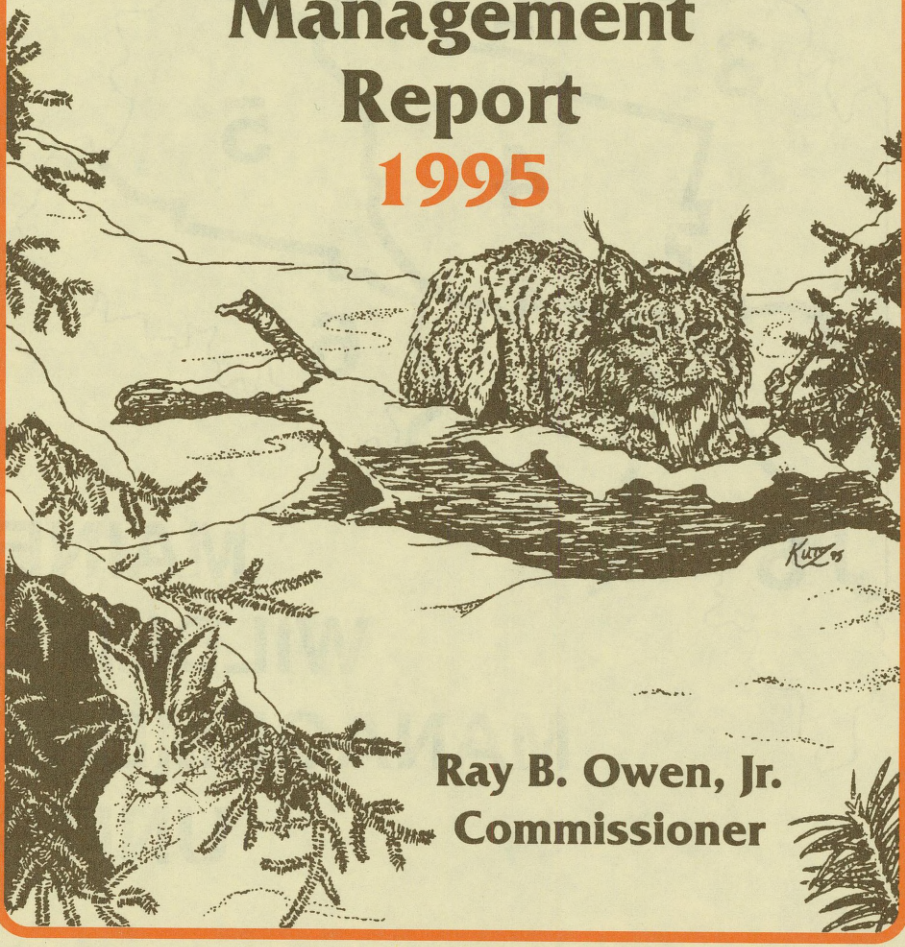
Maine Department of
Inland Fisheries
and Wildlife

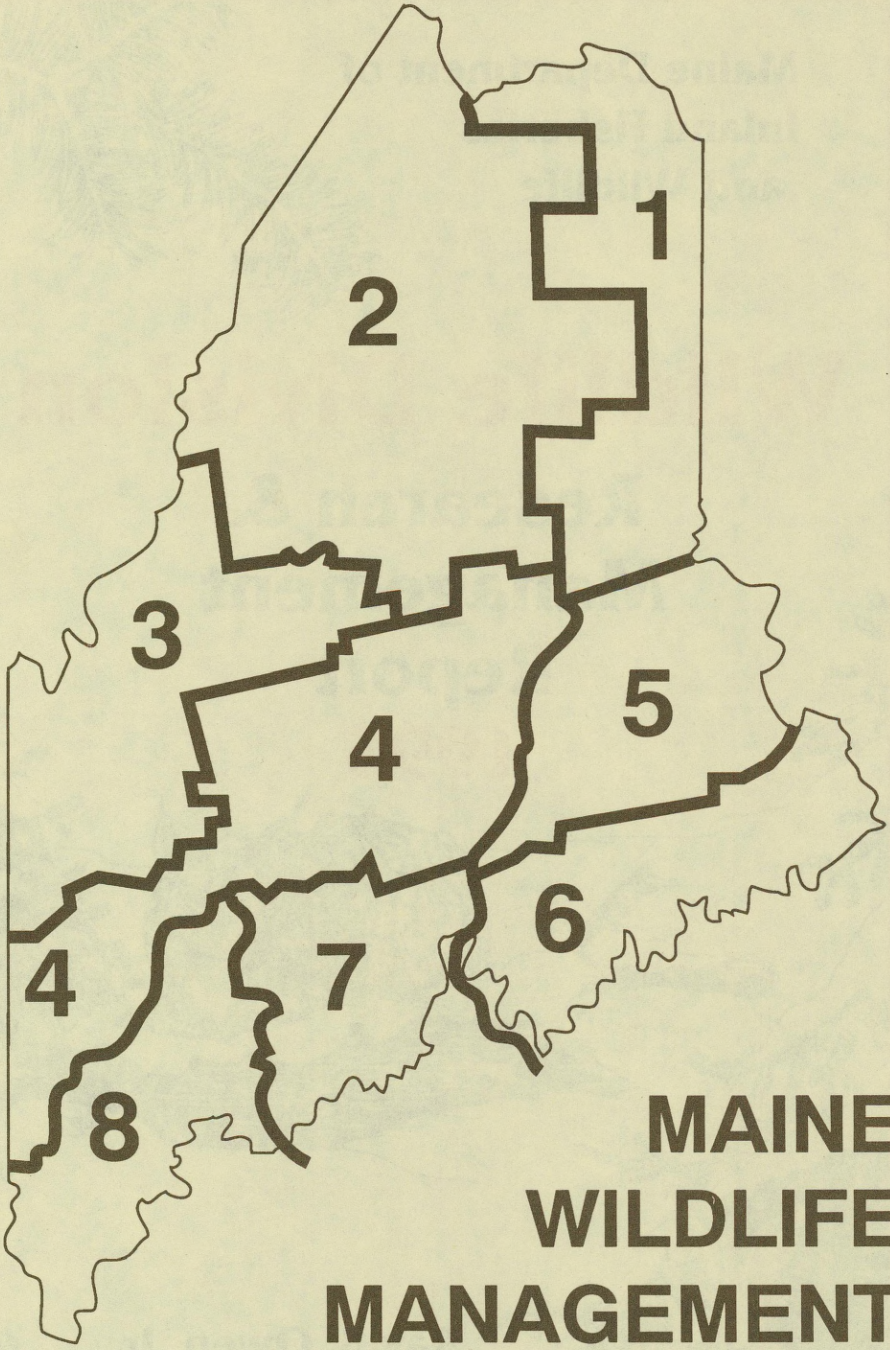
Wildlife Division

Research & Management Report

1995



Ray B. Owen, Jr.
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.

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INTRODUCTION

On behalf of the staff of the Wildlife Division, I would like to extend our sincere appreciation for your continued support and interest in our work. Without the cooperation of landowners and the generous assistance of thousands who volunteer time, data, guidance, and funds, none of our wildlife resource programs could be possible.

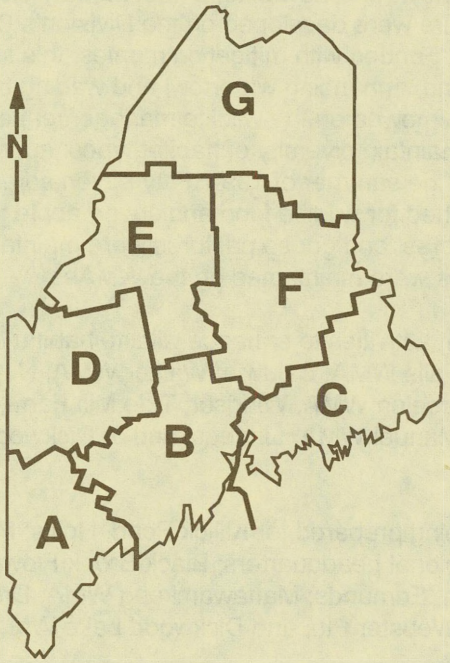
I hope that you find your copy of the "Research and Management Report" a convenient reference of the results of management initiatives conducted over the past year. If you would like additional information about programs addressed in this report, please feel free to contact wildlife biologists at the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

Ken Elowe
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 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 1994 WILDLIFE MANAGEMENT ACTIVITIES

Habitat Management

The Wildlife Division 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. The Division manages approximately 79,000 acres in 110 properties and 287 coastal islands and ledges.

Wildlife Management Areas

Many activities on the wildlife management areas are directed at maintaining existing developments and structures, such as roads, trails, bridges, buildings, signs, boundary lines, fences, and gates. This past year, such maintenance included 20 buildings, 21 bridges, 41 miles of road, and 60 miles of boundary line. In addition, a ramp was constructed at the Scarborough Marsh Nature Center, located at the Scarborough Marsh WMA, to provide access for handicapped individuals.

The Division's 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. Major renovations also occurred to the water-control structures at the Ruffingham Meadow WMA, Searsmont; Madawaska WMA, Palmyra; St. Albans WMA, St. Albans; Sandy Point WMA, Stockton Springs; and at Stump Pond WMA, New Vineyard. A new dike, 2 feet high by 1,320 feet long, and water-control structure were developed on the Division's Cassey Sutherland property in Ashland. Funded with mitigation monies, this structure created a shallow-water wetland, enhancing waterfowl and wading bird habitat.
Small fields are also mowed on the wildlife management areas to set back succession and to maintain diversity of habitat types: approximately 600 acres were mowed during the summer of 1994. Fifty-seven acres of grasses and clover were established for wildlife food and cover, apple trees were released and pruned on 11 acres, and goose pastures were maintained. In addition, 360 waterfowl nest boxes were maintained on the WMAs.

Timber management activities to enhance wildlife habitat occurred on 6,600 acres at the Steep Falls WMA, Baldwin; Walker WMA, Newfield; Letourneau WMA, Montville; Garcelon WMA, Windsor; Tide Mill Farm, Edmunds; Leavitt WMA, Charleston; Manuel WMA, Linneus; and at Dickwood Lake WMA, Eagle Lake.

WMA plans were being prepared for Killick Pond, Hollis; Mount Agamenticus, York; the Strong regional headquarters; Black Brook Flowage, Pierce Pond Twp.; Tide Mill Farm, Edmunds; Mattawamkeag WMA, Drew Plt. & Kingman; Mattagodus WMA, Webster Plt.; and Dickwood Lake WMA, Eagle Lake.

Public Reserved Lands

During the past year, the wildlife biologist assigned to BPL provided wildlife habitat management guidance to the Bureau through review of land management prescriptions affecting 21,987 upland acres. In addition, herbaceous seedings were established on 57 acres for wildlife forage and erosion control. One hundred Siberian crab apple trees were planted at the Pine Tree State Arboretum. Grouse management was initiated on 20 acres. Prescribed burning was conducted at Chain of Ponds Twp. to maintain old field habitat; and an additional 20 acres were burned on BPL's Cutler unit to maintain a rare grassland.

BPL's wetland management included seeding wild rice at three impoundments and maintaining 112 waterfowl nest boxes. The Bureau also managed 70 acres of wetland at 12 locations, using siphon pipe and fence, to allow potentially nuisance beaver and their flowages to remain adjacent to roads or other improvements.

A water control structure was built on the Yankee Wood Lot Demonstration Forest in Skowhegan. This created a three-acre wildlife pond that will enhance the educational value of an adjacent nature trail.

Private Lands

Much of the Division'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. Deer wintering area information collected for organized towns is provided to the municipalities for inclusion in their comprehensive plans. During the winter of 1993-1994, MDIFW biologists surveyed roughly 89,000 acres of deer wintering area throughout the state.

Based on winter surveys conducted in unorganized towns during previous years, MDIFW submitted three deer wintering area zoning petitions to the LURC. These petitions added another 1,200 acres of critical winter shelter for deer to the Fish and Wildlife Protection Subdistrict (P-FW) administered by the Commission.

Many land-use activities within a zoned DWA in the unorganized towns, such as timber harvesting, require review and comment by MDIFW. This past year, biologists helped various private landowners, including large industrial forest landowners, review and develop prescriptions for land-management activities on 3,300 acres within zoned DWAs.

Cooperative efforts among the MDIFW, Ducks Unlimited, Maine Dept. Of Transportation, U.S. Fish and Wildlife Service, and a Dresden landowner came to a successful conclusion this year with the completion of the water-control structure at the Raynes Marsh. This structure created a 60-acre wetland, providing ideal waterfowl and wading bird habitat, along I-95 in Dresden.

Finally, approximately 800 waterfowl nest boxes were maintained on privately owned wetlands throughout the state.

Wildlife Introductions

Wildlife biologists continued their successful efforts to reintroduce the wild turkey to its historical range in Maine. During 1993-1994, 11 birds were captured from southern Maine flocks and relocated to Kennebec County. Future release sites in Knox and Kennebec 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 Game 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 Division's Animal Damage Control program to address and remedy such problems. Many nuisance wildlife complaints involved problems with beaver plugging culverts or building dams at inappropriate locations, which flood roads or other developments. Numerous other wildlife species were also addressed by ADC: coyotes, bear, deer, Canada geese, and "house and garden" complaints involving raccoons, skunks, woodchucks, and squirrels. Wildlife 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 Agents.

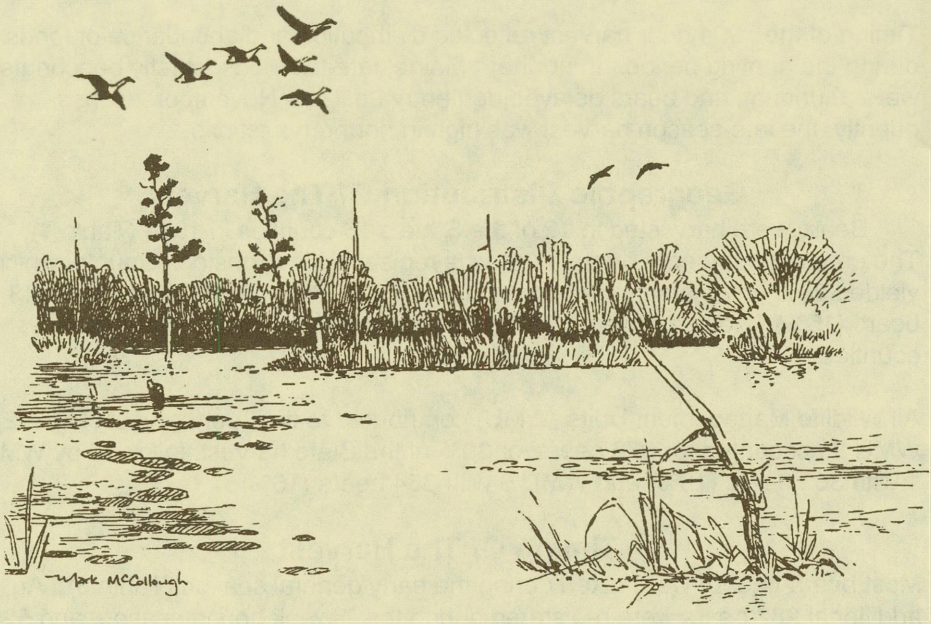
Environmental Assessment

Regional wildlife biologists are regularly asked to assess the effect of development and changes in land use on wildlife. 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, 1,300 wildlife assessments 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 Natural Resources Conservation Service, and the Consolidated Farm Service Agency.

MDIFW's regional wildlife staff continued to assist the Office of Comprehensive Planning, Department of Economic and Community Development, with implementation of the state's comprehensive Growth Management Act. This act encourages Maine towns to develop a comprehensive growth management plan to guide their future development. The Growth Management Act specifically requires that each plan address important wildlife habitats. Wildlife Division involvement 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. This work is a priority for the Wildlife Division as it will help to ensure that critical wildlife habitats in Maine are spared from degradation or loss. This past year, MDIFW completed wildlife habitat maps for 59 organized towns, and maps for another 40 towns were in progress.

Wildlife Resource Assessments

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. These activities are summarized in other sections of this report.



MAMMALS

BLACK BEAR

1994 Bear Harvest

Maine's 1994 black bear season included 3 hunting seasons and a trapping season. The early general hunting season opened August 29 and closed September 24. Bears could be hunted over bait or natural food sources, or stalked/stillhunted during this period. The hound season overlapped the early general season, opening September 12 and closing October 28. Hunters could take bears only by pursuit with dogs from September 24 (when the early general season closed) through October 28. The late general bear hunting season opened with the firearms deer season on October 30, and closed November 26. Hunters were restricted to hunting bears near natural food sources or by still-hunting during the late season. The bear trapping season opened October 1 and closed October 31.

The 1994 harvest of 2,243 bears was 187 bears more than the 1993 harvest (2,055 bears). Shortened bear seasons since 1990 have met the Department's objective of reducing the harvest below 2,300 bears to permit the bear population to increase.

Timing of the 1994 bear harvest reflected distribution and abundance of foods during the hunting period. In northern Maine, late-fall foods (chiefly beechnuts) were abundant, and bears delayed den entry until late November. Consequently, the late-season harvest was high in northern sections.

Geographic Distribution Of The Harvest

Bears were harvested in 12 of the State's 16 counties in 1994 (Table 1). The greatest number of bears (626) was registered in Aroostook County, which yielded 28% of the statewide harvest, followed by Penobscot County with 343 bears (15%). No bears were taken in Knox, Lincoln, Waldo, or Sagadahoc counties.

All Wildlife Management Units (WMU) contributed to the bear harvest (Table 2). WMU 2 accounted for 676 bears, or 30% of the State harvest, followed by WMU 1 with 363 bears (16%) and WMU 5 with 354 bears (16%).

Timing Of The Harvest

Most bears (1,390) were taken during the early general season (Table 3). An additional 282 bears were registered during the 7-week hound season, and 526 bears were registered during the late general season. Trappers reported 45 bears during the October trapping season.

Table 1. Maine bear harvests, by county, 1987-1994.

COUNTY OF HARVEST	YEAR 1987	1988	1989	1990	1991	1992	1993	1994
Androscoggin	1	0	0	2	1	1	3	2
Aroostook	694	876	863	610	517	630	610	626
Cumberland	5	2	4	7	1	5	7	2
Franklin	151	133	171	134	68	92	115	87
Hancock	92	141	99	88	90	99	104	106
Kennebec	4	1	3	3	3	0	0	1
Knox	1	0	0	0	1	0	0	0
Lincoln	0	0	0	0	0	0	0	0
Oxford	158	195	148	149	112	168	204	172
Penobscot	322	310	351	250	217	261	268	343
Piscataquis	426	424	462	384	269	342	294	326
Sagadahoc	0	0	0	0	0	0	0	0
Somerset	315	301	330	276	215	265	252	267
Waldo	2	0	2	3	1	0	0	0
Washington	220	282	248	164	161	176	195	305
York	3	4	4	9	0	3	3	6
Unknown	0	4	0	9	9	0	0	0
Statewide	**2,394**	**2,673**	**2,690**	**2,088**	**1,665**	**2,042**	**2,055**	**2,243**

Table 2. Maine bear harvests by Wildlife Management Unit (WMU), 1987-1994.

WMU	YEAR 1987	1988	1989	1990	1991	1992	1993	1994
1	431	503	528	296	288	332	381	363
2	667	816	779	712	503	634	525	676
3	393	392	443	363	240	307	325	289
4	444	384	429	358	284	379	392	345
5	292	360	328	237	230	271	266	354
6	154	194	171	100	106	112	157	209
7	5	0	3	5	2	0	0	1
8	8	1	6	10	3	8	9	6
UNK	0	23	0	7	9	0	0	0
STATE	**2,394**	**2,673**	**2,690**	**2,088**	**1,665**	**2,042**	**2,055**	**2,243**

Residence Of Successful Hunters

Maine residents killed 849 bears, or 38% of the total. Nonresident hunters traveling from 33 states, Quebec, Germany, and Greece registered the remaining 1,394 bears.

Nonresidents accounted for 69% of the early general season narvest, and 66% of the take during the hound season. Resident hunters took 54% of the bears harvested during the late general season.

Table 3. 1994 Maine bear harvest, by month and method of take.

SEASON	DATES	HARVEST BY METHOD	SEASON TOTAL
Early General	08/29-09/24	Baiting — 1,297	
		Unknown — 93	1,390
Hound	09/12-10/28	Hounds — 282	282
Late General	10/29-11/26		526
Trapping	10/1-10/31		45
COMBINED			**2,243**

Most bears taken over bait (72%) were taken by nonresident hunters. Hunting with hounds was also popular with nonresidents, as they registered 66% of the bears taken with dogs. Residents tagged 56% of the bears taken by unreported methods, and resident trappers accounted for 93% of the trapping harvest.

Methods Used By Successful Hunters

Depending upon the season, bears can be hunted over bait, with dogs, over natural food sources, trapped, or taken incidentally by hunters pursuing other species (usually deer or birds). Method of take was recorded for 1,624 bears, or 77% of the harvest (Table 3).

Hunting with Bait

The number of bears taken over bait in 1994 (1,297) increased slightly from 1993. Baiting continued to produce the bulk of the bear harvest, accounting for 57% of the 1994 harvest. Most successful bait hunters took their bears early. Over half (58%) of the bears taken with bait were killed in the first week of the early general season; 79% were registered during the first 2 weeks.

Most successful baiters hunted in WMU 2 (Table 4). Baiting accounted for 71% of WMU 2's harvest, and for over half of the bears taken in WMU's 1, 5, and 6.

Most successful hunters using bait (936) were nonresidents. Resident hunters took 361 bears over bait (43% of the harvest by residents).

Hunting with Dogs

Hunters using dogs took 282 bears or 13% of the total harvest (Table 4). WMU 5 accounted for 67 bears taken over hounds, and 56 bears were taken with dogs in WMU 3. Houndsmen tagged bears at a consistent rate, as they reported taking 34-50 bears per week over their 7-week season.

Most successful hunters using hounds (185) were nonresidents. Resident hunters took only 97 bears with hounds (11% of the harvest by residents).

Table 4. 1994 Maine bear harvest, by Wildlife Management Unit and method of take.

Method of Take	WILDLIFE MANAGEMENT UNIT 1	2	3	4	5	6	7	8	STATE
Hunting with bait	208	481	133	152	189	133	0	1	1,297
Hunting with dogs	52	26	56	49	67	32	0	0	282
Trapping	10	7	6	4	11	7	0	0	45
Unknown	93	162	94	140	87	37	1	5	619
Total	**363**	**676**	**289**	**345**	**354**	**209**	**1**	**6**	**2,243**
Archery	34	42	19	32	43	23	0	0	193
Assisted by guide	157	477	141	119	181	62	0	0	1,137

Trapping

Traditionally, a small but consistent percentage of the bear harvest is recorded by trappers. In 1994, 45 bears (2% of the harvest) were trapped. Most trapped bears (11) were taken in WMU 5, and WMU 1 produced 10 bears for trappers (Table 4). Resident trappers took 42 bears, and 3 bears were reported by nonresidents.

Harvest By Other Methods

Hunters did not report method of take for 619 tagged bears in 1994. Some of these bears were taken by hunters waiting near natural food sources (berries, beechnuts) and agricultural areas (oat fields, apple orchards). Many bears were harvested by hunters pursuing deer or birds.

WMU 2 produced most bears (162) taken by unknown methods (Table 4). Only 7% of the early general season harvest was taken by these unreported means, but all 526 bears taken in the late general season were taken this way. Maine residents registered 56% of the bears for which method of kill was unreported.

Archery Hunting

The 1994 archery bear harvest totaled 193 bears, which represents a 15% increase from 1993. Most successful archers (43, or 22%) took their bears in WMU 5 (Table 4). Bait was used by bowhunters to take 165 bears, 20 reported using dogs, and 8 did not report their hunting method. Sixty percent of the archery harvest was taken by nonresident sportsmen. Eight percent of all successful nonresidents, and 9% of all successful resident bear hunters, used archery tackle to take their bruins.

Assistance By Registered Maine Guides

About 51% of successful hunters (1,137) employed Registered Maine Guides to assist them during their hunt. Guides helped take 71% of the bears registered in WMU 2, and the majority of bears in WMU 5 (51%).

Most successful guided hunters (889, or 78%) took their bears in the early general season. An additional 227 guided hunters took bears in the hound season, and 19 hunters were guided to bears in the late general season.

Guides helped take 68% of the bears taken over bait, 81% of the bears taken in front of dogs, 2 trapped bears, and 4% of the bears taken by unreported methods.

Seventy-five percent of successful nonresident hunters employed guides, but only 12% of successful resident bear hunters did. Only 102 (11%) successful nonresident hunters took bears over bait without assistance by a guide. All nonresidents that took bears with dogs hunted with a guide.

Sex And Age Distribution Of The Harvest

The 1994 harvest included 1,290 males (58%), 945 females (42%), and 8 bears of unreported sex. Hunters registered 2,021 bears (90%) as adults, 214 (10%) as cubs, and age was not reported for 8 bears. Sex and age composition of the harvest fluctuated regionally. The adult female component ranged from 33% of the harvest in WMU 2 to 47% of the harvest in WMU 6.

Thirty-eight percent of the bears harvested over bait were registered as females, as were 41% of the bears taken with hounds, 53% of the bears taken by unreported methods, and 36% of the trapping harvest. Baiters registered 93% of their harvest as adult bears; houndsmen reported 95% of their bears were adults. Eighty-two percent of the harvest by unreported methods was adult bears, and adults made up 87% of the trapping harvest.

Prospects for the 1995 Season

In 1995, the bear season framework will remain similar to recent seasons' structure, with one exception. Beginning in 1995, trappers will have an additional week of opportunity to take bears. The 1995 trapping season will open on September 24, immediately following the closure of the baiting period.

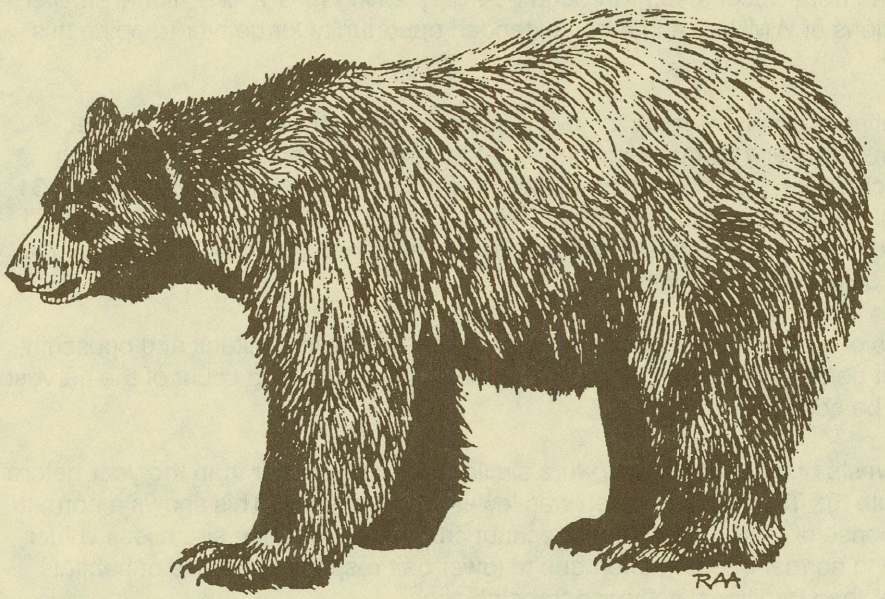
The early general hunting season will open August 28 and close October 27. Bears may be hunted over bait from August 28 until September 23. Bear hunting with dogs will be permitted from September 11 until October 27. The late general bear hunting season will run concurrently with the firearms deer season, from October 28 to November 25. The bear trapping season will open September 23 and close October 31. A bear hunting permit ($5 resident, $15 nonresident) will 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 1995 bear population is estimated at approximately 21,000-22,000 animals, slightly above the Department's objective level of 21,000 bears. The current bear season framework should restrict the 1995 harvest below 2,300 bears resulting in a modest increase in bear numbers into 1996.

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.

Reassessment of the status and use of bears, and bear habitat, may be part of the Department's management efforts in 1995-1996. Following public input, new management goals and objectives will be developed to guide bear conservation into the next century. Future bear management goals and objectives will continue to reflect the interests of all Maine citizens in this valuable wildlife resource.



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.

1994-95 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 1994-95 for all species, except beaver, was allowed from October 30 through December 31. As in past years, there was an additional fox and coyote trapping season that ran from October 23 through October 29. The beaver season ran from December 1 through March 31 in WMUs 1, 2, 3 and 5, from January 1 through February 28 in WMUs 4, 6, and 8, and from December 15 through February 28 in WMU 7. Additional smaller sections of WMUs 2 and 4 had extended opportunity for beaver trapping this year.

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 24 through December 31 for skunk and opossum, October 24 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.

Harvests of most furbearers were similar or slightly higher than the year before (Table 5). The take of marten was lower than last year. This shows a normal response of marten to higher beechnut crops, when marten seem less vulnerable to normal trapping effort due to lower bait response and use of habitats other than traditional softwood trapping sites.

Take of beaver was the highest it has been in the last 10-year period. This was probably due to anticipation that beaver prices would be higher than previous years and to the very high abundance of beaver. The higher otter take was due, in part, to a greater winter beaver trapping effort, and because prices paid for otter pelts remained high this year (Table 6).

Table 5. Furbearer harvests in Maine, 1990-Spring 1995.

	1990-91	1991-92	1992-93	1993-94	1994-95
Mink	1,513	2,068	1,803	1,881	1,549
Otter	558	759	887	908	1,324
Beaver	7,522	10,636	9,619	8,177	15,251
Marten	3,266	3,292	2,090	3,119	2,199
Fisher	1,181	1,603	1,345	1,623	1,546
Fox (R & G)	2,022	2,039	1,974	1,791	2,236
Coyote	944	1,222	1,356	1,410	1,647
Bobcat	113	119	123	180	157

Table 6. Average prices paid for pelts, 1990-Spring 1995.

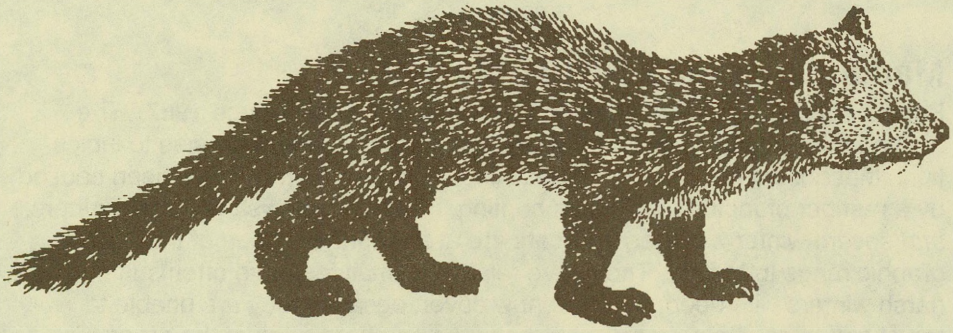
SPECIES	1990-91	1991-92	1992-93	1993-94	1994-95
Raccoon	$3.00	$6.00	$7.00	$9.00	$9.00
Mink:					
Male	24.00	33.00	29.00	26.00	22.00
Female	13.00	18.00	16.00	13.00	11.00
Otter	11.00	25.00	29.00	50.00	52.00
Beaver	10.00	13.00	9.00	20.00	17.00
Marten	27.00	31.00	22.00	25.00	24.00
Fisher:					
Male	10.00	19.00	12.00	14.00	14.00
Female	44.00	51.00	33.00	29.00	30.00
Red Fox	9.00	13.00	10.00	14.00	16.00
Gray Fox	6.00	8.00	—	10.00	8.00
Coyote	6.00	14.00	20.00	20.00	16.00
Bobcat	23.00	38.00	25.00	30.00	30.00
Muskrat	0.80	1.90	1.50	2.00	2.00

Management and Research

Bobcat populations seem to be on the increase in Maine since 1987. The hunting season was shortened by one month that year in response to indications that bobcat numbers were declining. The decline may have been caused by a number of factors, including: hunting, decline in snowshoe hare numbers, and severe winter weather. Bobcats are at the northern edge of their geographic range in Maine. They have relatively small feet, and often suffer in harsh winters with deep, powder snow cover, because they are unable to travel and hunt. Conversely, lynx are at the southern edge of their range in Maine. Their huge feet and long legs are well adapted to deep-snow travel. Weather conditions throughout Maine vary widely, and also vary between years, thus creating favorable conditions for bobcats sometimes, and unfavorable conditions at other times. During hard winters, it is not uncommon for bobcats in very poor condition to seek food around humans.

The combination of weather and prey influences on bobcat condition, and consequently, bobcat numbers, means that managing bobcats in Maine will always be a balancing of hunting impacts with impacts due to climate and prey numbers. The winters of 1992-93 and 1993-94 both had periods of weather harsh enough to cause starvation in some bobcats. This may have temporarily slowed the increase in bobcat numbers that we have seen in the last 3-4 years. The winter of 1994-95 was relatively easy, and bobcats probably did well. We have completed the 3rd year of an extensive, statewide survey of bobcat tracks on approximately 100 miles of transects in each WMU. This should indicate trends in bobcat numbers in different areas of the state in future years. We also record occurrences of fisher, marten, lynx, and snowshoe hare on our survey routes.

In addition to work on bobcats, our marten habitat research project continues. This project is designed to give us information on what habitats marten require. There is much controversy, nationwide as well as in Maine, concerning the impact timber harvesting operations that alter the forest structure have on marten populations. Unfortunately, there is very little information on the kinds of habitat martens require in order to live and reproduce. Maine has more marten than any other state in the "lower 48." Thus, we have the opportunity to gather information to help us work with landowners and plan timber harvests that will generate needed wood supplies, but also ensure adequate habitat for marten.



MOOSE

1994 Maine Moose Season

The 1994 moose season was held from 3 October through 8 October. In many respects, last year's season was not unusual. Hunters saw many moose and success was high (Tables 7 and 8). Hunters reported passing up an average of 3 moose apiece. They harvested 1,130 animals of which 84% were bulls, 15% were cows and 1% were calves (Table 9).

Table 7. Average number of moose seen per 10 hours of hunting, by hunting zone and year.

	Opening	Moose Hunt Zone						
Season	Day	NW	NE	CE	SE	SC	SW	ALL
1980	9/22				No Zones			
1982	9/20	0.8	1.4	2.2	1.0	3.8	2.2	1.7
1983	9/19	0.7	0.7	1.2	0.7	2.0	2.4	1.1
1984	10/8	0.7	1.0	1.6	1.0	3.3	3.1	1.4
1985	10/21	1.4	1.9	2.7	1.3	4.4	3.1	1.4
1986	10/20	0.9	1.5	3.0	1.0	4.5	6.4	2.2
1987	10/18	0.8	2.0	3.9	1.1	7.5	4.8	2.7
1988	10/17	2.2	3.2	5.3	1.3	5.3	8.8	3.8
1989	10/16	2.4	3.4	5.5	2.1	11.0	10.7	4.5
1990	9/24	1.1	1.5	2.4	0.9	4.0	4.2	2.0
1991	10/7	1.2	4.1	4.8	1.7	9.6	10.3	4.5
1992	10/5	2.4	2.9	3.7	1.5	7.9	7.7	3.5
1993	10/4	2.0	3.5	4.3	1.8	7.7	8.2	4.0
1994	10/3	2.3	5.0	5.0	2.4	12.8	9.8	5.5

Table 8. Percent of permittees who registered a moose, by zone and season.

	Moose Hunt Zone						
Season (Dates)	NW	NE	CE	SE	SC	SW	ALL
1980 (9/22-27)				No Zones			
1982 (9/20-25)				Not registered by zones			
1983 (9/19-24)	57	66	78	65	95	92	74
1984 (10/8-13)	67	78	82	83	94	91	82
1985 (10/21-26)	73	86	89	86	98	98	88
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
1993 (10/4-9)	80	95	96	85	98	99	93
1994 (10/3-8)	85	96	95	88	98	98	94

1The 3 southern zones were expanded in 1986.

Table 9. Composition of 1994 Moose Kill, by Zone.

Sex & age class	CE	NE	NW	SC	SE	SW	TOTAL
FEMALE							
Adult	32	24	11	9	7	21	104
Yearling	6	12	1	3	6	10	38
Calf	3	2	1	1	1	0	8
Unaged	3	7	5	1	9	2	27
MALE							
Adult	187	122	45	99	91	176	720
Yearling	33	33	11	9	17	29	132
Calf	1	0	0	0	0	3	4
Unaged	20	20	19	5	27	5	96
TOTAL	**285**	**220**	**93**	**127**	**158**	**246**	**1130**

The oldest bull, 13 years old, came from the SC zone. The SC and CE zones tied for the heaviest moose, each producing a 1,060 lb. bull. The oldest cow was 10 years old. The heaviest cow weighed 730 lbs. and came from the NE zone.

The major difference between this season and previous seasons was that 1,200 permits were issued, an increase of 200 permits (Table 10). The greatest increase was in the SW zone, where the number of permits, and consequently the harvest, doubled. The SE zone's allocation increased by 25%, and the remaining zones were increased only slightly.

In the past, the SW zone had one of the lowest hunter densities but one of the highest moose densities. This situation was created when the zone was enlarged in 1986. Because no additional permits were available, and all zones were lightly harvested, the permit allocation was not increased at that time.

A similar situation occurred with the SE zone. However, the moose density in the area added to this zone was much lower, so the increase in permits was less substantial.

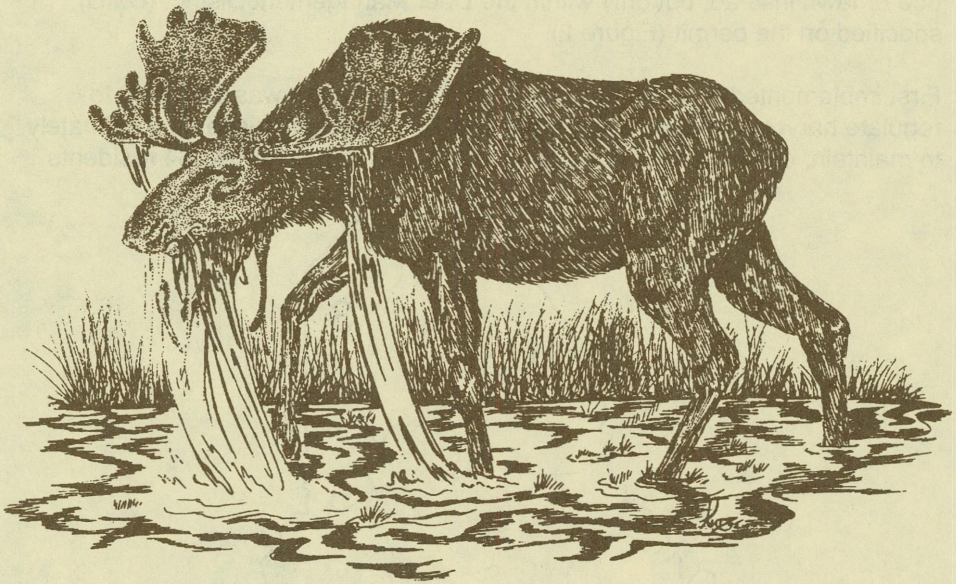
Table 10. Comparison of 1993, 1994, and 1995 moose permit allocation, hunter density, and kill density.

	1993 Season			1994 Season			1995 Season		
		# Hunters	Kill		# Hunters	Kill		# Hunters	Kill[1]
Zone	Permits	100 mi²	100 mi²	Permits	100 mi²	100 mi²	Permits	100 mi²	100 mi²
NW	100	6.6	5.3	110	7.2	6.2	130	8.6	7.3
NE	220	6.0	5.7	230	6.3	6.0	270	7.4	7.1
CE	290	8.6	8.2	300	8.9	8.5	320	7.4	7.1
SW	120	3.9	3.9	250	8.1	8.0	350	11.4	11.2
SC	120	5.6	5.6	130	6.1	5.9	130	6.1	6.0
SE	150	3.0	2.6	180	3.6	3.2	200	4.0	3.5

[1]Projected kill density for 1995 was calculated by assuming that hunter success would be the same as in 1994.

Prospects for future seasons

In 1995, the allocation will increase to 1,400 permits, with the majority again going to the SW zone. The SC zone has noticeably fewer permits compared to other zones. This is intended to keep hunting pressure relatively light in this popular moose watching area.



WHITE-TAILED DEER

1994 Deer Season

Maine's deer hunters could pursue white-tailed deer for 57 days during 1994. During the special archery season (26 days, September 29 - October 28), archers could hunt deer of either sex. The regular firearm season, which began for residents on October 29, and for all hunters on the following Monday (October 31), ended on November 26 (25 hunting days). Black powder enthusiasts had 6 days to hunt white-tails during the November 28 to December 3 special muzzleloader season. Deer could not be hunted on Sundays, and the limit on deer was one per hunter per year, regardless of season. During the regular firearm and special muzzleloader seasons, hunters could harvest a buck (a deer with antlers 3 or more inches in length) anywhere in Maine. Those hunters who drew an Any-Deer permit could choose to tag a doe or fawn instead, but only within the Deer Management District (DMD) specified on the permit (Figure 2).

First implemented in 1986, the Any-Deer permit system was designed to regulate harvests of does within each DMD in order to achieve, and ultimately to maintain, optimum deer population levels. During 1994, 84,064 residents

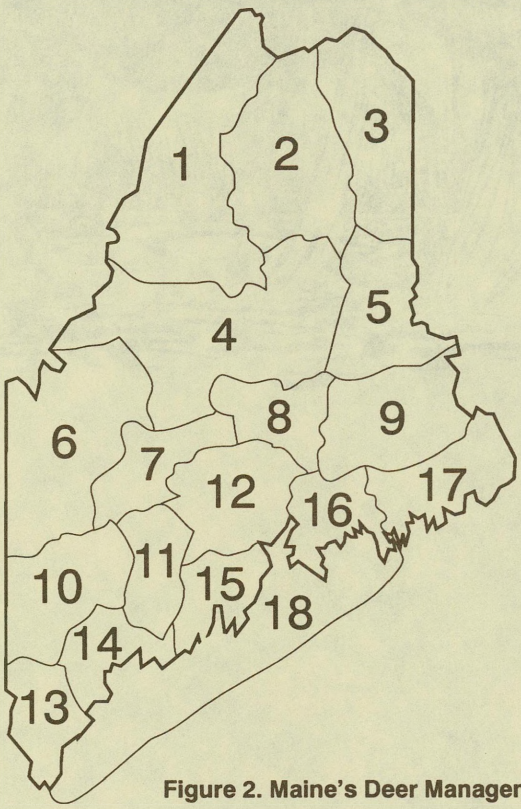


Figure 2. Maine's Deer Management Districts.

and 13,261 nonresidents applied for Any-Deer permits. Of the 33,020 permits offered, 5,122 (16%) were issued to qualifying landowners in a separate early lottery. The remaining permittees were drawn in a random computer lottery from among those applicants not drawn in the landowner lottery. On average, 85% of available Any-Deer permits were issued to Maine residents. Nonresidents who drew a permit represented 43 different states and 5 Canadian provinces.

During 1994, Any-Deer permits were not available for DMDs 1, 2, 3 and 17. Elsewhere, permits ranged from 255 in DMD 9 to 9,212 in DMD 12. The number of Any-Deer permits made available depends on the desired doe harvest in any given DMD. Generally, 5 to 8 permits are issued for each doe to be harvested. Obviously, not every hunter issued a permit succeeds in killing an adult doe — some choose to take a buck or a fawn, while others do not connect on a deer.

Desired harvests (quotas) of adult does (fawns excluded) during 1994 ranged from zero in DMDs 1, 2, 3 and 17, to 1,400 in DMD 12, and totaled 5,248 statewide. Compared to 1993 (6,825 does), doe quotas were generally lower in 1994. This reflects a desire to improve herd growth rates in most DMDs, while also compensating for above-average winter losses incurred in most DMDs during 1994. However, allocation of permits to hunters in DMD 18 remained quite liberal; a permit was issued to every qualified applicant. This reflects a management strategy to maximize doe and fawn harvests on those coastal islands that are open to deer hunting.

1994 Deer Harvest

Statewide

Overall, 24,683 deer were registered in 1994, of which 716, 23,748 and 219 were taken during the special archery, regular firearm, and special muzzleloader seasons, respectively (Table 11). Relative to 1993 (27,402),

Table 11. Sex and age composition of the 1994 deer harvest, by season type and week of the regular firearm season, statewide[1].

	Sex and Age Class					Total	Percent by Week		
	Adult		Fawn		Total	Antlerless	Adult		
Season	Buck	Doe	Buck	Doe	Deer	Deer	Total	Buck	Antlerless
Spec. Archery	**277**	**281**	**84**	**74**	**716**	**439**	**3**	**2**	**5**
Reg. Firearm	**15,562**	**5,108**	**1,762**	**1,316**	**23,748**	**8,186**	**96**	**97**	**94**
Open. Sat.	1,563	558	187	142	2,450	887	10	10	10
Oct. 31-Nov. 5	3,065	1,144	414	295	4,918	1,853	20	19	21
Nov. 7-12	3,135	955	341	250	4,681	1,546	19	20	18
Nov. 14-19	3,636	815	293	199	4,943	1,307	20	23	15
Nov. 21-26	4,163	1,636	527	430	6,756	2,593	27	26	30
Spec. Muzz.	**131**	**61**	**14**	**13**	**219**	**88**	**1**	**1**	**1**
Total	**15,970**	**5,450**	**1,860**	**1,403**	**24,683**	**8,713**	**100**	**100**	**100**

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

Maine's deer take decreased by 10% (2,719) in 1994, and it ranks 44th highest among the 76 years for which deer kill records are available (1919-1994). Among seasons, deer harvest in 1994 actually increased by 5% and 96% for the special archery and muzzleloader seasons, respectively. During the regular firearm season, the buck kill in 1994 declined 5% relative to 1993, while the antlerless deer kill dropped 18%. The reduction in bucks harvested may be attributed to above-average losses during the 1993-94 winter. However, the decline in doe and fawn harvest reflects a 25% reduction in Any-Deer permit allocations during 1994 relative to 1993.

Buck Harvest

The registered kill of antlered bucks (buck fawns excluded) totaled 15,970 in 1994; this ranks 13th highest since we began record-keeping for bucks in 1954 (41 years). The top five buck-producing DMDs, based on total bucks registered per square mile during 1994, are DMDs 11, 12, 13, 7 and 14. Among the 15,970 bucks taken statewide, roughly 6,900 (43%) were yearlings sporting their first set of antlers. An additional 4,000 were 2 year-olds, 2,250 were 3 year-olds, and nearly 2,900 were mature bucks ranging from 4 to 15 years old. Maine is nationally known for producing trophy bucks (4 years and older). This is possible because, unlike the situation in many other states, Maine's bucks are subjected to relatively light hunting pressure. Consequently, a healthy number of bucks annually survives to the older (mature) age classes. In more heavily hunted states, yearling bucks comprise as much as 70-90% of the bucks available, and bucks rarely survive beyond 3 years!

Antlerless Deer Harvest

The 33,020 Any-Deer permits issued during 1994, combined with the either-sex archery season (281 adult does), resulted in a statewide harvest of 5,450 does 1 years and older (Table 12). The doe kill achieved during these hunts fell within (4%) of the pre-determined quota of 5,248 does at the statewide level. In addition to adult does, Any-Deer permittees and archers tagged 3,263 fawns (1,860 male and 1,403 female) during 1994 (Table 12). As with each hunting season since 1986, hunters killed a smaller proportion of fawns vs. adult does in 1994 relative to earlier times, when deer of either sex could be taken by all hunters (prior to 1983). Since 1986, 60 fawns were hunter-killed for every 100 does harvested. During the either-sex years, that ratio was 95 fawns per 100 does. Coupled with the fact that we are allowing only half the number of does to be legally taken under the Any-Deer permit system relative to the either-sex years, it is apparent that doe and fawn mortality to legal hunting has been markedly reduced as we strive to increase Maine's deer population.

Harvest by Week

The 4-week special archery season and the black powder week together accounted for only 4% of the registered harvest of deer in Maine (Table 11).

During the opening Saturday for residents, hunting pressure is typically intense; 10% of the total deer kill occurs on this one hunting day. For the remainder of the regular firearm season, the deer harvest is distributed rather evenly (Table 11). There is, however, a tendency for the kill to enter a lull during the 2nd and 3rd weeks, then to surge during the final week. This pattern is particularly true for does and fawns, as hunters increase efforts to "cash in" on Any-Deer permits during the Thanksgiving holiday and week-end.

Harvest by DMD

Differences in doe and fawn harvests among our 18 DMDs (Table 12) largely stemmed from the relative number of Any-Deer permits issued. Although antlered buck harvests are influenced to some degree by regional differences in hunting pressure and hunting weather, the size of the buck harvest per square mile roughly reflects the relative abundance of deer in the DMDs.

Highest density of buck kills occurred in central and south-coastal DMDs (Figure 2; Table 12). DMD 11 led the state in 1994, with 150 bucks harvested per 100 square miles of habitat. At the other end of the scale, northern and eastern DMDs supported the lowest buck harvests (and generally smaller deer populations). DMD 3, encompassing NE Aroostook Co. (Figure 2), supported a buck harvest of only 14 bucks per 100 square miles. During 1994, the

Table 12. Sex and age composition of the 1994 deer harvest by Deer Management District[1].

	Sex/Age Class					Total	Adult Does	Antlerless	DeerKill
	Adult		Fawn		Total	Antlerless	Per 100	Deer/100	Per Mi²
DMD	Buck	Doe	Buck	Doe	Deer	Deer	Adult Bucks	Adult Bucks	Habitat
1	749	6	1	1	**757**	8	1	1	.21
2	628	17	1	0	**646**	18	3	3	.24
3	309	8	4	1	**322**	13	3	4	.14
4	989	188	62	46	**1,285**	296	19	30	.37
5	676	84	32	23	**815**	139	12	21	.46
6	735	120	37	26	**918**	183	16	25	.36
7	944	443	137	131	**1,655**	711	47	75	1.98
8	1,037	511	161	123	**1,832**	795	49	77	1.85
9	381	39	20	9	**449**	68	10	18	.25
10	1,495	588	192	134	**2,409**	914	39	61	1.54
11	1,161	470	166	115	**1,912**	751	40	65	2.47
12	2,690	1,412	527	388	**5,017**	2,327	52	87	2.68
13	1,120	530	168	145	**1,963**	843	47	75	1.97
14	718	342	118	85	**1,263**	545	48	76	1.86
15	1,098	415	115	96	**1,724**	626	38	57	1.61
16	529	66	28	16	**639**	110	12	21	.81
17	393	5	2	2	**402**	9	1	2	.23
18	318	206	89	62	**675**	357	65	112	NA[2]
State-wide	15,970	5,450	1,860	1,403	**24,683**	8,713	34	55	.84

[1]Sex/age data were corrected for errors in the deer registrations.
[2]Area of deer habitat in DMD 18 has not been determined.

registered kill of bucks averaged 54 antlered bucks per 100 square miles of habitat, statewide. During the past 5 years, the DMDs supporting the highest buck harvests (and therefore the highest overall deer populations) were, in decreasing order: DMDs 12, 14, 11, 13, and 7.

Harvest by Hunter Residency

Maine residents claimed the lion's share (83%) of the deer harvest in 1994 (Table 13). As has occurred during the past several decades, nonresidents claimed about one fifth of the total kill and accounted for roughly 15% of deer license sales.

Regional differences occurred in the distribution of the harvest by residents and visitors to Maine. In the more populous central and southern DMDs (Figure 2), most successful deer hunters were residents. However, in the largely unpopulated "Northwoods" of Maine, nonresidents accounted for a much larger share of the deer harvest. At one extreme, 70% of the deer harvested in remote, unpopulated DMD 1 were registered by nonresidents (primarily Canadians from Quebec). At the other end of the spectrum, 97% of the deer killed in heavily populated DMD 14 were registered by Maine residents (Figure 2; Table 13).

Table 13. Deer registrations by Deer Management District and hunter residence, 1994.

	Deer Registered by:						
	Residents		Nonresidents		Total	Total	Percent
DMD	No.	%	No.	%	1994	1993	Change
1	227	30	530	70	757	1,017	-26
2	336	52	310	48	646	705	-8
3	279	87	43	13	322	357	-10
4	789	61	496	39	1,285	1,657	-22
5	571	70	244	30	815	836	-3
6	606	66	312	34	918	1,348	-32
7	1,323	80	332	20	1,655	1,854	-11
8	1,440	79	392	21	1,832	1,962	-7
9	361	80	88	20	449	477	-6
10	2,181	91	228	9	2,409	2,482	-3
11	1,799	94	113	6	1,912	1,870	+2
12	4,432	88	585	12	5,017	5,400	-7
13	1,755	89	208	11	1,963	2,461	-20
14	1,229	97	34	3	1,263	1,737	-27
15	1,586	92	138	8	1,724	1,836	-6
16	509	92	49	8	639	500	+28
17	380	95	22	5	402	386	+4
18	638	95	37	5	675	517	+31
State-wide	**20,522**	**83**	**4,161**	**17**	**24,683**	**27,402**	**-10**

A substantial number of Maine residents typically travel to hunting areas outside their home DMD. Many residents pursue deer in two or more DMDs during the course of the deer seasons. Typically, one-quarter of the statewide deer harvest is registered by residents who travelled to a DMD away from their home DMD.

Hunter Participation and Success Rate

During 1994, roughly 239,000 licenses that permit deer hunting were sold in Maine; 85% were bought by residents. Overall license sales in 1994 differed from 1993 by less than 500. During 1994, less than one-half (97,325) of people who purchased deer hunting licenses also applied for an Any-Deer permit. This is not unusual, in light of past application rates.

Not all hunters who purchase big game hunting licenses actually pursue deer. According to recent (1988), and past surveys (1970-84), approximately 15% of these licensees typically choose not to hunt deer. When they are subtracted from total sales of hunting licenses, the estimated number of hunters who actually hunted deer in 1994 was roughly 205,000. Of this total, 174,000 were residents (85%), and 31,000 were nonresidents. It is worth noting that hunter numbers in Maine have remained stable at 190,000 to 210,000 for the past 15 years. However, unless more young hunters are recruited, the long-term trend will be toward a declining number of deer hunters in Maine.

Among archers, 13,959 residents and 1,172 nonresidents bought licenses that allowed them to hunt deer during the special archery season. The 15,131 archery licenses sold during 1994 represents a 14% increase (attributable entirely to residents) above 1993 sales (13,226). Since 1983, archery license sales have more than tripled, reflecting a continuing trend toward greater participation in the sport of bowhunting for deer. In that time, the archery deer harvest climbed from about 100 deer to more than 700 deer.

Relative to the regular firearms season, few deer hunters currently participate in Maine's one-week late black powder season. Sales of muzzleloading hunting permits totaled 5,788 during 1995; 96% were purchased by residents. Since its inception in 1981, however, the blackpowder deer season has drawn a steadily increasing number of participants. In its first year (1981), only 415 hunters purchased a muzzleloading permit. The number of deer taken during the muzzleloader season has increased from 7 in 1981 to 219 in 1994.

Hunter success averaged 12%, overall, during 1994. Success rate among nonresidents (13%) was slightly higher than success rates experienced by residents (12%). Success among hunters who drew an Any-Deer permit (33%) was considerably higher than among hunters who were restricted to bucks only (8%). In addition, some hunters evidently pool their antlerless deer kill with Any-Deer permittees, which is illegal. Success rate among archers (5%) and muzzleloader hunters (4%) remains considerably lower than success rate among hunters who use conventional firearms (12%).

Current Deer Population Status

Since 1983, herds in most DMDs had increased in response to doe harvest restrictions, and some rather mild winters. Wintering populations increased from a low of 160,000 prior to 1983 to nearly 250,000 in 1988. Since that time, however, populations have fluctuated between 210,000 and 235,000 wintering deer. Currently (1994), Maine's wintering deer population is estimated at 210,000.

It is noteworthy that population setbacks have occurred in 1990 and 1994, following slightly more severe winters than normal. During this time, herd declines were greatest in northern and eastern DMDs - the primary range where the 1975-1985 spruce budworm epidemic was most extensive and severe. We are just beginning to realize the impact that insect damage and logging have had on the carrying capacity of wintering habitat in industrial timberland areas of Maine. Deer populations in central and southern DMDs have been less affected by the recent severe winters, and herds there are expected to again increase, given restricted doe harvests, and a return to average or mild wintering conditions. Our management objective is to attain a statewide wintering herd of 250,000 to 300,000 deer.

Prospects For The 1995 Season

Deer season structure will remain similar to 1994, with one exception — the special muzzleloader season has been lengthened. Archers will be able to pursue deer from September 28 to October 27, 1995. The regular firearm season will open Saturday, October 28, for residents. All hunters will be allowed to pursue deer from Monday, October 30 through Saturday, November 25.

For 1995, the legislature authorized an additional week for the special muzzleloader season on deer, although this extension will apply only to our central and southern DMDs (Figure 2). The special muzzleloader season will be November 27 to December 2, 1995 in DMDs 1, 2, 3, 4, 5, 6, 9, 16 and 17. In DMDs 7, 8, 10, 11, 12, 13, 14, 15 and 18, the special muzzleloader season will begin on November 27, but will end December 9, 1995.

Any-Deer permits will be reduced 10% relative to 1994 in order to improve deer herd growth in all DMDs. The winter of 1994-95 was mild for deer, thus improved survival of adults and higher production of fawns following this winter should encourage herd recovery and growth.

During 1995, we will issue roughly 29,500 Any-Deer permits among 14 of our 18 DMDs. Districts 1, 2, 3 and 17 will remain bucks-only. This Any-Deer permit allocation, combined with the either-sex archery kill, should yield a statewide harvest of slightly more than 5,000 adult does and 3,000 fawns. We expect the buck kill to be higher in 1995 (about 16,600 statewide) than during 1994, due to improved winter survival of young bucks this year. Overall, we

project a statewide deer harvest in 1995 nearly the same as the previous year (about 24,600), although this fall's harvest should feature more antlered bucks but fewer antlerless deer.

Finally, 1995 will mark the 2nd year of our landowner preference program implemented as part of the Any-Deer permit lottery. Landowners who make their land available for deer hunting qualify for an early drawing for Any-Deer permits. A maximum of 20% of available Any-Deer permits will be issued to qualifying landowners (and their domiciled dependents) for each DMD. Landowners not drawn in this lottery are also included in the pool of applicants for the remaining Any-Deer permits.

Winter Severity and Maine's Deer Herd

Since Maine is near the northernmost limit of the white-tailed deer's range, the severity and duration of winter weather exerts considerable influence on deer survival and abundance. Our white-tails are not well-adapted to moving about in deep snow, and their dietary needs cannot be met if they must subsist on poor-quality winter forages for more than 10-12 weeks. Periodically, a severe winter, (or a series of them) causes high winter mortality and a population decline. Conversely, mild winters enhance deer survival and they enable the herd to increase.

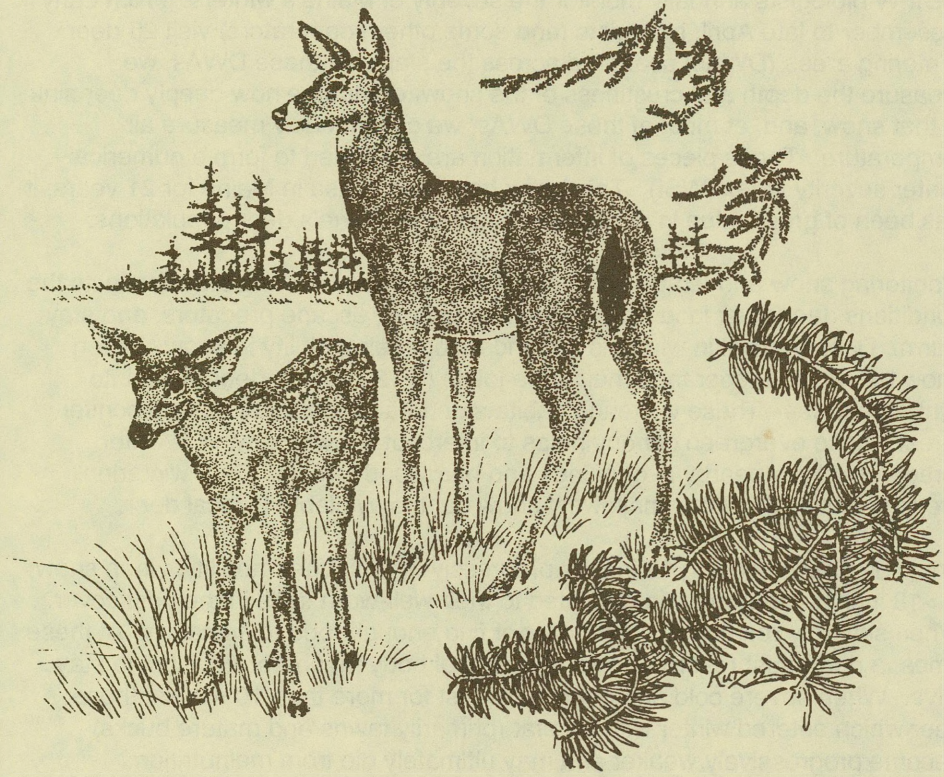
MDIFW biologists annually monitor the severity of Maine's winters. From early December to late April, biologists (and some other cooperators) visit 25 deer wintering areas (DWAs) scattered across the state. In these DWAs, we measure the depth and crustiness of the snow, determine how deeply deer sink in that snow, and, at most of these DWAs, we continuously measure air temperature. These pieces of information are combined to form a numerical winter severity index (WSI). This index has been in use in Maine for 21 years; it has been of great value in our efforts to manage Maine's deer populations.

Monitoring snow and temperature conditions in deer wintering areas reflects the conditions deer must face while trying to find food, escape predators, and stay warm. Deer survival in winter is dependant on their mobility in snow. When snow becomes deeper than their knee-joints (8-12 inches), deer move into wintering areas. These wintering habitats generally consist of mature conifer forest whose evergreen canopy helps to intercept snow and wind. Winter forage usually is nearby in openings and hardwood forests. Deer wintering areas usually exhibit the shallowest snow depths available to local deer.

Snow depths exceeding 12 inches progressively limit deer mobility; when snow is >18 inches, deer may be restricted to their well-worn trails in the best cover. When severely restricted, a deer cannot find enough food to sustain it. At these times, a deer must resorb its own reserves of body fat and protein just to stay alive. When severe cold and deep snow last for more than 10 weeks, those deer which entered winter with little fat (primarily fawns and mature bucks) become progressively weaker and may ultimately die from malnutrition.

The severity of winter weather exerts many other subtle effects on the herd. Losses to coyotes, bobcats, and dogs are directly related to the relative severity of winter. Following a severe winter, pregnant does subsequently produce stunted fawns, which may be stillborn or die soon after fawning. Autumn body weight of young bucks and does tends to be lighter following severe winters. Antler size among young bucks is also diminished following a severe winter. Frequently, the number of deer available for harvest declines following severe winters, because winter losses exceed the number of new fawns entering the population.

Proper management of Maine's deer resource requires a reliable estimate of winter severity so that prediction of winter deer losses, fawn production, and possible changes in the size of the deer herd can be made in a timely manner. During mild winters, deer losses may be as low as 3% of the herd, but herd losses exceeding 35% have been measured following killer winters, such as the one we experienced in 1970-71. Normally, Maine's female deer cannot sustain more than a 30% loss to all causes, including winter, legal hunting, illegal kill, road-kills, etc. Therefore, when above-average winter losses are projected by our winter severity monitoring program, we act immediately to reduce doe losses to hunting. In that way, we will reduce total losses of does which, in turn, will minimize or prevent a downward spiral in the deer population.



OTHER MAMMALS

Many of Maine's less conspicuous mammals warrant attention because of their rarity, special pressures, or simply because there is so little known about their status in Maine. New England cottontails fall into this category. New England cottontails once occurred from southern Maine to the northern Appalachians. They require open, brushy types of habitats, such as overgrown fields. This kind of habitat was common as farms were abandoned in the Northeast after the turn of the century. However, much of this habitat has passed through the brushy successional stages into forested habitat, which is less suited to New England cottontails.

New England Cottontails live in southern Maine, generally, occurring as far north as Fryeburg inland and Waldo county on the coast. Some biologists believe that Maine may be the last place where New England cottontails do not coexist with the more common Eastern Cottontail. There has never been an attempt to identify the species present in Maine. Considering the widespread declines of New England cottontails elsewhere in the northeast, it is prudent for us to survey Maine to identify the species, distribution, and relative abundance of cottontails. Therefore, survey work is planned to accomplish this task in the near future.

Another species group that has seen regional declines is bats. Almost nothing is known of the species present and their distribution in Maine, making an assessment of their status impossible. Pilot work is underway now to test sensors that were developed to detect the presence of bats as well as identify the species. The sensor records, in audible tones, the normally inaudible echo-sounding vocalizations that bats make while flying at night. Each species of bat has a unique set of sounds. Recordings can be computer analyzed to identify the species that flew within 30-50 yards of the sensor's microphone. This technique is much more efficient than the method of mist-netting at night and handling bats captured in the net. It also causes no trauma to bats, since they do not need to be captured. Hopefully, large areas of Maine can eventually be surveyed to yield information on the presence and distribution of the various bat species in the state.

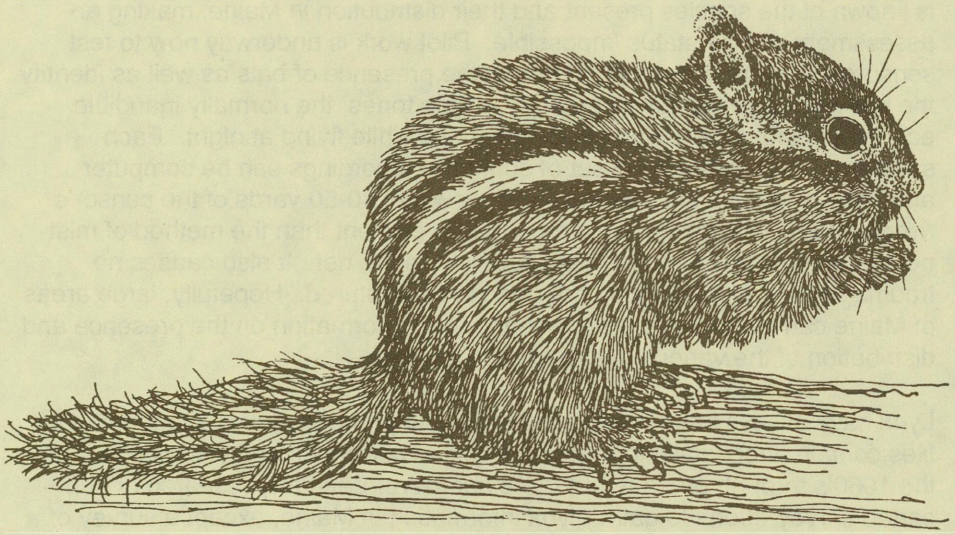
Lynx have always been present in Maine, but probably never abundant. Our files contain anecdotal information on lynx occurrences and distribution from the 1960's through present, but there has never been any research or concerted survey efforts to gather lynx information in Maine, except a survey of district warden opinion in the 1960's.

Maine probably forms the southern edge of lynx range in the northeast. Suitable habitat and prey to support lynx seem to be abundant in Maine. However, even though fully protected with no open season since 1967, lynx numbers do not appear to have substantially increased. Lynx have been

known to occur throughout northern and western Maine, with most of the small numbers living in the extreme western and northwestern parts of the state. In addition, competitive interactions with bobcats and coyotes, together with fluctuating snow conditions, may cause lynx numbers to vary considerably over time. Early writings from this region cited great fluctuations in lynx numbers over periods of a few years; much the same as has been cited wherever lynx occur.

The bottom line is that Maine has always had some lynx, but that we know very little about their status. We initiated a statewide, intensive track survey two winters ago to assess, over time, bobcat distribution and population trend. As part of this effort, we also collect information on marten, fisher, hare, and lynx. Hopefully, we will start to accumulate the kind of information that will help us understand lynx status much better.

In addition, we targeted 2 areas in northwestern Maine to survey very intensively for lynx and wolf, in particular, as well as bobcat, fisher, marten and hares. This survey thoroughly covered 16 townships and parts of 33 other townships. No wolf sign was discovered, but lynx tracks were found in several places on both areas. Hopefully, we will be able to intensively search other areas in future years.



BIRDS

The 1992 reorganization of the Department's Wildlife Resource Assessment Section profoundly affected the Bird Group's mission. Population assessment and management recommendations for all bird species, including some 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 while other birds were the responsibility of the Endangered and Nongame Wildlife Group. While upland bird and waterfowl work continues, other birds as shorebirds and neotropical migrants 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 1800's 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 1960's, 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 1980's.

In the 1960's and 1970's, 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 1980's, 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 population that still appears to be increasing. Unfortunately, the Hancock County wild turkeys failed to produce a self-sustaining population. Illegal shooting of these birds

was believed to be the major cause for this failure. Today, reports of adult wild turkeys in western Hancock County are not uncommon as birds appear to have crossed the Penobscot River on their own.

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.

Both the wild turkey population and the number of indiviudals that desire to hunt this quality gamebird are increasing. Results of the turkey hunter ques-

Table 14. Trends in turkey hunter questionnaire results, 1990-1994.

	YEAR				
	1990	**1991**	**1992***	**1993**	**1994**
Questionnaires Received	396	385	411	417	424
# Hunted	257 (64%)	251 (65%)	273(66%)	303 (73%)	332 (78%)
Hours Hunted	4,694	4,665	5,205	7,031	7,690
Gobblers Seen	177	200	403	513	815
Hens Seen	138	223	371	923	960
Turkeys Seen	315	423	774	1,436	1,775
# Shot At	23	30	72	78	107
# Registered	15	21	53	46	62
Weapon used					
Shotgun	244	241	257	283	305
Bow	13	14	22	32	42

*** First year with expanded hunting zone.**
1995 data were not received in time for this publication.

Table 15. Wild turkey hunting effort and harvests, 1986-95.

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
1994	1,185	500	62
1995	1,714	750	117

tionnaire indicate that more hens and gobblers are reported seen each year in the hunting zone (Table 14). This past spring, over 1,700 people applied and 750 received permits to hunt turkeys for 4 weeks, beginning on May 1, and they harvested a record 117 birds (Table 15). The harvest was well distributed over the hunting zone with 52 birds taken from 11 towns in Cumberland County; 51 birds harvested from 16 towns in York County; and 14 birds taken from 3 towns in Androscoggin County. The harvest was comprised of 51 adult male turkeys, 65 juvenile turkeys, and 1 bearded hen.

As interest and participation in turkey hunting increases, hunters must be especially sensitive to issues of safety, hunter interference, and hunter ethics.

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 utilized with a goal of eventually joining these two populations in the very near future. During the winter of 1994-95, department biologists continued to move birds in central Maine, utilizing stocks from mid-coast Maine. By the year 2000, management efforts will likely focus on a variety of 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 State Chapters of the National Wild Turkey Federation.

Individuals interested in becoming involved in wild turkey management are encouraged to contact the Maine State Chapter of the National Wild Turkey Federation, South Windham, Maine 04082, or one of the two local chapters, York County and Mid-Maine Chapters.

IMPORTANT!! Rearing and releasing "game-farm" strains of 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 only introduce inferior breeding stock into natural populations.

Ruffed Grouse

The ruffed grouse, or partridge, is considered by many to be the number one game bird in Maine. Data from the early 1980's show that an estimated 100,000 hunters harvest over 500,000 grouse annually in Maine. A more recent hunter survey reveals approximately half of all licensed hunters in Maine hunted grouse and/or woodcock in 1987.

During the past two years, a series of questions focusing on grouse hunting activities by moose hunters and their companions were added to the annual moose hunter questionnaire. The following is a brief summary of the 1993 and 1994 results. In 1993, 888 moose hunting parties reported seeing 4,624 grouse during the six-day moose hunting season. In 1994, 1,069 hunting parties reported 5,804 birds. The total number of grouse reported shot by moose hunters and their companions during 1993 and 1994 was 2,061 and 2,578, respectively. In both years, roughly half of the birds harvested were shot by moose hunting permittees and subpermittees, the other half went to moose hunting party companions. Questionnaire results indicate that moose hunters saw an average of 35 grouse per 100 hours of moose hunting in all moose hunting zones.

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 reduced the amount of sunlight and nutrients available to apple trees. 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 Corporation, University of Maine Cooperative Extension, Ruffed Grouse Society, Maine Forest Service, Small Woodlot Owners of Maine, and Maine Tree Farm Program.

IMPORTANT!! Hunters, make sure you can distinguish between the legally hunted Ruffed Grouse and the Spruce Grouse, on which there is no open season. These two species of grouse do occur in the same areas of Maine, but the Spruce Grouse is far less common. In certain light conditions, the two species may look similar. As in any hunting situation, it is imperative that hunters be certain of their target before discharging a firearm.

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 despite these restrictions, the rangewide woodcock population is still decreasing.

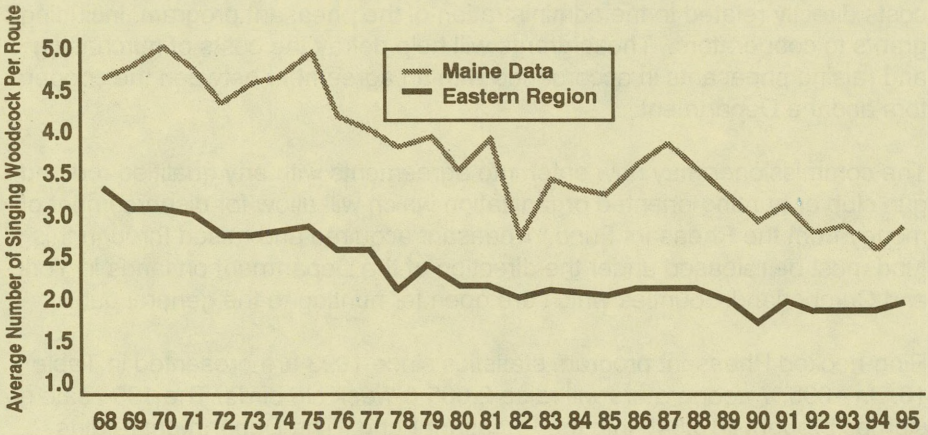
This past spring, migrating woodcock arrived in Maine about one week early, most likely because of mild weather conditions in March. The number of male woodcock counted during the survey was encouraging. When statewide data were combined, the overall male population trend showed an increase this year. Data collected at Moosehorn National Wildlife Refuge in Calais paralleled the statewide male woodcock population trend.

Although this past spring was considered cold, the amount of rain (which can adversely affect young woodcock) was light and may not have significantly affected survival. Researchers reported that timing of the hatch was asynchronous at Moosehorn, meaning woodcock hatched over a period of several weeks. If we were lucky, many young birds survived well after the hatch this past spring.

Management and Research

We are still concerned about 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 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

Figure 3. Breeding population index for woodcock, 1968–95[1]



[1] USFWS Data

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 3).

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 fish and wildlife organizations and individuals with Maine Wildlife Propagators licenses.

After a one year suspension of the Departments pheasant stocking program in 1991, an experimental program was established by the Legislature for 1992 only. This $16 stamp was required of all pheasant hunters in York and Cumberland counties during 1992. This program raised more then $9,700 for acquisition of pheasants for York and Cumberland county cooperators to raise and release in 1993. Six-week old birds acquired in 1993 were released in York and Cumberland Counties during October and November.

The current pheasant stamp program was approved by the Maine Legislature in 1993 and was modeled after the experimental 1992 program. A Pheasant Fund was also established within the Department to manage moneys received from the sale of the pheasant stamps. These dollars may only be used for costs directly related to the administration of the pheasant program, including grants to cooperators. These grants will help defray the costs of purchasing and raising pheasants in accordance with an agreement between the cooperators and the Department.

The commissioner may now enter into agreements with any qualified rod and gun club or hunting-oriented organization which will allow for dispersement of money from the Pheasant Fund. Pheasant acquired and raised through this fund must be released under the direction of the Department on lands in York and Cumberland Counties which are open for hunting to the general public.

Ring-necked Pheasant program statistics since 1993 are presented in Table 16. In 1995, 7 cooperators will raise 2,085 6-week old birds. The 1994 sale of stamps brought $13,545 into the Pheasant Fund. The Department retains about $1,000 annually to cover costs of printing stamps and distributing them

to vendors. The remaining funds are used for purchase of 6-week old birds, and for reimbursements to cooperators to defray costs of raising them.

Table 16. Summary of Pheasant Fund statistics 1993-1995

Year	Number of Stamps[1]	Number of Cooperators	Ring-neck Pheasants		
			6-weeks	Adults	Total
1993	610	8	1,995	380	2,375
1994	699	11	1,905	434	2,339
1995	960	7	2,080	0	2,085

[1]Number of $16 stamps sold during the previous year—includes a small number (57 in 1994) issued complimentarily to hunters over 70 years of age.

WATERFOWL

Hunting Seasons and harvest

Waterfowl harvests in the United States have been declining since 1978 when 15.1 million ducks were recorded in the federal harvest surveys. This has been partly by design as regulations became more restrictive, but it also reflects declining hunter numbers and lower waterfowl populations. The estimate of Maine waterfowl hunters has also been declining since 1978, when the high of 18,650 Federal migratory bird hunting stamps were sold. The average number of stamps sold to Maine hunters from 1981 to 1985 was 14,545; from 1986-1990 it was 11,603 and from 1991-1994 it was 10,189. Preliminary estimates for 1994 project sales of 9,777 waterfowl hunting stamps in Maine, one of the lowest totals on record (Table 17).

Season lengths have been shortened significantly since the mid-1980's (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. The season was extended to 40 days in 1994 after improvements were measured in mid-continent waterfowl breeding populations and their habitats. In the Atlantic Flyway, the number of adult hunter days spent hunting waterfowl declined from more than 2.9 million in 1978 to 1.5 million in 1992. This statistic rose to 1.7 million during the 1994 season, partially the result of increased season length.

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 through the 1994 hunting season.

Black duck population declines, measured by the mid-winter waterfowl survey since the mid-1950's, led to a harvest reduction plan in the United States and

Table 17. Maine and Atlantic Flyway waterfowl harvests and duck stamp sales, 1976-1994.

	WATERFOWL HARVEST		DUCK STAMP SALES	
Year	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	54,900	1,010,600	10,128	300,332
1993	53,600	1,120,300	9,553	292,566
1994[1]	56,700	1,094,800	9,777	281,367

[1] preliminary estimates

Table 18. Maine and Atlantic Flyway Black Duck Harvest Data 1977-1992.

	Base Year	Period 1		Period 2		
State	1977-81 Average	1983-87 Average	% Change from Base	1988-92 Average	% Change from Base	% Change from Period 1
Maine	20,820	8,080	-61	10,320	-50	+28
Vermont	6,420	4,120	-36	3,320	-48	-19
New Hampshire	6,940	4,940	-29	2,940	-58	-40
Massachusetts	24,540	16,260	-34	13,860	-44	-15
Connecticut	8,140	4,200	-48	4,080	-50	-03
Rhode Island	5,680	2,620	-54	2,100	-63	-20
New York	43,920	28,340	-35	25,180	-43	-11
Pennsylvania	11,040	5,640	-49	4,740	-57	-16
West Virginia	1,120	540	-52	280	-75	-48
New Jersey	37,220	22,760	-39	16,360	-56	-28
Delaware	9,760	5,720	-41	6,780	-31	+19
Maryland	29,400	14,960	-49	12,920	-56	-14
Virginia	19,040	12,760	-33	7,720	-59	-39
North Carolina	11,140	5,900	-47	6,520	-41	+11
South Carolina	7,240	3,500	-52	2,380	-67	-32
Georgia	2,360	1,460	-38	920	-61	-37
Florida	860	290	-66	140	-84	-52
Atlantic Flyway	245,640	142,090	-42	120,560	-51	-15

Canada between 1983 and 1987 (Period 1). Black duck harvests 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 18). Harvest reductions in other Atlantic Flyway states varied from a -29% to -66% during this period. Reductions in Canada's black duck harvests have been achieved since 1984, but to a lesser degree than those measured in the U.S.

Although restrictive regulations continued in the Atlantic flyway between 1988-1992, 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 18). Maine's 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. In fact, black duck kill estimates in the Atlantic Flyway during this latest period (1988-1992) were 15 percent lower than those measured between 1983-87.

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. More than 219,000 black ducks (+1.9 percent increase from 1994) in the Atlantic Flyways Mid-Winter Waterfowl Survey remained slightly above the latest 10-year average.

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 poor recruitment reduced continental waterfowl populations to historical lows by the late 1980's.

Population surveys and habitat inventories completed in 1994 and 1995 have shown marked improvements in both mid-continent duck breeding populations and habitat quantity and quality. These data will be used to support continued liberalization in harvest regulations during 1995. If trends continue upward in subsequent years, Maine hunters may look forward to a return of 40-day duck seasons and increased daily bag limits.

A review of waterfowl hunter and harvest statistics provides an interesting comparison of Maine's waterfowlers and their success (Table 19). Study of these figures will reveal that the average Maine duck hunter today is doing

Table 19. Maine waterfowl hunter and harvest statistics: 1961-1994.

	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	10,128	48,700	6.13	1.05	54,900	2,800
1993	9,553	56,435	6.49	0.96	53,600	2,300
1994[1]	9,777	62,729	7.03	0.92	56,700	2,400
1991-94 (Mean)[2]	10,189	58,866	6.78	0.98	59,750	2,425

[1] Preliminary estimates based on first three quarters only

[2] Mean includes preliminary estimate for 1994

Table 20. Maine dabbling duck harvest statistics, 1961-1994.

	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	6,600	9,100	3,100	200	6,800
1993	7,400	9,900	4,800	100	8,200
1994[1]	6,800	11,200	3,200	400	8,000
1991-94 (Mean)[2]	7,400	10,975	4,025	175	7,650

[1] preliminary estimates

[2] Mean includes preliminary estimate for 1994

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 10,128 duck stamps sold in 1992, is slightly higher than commonly measured in the early 1960's. This is, however, much lower than the average number sold during the 1970's.

The average hunter in 1992 spent the same number of days in the field per season (6.13 days) as the hunters of the early 1960's (6.24 days), and was only slightly more successful than his 1960's counterpart (1.05 ducks per day compared to 1.01 in the 1960's). This daily duck bag was actually higher than

the same figure for the 1970's and 1980's which were less than 1 duck per day. The 1991-94 mean for this statistic is 0.98 ducks per day per active hunter, and Maine hunters in 1994 hunted more than 7 days per season.

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 20, 21, and 22). 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 black scoter.

Table 21. Maine diving duck harvest statistics, 1961-1994.

	Greater scaup	Lesser scaup	Ring-necked	Buffle-head	Common Goldeneye
1961-65 (Mean)	125	50	950	1,780	2,240
1966-70 (Mean)	220	100	1,100	1,980	2,380
1971-75 (Mean)	200	160	1,550	3,340	2,040
1976-80 (Mean)	260	360	2,625	6,240	3,040
1981-85 (Mean)	220	300	2,620	4,340	4,040
1986-90 (Mean)	100	180	2,750	2,240	2,940
1991	100	0	1,700	1,300	1,200
1992	0	100	800	2,700	700
1993	100	300	1,300	3,200	1,700
1994[1]	0	100	2,700	4,300	2,600
1991-94 (Mean)[2]	50	125	1,625	2,300	1,550

[1] Preliminary estimates based on first three quarters only

[2] Mean includes preliminary estimate for 1994

Table 22. Maine sea duck harvest statistics, 1961-1994.

	Common eider	Old squaw	White-winged scoter	Surf scoter	Black scoter
1961-65 (Mean)	1,360	280	1,660	1,060	560
1966-70 (Mean)	2,800	1,520	3,120	4,000	1,580
1971-75 (Mean)	8,820	1,080	4,160	4,440	1,460
1976-80 (Mean)	7,580	1,300	2,020	2,980	1,680
1981-85 (Mean)	11,980	1,520	2,340	1,880	740
1986-90 (Mean)	13,675	2,360	1,500	1,980	400
1991	25,928	2,200	1,099	1,459	659
1992	15,300	5,400	937	1,045	0
1993	6,900	2,500	2,000	2,000	900
1994[1]	10,500	1,000	1,300	1,300	100
1991-94 (Mean)[2]	14,650	2,775	1,350	1,475	425

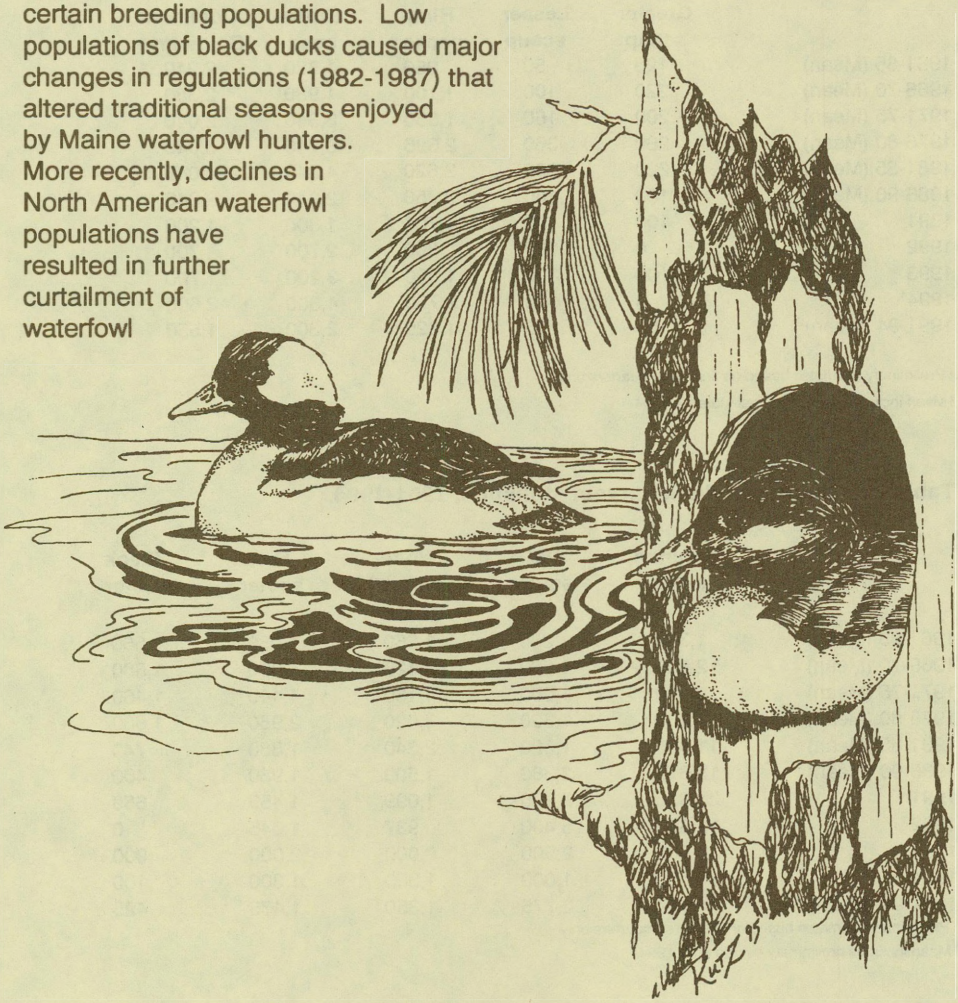
[1] Preliminary estimates based on first three quarters only

[2] Mean includes preliminary estimate for 1994

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, decreases, and redistribution; 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 assessments 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 use for duck and goose hunting has been banned nationally since 1991. Maine hunters were required to use steel shot statewide in 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 shot-shell 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.

Current waterfowl research efforts are aimed at measuring and tracking trends in breeding populations and the harvests they support. A statewide survey of waterfowl pairs was initiated in 1990 as part of a larger study designed and funded by the North American Waterfowl Management Plan's Black Duck Joint Venture. Twenty-five randomly located plots have been surveyed since 1990 by Maine biologists using a U.S. Fish and Wildlife Service (FWS) 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 five year experimental stage. A slight decline in breeding pairs of black ducks in Maine has been demonstrated.

Evaluation of the 5-year experimental helicopter plot surveys proved them to be to expensive for continued annual surveys. Fortunately for eastern waterfowl hunters, population trends measured by more economical fixed-wing aircraft were shown to be similar to trends measured by helicopter surveys. In 1995, a fixed-wing transect survey was initiated in Maine. The FWS plans to continue and expand these surveys in eastern North America. As data for additional areas and years are added to this data base, the results will be used to establish harvest regulations for the Atlantic Flyway which will be more independent of the mid-continent surveys.

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-1950's. The proportion of broods observed during brood counts in Maine has changed over time (Table 23). One goal of the state waterfowl management plan is to restore the relative proportions of species found breeding in Maine to historical levels.

Table 23. Species frequency found in brood counts for Maine, 1956-65, 1966-76, 1980-84 and 1986-90.[1]

	Period 1 1956-65[2]		Period 2 1966-76[2]		Period 3 1980-84[3]		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.
1Mallard x black duck hybrids and Canada geese were excluded from analysis.
2Spencer, H. E., Jr. 1979. Table 5D.
3Allen, R. B. 1984 Annual Performance Report W-62-R-15-131.

North American Waterfowl Management Plan

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 of title or conservation easements in both areas. More than 20 organizations are working through the Maine Wetlands Protection Coalition to protect the most significant parcels.

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 have slowed progress on habitat initiatives in these focus areas.

Harvest Information Program

Maine will enter the Harvest Information Program during the 1996 hunting season. This initiative will, for the first time, provide migratory bird managers and wildlife administrators with statistically valid estimates of migratory bird harvest in the United States. Under this program, states must certify migratory bird hunters and provide their names and addresses the FWS. This list of hunters will be used to select a representative sample of hunters for their harvest surveys. All states are required to participate in this program by 1998.

Our Department has used this as an opportunity to improve our licensing program, and has started to develop data bases which will support conversion to point-of-sale licensing. The 1995 Maine hunting licenses were redesigned to be machine readable and for one year were produced in a larger format than previously. The future licenses will be much different from those of the past, but their format and the method for distribution is still being developed.

OTHER BIRD GROUP ACTIVITIES

In the late 1980's, 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 in the process of developing species assessments for many coastal birds. The major groups of species that we are concentrating on are: island-nesting seabirds, wading birds, and migratory shorebirds that depend on Maine's coast during spring and fall migrations. Island-nesting seabirds, wading birds, and shorebirds represent a large and diverse group of species. Some species occur in Maine in small numbers while others occur by the thousands.

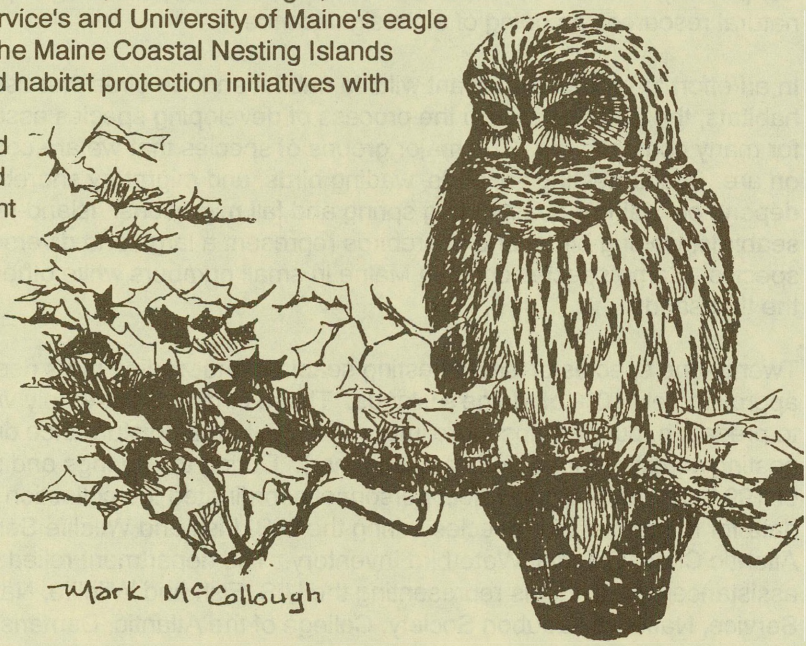
Twenty-one species of island nesting seabirds and wading birds nest on approximately 10% of Maine's islands. These birds are extremely vulnerable to predation, but perhaps more importantly, to human disturbance during the nesting season (spring and early summer). During the springs and summers of 1994 and 1995, Bird Project personnel coordinated the collection of nesting data for numerous bird species during the U.S. Fish and Wildlife Service's Atlantic Coast Colonial Waterbird Inventory. The department relied on the assistance of individuals representing the U.S. Fish and Wildlife, National Park Service, National Audubon Society, College of the Atlantic, Damariscotta River

Association and several private individuals, to complete this comprehensive inventory.

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 and established a computer database of known shorebird feeding and roosting areas located along the entire coast of Maine, and mapped them in preparation for entry into a Geographic Information System (GIS). Data collected during 1994 July and August field surveys, in mid-coast Maine, was incorporated in the shorebird database filling in the last major gap of habitat information within the database. Analysis of coastwide data to identify areas critical to migratory shorebirds are under way.

We now have the tools to protect many significant 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 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.

Lastly, in an effort to broaden our participation in other bird management activities, bird project personnel have become involved in a number of projects. We participate in Breeding Bird Surveys, Mourning Dove surveys, Eastern Bluebird banding activities, tern management activities, Partnerships for Wildlife in Maine, Partners in Flight, the Fish and Wildlife Service's and University of Maine's eagle research, the Maine Coastal Nesting Islands Forum, and habitat protection initiatives with numerous private land trusts. Bird management in Maine continues to be both challenging and rewarding.



ENDANGERED AND THREATENED WILDLIFE

In 1976, the Maine Endangered Species Act was passed 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. In 1994, the "Loon License Plate", a conservation registration, was initiated. Both programs allow people to donate to endangered species and other nongame wildlife management programs. The people of Maine contribute about $100,000 a year through the tax form option, nicknamed the "Chickadee Checkoff" (Table 24) and in this first year, close to 70,000 loon license plates have been sold. These two voluntary means of contributing provide the core funding for Maine's rare and Endangered species programs.

Table 24. 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%
1993	$ 82,842	15,943	$5,20	2.80%
1994	$ 78,112	9,678	$8.07	1.82%

All money donated, whether through the tax checkoff, car registrations, or direct gifts, are deposited into the Maine Endangered and Nongame Wildlife Fund, a special, interest bearing account from which money can only be spent for conservation of Maine's endangered and nongame species. A nine-member citizens advisory council oversees the fund and programs it supports (see box). This section summarizes some of the work that was supported by The Maine Endangered and Nongame Wildlife Fund in 1994. Other accomplishments are covered in the Mammals, Birds, and Habitat sections of this publication.

Private organizations, individual volunteers, and every branch of the Maine Department of Inland Fisheries and Wildlife are part of these successes. The U.S. Fish and Wildlife Service is also a major partner. However, special thanks are due the thousands of Maine people who generously contribute to The Maine Endangered and Nongame Wildlife Fund. As you read this, take pride in your accomplishments - and please, as you fill out your tax return next year, and register your car, join with us again in conserving Maine's Endangered and Nongame species.

ENDANGERED SPECIES LISTING

There currently are 26 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 25). Seventeen of these are also listed as federally Endangered or Threatened under the U.S. Endangered Species Act. An additional 23 species are officially designated as candidates for federal Endangered Species Listing, and about 50 other species have been identified by Maine as needing special attention to prevent them from becoming Endangered or Threatened in Maine.

MDIFW has the responsibility for managing federal Endangered and Threatened wildlife in Maine and for implementing Maine's Endangered Species Act, including maintaining the list of Maine Endangered and Threatened Species. The current list, established in 1986, has been undergoing review by MDIFW for the past two years. All species of vertebrates and rare invertebrates occurring in Maine, have been reviewed as part of this process. The procedures and criteria for listing species have been revised. Recommended changes to the lists were developed by MDIFW staff, outside scientists, and others, and presented at public workshops and hearings beginning in December 1994.

Table 25. Maine Rare and Endangered Species

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

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

*Federally listed Endangered Species **Federally listed Threatened Species

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

1. Northern Bog Lemming
2. Loggerhead Turtle*
3. Blanding's Turtle
4. Spotted 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
2. Common Tern
3. Arctic Tern
4. Water Pipit
5. New England Cottontail
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
2. Upland Sandpiper
3. Black-crowned Night Heron
4. Horned Lark
5. Orchard Oriole
6. Southern Flying Squirrel
7. Yellow-nosed Vole
8. Red Bat
9. Hoary Bat
10. Silver-haired Bat
11. Big Brown Bat
12. Little Brown Myotis
13. Keen's Myotis
14. Small-footed Myotis
15. Eastern Pipistrelle
16. Tremblay's Salamander
17. Wood Turtle
18. Brown Snake
19. Swamp Darter
20. Brook Stickleback
21. Grass Pickerel
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
2. Snowy Egret
3. Little Blue Heron
4. Tricolored Heron
5. Cattle Egret
6. Glossy Ibis
7. American Black Duck
8. Barrow's Goldeneye
9. Cooper's Hawk
10. Red-shouldered Hawk
11. Semipalmated Plover
12. Black-bellied Plover
13. Ruddy Turnstone
14. Whimbrel
15. Greater Yellowlegs
16. Lesser Yellowlegs
17. White-rumped Sandpiper
18. Least Sandpiper
19. Dunlin
20. Short-billed Dowitcher
21. Semipalmated Sandpiper
22. Sanderling
23. Red-necked Phalarope
24. Bonaparte's Gull
25. Black Tern
26. Razorbill
27. Atlantic Puffin
28. Eastern Bluebird
29. Vesper Sparrow
30. Sharp-tailed Sparrow
31. Southern Bog Lemming
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)
2. Eastern Anatum Peregrine
3. Eskimo Curlew
4. Great Auk (extinct)
5. Passenger Pigeon (extinct)
6. Loggerhead Shrike
7. Sea Mink (extinct)
8. Gray Wolf
9. Woodland Caribou
10. Eastern Cougar
11. Timber Rattlesnake

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 1994. 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 projects.

MDIFW reviewed hundreds of environmental permit applications in 1994, ranging from subdivisions proposals to construction of golf courses. All applications were screened to ensure protection of sensitive wildlife areas. About 25 sites important to Endangered or Threatened species were identified and received attention 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 1994, 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.

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, 1995, forty-one new bald eagle nests were adopted under this rule, bringing the total number of nest sites protected since 1989 to 299. In May, 1995, nine piping plover and least tern nesting, feeding and brood-rearing areas were also designated. In addition, 21 roseate tern nesting areas have been designated as Essential Habitat since 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, thus avoiding land-use conflicts where Endangered Species are of concern.

ENDANGERED AND THREATENED SPECIES STUDIES

Bald eagle

Bald eagles have been designated an Endangered species in Maine since 1978. Increasing numbers, and other advancements, may soon be rewarded by reclassification of this species as Threatened. The U.S. Fish and Wildlife Service is evaluating a proposal to downgrade their endangered status in Maine and 42 other states. Maine supports more than 90% of bald eagles nesting in the northeastern United States.

Numbers of bald eagles, and their reproductive success, have been monitored annually in Maine since 1962 (Table 26). The state's breeding population

Table 26. Bald eagle nesting and productivity in Maine, 1962-70 and 1972-94.[1]

Year	Occupied Sites	Successful Sites N	Successful Sites %	No. Young Fledged	Young Fledged/Nest Occupied	Young Fledged/Nest Successful	Occupied Nests Fledging # of Young 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
1993	150	84	56	115	0.77	1.37	66	53	31	0
1994	175	101	58	142	0.81	1.40	74	61	39	1

[1]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.

reached a new high of 175 nesting pairs in 1994. The 17% growth noted last year was the largest annual growth in eagle numbers recorded during these efforts.

Significant range expansion also highlighted 1994. Three new eagle nests were found in Oxford County, the first breeding records there since the 1950's. Also, three new breeding pairs in waters of the Fish River marked a four-fold increase of the known population in northern Aroostook County. Nearly 70% of Maine's eagles nest in coastal regions.

There have been numerous challenges to the recovery of bald eagles in Maine. A primary hinderance to eagle reproduction has been environmental contaminants, which pass through the food chain and affect hatching success of eggs. A general decline of contaminants during the 1970's allowed some improvement in eagle reproductive rates. However, DDE residues (a long-lasting by-product of the insecticide DDT), other organochlorine contaminants (most notably PCB's, an industrial pollutant), and several heavy metals (particularly mercury), apparently still influence eagle reproduction in Maine. These chemicals break down very slowly in the environment, and Maine eagles continue to accumulate them through dietary exposure. Research at the University of Maine is focused on this issue.

Another problem for Maine's eagles has been changing land use, mostly along coastal and other waterfront properties, which threatens many nests. A wide range of disturbances can cause both nesting failures (compounding a continuing problem caused by chemicals) or permanent abandonment of nests that normally support generations of breeding eagles. To address this problem, 302 bald eagle nest sites across Maine have been designated as "Essential Habitats" since 1990 and were covered by protection standards. To date, more than 95% of all projects proposed within "Essential Habitats" have been approved, many incorporating refinements in the design of the projects to ensure their compatibility with nesting eagles.

Maine has had an aggressive management program for bald eagles since 1976. It has evolved to address various threats that collectively caused bald eagles to be an endangered species. Each year, there is increasing optimism for a lasting bald eagle recovery, but there is yet plenty of work ahead to achieve that goal.

Peregrine falcon

The peregrine is on the way back in Maine and throughout the U.S. wherever reintroduction efforts have been undertaken. In fact, restoration programs for this species have been conducted in more than 35 countries. Peregrines declined worldwide and disappeared from the East in the early 1960's. Like bald eagles and many other birds of prey, they were victimized mostly by DDE in the environment.

Peregrines for reintroduction are produced in special captive breeding projects. 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 1994, MDIFW again conducted a single reintroduction of six captive-produced peregrines at Borestone Mountain, a National Audubon Society Sanctuary near Monson. All six fledged successfully. They were joined by a subadult male peregrine released at Tumbledown Mountain near Weld in 1993. Observations of peregrines at 11 different locations in 1994 provide some optimism for future population increases. Six nesting pairs raised a total of 8 young peregrines in 1994. Maine's population of breeding peregrines was first re-established in 1987, after more than 25 years of absence from the state.

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 continues to bear the unfortunate distinction as the rarest breeding bird in the eastern U.S. It once inhabited mountainous cliffs along the Appalachian Mountains from the mid-Atlantic states to Labrador. Only one nesting pair remains in Maine, and it is the only breeding record currently documented in the northeastern U.S. Sightings are occasionally reported from the western mountains or northern interior of Maine. These goldens may be migrants from Quebec but also offer hope that additional nests may be discovered. An East Sebago resident rescued a juvenile golden eagle this winter, but its injuries were too extensive to save the bird.

Unfortunately, Maine's single breeding pair has failed to nest successfully for 12 consecutive years. Eleven golden eagle eyries have been historically documented in Maine, but only three have been inhabited by goldens at some time during the last 25 years. Only 3 young golden eagles have been produced by resident pairs in Maine within the last 18 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 the 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. There is some evidence of increases in a small breeding population in eastern Canada, an area upon which the future of golden eagles in Maine is dependent.

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 four 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, and each requires some form of vegetative management.

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. This site annually supports more than 50-60 percent of the statewide breeding population. The 1994 census identified 19 singing males, the best indicator of territorial pairs. Eighteen were censused at three other locations inhabited by grasshopper sparrows in 1994.

The Kennebunk Plains was purchased by the state and is now a wildlife management area managed by MDIFW, in cooperation with The Nature Conservancy. Prescribed burns have been conducted to maintain suitable habitat for grasshopper sparrows and other grassland birds. Cooperative management with the U.S. Navy and the City of Sanford maintains grasshopper sparrow habitat at the Brunswick Naval Air Station and Sanford Municipal Airport.

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 nesting pairs 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 35 pairs at 11 sites in 1994. Fourteen 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 1980's: 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 eight of the past ten years. The trend in productivity has been generally one of increase since 1981. In 1994, 35 pairs of piping plovers nested at 12 sites and successfully fledged 70 chicks.

Monitoring and management of piping plovers in Maine has been carried out primarily by Maine Audubon Society, The Nature Conservancy, and U.S. Fish and Wildlife Service 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 11 years, the statewide population has fluctuated from a low of 39 pairs at 3 sites in 1982, to a high of 125 pairs at 4 sites in 1993. Since 1979, total productivity in Maine has ranged from 12 to 123 young fledged annually. In 1994, 90 pairs nested at 4 sites and produced 80 fledglings.

The erratic productivity of these birds in Maine can be attributed to human disturbance; destruction of nests or young by humans, foxes, skunks, raccoons, crows, dogs, and cats; 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

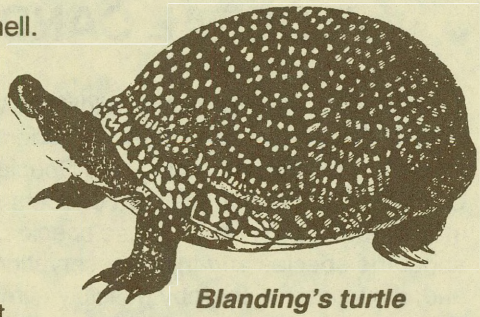
The roseate tern is listed as an Endangered Species by Maine and the Federal government. Roseate terns nest in Maine with common and arctic terns on coastal islands. The islands are critical to the survival of the species since they typically provide undisturbed, predator-free nest sites. With an increase 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 142 pairs nested in Maine in 1994. In the 1930's, 200-300 pairs nested in the state. 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

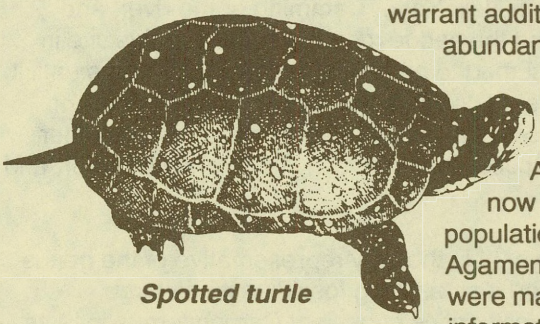
Two of Maine's threatened reptiles, the spotted and Blanding's turtles, are semi-aquatic species preferring clean, shallow wetlands. Spotted turtles are small (5 to 6 inches long) and have yellow spots on the head, tail, and legs

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.



Blanding's turtle

Little was known about either of these species until the Maine Amphibian and Reptile Atlasing Project (MARAP) was conducted in the 1980's. As a result of MARAP, spotted turtles were recorded at about 20 different sites from Kittery to Orrington. Blanding's turtles were known from only about 20 locations in Maine, all in York County. In 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 completing a study of two populations of both species in the Mt. Agamenticus area. More than 80 turtles were marked or radio-tagged. New information on nesting and hibernation sites, movements, and the types of wetlands used will help with conservation planning. In 1994, the Environmental Protection Agency provided additional funding to MDIFW to continue systematic survey of wetlands in all towns in York and Cumberland Counties for Blanding's and spotted turtles. Over 2,100 wetlands have been surveyed, and approximately 90 new sites have been discovered.



Spotted turtle

Vernal Pools

Many of Maine's amphibians depend on vernal pools as breeding habitat. Some, like spotted salamanders, blue spotted salamanders and wood frogs, use these habitats almost exclusively. In southern Maine, Blanding's and spotted turtles use vernal pools extensively. We know little about why some vernal pools have greater wildlife use than others. These small wetlands currently are not protected under state wetland protection laws. Funding from the Environmental Protection Agency and the Nongame and Endangered Wildlife Fund is being used to support a study of wildlife values associated with vernal pools in York County. A University of Maine graduate student, is studying invertebrate and amphibian use of 45 vernal pools. Results of this research will help guide protection efforts for these unique wetlands.

FEDERAL CANDIDATE SPECIES

Twenty-six species of fish or wildlife in Maine are listed by the U.S. Fish and Wildlife Service as candidates for federal listing as Endangered or Threatened. As part of MDIFW's Endangered Species Cooperative Agreement with the USFWS, MDIFW periodically conducts special investigations and management projects for those species. The purpose is to acquire information about the species and their conservation needs, or to manage the species, and, if successful, thereby possibly eliminate the need to list the species as Endangered or Threatened. Actions this past year included the following:

Tomah mayfly

The "Tomah" mayfly is a rare insect that is 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 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 1930's. The species was assumed to be extinct for nearly 50 years until it was "rediscovered" in Tomah Stream, Washington County by University of Maine entomologists in the 1970s. It has since been found at several other locations in Maine and in historic collections made in New York, Labrador, and Quebec.

This insect is unique in many ways. It is the only representative of the genus Siphlonisca. 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 Siphlonisca. 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 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. Often referred to as a "clam", the freshwater mussel's inconspicuous and seemingly drab lifestyle belies its importance. As filter feeders, mussels provide a valuable service to their aquatic environments by siphoning out impurities from the

Table 27. Freshwater mussels of Maine

Common Name	Scientific Name
Eastern-River Pearl Mussel	*Margaritifera margaritifera*
Eastern Elliptio	*Elliptio complanata*
Triangle Floater	*Alasmidonta undulata*
Brook Floater	*Alasmidonta varicosa*
Eastern Floater	*Pyganodon cataracta*
Newfoundland Floater	*Pyganodon fragilis*
Alewife Floater	*Anodonta implicata*
Squaw-Foot	*Strophitis undulatus*
Yellow Lamp-Mussel	*Lampsilis cariosa*
Eastern Lamp-Mussel	*Lampsilis radiata radiata*
Tidewater Mucket	*Leptodea ochracea*

water as they feed. In turn, mussels provide food for a variety of larger predators. The life histories of these animals are also unique and interesting. All freshwater mussels start life as free-floating larvae, vastly different in appearance from the adults. The young of most species must then chance upon, and attach to, a very specific fish host in order to mature into the more familiar adult form. Once the tiny mussels drop off their mobile nurseries (they do no harm to the fish!) and burrow into the substrate, they typically remain in the same spot for their entire lives. For some species, a lifetime can span 100 years or more!

Freshwater mussels are also one of the most diverse groups of species in North America. About one third of the world's mussel species are found in the United States, and nearly all of those occur east of the Mississippi River. Maine is relatively poor in mussel diversity, with only eleven species currently documented as living here (Table 27). And although most of our mussel species are widely distributed throughout the State, each one has a unique set of habitat requirements: some are found only in flowing water, and others occur in still water; some species prefer sand or mud substrates, but others succeed only on gravel or cobble bottoms. Flow rate, water depth, water chemistry and temperature, availability of fish hosts, and substrate type are some of the factors determining where each mussel species can survive.

Habitat integrity is an equally important component influencing mussel survival. Freshwater mussels are very sensitive to contaminants and changes in their environment - a vulnerability compounded by a filter feeding strategy, specific habitat and fish host requirements, and an inability to leave their surroundings. Consequently, freshwater mussels are one of our most valuable indicators of water quality and ecosystem health. They are also one of the most imperiled groups of animals in the country. Approximately half of the species representing our uniquely diverse mussel fauna have already vanished, or are in danger of extinction. Of the nearly 300 species of freshwater mussels found in the United States, at least 21 are thought to be

extinct, 56 are currently on the federal Endangered Species List, and an additional 74 are candidates for listing.

Freshwater mussels are in trouble because pollution, dams and other water control structures, channelization, dredging, and sedimentation of our once clean, free-flowing rivers and streams have all contributed to the degradation and loss of mussel habitat. In addition, poaching of shells for trade to the Orient, and the recent invasion of a prolific foreign competitor, the zebra mussel, are also jeopardizing some mussel populations. Too late for many species, efforts to maintain habitat quality for mussels, and prevent further loss of species, have now become a high priority for many state, federal, and private conservation agencies.

In 1992, with financial support from the U.S. Fish & Wildlife Service, MDIFW initiated surveys to determine the status, abundance, and distribution of the State's rarer species of freshwater mussels. Two of our 11 species, the brook floater and yellow lamp-musse,l are currently listed as candidates for both state and federal Endangered or Threatened Species status. Prior to our survey work, the brook floater was known from only six rivers in Maine, and no more than three living individuals had been found at any site in recent years. The yellow lamp-mussel seems slightly better off, with about 10 locations and greater numbers being documented at a few sites.

In the three years since research began, MDIFW has surveyed more than 400 sites in over 90 rivers and streams throughout Maine. York, Cumberland and Washington counties have been surveyed thoroughly. As a result, the brook floater has been found in an additional 15 rivers, several of which appear to have healthy populations. About ten new locations were documented for the yellow lamp-mussel, and all were based on just a few empty shells.

Compared to most states within the range of these two species, Maine seems to have the best remaining populations and may be the last stronghold for these rare mussels. However, despite the encouraging finds of the past three summers, both of these species must still be considered rare when survey results are put in perspective by the number of sites searched and number of live individuals found. Also, Maine is not immune to the problems of habitat loss and degradation that have eliminated populations and extirpated species in other parts of the country.

In 1995, we will continue surveying waters in the mid-coastal region to locate additional occurrences of these two mussels and continue to learn about their life histories, habitat requirements, status, and conservation needs. At the same time, we will continue to document the occurrence, distribution, and status of all of Maine's freshwater mussels. Unfortunately, very little is known even about species believed to be common. With so many species experiencing dramatic declines throughout the United States, including our neighboring northeastern states, it is becoming increasingly important to

monitor the status of, and develop conservation plans for, our entire mussel fauna.

Rare dragonflies

Maine's clean, free-flowing rivers may provide a last refuge for some of North America's rarest dragonflies. The midget snaketail dragonfly and the extra-striped snaketail dragonfly were recently listed as candidates for the Federal Endangered Species List. These species once had a wide distribution throughout Eastern North America, but pollution, dams, and deteriorating water quality have resulted in the extinction of many populations. Entomologists recently discovered the largest known remaining populations of these species in the Penobscot, Allagash, and Aroostook watersheds.

Two University of Maine graduate students are being funded in part by MDIFW and the U.S. Fish and Wildlife Service to study the life history and habitat needs of these dragonflies in the Aroostook River watershed. Their work will provide insights into the status of these rare invertebrates and help state and federal agencies better understand their conservation needs.

The banded bog skimmer dragonfly, also a candidate for the Federal Endangered Species List, reaches the northern extent of its range in Durham, NH, about 5 miles from the Maine border. About twenty-five sites in Maine have been surveyed in the last decade, but as yet, this elusive dragonfly has yet to be discovered in the state.

Black tern

Most people think of terns as nesting on Maine's coastal islands and beaches. However, one species, the black tern, nests in colonies on freshwater wetlands in central and eastern Maine. Prior to 1990, it was believed Maine's population of black tern was relatively secure, as they were annually observed at traditional nesting sites. In 1991, students at Nokomis High School, under the direction of their student advisor and MDIFW biologists, initiated the first state-wide census of black terns in Maine. They found that the black tern was actually the rarest species of tern in Maine and have made a strong case for listing this species as Endangered in the state.

Since then, the U.S. Fish and Wildlife Service has identified the black tern as a candidate for the Federal Endangered Species List and MDIFW is considering listing the species as Endangered. Black terns nest in New England only in New York, Vermont, and Maine. Their numbers are believed to have declined dramatically in North America in the last two decades.

Nokomis students have continued their annual survey of black terns, thus providing the state with valuable information on this species' status. The number of nesting pairs has increased from 36 pairs in 1991 to 67 pairs in 1994. Nesting colonies have been found in seven wetlands.

WILDLIFE HABITAT

The past year was another busy year for the Wildlife Habitat Group based in the Bangor office. Much activity focused on entry of wildlife habitat data into the Geographic Information System (GIS) computer workstation. Completion of these and related wildlife habitat identification tasks required close coordination with wildlife biologists in the Division's Wildlife Management Section, who collect much of the field data, and with the species specialists in the Wildlife Resource Assessment Section, who conduct/coordinate special surveys. In addition, our Habitat Group staff worked closely with other State and Federal agencies, as well as landowners and private conservation groups. Our primary goal: collect and assemble existing information on habitats of wildlife in Maine to facilitate transfer to users in these and other groups.

GEOGRAPHIC INFORMATION SYSTEM

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

Major projects involving use of GIS over the past year included: continuing work on identification of sensitive coastal wildlife areas for marine oil spill response; entry of Deer Wintering Areas (DWA) regulated by the Land Use Regulation Commission (LURC) into GIS; digitizing of DWA and Waterfowl/ Wading Bird Habitats (WWH) in southern and western Maine; tracking Essential Habitats for Endangered or Threatened species; and mapping locations of Endangered, Threatened, or Special Concern species being tracked in the wildlife portion of the Natural Heritage database.

MARINE OIL SPILL PLANNING

As reported previously, the oil spill planning effort is being conducted by our oil spill biologist, in coordination with wildlife species specialists and regional biologists, to identify sensitive coastal wildlife areas that will need protection in the event of a marine oil spill. Occurrence information collected over the past decade for a variety of coastal species (shorebirds, seabirds, waterfowl, wading birds, seals, Endangered or Threatened species, etc.) has been entered into the GIS. This computerized mapping and spatial analysis system facilitates the analysis of large amounts of complex geographic information. Concurrently, wildlife occurrence and use data related to these mapped areas were analyzed to determine which areas are the most sensitive to oil spills. Those areas with species most vulnerable to contact with oil have been rated the most sensitive (by season) and will be given the highest priority during oil spill response and cleanup. This past spring, the Habitat Group provided the first set of coastal data to the Department of Environmental Protection (DEP) for incorporation in the oil spill response maps. We will continue to update these maps with new/revised coastal wildlife information. In addition, we will be working over the next year to identify specific habitats which should be protected from oil spills throughout the year.

Another component of our oil spill planning efforts is wildlife rehabilitation. The GIS will facilitate identification of areas to target our rehabilitation efforts where the birds are most likely to occur, and identify potential locations of species which will benefit most from rehabilitation efforts. Wildlife Habitat Group staff are working closely with the DEP to implement the wildlife rehabilitation plan outlined in the Marine Oil Spill Contingency Plan for the State of Maine. A major component of this plan is training State/Federal agency staff and volunteers to conduct wildlife rehabilitation. In coordination with the State wildlife rehabilitation contractor, International Bird Rescue and Research Center, we conducted another intensive 2-day training session for State/Federal staff and other individuals in 1994. Two separate 1-day training sessions were held for volunteers. In addition to training, we are working on identification of rehabilitation facilities, as well as procurement of materials and equipment, in preparation for oil spill response. We have initiated discussions with the Maine National Guard to use their facilities during an oil spill. Finally, we have spent numerous hours in planning efforts at the State and Federal level. We have provided comments and updates to the Maine Oil Spill Plan. Our staff has participated in preparation of the Area Contingency Plan, a Federal effort coordinated by the U.S. Coast Guard. This Plan addresses oil spill response efforts for the coast of Maine and New Hampshire. Inland Fisheries and Wildlife is represented by the Habitat Group on the Area Committee, a group of State and Federal agency representatives authorized to approve the Area Plan. We are also coordinating with our neighbors, New Hampshire and New Brunswick through Federal oil spill

planning and exercise efforts. Inland Fisheries and Wildlife is also working directly with the U.S. Fish and Wildlife Service to address oil spill related issues of common interest.

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

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

WILDLIFE HABITAT MAPPING

Our Wildlife Habitat Group is continuing to enter DWA and WWH into the GIS. Original maps of DWA currently regulated by LURC have been upgraded (in draft form) to the scale of USGS 7.5' maps, the standard base map of OGIS. We are working closely with LURC staff, our regional biologists, and several forest landowners to proof existing and redrawn maps. These preliminary revised maps have been digitized with assistance from the Department of Conservation (Northern Forest Lands Project). Ultimately, final maps will be generated by LURC and submitted for rule-making before adoption. The assistance of several forest landowners in resolving DWA mapping issues and providing digitized versions from their GIS is appreciated.

During the last year, with assistance of the University of Maine U.S. Biological Survey Fish and Wildlife Cooperative Research Unit and the help of regional wildlife biologists, the Habitat Group has been coordinating the digitizing of DWA and WWH into GIS. These areas have previously been included on maps provided to towns as part of the comprehensive planning process. Although the boundaries of many areas are preliminary, this is the first step towards providing a tool to track these habitats and to analyze how they occur over the landscape.

ENDANGERED & THREATENED SPECIES HABITATS

Habitats protected under Maine's Endangered Species Act are also being tracked in the GIS. The Habitat Group is responsible for supporting designation of Essential Habitats, developing and distributing maps, identifying landowners of protected habitats, maintaining supporting databases, and a variety of related tasks. We are currently creating "layers" of these Essential Habitats in GIS. Using the capability of the GIS, we will be able to provide maps more efficiently for regulatory purposes. In the near future, a digital file will be provided to OGIS to increase the accessibility of this information to other users. Combined with the GIS effort, we are also working on databases used to support this important habitat protection effort.

A related series of projects involves tracking Endangered, Threatened, or Special Concern species in the Natural Heritage database (also called Biological Conservation Data System or BCD). The Habitat Group is responsible for managing and maintaining this database. Information entered into this database is verified and provided by species specialists in our Endangered & Threatened Species Group, the Mammal Group or the Bird Group, principally to track species which are "listed." Occurrences of wetland vertebrates and invertebrates being recorded as part of a project funded by EPA, are entered in the BCD and transferred to GIS to generate maps of species locations. These data will be combined with other "layers" of wetland related information from southwestern Maine. The ultimate goal is to identify habitats important to wetland dependent wildlife.

OTHER HABITAT PROJECTS

Our Habitat Group is working cooperatively on a number of other projects. The U.S. Forest Service is conducting a 1994-95 forest resurvey of Maine and Inland Fisheries and Wildlife is planning to use some of the data collected to assess changes in wildlife habitats since the last U.S. Forest survey (1980-81). We are also assisting the U.S. Biological Survey GAPS project in their efforts to assess species diversity and identify areas of high species diversity in Maine. Our Department has been a contributor of wildlife data for a coastal island prioritization project. A major effort is underway, in cooperation with the State Office of GIS, Department of Conservation, and other state and federal agencies, to develop land cover/use maps of Maine based on satellite imagery. These maps will be useful in the identification of wildlife habitat and habitat changes over time.

We are also assisting in mapping habitats for protection under the Natural Resources Protection Act (NRPA). Criteria are being developed by Wildlife Division staff to define these habitats, and existing data are being prepared for

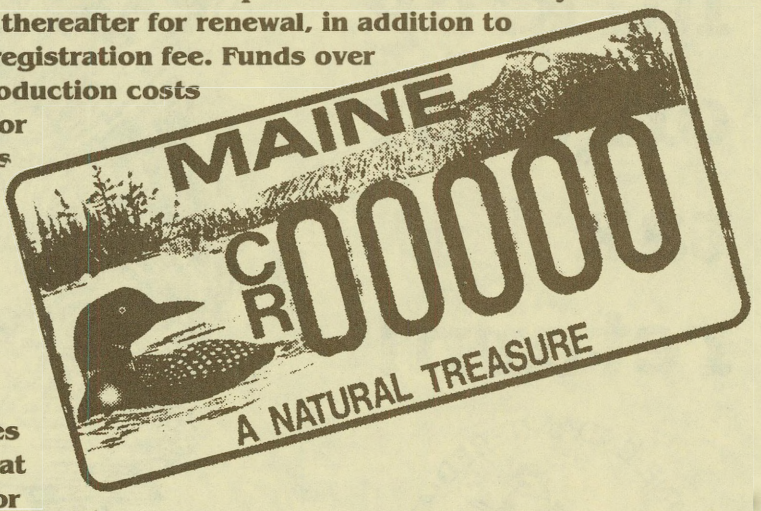
the GIS to facilitate habitat mapping and protection. We will be preparing maps and providing them to DEP for implementation of habitat protection. This past year, preliminary maps for designation of Seabird Nesting Islands for NRPA protection were prepared.

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

A License To Conserve!

Maine's new conservation registration (CR) license plates, now available at motor vehicle registration sites around the state, provide a way for passenger car owners to show support for Maine's state parks and endangered wildlife.

The attractive multi-colored plate costs $20 initially & $15 annually thereafter for renewal, in addition to your normal registration fee. Funds over and above production costs will be used for improvements at state-owned parks and historic sites, and for protection of endangered wildlife.

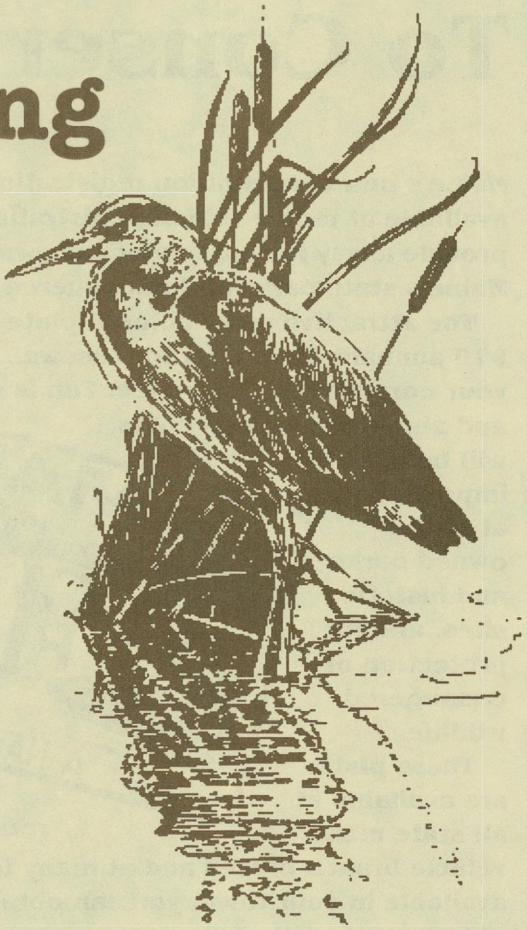


These plates are available at all state motor vehicle branch offices and at many town offices. If they're not available in your town, you can obtain them at the nearest branch office or by mailing a copy of your registration and a check for $20 to the Bureau of Motor Vehicles, Specialty Plate Clerk, Station 29, Augusta ME 04333. Vanity plates in this design are also available for an additional $15.

Show your support for the "natural treasure" we have in our state of Maine. Dress up your car, spruce up our parks, and protect our endangered wildlife—all with one check!

printed on recycled paper

There's something wild lurking on your tax return!

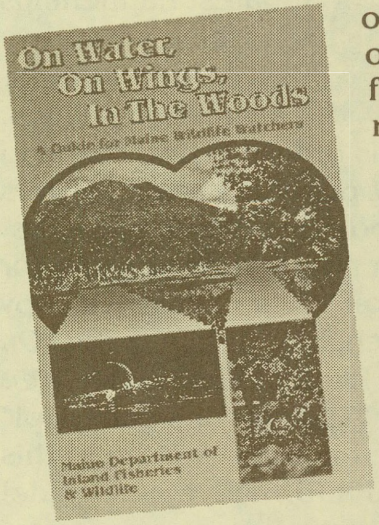


MAINE ENDANGERED NONGAME WILDLIFE FUND

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

Watchable Wildlife Guide Available!

This 64-page pocket guide contains more than two dozen full-color wildlife photographs and descriptions of 62 great places in Maine to go in search of that once-in-a-lifetime photograph or that ever-remembered glimpse of wildlife in its natural setting. Most of the sites listed are on publicly-owned land, but **all** sites are open for careful public use and enjoyment.



The book is organized by geographic regions and describes each site in detail — how to get there, the species you might expect to see, details on the availability of restrooms, parking, and other facilities, and much more, including information on access for persons with disabilities.

The guide is published by **MAINE FISH AND WILDLIFE Magazine**, generously assisted by many volunteer naturalists and photographers throughout the state. Production funding was provided through the magazine's budget, which in turn will benefit from proceeds from sales of the book.

To order, send check or money order for $5.95 (payable to Maine Fish and Wildlife) to:

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