather information about the distribution, abundance, habitat needs, limiting factors and other biological and ecological requirements of Maine's fish and wildlife species, and to develop programs to enhance or maintain their populations. The Act also directed the commissioner to designate selected species as endangered or threatened and to establish programs to restore these species to the point where they no longer faced extinction. No funds were provided to carry out this mandate, and for nearly ten years little was accomplished.

In 1983, the state legislature created The Maine Endangered and Nongame Wildlife Fund by adding a checkoff option to the Maine income tax form, allowing people to make voluntary contributions to support nongame wildlife management programs. Since then, the people of Maine have contributed about \$100,000 a year through this means, which has been nicknamed the "Chickadee Checkoff" (Table 20). These contributions provide the

core funding for management of nongame wildlife species. All money donated to the fund is deposited into a special interest-bearing account from which money can only be spent for the conservation of these species. A nine-member citizens advisory council oversees the fund and programs it supports (see box). This report summarizes the major accomplishments supported in part by The Fund in 1992.

## *Endangered and Nongame Advisory Council*

Charles Duncan, *Machias*  
Jody Jones, *Falmouth*  
Don Mairs, *Belgrade*  
Cherie Mason, *Sunset*  
Beth Nagusky, *Augusta*  
Bill Silliker, Jr., *Saco*  
Thomas P. Skaling, *Brunswick*  
Peter Vickery, *Richmond*  
Nat Wheelwright, *Brunswick*

**Table 20. A history of the Maine Endangered and Nongame Wildlife Fund.**

Year	Total Given	Number of Givers	Average Donation	Percent of Taxpayers Giving
1984	\$115,794	25,322	\$4.57	5.34%
1985	\$129,122	29,200	\$4.42	5.96%
1986	\$112,319	26,904	\$4.17	5.41%
1987	\$114,353	26,554	\$4.31	5.19%
1988	\$103,682	24,972	\$4.15	4.75%
1989	\$ 93,803	20,322	\$4.62	3.65%
1990	\$ 88,078	18,332	\$4.80	3.23%
1991	\$ 92,632	19,247	\$4.81	3.42%
1992	\$ 95,533	18,423	\$5.18	3.19%



Hundreds of cooperating public and private organizations and individual volunteers and every branch of the Maine Department of Inland Fisheries and Wildlife are part of these successes. However, the most special thanks are due the thousands of Maine people who make these conservation projects possible through their generous contributions to The Maine Endangered and Nongame Wildlife Fund. As you read this, take pride in the accomplishments - and please, as you fill out your tax return next year, join with us again in conserving Maine's endangered and threatened species.

## **ENDANGERED SPECIES LISTING**

There are currently 22 species of fish or wildlife listed as Endangered or Threatened under the Maine Endangered Species Act, indicating they are in danger of disappearing from Maine (Table 21). Thirteen of these are also listed as nationally Endangered or Threatened under the U.S. Endangered Species Act. An additional 61 species have been identified in Maine as needing special attention to prevent them from becoming Endangered or Threatened. This existing list was established in 1986.

MDIFW has the responsibility for implementing Maine's Endangered Species Act, including maintaining the list of Endangered and Threatened Species in Maine. MDIFW has initiated a comprehensive review of existing information on all species of vertebrates and known, rare invertebrates occurring in Maine, as part of this process. The procedures and criteria for listing species is also being reviewed. Recommended changes to the procedures, criteria, and lists will be developed by MDIFW staff, reviewed by scientists and others, and presented at public workshops and hearings. The goal is to have any needed revisions completed by 1994.

## **HABITAT MANAGEMENT AND PROTECTION**

Habitat protection is the most critical need of most Endangered and Threatened species in Maine. MDIFW uses a variety of methods to protect critical habitat for them, including land acquisition, voluntary management agreements with landowners, conservation easements, environmental permit review, and designation as Essential Habitat under the Maine Endangered Species Act. Habitat acquisition and conservation easements are the best tools for long-term protection of significant sites. Several important acquisitions were made by or with the help of the Department in 1992. Cooperative landowners, The Nature Conservancy, Maine Coast Heritage Trust, U.S. Fish and Wildlife Service, local land trusts, and others have worked together on these accomplishments.



**Table 21. Maine Rare and Endangered Species**

**I. Maine Endangered Species:** Species in immediate danger of extirpation (extermination).

- |                      |                        |                             |
|----------------------|------------------------|-----------------------------|
| 1. Bald Eagle*       | 7. Sedge Wren          | 12. Sperm Whale*            |
| 2. Peregrine Falcon* | 8. Grasshopper Sparrow | 13. Sei Whale*              |
| 3. Golden Eagle      | 9. Right Whale*        | 14. Leatherback Turtle*     |
| 4. Piping Plover**   | 10. Humpback Whale*    | 15. Atlantic Ridley Turtle* |
| 5. Least Tern        | 11. Finback Whale*     | 16. Box Turtle              |
| 6. Roseate Tern*     |                        | 17. Black Racer             |

\*Federally listed Endangered Species

\*\*Federally listed Threatened Species

**II. Maine Threatened Species:** Species that will become endangered if current populations experience further decline.

- |                             |                      |
|-----------------------------|----------------------|
| 1. Tundra Peregrine Falcon* | 4. Blanding's Turtle |
| 2. Northern Bog Lemming     | 5. Spotted Turtle    |
| 3. Loggerhead Turtle*       |                      |

\*Federally listed Threatened Species

**III. Maine Special Concern Species:** Species particularly vulnerable to population decline due to restricted distribution and/or habitat loss.

- |                            |                           |
|----------------------------|---------------------------|
| 1. Harlequin Duck          | 4. Water Pipit            |
| 2. Common Tern             | 5. New England Cottontail |
| 3. Arctic Tern             | 6. Ribbon Snake           |
| 7. Landlocked Arctic Charr |                           |

**IV. Maine Species of Indeterminate Status:** Indigenous wildlife believed to be of endangered, threatened, or special concern status, but about which insufficient data are available.

- |                              |                             |                           |                       |
|------------------------------|-----------------------------|---------------------------|-----------------------|
| 1. Least Bittern             | 6. Southern Flying Squirrel | 12. Little Brown Myotis   | 17. Wood Turtle       |
| 2. Upland Sandpiper          | 7. Yellow-nosed Vole        | 13. Keen's Myotis         | 18. Brown Snake       |
| 3. Black-crowned Night Heron | 8. Red Bat                  | 14. Small-footed Myotis   | 19. Swamp Darter      |
| 4. Horned Lark               | 9. Hoary Bat                | 15. Eastern Pipistrelle   | 20. Brook Stickleback |
| 5. Orchard Oriole            | 10. Silver-haired Bat       | 16. Tremblay's Salamander | 21. Grass Pickerel    |
|                              | 11. Big Brown Bat           |                           | 22. Lynx              |

**V. Maine Watch List:** Species that do not meet the rigorous requirements of inclusion in Categories I through IV, but do warrant special attention.

- |                         |                          |                            |                          |
|-------------------------|--------------------------|----------------------------|--------------------------|
| 1. Leach's Storm-Petrel | 9. Cooper's Hawk         | 17. White-rumped Sandpiper | 25. Black Tern           |
| 2. Snowy Egret          | 10. Red-shouldered Hawk  | 18. Least Sandpiper        | 26. Razorbill            |
| 3. Little Blue Heron    | 11. Semipalmated Plover  | 19. Dunlin                 | 27. Atlantic Puffin      |
| 4. Tricolored Heron     | 12. Black-bellied Plover | 20. Short-billed Dowitcher | 28. Eastern Bluebird     |
| 5. Cattle Egret         | 13. Ruddy Turnstone      | 21. Semipalmated Sandpiper | 29. Vesper Sparrow       |
| 6. Glossy Ibis          | 14. Whimbrel             | 22. Sanderling             | 30. Sharp-tailed Sparrow |
| 7. American Black Duck  | 15. Greater Yellowlegs   | 23. Red-necked Phalarope   | 31. Southern Bog Lemming |
| 8. Barrow's Goldeneye   | 16. Lesser Yellowlegs    | 24. Bonaparte's Gull       | 32. Long-tailed Shrew    |

**VI. Maine Extirpated Species:** Species of wildlife that were once indigenous to Maine but have not been documented as indigenous for the past 50 years.

- |                              |                               |                        |
|------------------------------|-------------------------------|------------------------|
| 1. Labrador Duck (extinct)   | 5. Passenger Pigeon (extinct) | 8. Gray Wolf           |
| 2. Eastern Anatium Peregrine | 6. Loggerhead Shrike          | 9. Woodland Caribou    |
| 3. Eskimo Curlew             | 7. Sea Mink (extinct)         | 10. Eastern Cougar     |
| 4. Great Auk (extinct)       |                               | 11. Timber Rattlesnake |



MDIFW reviewed well over a thousand environmental permit applications in 1992, including development proposals ranging from subdivisions to construction of highways and airports. All applications were screened to ensure protection of sensitive wildlife areas. About 25 sites important to Endangered or Threatened species were identified and received some sort of protective action through this process.

Another important habitat protection tool regularly used by the Department is voluntary, cooperative management of important sites for Endangered or Threatened wildlife on lands owned by state or federal agencies, businesses, or private individuals. In 1992, cooperative management arrangements were in place on dozens of sites including lands under the jurisdiction of the state bureaus of Public Lands and Parks and Recreation, Baxter State Park, Acadia National Park, U.S. Fish and Wildlife Service, and most major timber industry landowners. Additionally, a project was initiated for cooperative management of rare and endangered species on U.S. Air Force lands in Maine.

"Essential Habitat" designation under the Maine Endangered Species Act also continued to be a valuable tool in protecting sites for Endangered and Threatened Species. In March 1993, thirty-five new bald eagle nests were adopted under this rule, bringing the total number of nest sites protected since 1989 to 244. In addition, 21 roseate tern nesting areas were designated as "Essential Habitat" in 1993. The success of this program continues to be demonstrated not only in the species' response to "Essential Habitat" protection, but also in the cooperative partnerships that have developed between state agencies, municipalities, and private landowners to resolve avoidable land use conflicts where Endangered Species are of concern.

## **ENDANGERED AND THREATENED SPECIES STUDIES**

### **Bald Eagle**

We are encouraged by a steady, long-term trend of growth in Maine's bald eagle breeding population (Table 22). However, the rate of increase is relatively slow, because Maine's bald eagles do not raise enough young eaglets annually to accelerate the rate of increase in the breeding population. Bald eagles have been designated an Endangered species in Maine since 1978.

Eagle reproduction in Maine, monitored annually since 1962, remains 10-30% lower than healthy populations in the Great Lakes states, Pacific Northwest, Chesapeake Bay region, and Florida. The primary hinderance to eagle reproduction in Maine has been environmental contaminants, which pass through



**Table 22. Bald eagle nesting and productivity in Maine, 1962-70 and 1972-92.<sup>1</sup>**

Year	Occupied Sites	Successful Sites		No. Young Fledged	Young Fledged/Nest		Occupied Nests Fledging # of Young			
		N	%		Occupied	Successful	0	1	2	3
1962	27	8	30	8	0.30	1.00	19	8	0	0
1963	32	9	28	12	0.38	1.33	23	6	3	0
1964	28	6	21	6	0.21	1.00	22	6	0	0
1965	33	4	12	4	0.12	1.00	29	4	0	0
1966	28	7	25	11	0.39	1.57	21	3	4	0
1967	21	4	19	6	0.29	1.50	17	2	2	0
1968	23	9	39	11	0.48	1.22	14	7	2	0
1969	29	11	31	15	0.52	1.36	18	7	4	0
1970	32	8	25	11	0.34	1.38	24	5	3	0
1972	29	8	28	8	0.28	1.00	21	8	0	0
1973	31	6	19	6	0.19	1.00	25	6	0	0
1974	36	12	33	12	0.33	1.00	24	12	0	0
1975	31	9	29	11	0.35	1.22	22	7	2	0
1976	41	12	29	19	0.46	1.58	29	6	5	1
1977	50	24	48	35	0.70	1.46	26	16	5	3
1978	62	20	32	32	0.52	1.60	42	9	10	1
1979	52	29	56	38	0.73	1.31	23	20	9	0
1980	56	29	52	40	0.71	1.38	27	19	9	1
1981	63	34	54	49	0.78	1.42	29	19	15	0
1982	72	36	50	56	0.78	1.56	36	17	18	1
1983	74	40	54	60	0.81	1.50	34	20	20	0
1984	66	35	54	46	0.70	1.31	31	24	11	0
1985	86	51	59	75	0.87	1.47	35	27	24	0
1986	89	50	56	76	0.85	1.52	39	25	24	1
1987	91	46	51	65	0.71	1.41	45	28	17	1
1989	109	45	41	70	0.64	1.56	64	20	25	0
1990	123	69	56	98	0.80	1.42	54	40	29	0
1991	127	79	61	117	0.92	1.48	48	44	32	3
1992	140	77	55	113	0.81	1.47	63	43	32	2

<sup>1</sup>Data comparisons between the periods 1962-67 and 1968-89 are invalid due to variations in survey methodology, regional emphasis, and intensity. 1988 data were incomplete due to a lack of funds.

the food chain and affect hatching success of eggs. A general decline of contaminants during the 1970s allowed some improvement in eagle reproductive rates, however, DDE residues (a long-lasting by-product of the insecticide DDT), plus other organochlorine contaminants (most notably PCBs, an industrial pollutant), and several heavy metals (particularly mercury), apparently still hinder the eagle population's recovery in Maine. Most of these chemicals break down very slowly in the environment, and because Maine eagles often eat other fish-eating birds (e.g., cormorants, herons, and mergansers) as well as fish, they are especially vulnerable to accumulating contaminants. A graduate study at the University of Maine documented significant contaminant levels in unhatched eagle eggs and nestling eaglets in 1991.

Another problem for Maine's eagles, has been changing land use, mostly along coastal and other waterfront properties, which has threatened more than



30% of all occupied eagle nests in Maine during recent years (Human disturbances of nesting eagles were previously documented at only 2 or 3 incidents annually). A wide range of disturbances have been involved that resulted in both nesting failures (compounding a continuing problem caused by chemicals) or permanent abandonment of nests that normally support breeding eagles for at least 10 to 15 years. To address this problem, 244 bald eagle nest sites across Maine have been designated as "Essential Habitats" since 1989 and are covered by protection standards. To date, six of 7 projects proposed within "Essential Habitats" have been approved, but refinements in the design of the projects were required to protect the nesting eagles.

In summary Maine has had an aggressive management program for bald eagles since 1976. It has evolved to address the various threats that collectively cause bald eagles to be an endangered species. Each year there is increasing optimism for bald eagle recovery, and certainly plenty of work ahead to achieve that goal.

## Peregrine Falcon

The peregrine is on the way back in Maine and throughout the East! Each year yields new advancements in this re-established breeding population. Peregrines declined worldwide and disappeared from the East in the early 1960s. Like bald eagles, and many other birds of prey, they were victimized mostly by the effects of DDE in the environment.

Peregrine recovery is a broad, regionally coordinated program jointly undertaken by individual states, the U.S. Fish and Wildlife Service, and The Peregrine Fund. Reintroductions in Maine began in 1984, 10 years after inaugural efforts in the East. Maine has played a prominent role since, and now accounts for more than 10% of all peregrines released in the East.

Peregrines for reintroduction are produced by captive breeding birds. Young peregrines arrive at their planned release sites when they are 4-5 weeks of age. After acclimating to their new surroundings, they are released at 6 weeks of age, but field technicians stay on duty for another 5 to 6 weeks. Daily care, feeding, and monitoring promotes normal development of young peregrines before they disperse in late summer.

Many peregrines die of natural causes, just like other wild animals, so it is important to maintain the supply of reintroduced peregrines until a viable population is re-established. The needs and options for continuing these peregrine releases are reviewed annually to optimize their effectiveness.



In 1992, MDIFW, again conducted a single reintroduction of 4 captive-produced peregrines at Boarstone Mountain, a National Audubon Society Sanctuary near Greenville. Fortunately, re-established pairs of breeding peregrines are contributing more young each year. The first successful nesting of peregrines in Maine was documented in 1988. Six pairs raised a total of 7 young peregrines in 1992.

We anticipate an increasing number of peregrines at nesting eyries in upcoming years. If you witness the spectacular vertical dives of a peregrine, or otherwise suspect their presence, please contact the nearest MDIFW office. Watch and enjoy!

## Golden Eagle

The golden eagle is apparently the rarest breeding bird in eastern U.S. It once was an inhabitant of mountains from the southern Appalachians of Tennessee and Virginia north through Maine. Only one nesting pair remains in Maine, and it is the only documented breeding record at present in this region. Reported sightings from 2 other locations offer hope that additional nests may be discovered.

Unfortunately, Maine's single breeding pair has failed to nest successfully for 10 consecutive years. Only 3 other cliff eyries in Maine have been known to be inhabited by goldens at some time during the last 20 years, and only 3 young golden eagles have been produced by resident pairs in Maine within the last 15 years.

Certainly, the outlook is grim for the golden eagle. There are natural habitat limitations on the species in the East which have made them rare throughout recorded history. Golden eagles are relatively numerous in the West, where open terrestrial habitats favor their normal lifestyle of preying upon small mammals. The extensive forestlands in Maine cannot be used as hunting areas by golden eagles.

Goldens in Maine traditionally preyed on wading birds (such as herons and bitterns) in open wetlands. Such a diet would have made them particularly vulnerable to environmental contaminants, which took their toll on reproduction of bald eagles and peregrine falcons in Maine. Great blue herons, apparently a mainstay food for golden eagles in Maine, contained some of the highest DDE residues ever found in wildlife. Apparently, contaminants have brought the few golden eagles of northeastern U.S. to the threshold of extinction.

The immediate priority in Maine has been to manage the few suitable nesting habitats that once supported golden eagles. The last remaining pair is being carefully monitored to learn more of the species' needs in the East, and to



identify factors limiting their existence. However, the emergence of a new pair in Maine this year and the existence of a small breeding population in eastern Canada offer some hope for the golden eagles's future here.

## Grasshopper Sparrow

Grasshopper sparrows are listed as Endangered by MDIFW because of low numbers and threats to their nesting habitat. Maine is presently the northeastern edge of the range of the grasshopper sparrow. The species now nests at only 4 locations in the southern part of the state. Grasshopper sparrows inhabit large sandy grasslands and blueberry barrens that are vegetated with sparse bunch grasses. These grassland habitats are also rare in Maine.

The largest nesting population of grasshopper sparrows in New England occurs on 600 acres of blueberry barrens and grasslands on the Kennebunk Plains in West Kennebunk, York County. At least 23 pairs nested on the Kennebunk Plains in 1992. This site annually supports more than 50-60 percent of the statewide breeding population. The 1991 census identified 47 nesting pairs, the highest breeding abundance of grasshopper sparrows ever recorded in Maine. In 1992, only 32 pairs were tallied statewide. Winter mortality, as well as habitat quality, in Maine likely influence breeding numbers in Maine.

The Kennebunk Plains has been purchased by the Land For Maine's Future Board, in cooperation with The Nature Conservancy, the Kennebunk Water District, and MDIFW. The property will be managed by MDIFW as a Wildlife Management Area. Habitat restoration for grasshopper sparrows and other grassland birds will be a high priority.

## 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. In Maine, the piping plover is listed as Endangered by MDIFW because of its extreme rarity in the state and because of threats it faces during the nesting season.

In 1990, a recovery plan was completed for the Piping Plover in Maine, establishing the Department's goals and objectives. The objectives are to increase the plover population to at least 20 pairs nesting at 7 sites and producing at least 2 chicks per pair.

Maine's population of piping plovers has been monitored annually for the Department since 1981 by biologists with the Maine Audubon Society. During this period, the number of pairs reported has fluctuated between a low of 7



pairs at 4 sites in 1983 and a high of 24 pairs at 9 sites in 1992. Thirteen different nesting sites have been used during the period. The overall population trend has been one of increase, due largely to intensive management at nesting sites and favorable habitat changes at one site, Seawall Beach. However, nesting plovers have not nested at 2 sites since the early 1980s: Batson River and Wells Beach.

Productivity of piping plovers in Maine, measured as number of chicks fledged per nesting pair, has ranged from a low of 0.9 chicks per pair in 1981 to a high of 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 7 of the past 9 years. The trend in productivity has been generally one of increase since 1981. In 1992, 24 pairs of piping plovers nested at 9 sites and successfully fledged 49 chicks - a record number of chicks in Maine!

Monitoring and management of piping plovers in Maine has been carried out primarily by Maine Audubon Society and The Nature Conservancy biologists, with partial funding from MDIFW. Biologists conduct annual surveys of abundance and reproductive success and determine factors limiting productivity. Where necessary, nests are protected from human disturbance, pets, and natural predators such as foxes, skunks, and crows. Management since 1988 has included use of wire enclosures to prevent nest predation by mammalian and avian predators.

## Least Tern

Least terns are the smallest of four species of terns that nest along the coast of Maine. Least terns nest on a few sandy beaches in southern Maine. They are listed as endangered by MDIFW because of their rarity and because of threats to nesting colonies and habitat.

Nesting colonies of least terns in Maine are monitored and protected by Maine Audubon Society and The Nature Conservancy biologists, with partial funding provided by MDIFW. During the past 10 years, the statewide population has fluctuated from a low of 39 pairs at 3 sites in 1982, to a high of 124 pairs at 4 sites in 1986. Since 1979, total productivity in Maine has ranged from 12 to 123 young fledged annually. In 1992, 94 pairs nested at 4 sites and produced 123 fledglings.

The poor 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; and habitat alteration from coastal development. Management of least terns in Maine includes protection of nesting colonies with symbolic fencing, snow fencing, or chicken wire. Symbolic



fences are fences of stakes and twine with warning signs around the nesting colonies. Public education to inform recreational beach-goers and local residents about the conservation needs of least terns is another important management activity. MDIFW and Maine Audubon are developing management recommendations for each of the nesting beaches to aggressively confront predation and disturbance problems.

## Roseate Tern

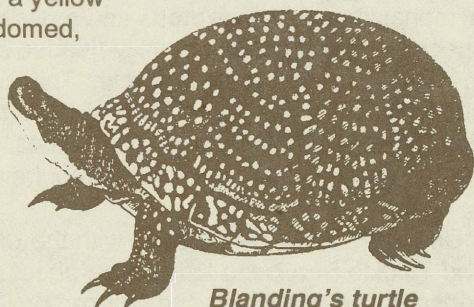
The roseate tern is listed as an Endangered Species by Maine and the Federal government. The roseate tern nests in Maine with common and arctic terns on coastal islands. The islands are critical to the survival of the species since they typically provide undisturbed, predator-free nest sites. With an increase of gulls on the coast (a predator and competitor of the terns), and an increase of human disturbance on the islands, tern numbers and reproductive success have declined to where the species is now listed as Endangered.

In recent years, 50-80 pairs of roseate terns have nested in Maine. Their numbers have increased in response to management, and 121 pairs nested in Maine in 1992. In the 1930s, that number was probably between 200-300. Recovery of this species is a cooperative venture among the U.S. Fish and Wildlife Service, National Audubon Society, Maine Audubon Society, College of the Atlantic, and MDIFW. With their assistance, MDIFW developed a recovery plan in 1990, for the roseate tern. The Department's goal is to increase the population of roseate terns to 200-300 pairs. In 1992, protection of 21 historic nesting islands was attained using Essential Habitat provisions of the Maine Endangered Species Act. Also, new tern restoration projects are being planned to specifically benefit roseate terns.

## Blanding's and Spotted Turtles

Two of Maine's threatened reptiles, the spotted and Blanding's turtles, are semi-aquatic species preferring clean, shallow wetlands. Spotted turtles are small (5 to 6 inches long) and have yellow spots on the head, tail, and legs and a slightly flattened, black, upper shell. Blanding's turtles are medium-sized turtles (7 to 10 inches long) with a yellow throat and light-colored flecking on a domed, helmet-shaped shell.

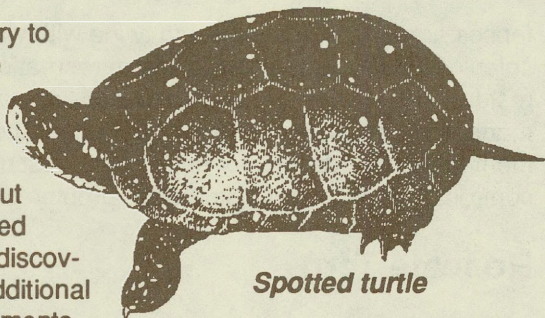
Little was known about either of these species until the Maine Amphibian and Reptile Atlas Project (MARAP) was conducted in the 1980s. As a result of MARAP, spotted turtles were recorded at



*Blanding's turtle*



about 20 different sites from Kittery to Orrington. Blanding's turtles were known from only about 20 locations in Maine, all in York County. In 1990, MDIFW increased efforts to learn more about the distribution of these Threatened turtles. Sufficient numbers were discovered in York County to warrant additional studies of their abundance, movements, habitat use and ecology. In collaboration with the University of Maine Wildlife Department and Maine Audubon, a graduate student is now studying populations of both species in the Mt. Agamenticus area. More than 80 turtles were marked or radio-tagged in 1992. New information on nesting and hibernation sites, movements, and the types of wetlands used will help with conservation planning. In 1992, the Environmental Protection Agency provided additional funding to MDIFW to systematically survey all towns in York County for Blanding's and spotted turtles. Over 850 wetlands were surveyed and approximately 50 new sites were discovered.



**Spotted turtle**

## Tomah Mayfly

The "Tomah" mayfly, *Siphonisca aerodromia*, is a rare insect that is currently a candidate for Threatened or Endangered species status by the U.S. Fish and Wildlife Service and the State of Maine. This large mayfly was first collected early in this century from a single location on the Sacandaga River in New York. Damming of the river, and associated construction, destroyed the Sedge meadow habitat at this site in the 1930s. The species was assumed to be extinct for nearly 50 years until it was "rediscovered" at Tomah Stream in Washington County by University of Maine entomologists in the 1970s. It has since been found at several other locations in Maine and single sites in New York, Labrador, and Quebec.

This insect is unique in many ways. It is the only representative of the genus *Siphonisca*. Some have described it as a "living fossil" as it has large projections on the abdomen, characteristics of ancient Carboniferous insects. The nymphal stage is carnivorous and preys on other mayfly nymphs. This species depends on seasonally-flooded sedge meadows along large streams or rivers to complete its life cycle. This highly productive habitat supports abundant populations of mayfly nymphs that, in turn, serve as prey for *Siphonisca*. Finally, research suggests that a portion of the females may be able to successfully reproduce without males. Figure that one out!

MDIFW has been cooperating with the University of Maine and the U.S. Fish and Wildlife Service to learn more about this intriguing insect and to insure its conservation. Studies have focused on its distribution, population size, and



habitat needs. MDIFW is also concerned about threats (damming, pollution, wetland alteration) that may alter the sedge meadow, an increasingly rare natural community, where this rare creature still exists.

## Freshwater Mussels

Freshwater mussels are relatively sedentary, bottom-dwelling invertebrates found in many of Maine's lakes, ponds, rivers and streams. Most species require clear, clean, flowing water and are highly sensitive to water quality and alterations to the their aquatic environment. During the summer of 1992, MDIFW initiated a freshwater mussel survey to determine the abundance, distribution, and status of some of the State's rarer molluscs. Ten species of freshwater mussels are currently known to occur in Maine. Two of these species, the Brook Floater (*Alasmodonta varicosa*) and Yellow Lamp-Mussel (*Lampsilis cariosa*) are rare and declining throughout parts or all of their ranges along the Atlantic Coast. Both species are currently listed as candidates for federal Endangered and Threatened Species status.

As a result of our survey work, presence of the Brook Floater was reverified at 5 of 6 known historic Maine rivers, and 5 new sites were discovered. One additional new site was found for the Yellow Lamp-Mussel. We were also able to document sufficient enough numbers of individuals in several of these rivers to indicate both species are probably relatively secure in Maine for the present. In fact, Maine may be the last stronghold for these rare mussels.

In 1993, MDIFW will continue surveying rivers and streams throughout Maine to locate additional occurrences of these two species and continue to learn about their life histories, habitat requirements, status and conservation needs. At the same time, we will continue to document occurrences for all of Maine's freshwater molluscs, for very little is known about even our more common species. With many mussel species experiencing dramatic declines throughout the United States, including our neighboring northeastern states, it is becoming increasingly important to monitor the status of all our mussel fauna. As valuable indicators of water quality and habitat integrity in our rivers and streams, freshwater mussels can tell us much about the health of Maine's environment.



# Atlas of Amphibians and Reptiles in Maine

Thirty-eight kinds of frogs, toads, salamanders, snakes, and turtles are known to live in Maine. Collectively called herptiles, or "herps" for short, these animals are some of the smallest, most inconspicuous, and perhaps least understood of all vertebrate species. Some of them are also among the rarest and most threatened of Maine's wildlife.

In 1984, MDIFW, The Nature Conservancy, Maine Audubon, and the Wildlife Department of the University of Maine initiated the Maine Amphibian and Reptile Atlas Project (MARAP) to determine the distribution and status of these species. Through eight years, the project has enlisted the aid of many enthusiastic and dedicated volunteers to record observations of both rare and common herps. Information collected by MARAP observers has greatly increased the knowledge of amphibians and reptiles in Maine and our ability to conserve them. New locations for some of our rarest herps have been documented.

A long-held goal of MARAP participants is now being realized with the publication of the Atlas of Amphibians and Reptiles in Maine. This publication, available from MDIFW, contains 186 pages of maps, drawings, descriptions and information on conservation needs, life history, and habitat for all of Maine's Amphibians and reptiles. The Atlas is available through the Public Information Division, MDIFW, 284 State Street, Augusta, ME 04333, for \$9.95, which includes shipping. Proceeds from the sale of this book are being deposited in The Maine Endangered and Nongame Wildlife Fund and will be used for further work on the conservation of reptiles and amphibians in Maine.





# HABITAT

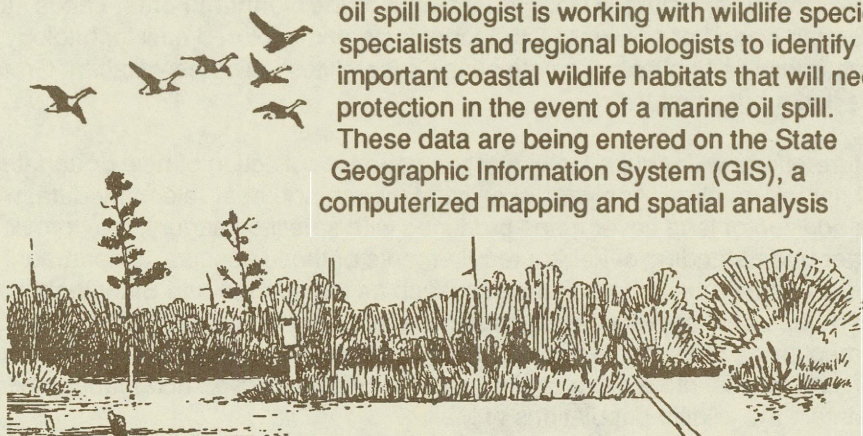
What do the Marine Oil Spill Prevention, Planning and Response Act, Natural Resources Protection Act, Land Use Regulation Commission, Endangered Species Act, Northern Forest Land Council, and Gulf of Maine Council have in common? All require the Maine Department of Inland Fisheries and Wildlife (MDIFW) to identify important wildlife habitats in the State of Maine. Combine these demands with the requisite for wildlife habitat data to develop species assessments and management systems, and also respond to numerous permit reviews and requests from private and public groups, then you begin to understand the overwhelming necessity for wildlife habitat information.

Recently, the Wildlife Division recognized the need to more efficiently manage wildlife habitat data to meet the variety of wildlife habitat information needs. In October 1991, a new Wildlife Habitat Group was created within the Resource Assessment Section in Bangor to act as a focal point for addressing wildlife habitat information needs. The new group, comprised of two current Department wildlife biologists and a third biologist (paid from the Maine Coastal and Inland Surface Oil Clean-up Fund and added to the staff in November 1991 to exclusively work on oil spill issues) was faced with several major tasks including: coordinating development and implementation of wildlife habitat inventories; consolidating and managing wildlife habitat information for various users; implementing habitat protection initiatives; and, providing expertise on monitoring habitats. Obviously, a staff of three persons cannot accomplish these tasks without the help of the entire Wildlife Division. The new group has become the hub of wildlife habitat protection efforts, however, planners, regional biologists, species specialists and others continue to play key roles.

Two major tasks that required immediate action were: 1) identification of sensitive coastal areas for Maine's marine oil spill contingency plan and 2) development of a wildlife rehabilitation plan for wildlife contaminated by oil. Our

oil spill biologist is working with wildlife species specialists and regional biologists to identify important coastal wildlife habitats that will need protection in the event of a marine oil spill.

These data are being entered on the State Geographic Information System (GIS), a computerized mapping and spatial analysis





system capable of manipulating large amounts of complex geographic (i.e., habitat) information. The information will also be used to assess oil spill damage.

We are also working with the Department of Environmental Protection (DEP) to develop a wildlife rehabilitation plan for contaminated wildlife during a marine oil spill. Rehabilitation facilities, materials, and equipment are being prepared, and volunteers trained to respond to oil spills along Maine's coast.

Meanwhile, we have been evaluating the status of all habitat information in the Wildlife Division. Based on this assessment, a habitat information management system will be developed to improve and update existing habitat databases and to expedite distribution of information to where it is needed. GIS capabilities will be used to simplify management of habitat maps and geographic information. The process has just begun; we have a long way to go!

We are also currently assisting in mapping habitats for protection under various State laws, such as the Endangered Species Act (Essential Habitat for Endangered or Threatened species) and the Natural Resource Protection Act (Significant Wildlife Habitat - deer wintering areas, seabird nesting islands, and wading bird/waterfowl habitat, etc.). Criteria are being developed to define these habitats, and existing data are being prepared for the GIS to facilitate habitat mapping and protection. Our Habitat Group will also be responsible for distributing these habitat maps and associated data as they become available.

Our Habitat Group is also working cooperatively with the Land Use Regulation Commission (LURC) staff and MDIFW Regional Biologists to produce upgraded maps (scale 1:24,000) of deer wintering areas. Information is being provided for a wildlife habitat study conducted by the U.S. Fish and Wildlife Service in northern New England.

We are learning to operate the GIS computer system and software and use it to map wildlife habitat. We have coordinated with the U.S. Forest Service on the 1993-94 forest resurvey, created master files of aerial photos used by Department biologists, provided Department input to the Northern Forest Lands study, attended workshops to learn GIS technology, and explored new technology to assess wildlife habitat by remote sensing (satellites). The new Habitat Group has had a busy first year!

Future efforts will require looking at the need for collection of new or updated habitat information. Analyses of existing moose and bear telemetry data, with the addition of land cover maps produced with satellite imagery, may provide a better understanding of habitat requirements of these species. Department studies on a variety of other species, such as the spotted and Blanding's turtles, will require new approaches to habitat identification and use of GIS techniques to map areas of essential habitat. Many challenges lie ahead as the Wildlife Division moves into a more active role of habitat protection and management to maintain the wildlife populations of Maine.

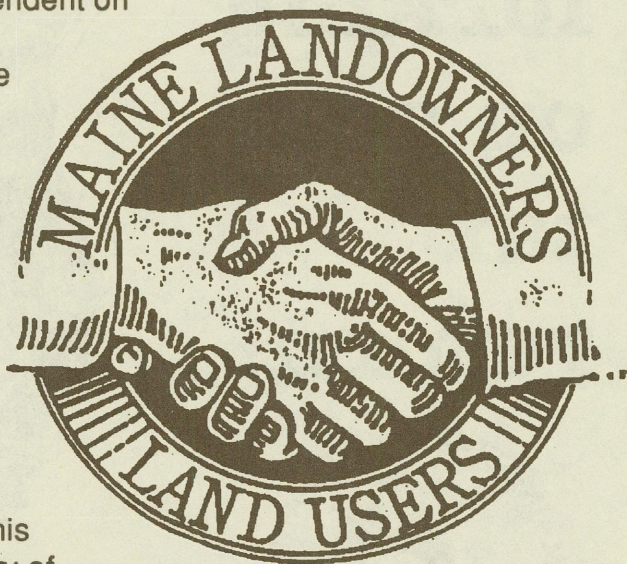


In Maine, where only 5 percent of the total land area is in public ownership, the private landowner's role in wildlife management cannot be overstated. The underlying fact is that most wildlife in this state is produced on privately-owned land. It is also on land owned by others that most people take their enjoyment of wildlife.

The way landowners use their property has a significant bearing on the abundance and diversity of most game and nongame species, and the very existence of some land-intensive forms of recreation, such as hunting, is heavily dependent on the good will of these individual and corporate landowners.

Much of northern Maine is in large forest and agricultural ownerships; elsewhere, family farmers and small woodlot owners dominate rural ownership patterns. These owners of 95 percent of the land in this state have a long history of stewardship and of sharing their land with others for recreational uses.

Despite additional acreages of private property being closed annually to public recreation — largely the result of thoughtless acts by recreational users — there still remains abundant opportunity for public recreation on privately owned land in Maine. Preserving the tradition of easy access to private property will take diligence by all concerned, but particularly it means that land users must treat the land and its owners the same way they would want someone else to treat their private property: with care and respect.





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lurking  
on your  
tax  
return!**



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



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