2023-2024 RESEARCH + MANAGEMENT REPORT

GAME SPECIES CONSERVATION & MANAGEMENT

2023-24 RESEARCH & MANAGEMENT REPORT

Maine Department of Inland Fisheries and Wildlife protects and manages Maine's fish and wildlife and their habitats, promotes Maine's outdoor heritage, and safely connects people with nature through responsible recreation, sport, and science.

Game Species Conservation & Management

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Maine Department of Inland Fisheries & Wildlife

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Project Funding

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Game Species Conservation & Management

The Game Research and Management Section develops and oversees Maine's game species research, monitoring and management programs, assists with permit reviews, and provides technical assistance to policy makers and the public. We address public and departmental informational needs by designing and implementing research programs, assisting with strategic planning, contributing to the Department's environmental education efforts, and responding to public information requests. We use this information to inform regulatory recommendation on hunting and trapping of game mammals and birds to the Wildlife Division Director. The Game Section works in close cooperation with other Wildlife Division, Warden Service, Licensing, Outreach and Communication Staff, and the Commissioner's Office, as well as outside partners on regulatory recommendations, planning, and research and monitoring efforts for Maine's game birds and mammals.

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Wildlife Conservation Funding

Industry federal excise taxes have been crucial to American conservation since 1937, when pressure from conservation groups and the public helped pass the Federal Aid in Wildlife Restoration Act, known as Pittman-Robertson (PR), followed in 1950 by the Federal Aid in Sport Fish Restoration Act, known as Dingell-Johnson (DJ). Today, manufacturers' federal excise taxes on firearms, ammunition, fishing and boating equipment, and motorboat fuel tax provide roughly $1 billion in conservation and outdoor access funding to state fish and wildlife agencies annually.

For more than eighty years, Maine Department of Inland Fisheries and Wildlife has benefited from funds generated by manufacturer federal excise tax. The PR funds, collected through an 11% federal excise tax on firearms, ammunition, and archery equipment and a 10% excise tax on handguns, have been critical to conserving, monitoring, and managing wild mammals and birds throughout the state. These funds are also critical in habitat conservation with 69 Wildlife Management Areas covering more than 120,000 acres supported through federal excise taxes. Maine's wildlife management areas benefit hundreds of species directly providing habitat for species like white-tailed deer, moose, Canada lynx, New England cottontail, and hundreds of resident and migratory birds. These funds also provide opportunities for outdoor pursuits including hunting on Wildlife Management Areas and support for hunter education courses and target range construction and maintenance.

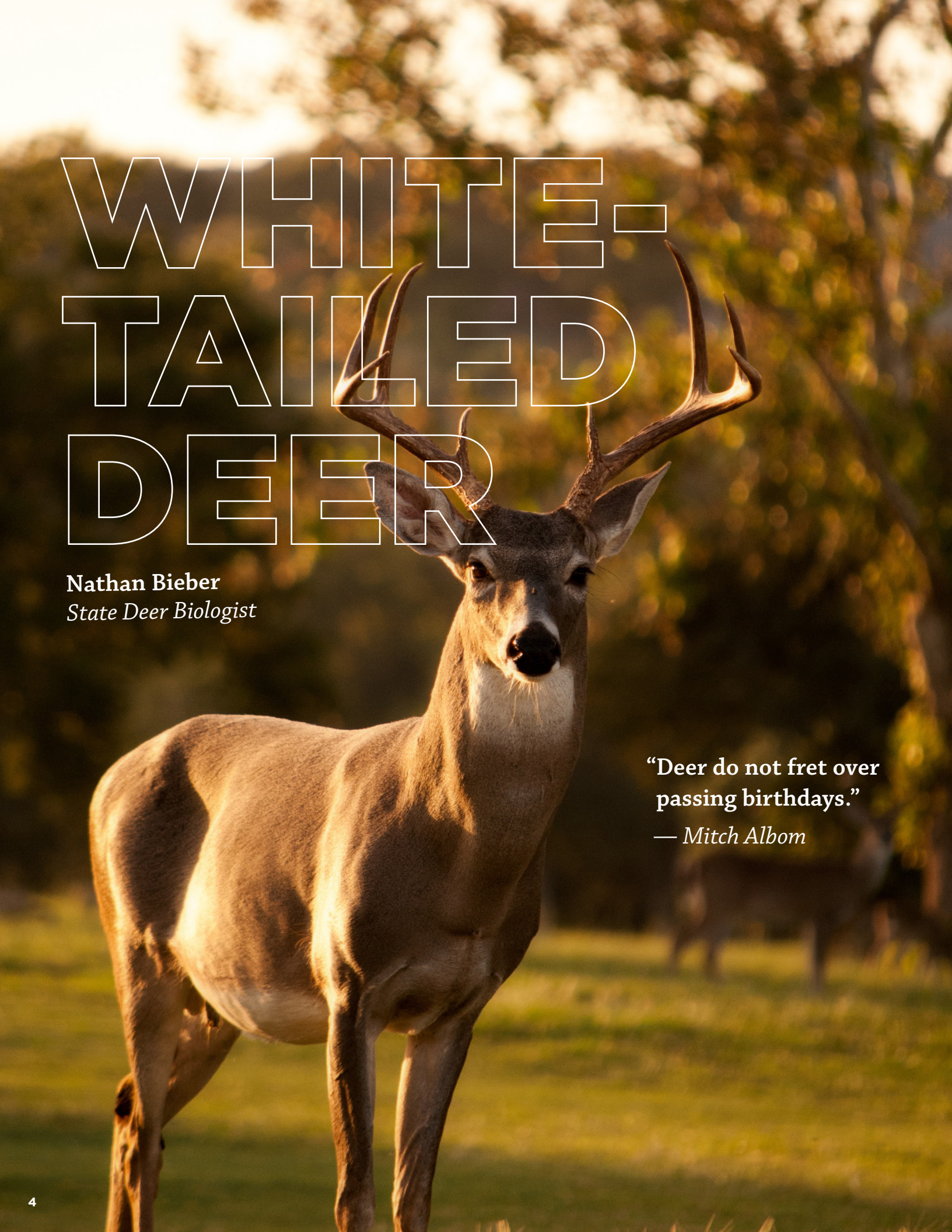
The partnership between the excise tax paying manufacturers, state fish and wildlife agencies that conserve wildlife and habitat, and the U.S. Fish and Wildlife Service's Office of Conservation Investment that administers these funds has been one of America's most effective tools for funding conservation. Here in Maine, up to 75% of the salaries and essential operating costs of our research, conservation efforts, and regional management staff time related to wild mammals and birds are supported through PR funds.

Were it not for PR funds, we essentially would not have management programs for white-tailed deer, moose, black bear, furbearers, wild turkeys, waterfowl and upland game.

Of the total federal manufacturers excise tax funds collected nationwide each year, each state receives a portion that is dependent on the land area of the state and the number of hunting licenses sold in the state. In 2024, Maine received $11.08 million in PR funds. How does this translate into wildlife programs? First, the PR money must be spent on management efforts for wild mammals and birds. Then, the federal money must be matched with 25% non-federal money, often from state hunting and fishing license dollars. This means that Maine contributed over $2.7 million in matching wildlife funds in 2024. For every $1.00 that Maine puts into management for wild mammals and wild birds, and outdoor access we can receive $3.00 more from PR funds through the federal excise tax.

These management efforts benefit species and current and future generations of Mainers ensuring healthy fish and wildlife populations and species habitat conservation. While not all Mainers participate in hunting, trapping, and fishing, they are important outdoor activities that connect people to our state's wild animals and wild landscapes. Each year, Mainers sustainably harvest millions of pounds of protein from moose, black bear, white-tailer deer, waterfowl, and goose to feed their families and communities. In 2023 alone, over 38,000 deer were harvested in Maine. With an average meat yield of 58 pounds per deer that is over 2 million pounds of lean healthy protein on the plate.

In addition to the meals provided, hunting and trapping also provide important economic benefits throughout the state. Hunting in Maine has an economic impact of over $338 million and supports over 3,400 jobs. Outdoor pursuit related employment opportunities are shared across many sectors of the Maine economy. These income benefits are particularly important in rural or remote areas of the state, where the majority of hunting, trapping, and angling takes place.'



WHITE-TAILED DEER

Nathan Bieber
State Deer Biologist

"Deer do not fret over passing birthdays."
— Mitch Albom

White-tailed deer are adaptable, resilient, and found statewide in nearly all habitat types. Deer populations in Maine are now as abundant as they've ever been, and in some areas, more abundant than ever. Our primary tool for influencing deer numbers is regulated harvest, particularly of adult females. In much of central and southern Maine, where populations exceed goals, we've been increasing doe harvest pressure for several years to slow or reverse growth.

To guide our management decisions, we collect a range of data, which includes examinations of hunter-harvested deer, community science observations, public surveys, and environmental monitoring. More detailed information is provided in the following sections of this report.

2023 and 2024 Deer Harvest

SEASON DATES AND STRUCTURE

In 2023 and 2024, Maine offered five structured fall deer hunting seasons: expanded archery, regular archery, general firearms, and two muzzleloader seasons. There were 79 days available for deer hunting in 2023 and 85 in 2024, with the first season opening in September and the final season closing in December.

PERMIT ALLOCATION

In Maine, a hunting license generally allows for the harvest of one antlered deer anywhere in the state, while harvesting antlerless deer is restricted to certain areas and requires a permit. Each year, MDIFW develops antlerless deer permit recommendations for each WMD using data from harvest reports, biological samples, winter severity monitoring, and community scientists' observations.

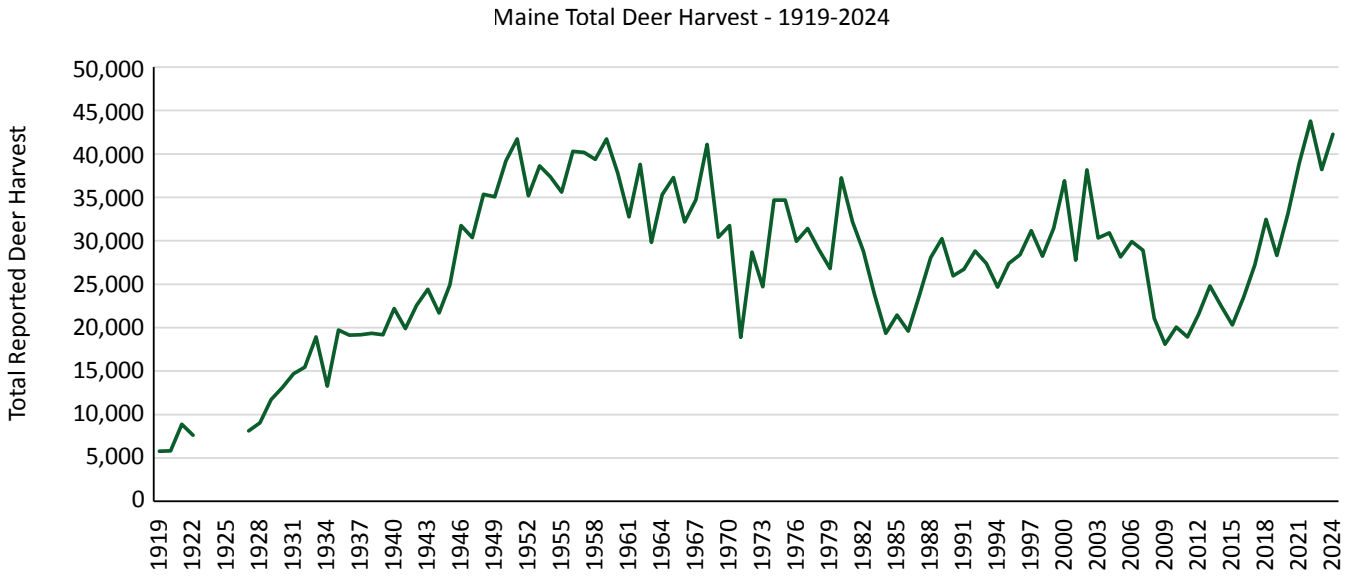
In 2023, MDIFW allocated 108,070 antlerless deer permits across 25 WMDs and two deer management subunits. In 2024, we allocated 128,030 such permits across 25 WMDs and one subunit.

The Department distributes antlerless permits first by lottery. Any remaining permits then become available for purchase through the MDIFW website. Permit revenue supports the Maine Deer Management Fund, which is used to acquire and manage deer habitat, particularly deer wintering areas. Hunters purchased 86,406 permits in 2023 and 92,280 in 2024.

HARVEST STATISTICS

Maine hunters registered 38,215 deer during the 2023 hunting seasons and 42,259 in 2024 **(Figure 1).** These ranked as the 13th and 2nd highest total statewide harvests ever recorded.

FIGURE 1. MAINE'S HISTORIC DEER HARVEST FROM THE EARLY 1900S WHEN REPORTING BEGAN. VERY LOW REPORTED HARVESTS IN THE EARLY 1900S WERE LIKELY DUE LARGELY TO SLOW ADOPTION OF AND COMPLIANCE WITH REPORTING REQUIREMENTS.



Most of Maine's deer harvest comes from the regular firearms season, which typically accounts for 80-85% of the annual total **(Tables 1 and 2).** The percentage from combined archery seasons has increased slightly in recent years to ~10%, driven in part by expanded access to crossbow hunting. Annual harvest averages have increased significantly since the late 2000s, when successive severe winters greatly depressed Maine's deer population. The average annual deer harvest from 2010-2014 was 21,564; from 2015-2019, it was 26,369; and from 2020-2024, it was 39,273.

♂ 2023

TABLE 1. MAINE DEER HARVEST BY SEASON AND SEX AND AGE-CLASS, 2023.

	ADULT		FAWN				PERCENT BY SEASON AND WEEK		
SEASON	BUCK	DOE	BUCK	DOE	TOTAL DEER	TOTAL ANTLERLESS DEER	TOTAL	ADULT BUCK	ANTLERLESS
ARCHERY	1,314	1,554	257	284	3,409	2,095	9	6	14
Expanded	704	777	146	151	1,778	1,074	5	3	7
Oct	610	777	111	133	1,631	1,021	4	3	7
YOUTH DAY	333	473	131	103	1,040	707	3	1	5
REGULAR FIREARMS	20,080	8,102	1,924	1,577	31,683	11,603	83	88	75
Opening Sat	1,381	698	167	135	2,381	1,000	6	6	7
Oct 31 - Nov 5	5,503	2,526	580	487	9,096	3,593	24	24	23
Nov 7-12	4,715	1,722	441	357	7,235	2,520	19	21	16
Nov 14-19	4,127	1,288	313	248	5,976	1,849	16	18	12
Nov 21-26	4,354	1,868	423	350	6,995	2,641	18	19	17
MUZZLELOADER	1,080	721	145	137	2,083	1,003	5	5	6
Nov 28 - Dec 3	588	263	54	52	957	369	2	3	2
Dec 5-10	492	458	91	85	1,126	634	3	2	4
UNKNOWN	0	0	0	0	0	0	0	0	0
TOTAL	22,807	10,850	2,457	2,101	38,215	15,408	100	100	100

Corrections applied for errors in sex-age. Estimated error rates are applied independently for each table, so estimates will vary.

⚥ 2024

TABLE 2. MAINE DEER HARVEST BY SEASON AND SEX AND AGE-CLASS, 2024.

SEASON	ADULT		FAWN		TOTAL DEER	TOTAL ANTLERLESS DEER	PERCENT BY SEASON AND WEEK		
	BUCK	DOE	BUCK	DOE			TOTAL	ADULT BUCK	ANTLERLESS
ARCHERY	1,756	1,935	419	454	4,564	2,808	11	7	15
Expanded	939	995	226	237	2,397	1,458	6	4	8
Oct	817	940	193	217	2,167	1,350	5	3	7
YOUTH DAY	637	736	226	208	1,807	1,170	4	3	7
REGULAR FIREARMS	21,173	8,304	2,497	1,967	33,941	12,768	81	87	71
Opening Sat	2,784	1,152	353	272	4,561	1,777	11	12	10
Oct 31 - Nov 5	5,829	2,161	649	517	9,156	3,327	22	24	19
Nov 7-12	5,952	1,888	621	456	8,917	2,965	21	24	16
Nov 14-19	3,442	1,275	389	298	5,404	1,962	13	14	11
Nov 21-26	3,166	1,828	485	424	5,903	2,737	14	13	15
MUZZLELOADER	812	789	156	190	1,947	1,135	4	3	7
Nov 28 - Dec 3	481	327	64	77	949	468	2	2	3
Dec 5-10	331	462	92	113	998	667	2	1	4
UNKNOWN	0	0	0	0	0	0	0	0	0
TOTAL	24,378	11,764	3,298	2,819	42,259	17,881	100	100	100

Corrections applied for errors in sex-age. Estimated error rates are applied independently for each table, so estimates will vary.

In 2023, hunters registered 22,816 antlered (adult) bucks. In 2024, they registered 24,376 — the highest statewide buck harvest on record. The top five WMDs for buck harvest density (bucks per square mile) over this two-year period were, in descending order, districts: 24, 22, 21, 23, and 29.

Overall, hunters registered 15,399 antlerless deer in 2023 (2,454 male fawns, 2,096 female fawns, and 10,849 adult does) and 17,883 in 2024 (3,305 male fawns, 2,815 female fawns, and 11,763 adult does) **(Tables 3 and 4).**

2023

TABLE 3. MAINE DEER HARVEST BY WILDLIFE MANAGEMENT DISTRICT (WMD) AND SEX AND AGE-CLASS, 2023.

	ADULT		FAWN		TOTAL		HARVEST PER 100 ADULT BUCKS		HARVEST PER 100 SQ MILES HABITAT		
WMD	BUCK	DOE	BUCK	DOE	ANTLERLESS DEER	ALL DEER	ADULT DOES	ANTLERLESS	ADULT BUCKS	ALL	ADULT DOES
1	91	3	0	0	3	94	3	3	6	7	0
2	82	5	1	1	7	89	6	9	7	8	0
3	174	13	6	2	21	195	7	12	20	22	1
4	103	0	0	0	0	103	0	0	5	5	0
5	84	3	1	1	5	89	4	6	6	6	0
6	356	63	15	16	94	450	18	26	25	32	4
7	582	137	25	22	184	766	24	32	42	55	10
8	470	59	17	11	87	557	13	19	24	28	3
9	129	20	5	4	29	158	16	22	14	18	2
10	95	8	2	1	11	106	8	12	10	11	1
11	399	41	14	8	63	462	10	16	24	28	2
12	666	111	21	18	150	816	17	23	73	89	12
13	586	153	37	30	220	806	26	38	104	143	27
14	301	73	11	16	100	401	24	33	41	55	10
15	1,656	820	212	157	1,189	2,845	50	72	177	305	88
16	1,710	826	194	160	1,180	2,890	48	69	222	374	107
17	2,752	1,439	298	278	2,015	4,767	52	73	206	356	108
18	468	75	18	17	110	578	16	24	38	47	6
19	258	24	8	5	37	295	9	14	22	25	2
20	1,391	664	169	122	955	2,346	48	69	240	404	114
21	1,449	1,104	250	220	1,574	3,023	76	109	301	628	229
22	1,465	1,096	277	235	1,608	3,073	75	110	338	709	253
23	2,094	1,443	344	279	2,066	4,160	69	99	268	533	185
24	753	516	112	99	727	1,480	69	97	343	675	235
25	1,634	1,012	191	179	1,382	3,016	62	85	233	430	144
26	1,559	619	111	117	847	2,406	40	54	173	267	69
27	779	163	29	26	218	997	21	28	106	136	22
28	410	49	7	8	64	474	12	16	38	44	5
29	320	310	79	64	453	773	97	142	220	532	213
UNKNOWN	0	0	0	0	0	0	0	0	0	0	0
STATEWIDE	22,816	10,849	2,454	2,096	15,399	38,215	48	67	79	133	38

Corrections applied for errors in sex-age. Estimated error rates are applied independently for each table, so estimates will vary.

While the statewide doe harvest remains below Department objectives, harvest figures have improved significantly in the first three years of the new antlerless permit system. From 2022-2024, the average annual adult doe harvest was 12,165 per year, compared to 8,794 from 2019-2021, and 6,675 from 2016-2018.

Buck kill indices, which are used to monitor population trajectory, have begun to stabilize or slightly decline in some of our most deer-populated districts, including WMDs 21, 22, 23, and 25. We hope to see this trend continue in the coming years.

2024

TABLE 4. MAINE DEER HARVEST BY WILDLIFE MANAGEMENT DISTRICT (WMD) AND SEX AND AGE-CLASS, 2024.

	ADULT		FAWN		TOTAL		HARVEST PER 100 ADULT BUCKS		HARVEST PER 100 SQ MILES HABITAT		
WMD	BUCK	DOE	BUCK	DOE	ANTLERLESS DEER	ALL DEER	ADULT DOES	ANTLERLESS	ADULT BUCKS	ALL	ADULT DOES
1	114	5	4	2	11	125	4	10	8	9	0
2	120	6	1	0	7	127	5	6	10	11	1
3	245	39	10	9	58	303	16	24	28	34	4
4	177	2	0	2	4	181	1	2	9	9	0
5	116	10	2	0	12	128	9	10	8	9	1
6	512	120	32	33	185	697	23	36	36	49	8
7	590	153	30	34	217	807	26	37	42	58	11
8	585	101	23	20	144	729	17	25	30	37	5
9	120	18	7	5	30	150	15	25	13	17	2
10	141	12	6	4	22	163	9	16	15	17	1
11	526	69	33	22	124	650	13	24	32	39	4
12	672	115	39	23	177	849	17	26	73	93	13
13	581	217	52	53	322	903	37	55	103	160	39
14	349	86	24	19	129	478	25	37	48	65	12
15	1,515	848	275	190	1,313	2,828	56	87	162	303	91
16	1,750	920	274	230	1,424	3,174	53	81	227	411	119
17	2,864	1,734	421	410	2,565	5,429	61	90	214	406	130
18	592	95	31	26	152	744	16	26	48	60	8
19	286	35	12	10	57	343	12	20	24	29	3
20	1,517	727	227	159	1,113	2,630	48	73	261	453	125
21	1,494	1,082	370	269	1,721	3,215	72	115	310	668	225
22	1,501	988	309	265	1,562	3,063	66	104	347	707	228
23	2,063	1,288	383	333	2,004	4,067	62	97	264	521	165
24	805	523	140	126	789	1,594	65	98	367	727	239
25	1,659	1,018	250	223	1,491	3,150	61	90	236	449	145
26	1,739	851	196	179	1,226	2,965	49	71	193	329	95
27	804	228	42	49	319	1,123	28	40	110	153	31
28	520	72	16	18	106	626	14	20	48	58	7
29	419	401	96	102	599	1,018	96	143	289	701	276
UNKNOWN	0	0	0	0	0	0	0	0	0	0	0
STATEWIDE	24,376	11,763	3,305	2,815	17,883	42,259	48	73	85	147	41

Corrections applied for errors in sex-age. Estimated error rates are applied independently for each table, so estimates will vary.

HUNTER PARTICIPATION

Each year, MDIFW sends an online deer hunter effort survey to a randomly selected group of Maine hunters to measure time spent hunting deer during the regular firearms season. In 2023, hunters reported spending an average of 7.6 days and 4.6 hours per day hunting deer during this season. In 2024, they spent an average of 5.8 days and 4.8 hours per day. This translates to ~35 hours per hunter in 2023 and ~28 hours in 2024. The reported effort in 2024 was the lowest since the online survey began, and the reason for this dip is unclear.

In addition to tracking time spent hunting, we use the annual survey to pose a few miscellaneous questions on topics of interest. In 2023 and 2024, we asked hunters the following:

At what age did you first hunt for deer?
Among the 403 respondents, the average age at which hunters began pursuing deer was 17. Nearly 79% reported starting at age 21 or younger, and the most common response was age 10.

How did you first get introduced to deer hunting?
Most hunters (71%) said that a family member introduced them to deer hunting. 16% were introduced by a friend, 11% were self-taught, and 1% credited a workshop, class, or "other."

The response to the first two survey questions highlights not only the importance of introducing people to deer hunting at a young age, but also the value of family and friends who are willing and able to mentor young hunters.

In the wildlife management district where you spend the majority of your time deer hunting, how would you describe the status of this year's acorn crop?
It is widely believed that natural food availability can influence big game hunters' success. This is commonly discussed with regards to bear hunting in Maine but not often as it relates to deer. Research in other Northeastern states suggests that in years of high acorn abundance, harvest success tends to drop, and in years when acorns are scarce, success increases. To explore this relationship in Maine, the Department asked hunters to rate perceived acorn abundance on a scale of 1 to 5 (1 = absent or very scarce; 5 = very abundant). In 2023, the average response was 3.7; in 2024, it rose slightly to 3.9 suggesting slightly more perceived acorn abundance in 2024.

How would you describe this year's acorn crop compared to last year's acorn crop?
We added this question to better gauge the accuracy of hunters' perceptions of acorn abundance. With an average perceived acorn abundance of 3.7 in 2023 and 3.9 in 2024, we'd hope that hunters would report seeing more acorns on average in 2024 than they did the previous year. Around 80% of hunters indicated that they felt that acorn abundance was the same or greater in 2024 than in 2023, which was consistent with the results from the previous question. We will wait for a few more years of data to start looking at perceptions of acorn abundance relative to deer hunter success rates.

NEW REGULATIONS

The Youth Deer Hunt, first established in 2002, was expanded from a one-day hunt to a two-day hunt in 2023. The Youth Hunt now takes place on a Friday and Saturday, one week before the regular firearms season opens. During this season, licensed youth hunters may harvest a deer of either sex in designated WMDs. In 2023 and 2024, all WMDs were open to either-sex harvest. The Youth Hunt harvest was 1,040 deer in 2023 and 1,807 in 2024 **(Tables 1 and 2).**

In recent years, MDIFW has revised rules and statutes related to crossbow use so that both bow and arrow and crossbow and bolt are classified as "archery equipment" and legal in any season where archery equipment is allowed. The final change took effect in 2024, when crossbows became legal for the first time during the expanded archery season. Most deer killed during the regular archery season are now taken with crossbows. In 2024, bow and arrow still dominated the expanded archery season, but crossbows are likely to overtake bow and arrow in that season as well. During the regular archery season, hunters harvested 1,631 deer in 2023 and 2,167 in 2024. In the expanded archery season, hunters harvested 1,778 deer in 2023 and 2,397 in 2024 **(Tables 1 and 2).**

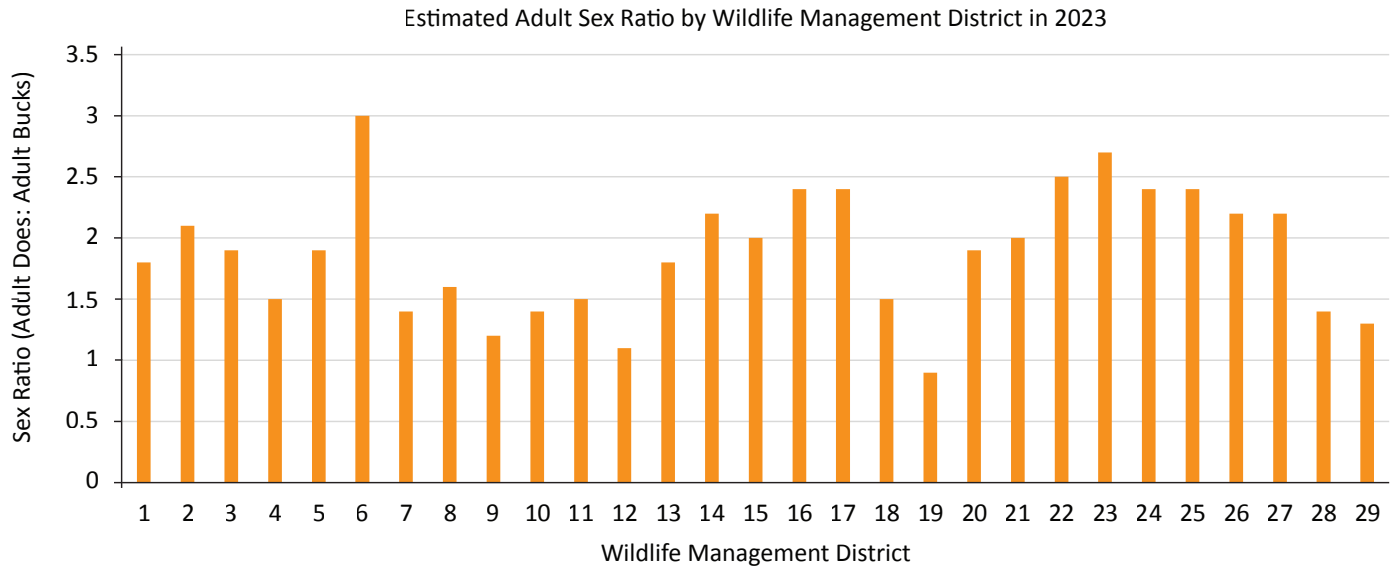
Biological Data

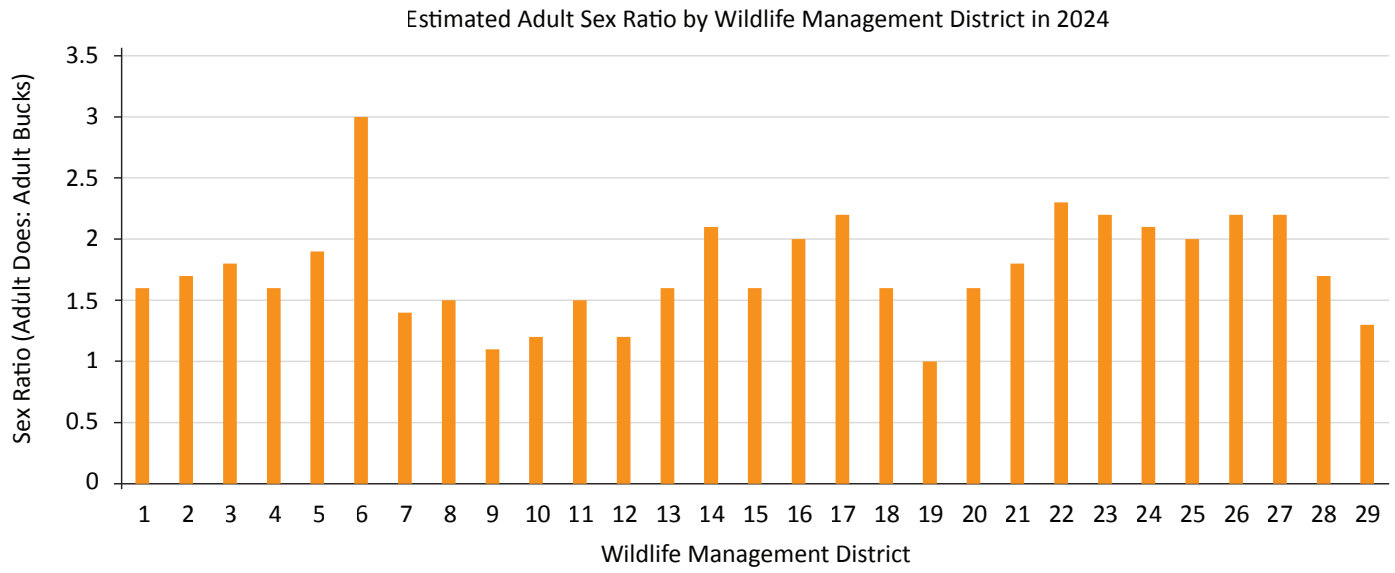
AGE AND SEX STRUCTURE

Age and sex data from harvested deer help us to estimate mortality rates and adult sex ratios, and they are among the most important data we collect each year. During the regular firearms season, trained staff examine harvested deer to classify them as fawns, yearlings, or "adults" (2+ years old). We compare the sex and age determined by our staff examining deer to the sex and age assigned at registration to estimate error rates and adjust harvest totals accordingly.

♂ 2023
2024

FIGURES 2 AND 3. ESTIMATED ADULT SEX RATIOS (ADULT DOES PER ADULT BUCK) IN MAINE, 2023 AND 2024. SEX RATIOS MAY BE MANIPULATED TO ACHIEVE MANAGEMENT GOALS, FOR EXAMPLE, WE AIM TO DECREASE SEX RATIOS IN WMDS WHERE OUR MANAGEMENT GOAL IS TO REDUCE DEER NUMBERS.



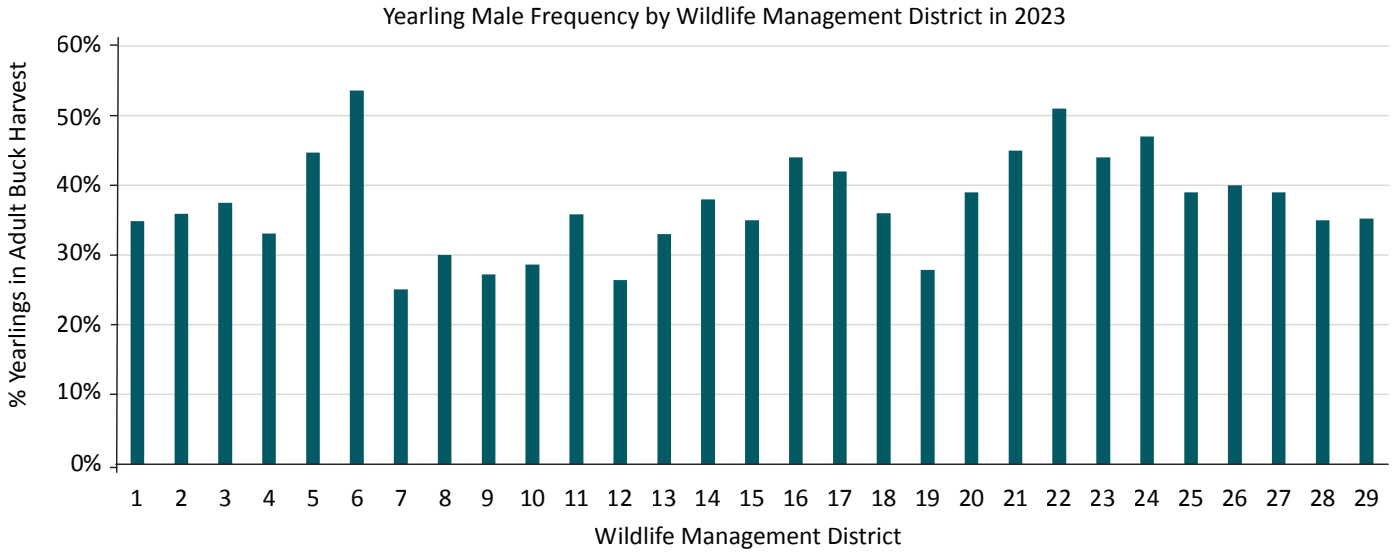


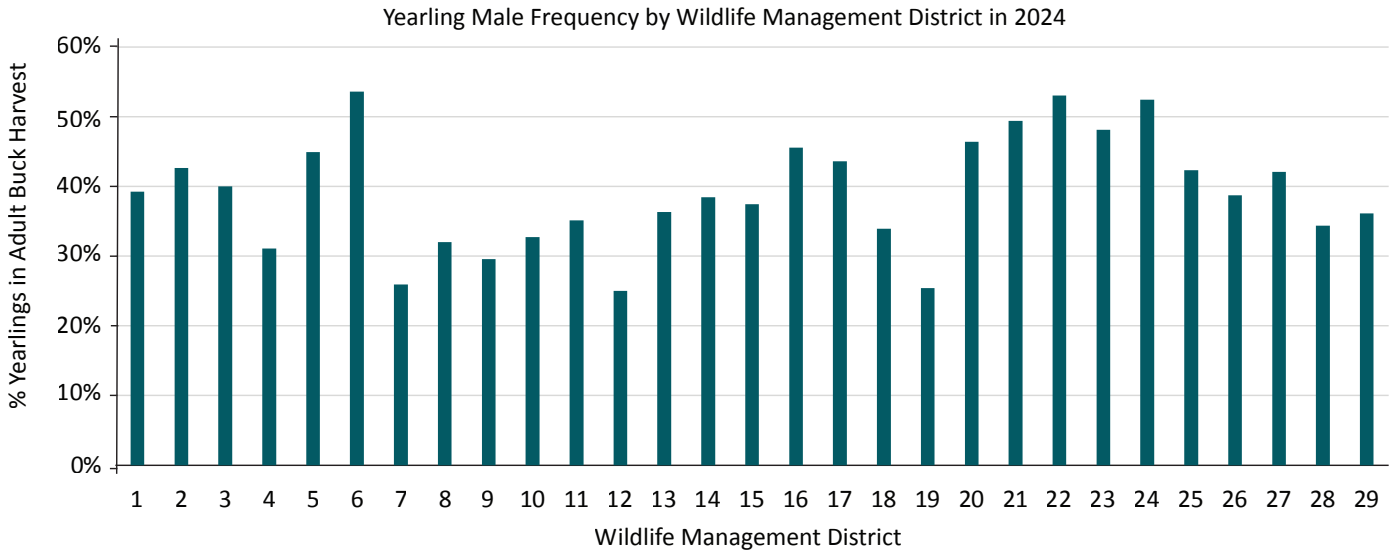
Overall registration error rates were 7.2% in 2023 and 8.3% in 2024, meaning that 7-8% of deer were registered with an incorrect sex or age class. The most common errors were fawns (doe and buck) registered as adult does.

We monitor yearling frequencies to estimate adult sex ratios (the number of adult does per adult buck; **Figures 2 and 3**). To minimize variability caused by weather or other unpredictable factors, we use 7-year running averages to inform management decisions **(Figures 4 and 5)**. This ensures that the values we use track with population changes over time while smoothing out any high single-year variability.

2023
2024

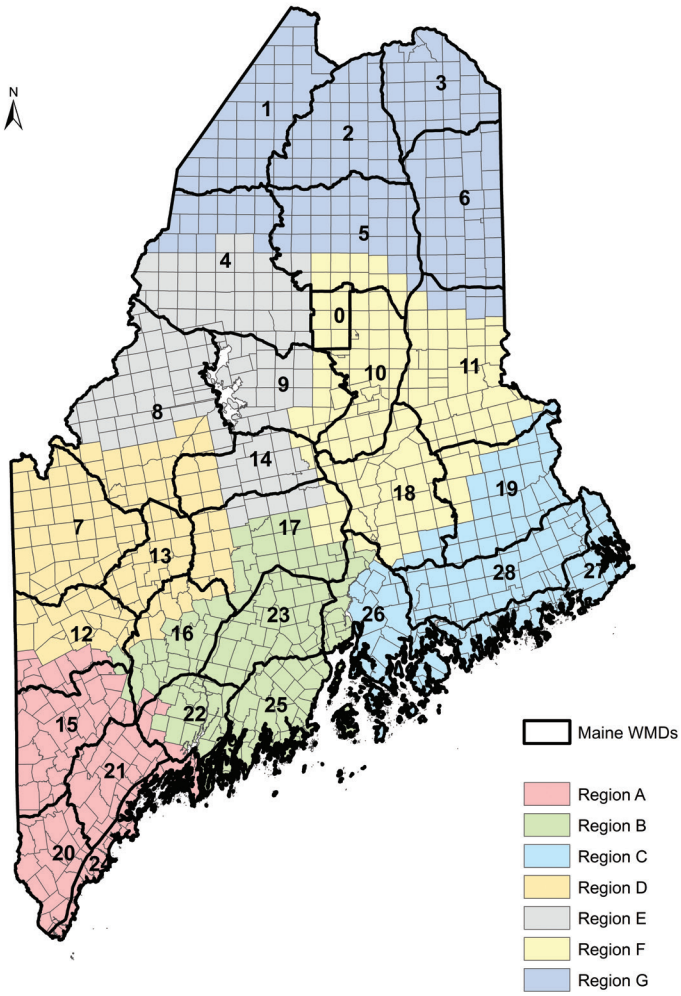
FIGURES 4 AND 5. YEARLING MALE FREQUENCIES USED IN 2023 AND 2024 MANAGEMENT DECISION MAKING. YEARLING FREQUENCIES MAY BE USED TO ESTIMATE MORTALITY RATES. FOR EXAMPLE, A WMD WITH A YEARLING MALE FREQUENCY OF 40% SUGGESTS THAT 40% OF ALL BUCKS ARE LOST IN A YEAR IN THAT WMD.





MDIFW also collects a random sample of incisor teeth each year at the regional scale **(Figure 6)**. These teeth are sent to a laboratory for cementum annuli analysis, which provides insight into advanced age structure and allows us to verify estimated yearling frequencies. These data may be viewed at the end of the annual deer age report on our website at **maine.gov/ifw/hunting-trapping/hunting/harvest-information.**

FIGURE 6. MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE REGIONS.



ANTLER CHARACTERISTICS AND WEIGHTS

Each year, MDIFW collects biological data including dressed weights, antler measurements and characteristics, and yearling antler beam diameters (YABD). These data are collected at registration stations and meat cutters and during house visits.

YABD serves as an index that tells us where a deer population is relative to the habitat's ability to support it (carrying capacity). Higher YABD measurements (>16.8 mm) suggest a higher plane of nutrition and a population below the land's carrying capacity, while lower YABD measurements (<15.5 mm) suggest a lower plane of nutrition and a population closer to or exceeding the land's carrying capacity. Intermediate values (15.5 – 16.8 mm) indicate a population in balance with its habitat. The statewide average YABD was 16.6 mm in 2023 and 17.1 mm in 2024, suggesting that populations are generally below the land's carrying capacity.

In 2023 and 2024, the average adult Maine buck sported 6.8 points with little variation north-to-south. The average yearling buck had 3.0 points in 2023 and 3.2 in 2024.

In 2023 and 2024, adult bucks averaged 150 and 151 pounds, respectively. Yearling bucks averaged 109 pounds in 2023 and 110 in 2024. Adult does averaged 110 pounds in 2023 and 112 in 2024, while yearling does averaged 92 and 95 pounds. Buck fawns dressed at 64 pounds in 2023 and 67 in 2024, and doe fawns averaged 57 and 61 pounds.

Research and Monitoring

WINTER SEVERITY INDEX

Deer winter mortality rates are impacted by weather conditions, so MDIFW has long monitored winter severity to inform permit recommendations, particularly in northern and western Maine. For decades, we monitored winter severity at 26 stations throughout the state to estimate winter mortality rates. After concluding the deer winter mortality study (discussed in the following section) and refining our winter mortality model, we now rely more heavily on remote-sensed data from National Oceanic and Atmospheric Administration (NOAA) weather stations. In the future, we may add cameras at monitoring stations to periodically photograph snow depths on a measuring stake.

The winter of 2023-2024 was rated as "very severe" in zero WMDs and "severe" in one WMD (northern Maine), suggesting above-average winter mortality in just one WMD. It was rated as "moderate" in five WMDs (northern and western Maine), indicating near-average winter mortality, and "mild" in 23 WMDs, suggesting below-average winter mortality. The winter of 2024-2025 was rated as "very severe" in zero WMDs, "severe" in five, "moderate" in two, and "mild" in 22. Statewide, both winters were milder than the long-term average.

DEER WINTER MORTALITY STUDY

Beginning in 2015, MDIFW captured and applied GPS collars to white-tailed deer in four study sites: WMD 1 near Allagash, WMD 5 near the Scraggly Lake Maine Public Reserved Land, and throughout WMDs 6 and 17. The intent of this study was to improve our understanding of how winter severity impacts deer winter mortality rates. Through 2021, we collared 268 unique deer: 61 in WMD 1, 39 in WMD 5, 99 in WMD 6, and 69 in WMD 17. The winter of 2020-21 was the seventh and final capture year. Collar batteries typically lasted 2-2.5 years, and data collection finally wrapped up June 2023.

We examined how climate-related variables influenced winter mortality in adult female deer. These variables included snow depth and sinking depth in both open and closed canopy forests, temperature, number of large snowstorms producing 10" or more of snow, number of days with more than 18" of snow on the ground, number of days below freezing, and number of days with subzero temperatures. We also looked at the effects of living near people, including artificial feeding, possible refuge from predation, and increased mobility and food with cleared roads, trails, and yards.

The model that best explained observed winter mortality rates was the one that considered maximum snow depth in closed canopy forest and influences of living around humans. Specifically, deeper snow in closed canopy forests led to higher mortality rates, and wintering near people led to slightly lower mortality.

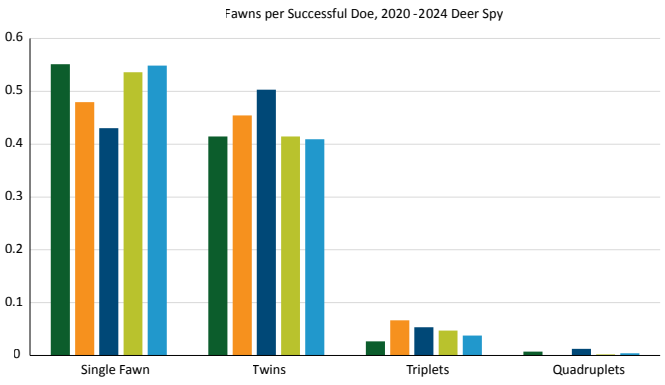
COMMUNITY SCIENCE

In 2020, MDIFW launched a community science project called "Maine Deer Spy" to gather observation data from Mainers. In its first iteration, the project collected summer deer observations to help us estimate recruitment (the number of fawns that survive to independence and are recruited into the fall population). In 2023, we added a second project, "Rut Watch," which was a fall survey of breeding season behaviors. In 2024, we launched "The Northern Maine Wintering Deer Survey" to collect winter deer observations and support deer wintering habitat management and conservation in northern Maine.

Estimated statewide recruitment was 0.75 fawns per doe in 2023 and 0.78 in 2024. The 2023 estimate was the lowest seen in the project's five years, owing largely to very cold and wet conditions during peak fawning season. More typical spring conditions throughout the 2024 fawning season led to slightly higher recruitment, which was nearer to average. In 2023, 52% of does successfully raised fawns until the fall; in 2024, that figure rose to 56%. The number of does successfully raising single fawns, twins, triplets, or quadruplets was similar both years **(Figure 7).**

Photo by Mike Benjamin, Bowdoinham, ME

FIGURE 7. NUMBER OF FAWNS RAISED PER SUCCESSFUL DOE, 2020-2024. DATA FROM COMMUNITY SCIENTIST OBSERVATIONS OF DOE-FAWN GROUPS IN LATE SUMMER.



The Rut Watch survey gathered 556 observations from 2023 and 2024 with some observations reported in every WMD. There were 40 observations of breeding taking place, 80 of sparring, and many of rubs and scrapes. Direct observations of breeding provide insight into conception dates, which gives us some idea of rut intensity and peak timing. By extrapolation, we can then estimate the timing of fawn birthing. The peak of conceptions (peak breeding or peak rut) occurs around the 3rd to 4th week of November, which means the peak of fawn birthing occurs around the 2nd week of June.

The Northern Maine Wintering Deer Survey gathered 221 usable data points in its first season. Ahead of the season, we promoted the project to outdoor recreationists, sled clubs, foresters, and others likely to spend significant time outdoors in the winter. The purpose of this survey is to identify wintering deer populations that we are not already aware of and inform efforts to protect deer wintering habitat.

Health and Diseases

CHRONIC WASTING DISEASE

Chronic wasting disease (CWD) is an always-fatal brain disease that impacts cervids such as white-tailed deer, mule deer, caribou, moose, and elk. CWD has been found in 36 U.S. states and five Canadian provinces as well as Finland, Norway, Sweden, and South Korea, but it has not yet been found in Maine. CWD can persist in the environment outside of a host for many years, and plants can uptake the disease agent and subsequently become a potential disease vector. Recent studies also suggest that ticks, bot flies, and perhaps other parasites may ingest and excrete infectious prions after feeding on infected deer.

The nearest state or province where CWD is found in wild cervids is Pennsylvania. While CWD was found at a captive deer facility in New York in 2024, it has not yet been found in wild deer following that detection.

MDIFW has monitored white-tailed deer for CWD since 1999, during which time we have screened over 14,300 wild deer. In 2023, we collected 500 samples from white-tailed deer for lab testing, all of which tested negative. In 2024, we collected 499 samples, all of which also tested negative.

As a precaution, MDIFW does not translocate deer from other states into Maine, and we prohibit the transportation of unprocessed deer carcasses or parts into Maine from any state or province except New Hampshire. MDIFW has also drafted a CWD Response Plan outlining steps and protocols to follow if CWD is found in Maine or an adjacent jurisdiction.

You can help prevent the introduction of CWD into Maine, or limit its spread if found:

- **Prevent the spread:** If you feed deer, keep feeding sites small and spread out on the landscape, and rotate them periodically. Consider using synthetic deer lures instead of natural deer urine lures. Know and follow state laws and rules around carcass processing, transportation, and disposal
- **Report the signs:** Contact your regional wildlife biologist or warden if a deer shows clinical signs of illness, such as loss of fear of humans, excessive drooling or urinating, loss of coordination, and excessive weight loss.
- **Protect yourself:** Although there is currently no evidence that CWD can be transferred to humans, similar diseases do exist in humans, and CWD has been transmitted to primates in a laboratory setting. When processing a harvested deer, take precautions such as using latex gloves and sterilizing your equipment afterward with a 50/50 bleach-and-water solution. Also, avoid consuming the brain and spinal tissues.

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

PFAS are human-made chemicals that are resistant to heat, water, and oil. For decades, PFAS have been used in industrial applications and consumer products such as carpeting, waterproof clothing, upholstery, food wrappings, personal care products, fire-fighting foams, and metal plating. Long-term human exposure to PFAS chemicals may negatively impact cholesterol levels, liver enzyme chemistry, and immune response, and may lead to higher incidences of certain cancers.

In November 2021, MDIFW and the Maine Center for Disease Control and Prevention (MECDC) issued a "Do Not Eat" advisory for deer taken in the greater Fairfield, Maine area. A "Do Not Eat" advisory is a recommendation to not eat game harvested within a specified area in response to a possible health concern. We issued the advisory due to high levels of a PFAS chemical known as PFOS (perfluorooctane sulfonic acid) found in five of eight deer collected in Fairfield near fields known to have high PFOS soil and surface water levels. After testing 60 additional deer and 51 turkeys, the advisory area was reduced in scope from 125 to 25 mi^2, and wild turkeys were added to the consumption advisory. In 2024, two additional areas were added: a 5.5 mi^2 zone near Unity and a 4.3 mi^2 zone near Albion and Freedom. For more information, see **maine.gov/ifw/hunting-trapping/hunting/laws-rules/pfas-related-consumption-advisory.**

DEER HEALTH NOTES

MDIFW collects reports of deer exhibiting signs of illness, injury, or unusual characteristics. If you see deer with conditions such as noteworthy hair loss, abnormal growths, behavior, or coloration, or injuries, please report these sightings and the town of observation to your nearest MDIFW regional office. Try to take and provide photos. While most cases require no management response, these reports are valuable for documenting trends and creating case histories. For more information about common deer diseases in Maine, visit **maine.gov/ifw/fish-wildlife/wildlife/living-with-wildlife/diseases/index.html.**

Management Notes

DEER MANAGEMENT SUBUNITS

While most deer management takes place at the wildlife management district (WMD) level, the Department occasionally designates deer management subunits in areas with high deer-human conflict. These subunits consist of towns that rank among the highest in terms of deer conflicts statewide, including Lyme Disease prevalence, nuisance deer complaints, and deer-vehicle collisions. To reduce deer densities and conflicts with people, we issue additional antlerless deer permits in these areas.

Deer management subunit 25a, consisting of Georgetown and Arrowsic, was removed after the 2023 hunting season as those towns were no longer identified as priority areas and because permit allocations in WMD 25 were already high enough that 25a permits had little added effect. Deer management subunit 26a remains in place, covering all or portions of the high-conflict towns of Brewer, Bucksport, Castine, Dedham, Holden, Orland, Orrington, Penobscot, and Verona.

DEER MANAGEMENT ASSISTANCE PROGRAM

In 2023, MDIFW began development of a Deer Management Assistance Program (DMAP). DMAPs are very flexible programs that address deer management goals at scales as small as a parcel or property. The Maine DMAP will initially focus on assisting landowners who are experiencing deer conflicts, specifically commercial crop, orchard, and nursery tree growers. A DMAP webpage is in development to guide landowners on steps they can take to take to alleviate deer conflicts.

Beginning in 2025, DMAP permits will be issued to remove additional antlerless deer from specific properties during the regulated hunting seasons. In some situations, assistance with fencing and deterrents may also be available. Funding assistance (e.g., cost-share or lease-to-own programs) may be provided through our partners and the Maine Deer Management Fund using a portion of the registration fee from each deer registered by hunters in Maine.

Other Updates

NORTHEAST DEER TECHNICAL COMMITTEE

Every year, deer biologists from northeastern states and eastern Canadian provinces meet to compare notes, discuss issues facing deer management, and catch up on recent research. This meeting of the Northeast Deer Technical Committee is held in a different location each year, rotating between participating jurisdictions on a ~15-year cycle. In 2023, the Schoodic Institute in Winter Harbor hosted 23 deer managers for three full days, with others attending portions of the meeting. It was the first time the event had taken place in Maine since 1999.

This work is supported by the federal Pittman-Robertson program, state revenues from the sales of hunting licenses, and volunteer assistance.

MOOSE

Lee Kantar
State Moose Biologist

Photo by Hunting ME

Moose are among Maine's most iconic and sought-after game species, highly valued by residents and visitors alike. Moose densities in Maine are some of the highest in the lower 48 states. Along with northern New Brunswick and southern Quebec, Maine remains a stronghold for the species.

While moose can be found throughout the state, hunting is limited to 20 of Maine's 29 Wildlife Management Districts (WMDs), with permits allocated by a lottery system. Moose management is guided by the 2017 Big Game Management Plan, which outlines goals and objectives for sustaining healthy moose populations for hunting and viewing.

2023 and 2024 Harvest Information

SEASON DATES AND STRUCTURE

Maine offers three traditional six-day moose hunts:

- **September Bull**
  WMDs 1-6, 10, 11, 19, and 27/28
- **October Bull**
  WMDs 1-15, 17, 19, and 27/28
- **October Antlerless (adult cow and calf)**
  WMDs 1-6 and 8

In 2021, the Department launched an experimental five-year Adaptive Hunt with three separate six-day hunt segments in portions of WMD 4.

MOOSE HUNT DATES FOR 2025

- **September Bull**
  Sep 22-27
  WMDs 1-6, 10,11,19, and 27/28
- **October Bull**
  Oct 13-18
  WMDs 1-15, 17-19, and 27/28
- **October Antlerless**
  Oct 27-Nov 1
  WMDs 1-6 and 8
- **Adaptive Hunt**
  Three six-day segments over three consecutive weeks starting Oct 20 in portions of WMD 4.

Photo by Hunting ME

PERMIT ALLOCATION

MDIFW awards Moose permits annually through a random lottery, with 90% of permits allotted to Maine Residents, 8% to non-residents, and 2% to qualifying outfitters. The Department can adjust each WMD's permit numbers annually based on district-specific goals and objectives. In 2023 and 2024, permit levels remained unchanged **(Table 1)**.

2023 AND 2024 ANNUAL HARVEST STATISTICS AND TRENDS

Hunters took 1,836 antlered bulls during the 2024 season — 153 more (+9%) than the 2023 total of 1,683. In both years, biologists aged more than 1,600 moose by counting cementum annuli on extracted teeth.

Annual harvest numbers vary by season, WMD, and year, and are heavily influenced by temperature, with cooler, seasonable weather typically increasing success rates and harvest in many districts.

In 2024, the statewide harvest of adult cows (yearling and older) was 643, compared to 659 in 2023. Hunters also harvested 116 calves in 2024 (53 males and 63 females), for a total of 759 antlerless moose, including those taken during the Adaptive Moose Hunt. In 2023, the calf harvest totaled (35 males and 45 females), with 739 total antlerless moose taken.

Harvests by season and WMD are reported in **Table 1**.

HUNTER PARTICIPATION

In 2024, 3,712 residents and 393 nonresidents won moose permits, compared to 3,782 residents and 378 nonresidents in 2023. In 2024, out-of-state hunters came from 43 states (as far away as Alaska), compared to 39 states in 2023. In both years, one Canadian province was represented. Pennsylvania accounted for the largest share of out-of-state hunters in 2024 (14%), while New York led in 2023 (10%).

Overall hunter success rates held steady at 64% in both years. Although nonresidents received only 8% of total permits, most succeeded in their hunt (90% in 2024 and 89% in 2023). This high success rate, compared to that of residents (62% both years), may be due to nonresident hunters' greater use of registered Maine Guides. Nonresident success rates over the past 10 years have held around 80%.

Weather conditions in September and October 2023 and 2024 were good, with cool early Septembers likely contributing to higher success rates (unseasonably warm conditions typically lead to lower success).

SURVEYS

In 2024, the Maine Fish and Wildlife Joint Standing Committee directed MDIFW to convene a stakeholder group to evaluate moose season timing and length. As a result, the Department partnered with Responsive Management Inc. to conduct a public survey and engage a broader range of stakeholders.

Overall, most survey respondents supported the current season length and timing, with few reporting any conflicts with others when working or recreating in northern, western, or eastern Maine during moose season. The survey also revealed greater than expected support for adding a September moose season in western Maine, including the Moosehead Lake Region. Full survey results are available at **maine.gov/ifw/docs/Attitudes%20Toward%20Moose%20Management%20in%20Maine.pdf.**

NEW REGULATIONS

Since 2023, moose hunters with permits for WMDs 7 or 13, 12 or 15, 14 or 17, and 27 or 28 have been allowed to hunt in either of the two adjacent districts. The Department adopted this regulation to create larger moose hunting zones and thereby expand opportunity along the southern periphery of Maine's moose range, where densities are lower.

2023 & 2024

2023 AND 2024 MAINE MOOSE SEASON REGISTERED KILL BY WMD, SEASON, PERMIT TYPE, AND SUCCESS RATES.

				2023 REGISTRATIONS		2024 REGISTRATIONS	
WMD	SEASON	PERMIT TYPE	# OF PERMITS	KILL	SUCCESS RATE	KILL	SUCCESS RATE
1	SEP	BOP	225	161	72%	154	68%
	OCT	BOP	225	117	52%	150	67%
	2nd OCT	AOP	175	136	78%	132	75%
	*WMD Subtotals		625	414	66%	436	70%
2	SEP	BOP	175	121	69%	119	68%
	OCT	BOP	175	106	61%	122	70%
	2nd OCT	AOP	175	125	71%	128	73%
	*WMD Subtotals		525	352	67%	369	70%
3	SEP	BOP	100	74	74%	72	72%
	OCT	BOP	100	60	60%	62	62%
	2nd OCT	AOP	125	84	67%	76	61%
	*WMD Subtotals		325	218	67%	210	65%
4	SEP	BOP	200	144	72%	140	70%
	OCT	BOP	200	87	44%	124	62%
	2nd OCT	AOP	100	43	43%	47	47%
	*WMD Subtotals		500	274	55%	311	62%
4a	OCT 1	AOP	172	57	33%	81	44%
	OCT 2	AOP	134	50	37%	47	36%
	OCT 3	AOP	176	35	20%	50	29%
	*WMD Subtotals		482	156	32%	178	36%
5	SEP	BOP	125	101	81%	110	88%
	OCT	BOP	125	79	63%	96	77%
	2nd OCT	AOP	125	79	63%	87	70%
	*WMD Subtotals		375	259	69%	293	78%
6	SEP	BOP	100	78	78%	70	70%
	OCT	BOP	100	49	49%	75	75%
	2nd OCT	AOP	60	50	83%	46	77%
	*WMD Subtotals		260	177	68%	191	73%
7	OCT	BOP	125	98	78%	92	74%
	*WMD Subtotals		125	98	78%	92	74%
8	OCT	BOP	200	120	60%	128	64%
	2nd OCT	AOP	150	96	64%	89	59%
	*WMD Subtotals		350	216	62%	217	62%
9	OCT	BOP	125	76	61%	88	70%
	WMD SUBTOTALS		125	76	61%	88	70%
10	SEP	BOP	30	20	67%	23	77%
	OCT	BOP	30	19	63%	18	60%
	*WMD Subtotals		60	39	65%	41	68%
11	SEP	BOP	25	21	84%	22	88%
	OCT	BOP	25	18	72%	17	68%
	*WMD Subtotals		50	39	78%	39	78%
12	OCT	BOP	25	15	60%	22	88%
	*WMD Subtotals		25	15	60%	22	88%
13	OCT	BOP	15	1	7%	1	7%
	*WMD Subtotals		15	1	7%	1	7%
14	OCT	BOP	30	23	77%	22	73%
	WMD Subtotals		30	23	77%	22	73%
15	OCT	BOP		1	NA	2	NA
	WMD Subtotals		15	1	7%	2	13%
17	OCT	BOP	10	0	0%	0	0%
	WMD Subtotals		10	0	0%	0	0%
18	SEP	BOP	20	12	60%	15	75%
	OCT	BOP	20	10	50%	11	55%
	*WMD Subtotals		40	22	55%	26	65%
19	SEP	BOP	30	21	70%	22	73%
	OCT	BOP	30	16	53%	15	50%
	*WMD Subtotals		60	37	62%	37	62%
27/28	SEP	BOP	20	10	50%	14	70%
	OCT	BOP	20	7	35%	6	30%
	WMD Subtotals		40	17	43%	20	50%
	WMD TOTALS		4,037	2,434	64%	2,595	64%

**In 2023 hunters were allowed to return for a 4th week if they had not filled their tag.*

BOP = Bull Only Permit – The holder may kill one male moose of any age.

AOP = The holder may kill a cow or a calf (male or female); by definition an antlerless moose is a moose without antlers.

AMP = Any Moose Permit – The holder may kill any moose.

**Does not include additions to total permit allocation through deferment, hunt of a lifetime, and auction.*

Biological Data From Harvest

SEX AND AGE DISTRIBUTION OF BULLS

In 2024 and 2023, we collected age data from 88% of harvested bulls. Most were between 4½ and 18½ years old, with ages distributed as follows:

- **1½ years old**
  (yearlings sporting their first set of antlers)
  16.5% (266) in 2024; 9.5% (139) in 2023
- **2½ years old**
  22% (359) in 2024; 21% (306) in 2023
- **3½ years old**
  16% (256) in 2024; 22% (318) in 2023
- **Mature bulls (4½ to 18½ years)**
  45% (726) in 2024, 48% (700) in 2023

WEIGHT OF BULLS

Each year during the rut (September to October), breeding bulls lose about 15% of their body mass. In 2024, this translated to a 9.5% decrease in average dressed weights between seasons: 726 lbs. in September vs. 657 lbs. in October. In 2023, weights dropped 7% between seasons, from 745 lbs. in September to 695 lbs. in October. The sharper decline in 2024 is likely explained by a longer gap between seasons that year (two weeks, compared to just one week in 2023).

The heaviest bull in 2024 weighed 1,043 pounds field dressed (no digestive tract, heart, lungs, or liver). He was 7½ years old and was harvested in WMD 4 during the September season. In 2023, the heaviest bull was 1,031 pounds. He was 8 ½ years old and was harvested in WMD 2 during the September season.

Photo by Hunting ME

Photo by Hunting ME

ANTLER STATS

Every year at registration stations, hunters and the public alike stop in to see the harvested bulls, and people always enjoy seeing the wide array of antler sizes and shapes.

Antler spread, number of points, and palmation typically increase with age.

In 2024, the largest antler spread measured 66.5 inches with 10 legal points. The bull was 6½ years old and harvested in WMD 7. In 2023, the distinction went to a 9.5-year-old bull with a 64-inch antler spread and 12 points, harvested in WMD 4.

In 2024, 22% of the antlered bulls sported cervicorn antlers (antlers without a defined palm). Of these, 50% were yearlings and 13% were mature bulls (over 4 years old). The oldest was 16½ years old. In 2023, 16% of the antlered bulls were cervicorn, 57% being yearlings, and only 7% being mature. The oldest was 12.5 years old.

Cervicorn antlers are typical of younger animals, who in most cases develop more palmate antlers as they age.

MOOSE REPRODUCTIVE DATA

Antlerless permits during the second October season allow MDIFW to collect critical reproductive data for assessing and monitoring moose population health and growth. In 2024, hunters in WMDs 1-6 and 8 removed and brought in 210 sets of moose ovaries for examination by biological staff. In 2023, they submitted 218.

Typically, moose cows do not become pregnant until 2½ years old. At that age, fertility and the number of offspring depend upon body weight and condition – factors influenced strongly by diseases and parasites like the winter tick.

Of the cows examined in 2024, 93% of those older than 2½ years were pregnant, compared to 88% in 2023.

MDIFW biologists can forecast a cow's reproduction rates by looking at corpora lutea, which are structures in the ovaries that indicate ovulation and potential pregnancy. In 2024, cows older than 2½ years had an average of 0.91 corpora lutea each, down from 1.01 in 2023. This translates to 91 calves born to 100 cows in 2024, versus 101 calves per 100 cows the previous year.

These rates fluctuate each year, due in part to varied winter tick infestation severity. We continue to evaluate how winter ticks impact moose fitness, including their role in depressed reproductive rates.

Photo by Hunting ME

Research and Monitoring

Maine's moose are monitored year-round in many ways, including GPS collaring to track movements and mortality, rotary aircraft surveys to classify bulls, cows, and calves, harvest data evaluation, and multi-year research partnerships with the organizations below:

In Progress

ADAPTIVE HUNT EVALUATION - MDIFW

Now in its fourth year, the Adaptive Hunt is a five-year experimental program designed to test whether targeted harvests can lower moose densities, reduce winter tick infestations, and improve yearling survival. Each January, biologists GPS-collar 72 calves to monitor their survival and movements. Summary and analysis are expected in early 2026.

Remote Camera Monitoring
Northeast Wildlife Monitoring Network (Alexej Siren)

Launched in 2021, this project established an 80-camera array in a WMD 4 aerial survey area to assess whether cameras could be an effective technique for estimating moose abundance and bull, cow, and calf composition, potentially replacing more costly and hazardous aerial surveys. The study has captured thousands of moose images, with very high detection and identification rates. Researchers are working with the University of New Hampshire to tag the photos, analyze occupancy, and compare the results to those of traditional aerial surveys.

Winter Tick Range Expansion
University of New Brunswick-Fredericton and Laval University (Doug Munn)

This study focuses on the movement and dispersal patterns of juvenile winter-tick-parasitized moose, with the goal of learning whether winter ticks are expanding their range.

Moose Parasite Prevalence and Immune Response
University of Maine Orono (Alaina Woods, Ph.D. student)

This project, in partnership with the Moose Health Monitoring Lab at UMaine Orono, investigates the prevalence and distribution of parasitic infections in Maine moose. Preliminary results show a low (<10%) prevalence and distribution of meningeal worm (P. tenuis) and a slightly elevated presence (<30%) of Anaplasma spp., with higher rates of Anaplasma infection in bulls than cows. Genetic markers suggest winter tick parasitism may influence moose population genetic diversity and provide evidence for the evolution of immune responses to winter tick.

Completed

Habitat Use and Winter Tick Load
University of Maine Orono (Annie Oviedo Stupik)

As part of her master's research, Stupik examined how landscape characteristics influence moose habitat use, winter tick loads, and survival. She found that moose concentrate their space use in optimal habitat and overlap less in areas with more hardwood, likely due to habitat preferences during the leaf-off season.

Human Dimensions Survey on Moose Management
University of Maine Orono (Alyssa Soucy, Ecology and Environmental Science)

This survey elicited respondents' personal experiences and perceptions of moose in Maine. The survey population expressed deep concerns about the changes to Maine's moose population, with many perceiving a decline and wanting to see more moose on the landscape. Participants' understanding of the issue often reflected their own varied experiences in Maine, including ideas around ticks.

Winter Habitat Selection and Climate
University of Maine Orono (Asha Dimatteo-LePape)

Published in Alces, this study used GPS-collared moose to explore how winter habitat selection responds to winter conditions. It found a slight positive habitat association with regenerating forest, but high levels of variance indicated a weak relationship. And contrary to predictions, weather conditions had no detected influence on winter habitat selection, suggesting that Maine's mosaic of forest types and commercial forestry provide adequate food and cover for moose regardless of winter conditions.

Photo by Hunting ME

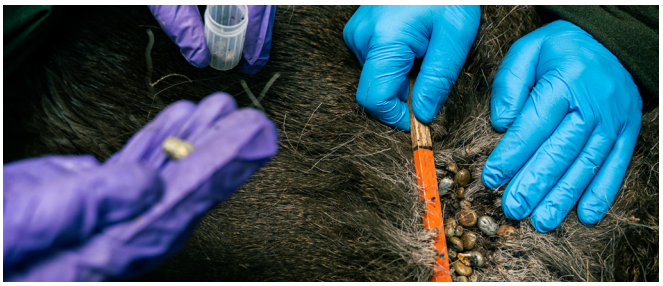


Photo by Hunting ME

Health and Disease

IFW monitors and researches diseases and parasites in Maine's moose population to inform management and meet population goals and objectives. This includes:

- **Seven-year GPS collar study (2014-2020):** Findings from this study, which tracked adult cow and calf mortality, informed development of the experimental Adaptive Hunt in a portion of WMD 4.
- **Five-year Adaptive Hunt in WMD 4 (2020-2026):** This project aimed to test whether lowering moose numbers in half of WMD 4 could break the winter tick cycle and/or improve overwinter calf survival. MDIFW is evaluating harvest and calf survival data to see if the approach was effective.
- **Opportunistic sampling of compromised (sick) moose:** MDIFW collects biological data from moose reported by the public, game wardens, and biologists as appearing sick. The number of reports, and whether the moose at hand is found dead or alive, can give us insights into the population's overall health.
- **Winter tick counts during the October bull hunt:** Biologists collect ticks from harvested moose to monitor infestation levels over time and predict spring overwinter calf mortality.
- **Continued collaboration with the University of Maine at Orono**

Management

Several recent graduate projects at the University of Maine, Orono have explored moose management and public attitudes. In addition, Responsive Management, Inc. completed its survey for the Legislative Inland Fisheries and Wildlife Joint Standing Committee's Moose Stakeholder group in early 2025. These documents will be important over the next year as we begin the process of reviewing the Big Game Management Plans for moose, deer, bear, and wild turkey.

Other Updates

In summer 2025, the Department, in conjunction with HuntingME, will release a film titled *Guardian of the Giants* about Maine's moose research and management efforts.

This work is supported by the federal Pittman-Robertson program, state revenues from the sales of hunting licenses, and volunteer assistance.

BLACK BEAR

Caitlin Drasher
State Black Bear Biologist

The Maine black bear is an iconic symbol of Maine's forests and one of our wildlife success stories. Once relegated to no more than a nuisance, the black bear has risen in stature to one of our state's most valued animals—by wildlife watchers and hunters alike.

Today, Maine's expansive northern, eastern, and western forests support one of the largest black bear populations in the lower 48 states, estimated at around 25,000 bears **(Figure 1).** Despite this large bear population, human-bear conflicts have remained low compared to other northeastern states. MDIFW manages the bear population through regulated harvest, including seasons for hunting over bait, hunting with dogs, trapping, and still/spot/stalk methods. MDIFW strives to balance biological and social needs, using data collected from hunters, trappers, and MDIFW's long-term monitoring study of radiocollared bears (initiated in 1975) to guide management decisions.

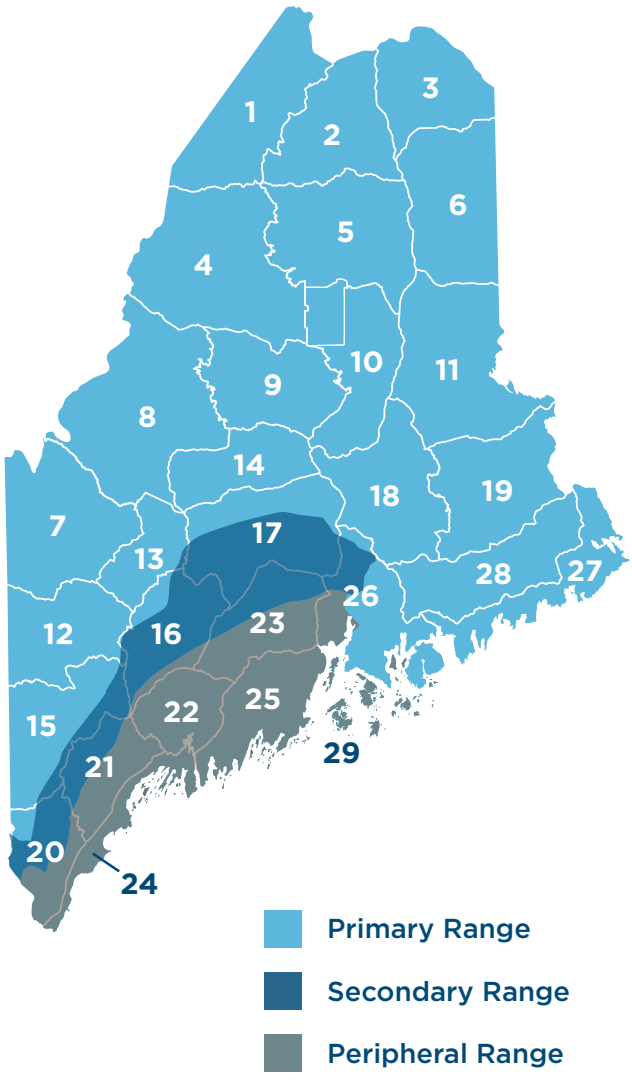
Bi-Annual Harvest Information

SEASON DATES AND STRUCTURE

MDIFW's black bear management approach includes setting the season length, bag limits, and legal harvest methods. In addition to a hunting license, hunters (except for resident deer hunters during the firearm season) must purchase a bear permit and register any harvested bears. The Department uses bear registration data to monitor harvest levels and adjust regulations as needed.

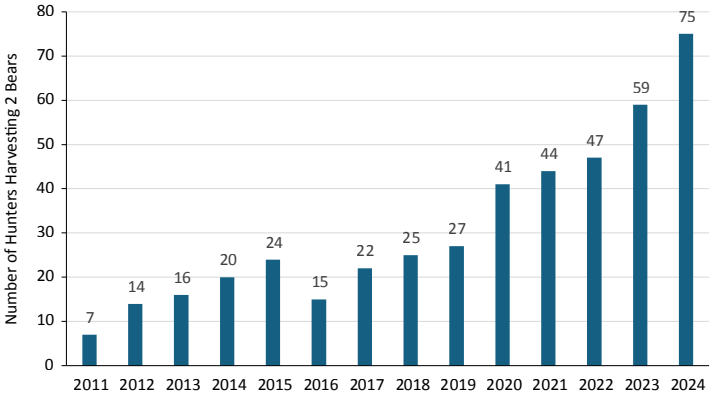
The black bear hunting season runs from the last Monday in August through the last Saturday in November and is restricted to certain hunting methods during certain weeks. In 2023, hunting over bait was allowed from Aug. 28-Sept. 23; and in 2024, it was allowed from Aug. 26-Sept. 21. The hound (trained bear dogs) season overlapped with the last two weeks of the bait season, spanning Sept. 11 to Oct. 27, 2023, and Sept. 9 to Nov. 1, 2024. Trapping season opened Sept. 1 and closed Oct. 31 each year. Hunters could also hunt bears near natural food sources or by still-hunting throughout the entire three-month season.

FIGURE 1. MAINE BLACK BEAR RANGE



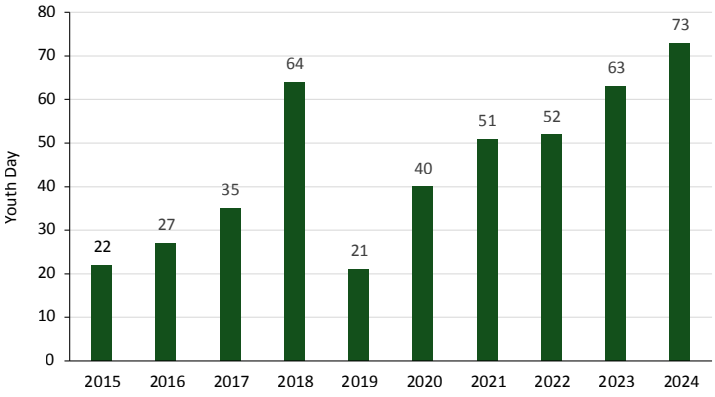
Since 2011, properly licensed individuals have been allowed to harvest two bears a year if one is taken by hunting and the other by trapping. While only a small proportion of hunters and trappers take advantage of this opportunity, interest in bear trapping has risen in recent years. In 2023, 59 hunters harvested two bears, and in 2024, the number increased to 75 – more than any previous year **(Figure 2).**

FIGURE 2. SINCE 2011, PROPERLY LICENSED INDIVIDUALS CAN HARVEST TWO BEARS IF ONE IS TAKEN WHILE HUNTING AND THE OTHER WHILE TRAPPING. ***In 2023, 59 hunters harvested two bears; in 2024, 75 hunters harvested two bears.***



Since 2015, the Saturday before opening day has been designated for youth hunters. The 2023 youth day harvest was 63 bears; and in 2024, Maine's young hunters set a new record of 73 bears **(Figure 3).**

FIGURE 3. SINCE 2015, YOUTH HUNTERS CAN HUNT BLACK BEARS THE SATURDAY BEFORE OPENING DAY OF THE BEAR SEASON. ***In 2023, 63 youth hunters harvested a bear on youth day, and in 2024, 73 youth hunters harvested a bear on youth day.***



BEAR HUNTING ANNUAL HARVEST

Although many factors, including weather and hunter numbers, influence the black bear harvest, natural food levels tend to play a large role. Natural foods generally alternate in abundance from one year to the next. In a good food year, bears show less interest in bait sites and forage for plentiful natural foods through late fall. In a poor food year, bears show greater interest in bait and enter their winter dens early to conserve their limited fat reserves.

As a result, harvest with the use of bait is typically higher in poor food years and lower in good food years, while harvest by deer hunters during the November firearm season is typically lower in poor food years and higher in good food years **(Figure 4 and Figure 5).**

We expected 2023 to be a good natural food year, leading to a lower bait hunter (and therefore, lower overall) harvest, and expected 2024 to be a poor natural food year, leading to a higher harvest over bait (and higher overall harvest). Harvest numbers aligned with these predictions, with 3,272 bears harvested in 2023 and 3,791 in 2024. Hunter participation numbers were high both years, with over 13,100 hunters pursuing bear in 2023 and more than 12,900 in 2024.

We attribute the recent increases in participation and total harvest (regardless of good or bad food year) to a broader increased interest in outdoor pursuits that began during the pandemic and has continued to date.

FIGURE 4. HARVEST ALTERNATES WITH NATURAL FOODS.
Typically, a good food year is followed by a poor food year.

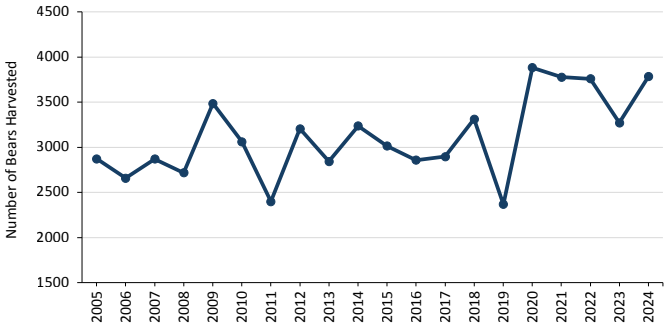
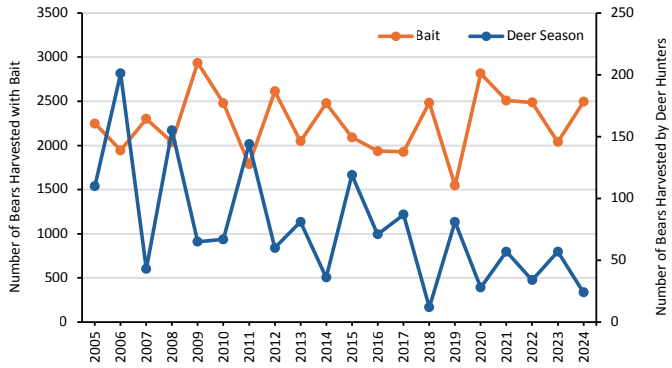


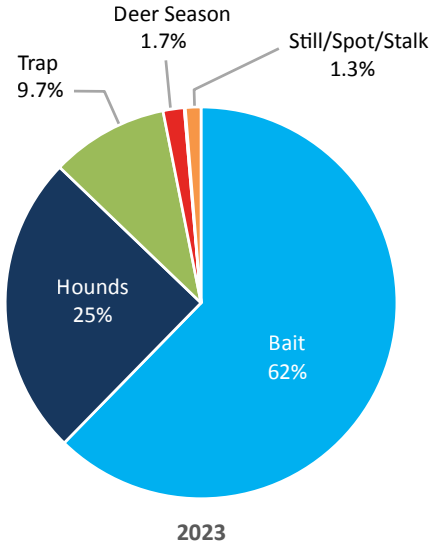
FIGURE 5. IN POOR FOOD YEARS, HARVEST BY BEAR HUNTERS USING BAIT IS HIGH AND HARVEST OF BEARS BY DEER HUNTERS IS LOW.



During the 2023 and 2024 seasons, most bears were harvested with bait: 2,039 bears (62% of the total) in 2023 and 2,494 (66%) in 2024. Hunting with trained dogs accounted for ~25% of the total both years (813 bears in 2023 and 916 in 2024). And trapper harvest reached a record high of 318 bears in 2023 and dropped just slightly to 312 in 2024. Meanwhile, bear harvest during the November firearm deer season remained low, at 57 bears in 2023 and less than half that number (24) in 2024. We attribute that dip to the influence of natural food availability on bear den entrance dates **(Table 1-2 and Figure 6).**

In Maine, hunters harvest most bears (>90%) over bait or with trained bear dogs. Prior to 2012, hunters took roughly 80% of bears over bait and 10% using dogs. Since 2013, bait has remained the prominent method of harvest, but a higher proportion (16-25%) of bears have been harvested every year using trained bear dogs. From 2013-2015, hunters harvested 16-17% of bears with trained dogs; and since 2016, that number has risen to 20-25% of the total harvest annually. This likely reflects greater interest following the 2014 bear hunting referendum which, if passed, would have made hunting bears with bait, trained bear dogs, or traps illegal in Maine. Interest in bear trapping also rose following both the 2004 and 2014 bear referendums **(Figure 7).** Notably, the low trapping harvest in 2018 was due to an emergency rule limiting the types of allowable bear traps, not a change in interest. Bear trapping interest has continued to grow following the pandemic years, and since 2022 when MDIFW developed a bear-specific online trapping education course and reduced license requirements and fees.

FIGURE 6. MOST BEARS IN MAINE CONTINUE TO BE HARVESTED WITH BAIT AND HOUNDS (TRAINED BEAR DOGS).



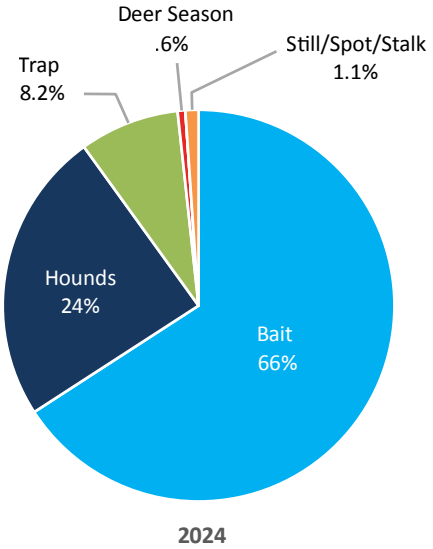
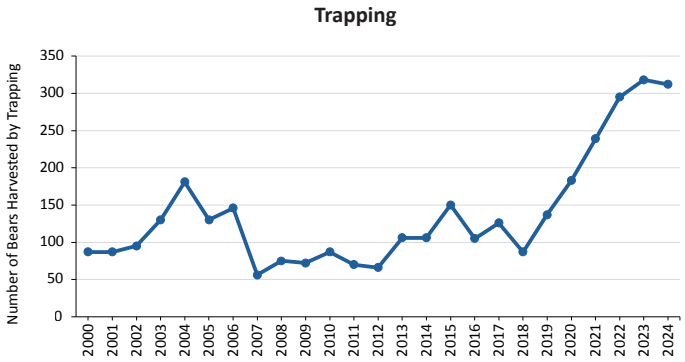
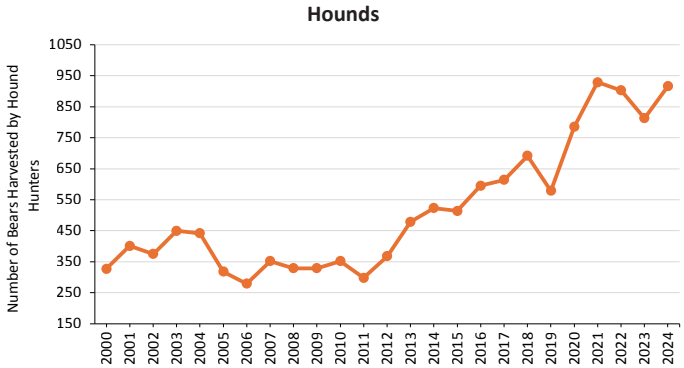
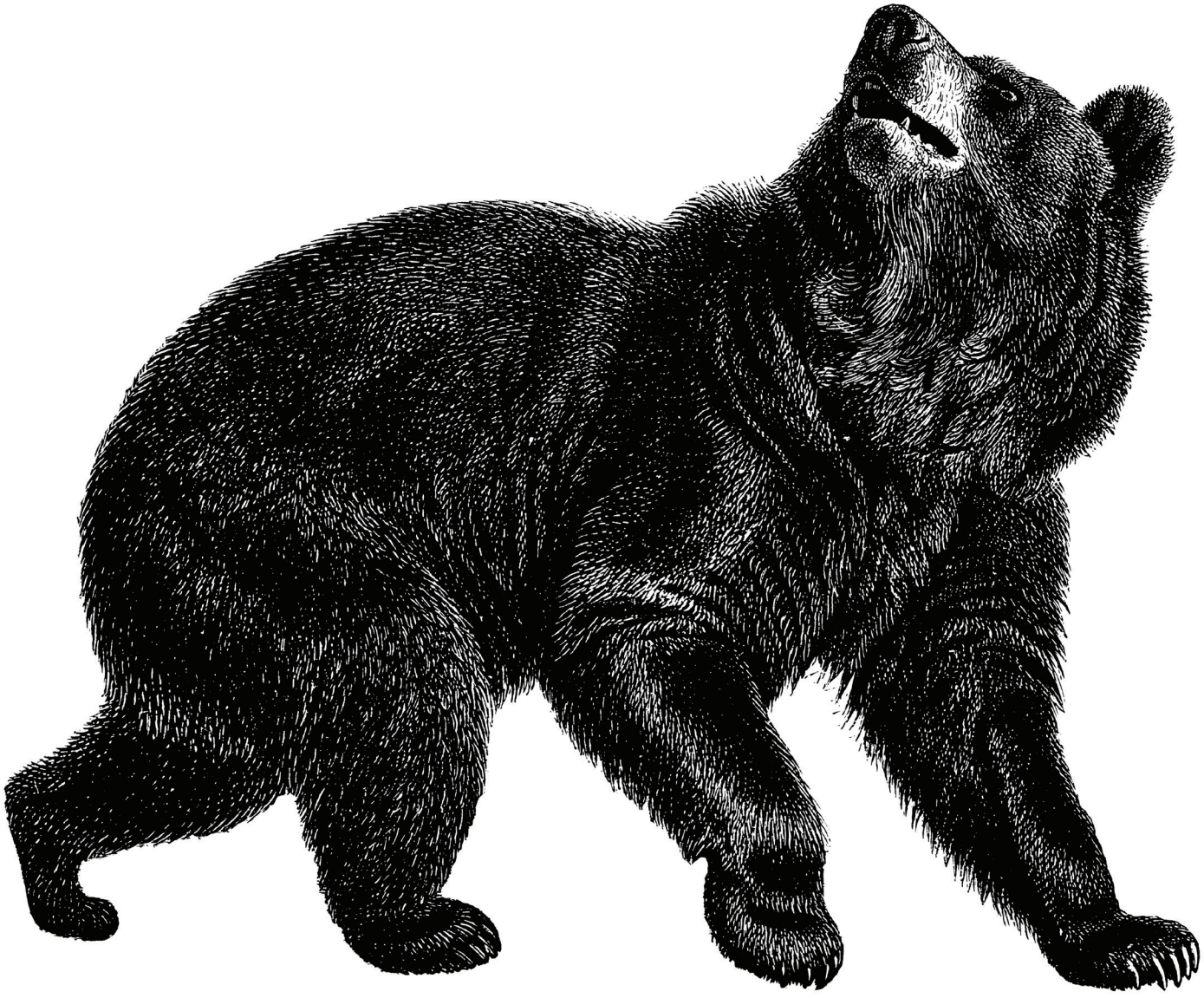


FIGURE 7. HARVEST USING HOUNDS (TRAINED BEAR DOGS) HAS INCREASED IN RECENT YEARS. PERIODS OF HIGH TRAPPER HARVEST OCCURRED FOLLOWING THE 2004 AND 2014 BEAR REFERENDUMS WHICH, IF PASSED, WOULD HAVE MADE IT ILLEGAL TO HARVEST BEARS WITH BAIT, TRAINED BEAR DOGS, OR TRAPS. PARTICIPATION ALSO INCREASED DURING THE PANDEMIC YEARS.







2023

TABLE 1. NUMBER OF BEARS HARVESTED IN MAINE IN 2023 BY WILDLIFE MANAGEMENT DISTRICT (WMD).

	METHOD OF TAKE										
WMD	HUNTING WITH BAIT	WHILE DEER HUNTING	HUNTING WITH DOGS	SPOT AND STALK	TRAPPING	UNKNOWN[1]	TOTAL HARVEST	ARCHERY[2]	ASSISTED BY GUIDE	RESIDENT	NONRESIDENT
1	87	0	18	4	3		112	6	101	32	80
2	72	1	47	3	8		131	6	114	22	109
3	181	0	50	7	21		259	13	207	96	163
4	192	1	16	3	10		222	11	154	81	141
5	117	1	53	4	4		179	4	32	46	133
6	214	6	56	5	14		295	13	179	113	182
7	111	0	45	1	24		181	7	132	52	129
8	179	0	113	1	39		332	11	240	143	189
9	83	3	34	1	12		133	8	85	64	69
10	78	2	4	0	8		92	4	71	35	57
11	186	8	73	1	24		292	6	232	84	208
12	61	11	83	2	19		176	6	88	86	90
13	18	2	12	0	7		39	2	21	18	21
14	34	1	27	0	14		76	1	54	34	42
15	24	3	15	1	9		52	3	8	42	10
16	2	1	0	1	4		8	0	0	8	0
17	38	4	13	0	18		73	3	20	55	18
18	104	2	27	2	28		163	4	97	81	82
19	91	2	47	0	7		147	8	132	20	127
20	4	1	1	1	1		8	0	1	8	0
21	1	0	0	0	2		3	0	1	2	1
22	0	0	0	1	0		1	0	0	1	0
23	4	0	0	0	2		6	0	3	6	0
24	0	0	0	0	0		0	0	0	0	0
25	3	0	0	0	0		3	1	0	3	0
26	39	4	1	2	15		61	3	2	59	2
27	32	1	24	2	7		66	2	23	49	17
28	84	3	54	0	18		159	9	108	58	101
29	0	0	0	0	0		0	0	0	0	0
STATEWIDE	2039	57	813	42	318	3	3272	131	2105	1298	1971

[1]*Unknown Method = Hunter did not report the method they used to harvest their bear.*

[2]*This does not include 78 bears harvested with a crossbow.*

2024

TABLE 1. NUMBER OF BEARS HARVESTED IN MAINE IN 2024 BY WILDLIFE MANAGEMENT DISTRICT (WMD).

	METHOD OF TAKE										
WMD	HUNTING WITH BAIT	WHILE DEER HUNTING	HUNTING WITH DOGS	SPOT AND STALK	TRAPPING	UNKNOWN[1]	TOTAL HARVEST	ARCHERY[2]	ASSISTED BY GUIDE	RESIDENT	NONRESIDENT
1	150	0	32	0	5		187	4	172	36	151
2	105	0	49	0	8		162	4	147	22	140
3	194	0	51	4	18		267	7	213	80	187
4	230	0	31	0	4		265	19	196	82	183
5	153	1	52	0	10		216	13	184	40	176
6	250	1	35	7	13		306	29	185	116	190
7	136	0	44	1	28		209	4	135	64	145
8	209	0	111	2	29		351	10	259	140	211
9	94	0	47	0	8		149	10	108	69	80
10	93	0	22	0	14		129	3	101	45	84
11	188	0	77	0	15		280	14	222	90	190
12	95	4	87	4	24		214	12	105	102	112
13	26	1	21	0	6		54	2	34	22	32
14	55	1	33	2	12		103	5	71	53	50
15	50	1	26	2	19		98	6	21	84	14
16	7	3	1	1	5		17	1	0	17	0
17	32	1	19	2	15		69	5	23	53	16
18	126	1	32	1	21		181	11	112	95	86
19	101	0	71	1	6		179	7	153	37	142
20	6	5	0	2	7		20	2	1	19	1
21	3	2	0	0	4		9	0	0	9	0
22	0	0	0	0	0		0	0	0	0	0
23	3	2	0	2	5		12	0	1	11	1
24	0	0	0	0	0		0	0	0	0	0
25	0	0	0	0	0		0	0	0	0	0
26	52	5	0	1	16		74	5	9	66	8
27	33	2	20	1	7		63	3	22	47	16
28	103	1	55	1	13		173	9	118	72	101
29	0	0	0	0	0		0	0	0	0	0
STATEWIDE	2,494	31	916	34	312	0	3,787	185	2,592	1,471	2,316

[1]*Unknown Method = Hunter did not report the method they used to harvest their bear.*

[2]*This does not include 105 bears harvested with a crossbow.*

Hunters that use bait or trained bear dogs have the most success, with a 30% average success rate since 2008. Success is also higher among nonresidents (Figure 8), who are more likely than residents to hire licensed professional Maine hunting guides (~90% of successful nonresidents use a guide vs. ~30% of successful residents).

FIGURE 8. BEAR HUNTING SUCCESS RATES BASED ON PERMIT SALES BY RESIDENCE AND METHOD OF HARVEST.

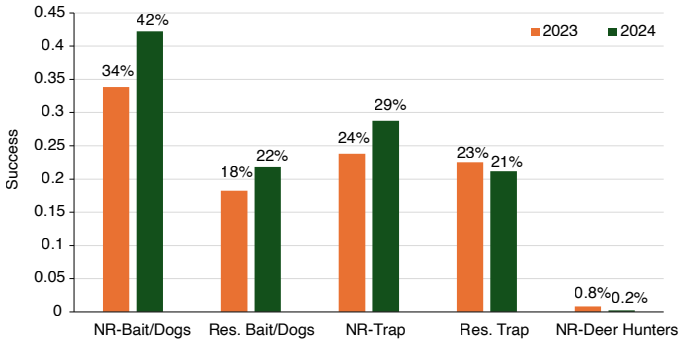
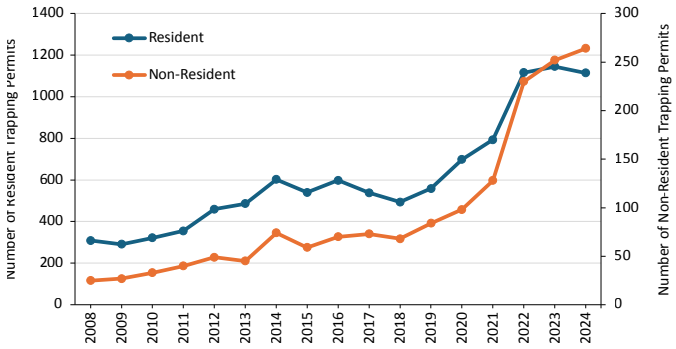


FIGURE 9. THE NUMBER OF RESIDENTS AND NONRESIDENTS PURCHASING A PERMIT TO TRAP BLACK BEARS IN MAINE HAS BEEN INCREASING.



BEAR TRAPPING ANNUAL HARVEST

Trappers can harvest a bear in September or October using a cable foot restraint or a cage-style trap. Since 2008, trappers have been required to purchase a separate permit to trap a bear, and permit sales indicate rising interest.

For five years in a row, trapping permit sales have recorded record highs **(Figure 7).** The 2023 and 2024 harvests of 318 and 312 bears by 1,397 and 1,378 trappers, respectively, eclipsed the previous five years, where an average of 854 trappers harvested anywhere between 87 and 295 bears. Notably, ~80% of bear trapping permits are purchased by Maine residents

GEOGRAPHIC DISTRIBUTION OF THE HARVEST

The 2023 and 2024 bear harvests spanned most Maine counties and Wildlife Management Districts (WMDs), with the 2023 harvest covering slightly more ground (14 of 16 counties and 27 of 29 WMDs, compared with 13 counties and 25 WMDs in 2024). Statewide harvest density, expressed as the number of bears killed per 100 square miles of habitat (forested land) was lower in 2023 (a good food year) at 11 bears/100 mi^2, rising in 2024 (a poor food year to 14 bears/100 mi^2).

While Aroostook County accounted for ~31% of the annual harvest (1,053 in 2023 and 1,176 in 2024), harvest density expressed as the number of bears killed per 100 square miles of habitat (forested land) was greatest (19-33 bears/100 mi^2) in other portions of northern, western, and eastern Maine — specifically, WMDs 3, 6, 12, and 28.

Fewer bears were taken in southern and central Maine, with only 2 to 9 harvested per season in Androscoggin, Cumberland, Kennebec, and Waldo counties. In 2023, no bears were taken in Lincoln or Sagadahoc counties or WMDs 24 or 29; and in 2024, no bears were taken in Knox, Lincoln, or Sagadahoc counties or in WMDs 22, 24, 25, or 29 **(Table 1).**

HUNTER/TRAPPER EFFORT/SUCCESS

Nonresidents harvested most bears overall (60% in 2023 and 61% 2024) season. In 2023, nonresidents took 71% of the bears with trained bear dogs and 65% of the bears taken over bait, and in 2024 took 73% of the bears with trained bear dogs and 63% of the bears taken over bait. The percentage of the harvest by nonresident hunters using spot and stalk methods remains low and accounted for 7% of the total spot/stalk harvest in 2023 and 21% in 2024.

Among residents, hunting over bait remains popular, with 55% of successful residents taking bears by this means in 2023 and 64% in 2024. Although fewer bears are taken during the deer season, in traps, or by spot and stalk methods, Maine residents continue to account for the majority of this harvest (83% in 2023 and 77% in 2024).

Every year, most bears are taken by hunters using Registered Maine Guides. In 2023, guides helped hunters (83% of whom were non-residents) harvest 2,220 bears (68% of the total). In 2024, guides helped hunters (82% non-residents) harvest 2,592 bears (68% of the total). In 2024, hunters employing guides accounted for 91% of the trained bear dog harvest (up from 87% in 2023), 67% of the bait harvest (down from 70% in 2023), and 27% of the trap harvest (slightly up from 26% in 2023). The proportion of bears taken by spot and stalk methods with a Maine Guide is relatively low and fluctuates widely: 7% of the total in 2023 and 18% in 2024.

Among successful Maine resident hunters, only 32% (2024) and 30% (2023) used a guide. Non-residents' greater use of professional Maine hunting guides could explain their overall higher success rates leading up to deer firearm season (39% compared to 26% for Maine residents).

HUNTER EFFORT/PERMIT SALES

Bear hunting effort and success is estimated from annual permit sales, which fluctuate with changes in permit cost, gas prices, other economic factors, and ballot initiatives related to hunting and trapping.

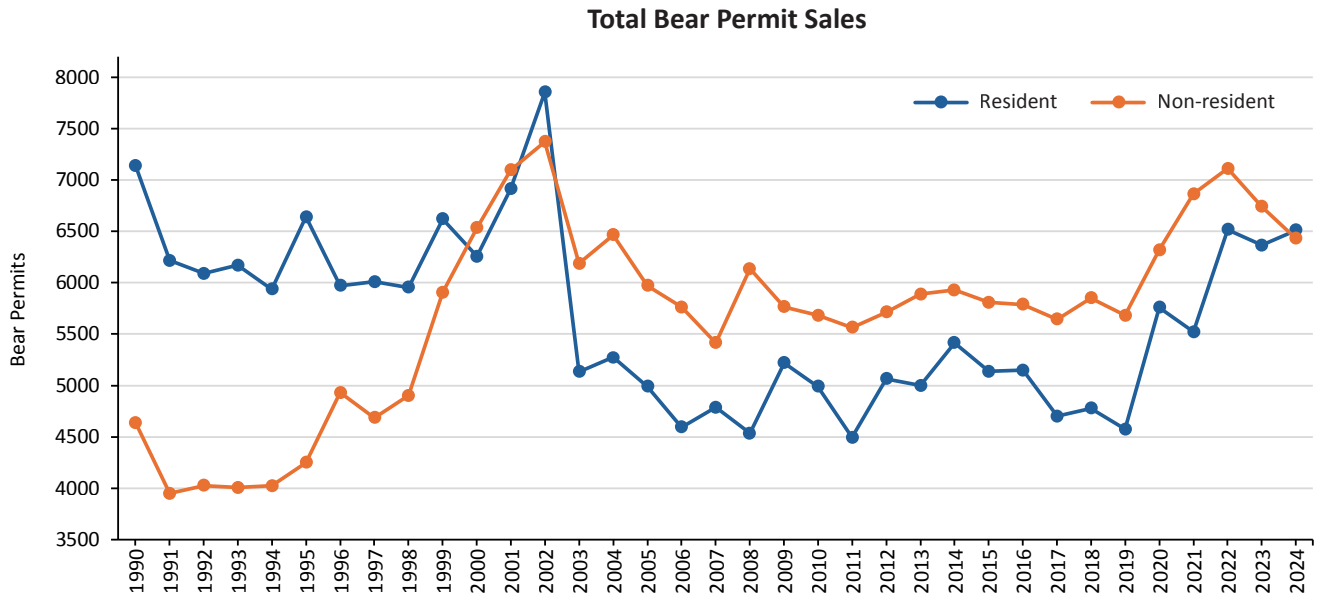
Since 1990, any hunter interested in harvesting a black bear has had to purchase a bear hunting permit in addition to their hunting license. That first year, nearly 12,000 permits were sold. The number then stabilized to approximately 10,500 permits through 1999 before rising to more than 15,000 permits by 2002. In 2003, permit fees were raised from $5 to $25 for residents and from $25 to $67 for non-residents. Subsequently, bear hunting participation steeply dropped for residents and nonresidents alike. After a slight bump during the 2004 bear hunting referendum, numbers continued to decline before stabilizing at just under 11,000 in 2009 **(Figure 9).** More recently, numbers have increased, with over 13,600 bear permits sold in 2022. We attribute this bump to increased participation in the pandemic years, combined with reduced resident permit fees and changes to bear trapping license requirements. The demand has held: more than 13,000 bear permits were sold in 2023 (the second-highest number in 21 years) and ~12,900 were sold in 2024.

Historically, most bear permits (55-60%) were purchased by residents. However, following the closure of the Ontario spring bear hunt in 1999, nonresidents became more interested in hunting Maine black bears; and in 2000, nonresident participation eclipsed that of residents. Since then, nonresidents have accounted for an average of 53% of bear hunting permits.

With the permit fee increase in 2003, resident participation fell more sharply. While not as many nonresidents dropped off, this decline is particularly significant since nonresidents' higher success rates have a greater impact on the final harvest level **(Figure 6).**

The bump in permit sales in 2020 and 2021 contributed to the near-record harvests of 3,883 and 3,779 bears, respectively, and reflected an increase in participation seen during the pandemic years **(Figure 9).** Most notable was the increase in nonresident participation in 2021, which likely explains the higher-than-expected 2021 harvest. A fee reduction for resident permits in 2022 also increased resident permit sales from 5,521 in 2021 to 6,517 in 2022. Since then, resident permit sales have remained higher (6,365 in 2023 and 6,512 in 2024).

FIGURE 10. THE DEPARTMENT DOES NOT LIMIT THE NUMBER OF BEAR HUNTING OR TRAPPING PERMITS. ***Since 2020, the average number of resident and nonresident bear permits sold per year has increased slightly ~12,800, compared to the pre-pandemic annual average of ~11,000. A similar number of residents and nonresidents purchase permits. Prior to 2003, more residents purchased bear permits, likely due to the low permit cost at that time.***



During the summer of 2023 the bear field team, led by wildlife biologist Matt O'Neal, spent 41 long days in the field setting, checking, and adjusting up to 78 traps per day, ultimately creating 1,784 opportunities to capture bears. Their hard work resulted in 47 newly tagged bears, deployment of 20 new radio collars on female bears, and the successful maintenance of a representative sample of bears for research and management. When a bear is captured, they are sedated then carefully monitored while biological samples are collected, and they are weighed and measured before being released unharmed.

HUNTER SURVEYS

MDIFW periodically sends email-based surveys to bear hunting permit holders. One such survey was sent following the 2024 season, providing the Department with more precise data on hunter effort (i.e., how many days spent bear hunting), participation, and interest in different types of bear hunting (such as hunting over bait, using trained bear dogs, trapping, or still hunting), as well as hunters' response to potential regulatory changes.

PERMITS FUNDING BLACK BEAR RESEARCH AND MANAGEMENT

Since 2008, trappers have been required to purchase a bear permit to harvest a bear, and nonresidents have also been required to purchase a permit to take a bear during deer firearms season. Funds from these permit sales are dedicated to bear research and management, and we are currently using them to:

- Purchase culvert traps that meet standards
- Determine the age of harvested black bears from teeth turned in by hunters
- Regularly update an integrated bear population model, and
- Evaluate the role of anthropogenic foods (including bait) on Maine's bear population

Although the number of nonresident bear permit sales for deer hunting season has remained stable at 700 to 1,000 per year (876 in 2023 and 886 in 2024), sales of resident and nonresident bear trapping permits have increased, and now contribute between $40,000 and $90,000 annually to bear research and management.

Biological Data From Harvest

AGE AT HARVEST DATA

Each fall, successful black bear hunters and trappers must report the sex of their harvested bear and submit a tooth (the first premolar) to MDIFW. We send the collected teeth to an external lab for cementum annuli analysis, which determines each bear's age. Age-at-harvest data provides insight into the bear population's age structure, which is a key input into our statewide black bear population model.

In 2023, 1800 harvested bears (55%) were male and 3,119 (95%) were adults. In 2024, 2,074 were male (55%) and 3,631 (96%) were adults.

Research and Monitoring

MONITORING

MDIFW's black bear monitoring program is one of the most extensive and longest-running programs of its type in the U.S. Over the last 50 years, Department biologists have captured and marked more than 4,300 bears to determine their health and condition (an index to infer habitat quality and natural food levels), visited over 2,500 dens of radiocollared female bears to record data and estimate how many cubs are born each year in Maine, how many cubs born the previous year survived, and determine annual cause-specific mortality rates.

RECENT AND ONGOING RESEARCH PROJECTS

MDIFW recently worked with research partners at three USGS Cooperative Fish and Wildlife Research Units at Washington State University, Cornell University, and North Carolina State University to develop a new integrated age-at-harvest population model for Maine's black bears. This model uses age data from harvested bears as well as long-term monitoring data from radiocollared females and ear tagged males in three study areas to estimate the statewide bear population and each Wildlife Management District's bear density. The model is updated each year with new harvest season data, capture histories of tagged bears, and demographic data from the field study to help inform management decisions.

In 2024, MDIFW and research partners at Purdue University and Mississippi State University published a study in the Journal of Wildlife Management that examined potential impacts of hunting bait on the black bear population in Maine (Morin et al. 2024). Researchers measured the amount of bait (or other human foods) in a bear's diet from hair samples from female bears captured in dens by MDIFW biologists and compared the bear's diet to the number of cubs they produced. They also examined whether a greater proportion of bait in the diet would increase the chances a female bear would be harvested. Because hair grows through the spring, summer, and fall, stable isotope analysis of hair samples reflects the diet during that entire time. This study found no evidence that bait increases bear reproduction in Maine, and found that bears consuming more human foods (including bait) throughout the year are more likely to be harvested. These results indicate that hunting with bait in Maine is an effective tool for stabilizing bear population numbers. This research is being expanded to examine bear diets at different times of year (summer through fall) and to include data from harvested bears in addition to research bears.

The bear crew using telemetry equipment to locate a bear den with a radiocollared female bear to collect annual reproduction data.

Management

SPECIES PLANNING: BEAR MANAGEMENT 2017-2027

MDIFW biologists set management goals through a strategic planning process which includes public input. In 2017, we finalized a new 10-year management plan for Maine's big game species (deer, moose, bear, and turkey). This plan carefully considers black bears' value to outdoor enthusiasts and the general public, as well as the likely public acceptance of an increasing bear population. The plan includes goals, objectives, and management strategies designed to ensure continued enjoyment of black bears without too many conflicts in backyards and neighborhoods.

The plan set an overarching goal of maintaining a healthy, sustainable bear population overall, while minimizing population growth in areas of higher human density. To maintain the bear population at a healthy and socially acceptable level, the Department's primary tool is hunting.

Maine offers a variety of traditional bear hunting methods, but the odds of taking a bear are low. Most bears (~96%) are harvested with bait, trained bear dogs, or traps; but hunters also have the option of still-hunting or stalking, including the opportunity to take a bear while hunting deer. Success rates are just 27% for hunters using bait or trained bear dogs, <23% for trappers, and <3% for those who still-hunt or stalk bear through Maine's dense forests.

LIVING WITH BLACK BEARS

Maine's bear population is one of the largest in the country, thriving in the forests that cover more than 90% of our state's land area.

Despite a large bear population, the number of human-black bear conflicts in Maine is lower than other northeastern states, averaging about 500 reported complaints each year. This relatively low conflict level is partially attributed to bears being more common where human densities are lowest. But if Maine's bear population continues to grow and expand into areas with higher human densities, conflicts could rise.

These conflicts, when they happen, tend to be mild in nature (the most common complaints we receive involve bears feeding at bird feeders and on garbage); but if you live in a community that is experiencing these issues, they can be concerning.

WHEN & WHY CONFLICTS HAPPEN

Most human-bear conflicts occur in the spring and early summer, after bears emerge from their winter dens and find it difficult to locate high-quality natural foods. As they search, they sometimes encounter food odors (bird seed, garbage, compost, and grills) that attract them to backyards and neighborhoods. Once berries begin to ripen in late summer, bears typically return to wooded areas to forage, and conflicts with humans decline. However, when these natural foods are not abundant, bears are more likely to take the risk and keep searching for food provided by people.

SOLUTIONS

Many people expect the Department to move bears that are frequenting backyards, communities, and agricultural areas because it provides a quick fix to a problem. While this can provide a temporary solution, trapping and moving a bear is not always appropriate or effective. Bears that are trapped and transferred to a new area do not stay where they are released, and they often return or create a new problem somewhere else. Moving bears also puts them at a greater mortality risk as they encounter more roads, other bears, and people.

Although it may seem simple to move or destroy the offending bear, the best solution is to remove or secure food, food odors, and other common bear attractants from your outdoor space every spring. If you don't, bears will likely continue visiting. Even if a bear moves on, you should remove or secure attractants to avoid future problems.

This work is supported by the federal Pittman-Robertson program and state revenues from sales of hunting and trapping licenses.

Here is a checklist that you can run through every spring:

YOU CAN PREVENT BEAR CONFLICTS by simply removing or securing bear attractants each spring.	1 REMOVE & STORE INSIDE Between Apr 1 and Nov 1	2 SECURE & CLEAN
BIRD SEED 	• Take bird feeders down • Store seed and feeders indoors (you can still feed birds in the winter)	• Rake up bird seed from the ground
GARBAGE 	• Store garbage cans in a building or electric-fence enclosure • Take to curb on morning of pickup	• Keep outbuilding and garage doors closed at all times and repair broken window and doors • Keep dumpster lids and doors closed and latched • Use bear-resistant dumpsters or garbage cans
GRILLS 	• Store grill inside when not in use • If you are having bear conflicts, stop grilling until bear moves on	• Burn off food residue • Dispose of food wrappers and grease cups
PETS AND LIVESTOCK 	• Feed pets inside • Store livestock and pet food inside • Keep livestock in buildings at night • Install and maintain effective livestock fencing	If you feed your pets or livestock outside: • Clean dishes daily • Remove leftover food daily

Our website and outreach materials provide additional information on what to do if you encounter a bear in your backyard, in your neighborhood, or during any outdoor activity in Maine. You can find that information, including printable/shareable PDFs, at: **mefishwildlife.com/livingwithblackbears.**

FURBEARERS

Shevenell Webb
State Furbearer Biologist

Maine's abundant forests and aquatic habitat support some of the most varied wildlife assemblages in the Northeast, including 16 species of furbearing animals. The terrestrial species include bobcat, coyote, red and gray fox, fisher, marten, raccoon, opossum, striped skunk, short- and long-tailed weasel, and red squirrel. The semi-aquatic species include beaver, river otter, mink, and muskrat.

Thanks to modern wildlife management principles, many of these species are more abundant now than they were 100 years ago. MDIFW's furbearer management efforts aim to maintain healthy, sustainable populations for viewing and harvest, while also minimizing conflicts. Regulated trapping and hunting provide many benefits, including population management, protection and restoration of rare species, reduction of human-wildlife conflicts, and improved knowledge of furbearer species. Maine trappers and hunters have contributed to scientific research including disease surveillance and studies on genetics, toxin prevalence, the role of carnivores as potential hosts for ticks, and more.

Trapping Best Management Practices

Trapping in Maine is highly regulated and enforced by game wardens. Since 1997, state and federal agencies have worked together with trappers, veterinarians, and other wildlife professionals to improve trap safety, selectivity, efficiency, and humaneness. The ongoing trapping Best Management Practices (BMPs) program provides science-based recommendations on the best traps and methods for each U.S. furbearer species. By 2024, the program had tested over 700 different traps and developed BMPs for 22 species. Learn more about the BMP program at **furbearermanagement.com,** or visit **mefishwildlife.com/trapping** for Maine-specific details.

To learn more about Maine trapping regulations, please visit **mefishwildlife.com/trappinglaws.**

Harvest Information

SEASON DATES AND STRUCTURE

The furbearer trapping season opens in the fall for most species, though dates may vary by species and wildlife management district. Hunting season dates also vary by species, but typically open in the fall and close in the winter. Trapping is the primary method of harvesting furbearers, but some species can also be hunted, including red and gray fox, coyote, bobcat, raccoon, opossum, and skunk. Small game like snowshoe hare, red and gray squirrel, woodchuck, and porcupine can be hunted as well.

The pelts of all furbearers except weasels, raccoon, red squirrel, muskrat, skunk, and opossum must be registered and tagged with some exceptions. Registration gives the Department valuable data including the total number of each species taken in a season and who harvested each animal, with what method, in which town, during which month — all of which helps inform and direct future management decisions.

We also collect biological data during pelt registration for bobcat, river otter, fisher, and marten. This data is important for monitoring species distribution and population demographics to ensure a sustainable harvest.

ANNUAL HARVEST STATISTICS AND TRENDS

Furbearer harvests can be influenced by many factors that affect trapper effort (e.g., changes in trapping regulations, trapping licenses, pelt values, weather conditions, gas prices, personal health) or wildlife populations (e.g., natural food availability, disease, habitat changes).

Biologists use a variety of indices to monitor species populations, including fur registration data. During the 2023/24 and 2024/25 seasons, trappers and hunters registered 13,038 and 11,329 furs, respectively — up from 11,607 in 2022/23 **(Table 1).** Beaver and coyote typically account for the highest number of tagged furs each year. During the 2023/24 season, hunters and trappers were incentivized by decent beaver pelt prices, and their work was made easier by a mild winter and early spring which improved open-water trapping conditions. These factors likely contributed to that season's increased beaver harvest **(Table 1).**

Given their similar habitats and capture techniques, beaver and otter harvests are strongly linked, with otters typically representing 10% of the annual beaver harvest statewide. Although beaver, otter, and bobcat harvests have increased, mink and fox harvests have declined, likely due to low fur values and decreased trapper interest. Coyote, fisher, and marten registrations, meanwhile, have remained stable over the past ten years.

The bobcat harvest also remains strong. Hunting is the most common method of pursuit, accounting for 53% of the annual harvest in recent years (2021/22-2023/24). Among successful bobcat hunters, 42% used dogs, 39% used bait, 7% used calling, 5% used other methods, and 4% took a bobcat incidentally during another hunt. Snow conditions play an important role in dog hunter success.

Over the past ten years, the number of successful bobcat hunters has been higher but more variable, averaging 111 hunters annually (range: 31-178), while the annual number of successful trappers has been lower but more stable, averaging 72 trappers (range: 51-84). Trapping success, measured by the proportion of land trappers (those who caught at least one bobcat, coyote, or fox) that caught at least one bobcat, is a key index for monitoring population trends. Bobcat trapping success over the past ten years indicates a growing population.

TRAPPER PARTICIPATION

Interest in trapping has grown over the past ten years, with over 700 people completing a Maine furbearer trapper education course in 2024. People are motivated to trap for many reasons, including a desire to spend more time outdoors, pass along skills to the next generation, help out a local neighbor or farmer dealing with wildlife conflicts, learn more about wildlife, or make garments and other products out of fur.

Trapping license numbers have been stable over the last 20 years. During the 2023/24 season, Maine issued 4,936 trapping licenses (including annual, special, and lifetime trapping licenses), representing an 11% increase from the previous five-year average. The increase was mostly driven by more Resident Apprentice, Lifetime, Junior, and Resident licenses.

TABLE 1. SUMMARY OF THE FURBEARER HARVEST REGISTRATIONS FROM THE 2014/15 – 2024/25 TRAPPING AND HUNTING SEASON AND PREVIOUS 10 YEAR SEASON AVERAGES IN MAINE USED AS AN INDEX TO ASSESS STATUS OF FURBEARERS.

SPECIES	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-20	2022/23	2023/24	10-YR AVG	2024/25
BEAVER	3,541	5,666	3,448	5,411	4,187	6,193	6,072	5,476	7,115	9,001	5,611	6,604
BOBCAT	136	230	207	223	283	357	396	357	340	273	280	355
COYOTE	1,036	1,429	963	1,482	1,965	2,024	1,919	1,229	1,248	1,138	1,443	1,149
FISHER	688	295	341	352	659	365	754	473	679	567	517	695
GRAY FOX	415	180	121	268	196	249	274	140	181	153	218	165
RED FOX	431	726	460	583	726	466	740	416	378	271	520	280
MARTEN	1,224	395	1,113	519	946	315	1,042	400	687	527	717	1,118
MINK	1,173	1,206	485	536	284	335	357	251	226	286	514	358
RIVER OTTER	292	494	322	656	394	679	666	572	753	822	565	605
TOTAL	8,936	10,621	7,460	10,030	9,640	10,983	12,220	9,314	11,607	13,038	10,385	11,329

TRAPPER EFFORT

Trapper harvest reports provide an important index to assess trapper effort and species population trends. All trappers 16 years and older must submit both fall and spring harvest reports each season, even if they did not trap. MDIFW uses these reports to monitor trapper activity, species catch per unit effort, disease observations, and the harvest of all furbearer species.

The reports indicate that coyote and beaver are the most targeted species, based on total trapnights (1 trap set for 1 night = 1 trapnight). The average species catch per 100 trapnights reported on fall harvest reports (2021/22-2023/24) was highest for muskrat (9) and beaver (6), followed by otter and skunk (2); raccoon, coyote, red fox, mink, fisher, marten, weasel, and bobcat (1); and gray fox (<1), respectively **(Table 2).**

Catch per unit effort can indicate relative abundance, though changes in trapper effort and/or regulations may affect these values.

TABLE 2. SPECIES CATCH PER 100 TRAPNIGHTS (1 TRAP SET 1 NIGHT = 1 TRAPNIGHT) AS REPORTED ON FALL HARVEST REPORTS FROM THE 2021/22 – 2023/24 TRAPPING SEASONS USED TO MONITOR CHANGES IN ABUNDANCE.

SEASON	BEAVER	BOBCAT	COYOTE	FISHER	G FOX	R FOX	MARTEN	MINK	MUSKRAT	RACCOON	OTTER	SKUNK	OPOSSUM	WEASELS	TOTAL REPORTS
2021/22	6.35	0.60	1.03	0.68	0.37	0.92	0.82	1.31	10.14	1.18	2.02	1.93	0.96*	0.41*	1,078
2022/23	6.20	0.71	1.04	1.02	0.46	0.82	0.78	1.58	8.49	1.86	1.19	1.25*	0.78*	1.15	1,282
2023/24	6.02	0.50	1.06	0.50	0.53	0.55	0.81	1.09	7.04	0.85	1.54	1.31*	3.31*	1.54*	1,071
AVERAGE	6.19	0.60	1.04	0.73	0.45	0.76	0.80	1.33	8.56	1.30	1.58	1.93	N/A	1.15	1,144

**Low sample size (i.e., less than 30 trappers submitted a report)*

Biological Data from Harvest

AGE AND SEX STRUCTURE

Since 2016, MDIFW biologists have been conducting a study on harvested bobcat, fisher, marten, and river otter by collecting biological samples **(Figures 1-4).** By closely monitoring harvest demographics like age and sex, the study will help improve species management and ensure that trapping and hunting remain sustainable.

Over the past eight years, we have learned that younger age classes are more common in the harvest due to their inexperience and greater movement during dispersal, which makes them more vulnerable. On average, 77% of the fisher and marten sampled each season were juveniles (<1 year old) or yearlings (1 year old). By contrast, bobcat and otter offspring stay with their mother for about a year before they disperse, resulting in a smaller proportion of young animals in the harvest (50% of bobcats and 55% of otters sampled were juveniles or yearlings).

Adult females (2+ years old) have made up a small share of the harvest: 15% of fisher and otter, and just 5% of marten sampled each season. The proportion of adult female bobcats has been higher (averaging 23% of the bobcat harvest sample), but we are interpreting these data cautiously due to a low sample size (~7-31% of the annual bobcat harvest had age and sex determined through genetic analysis).

It can be difficult to determine sex of bobcats and other felids in the field because the males' testes are less visible than they are in other carnivores. To verify sex, we collect a small piece of muscle for genetic analysis and compare the results to hunter/trapper field reports.

During the first six years of the study, hunters and trappers correctly identified 77% of females and 56% of males. In the 2020/21 and 2021/22 seasons, 68% and 87% of misidentified males were young (≤2 years old), suggesting that further training could improve the accuracy of field reports.

The Department will continue working with staff, hunters, and trappers to improve sample quality and ensure data is representative of the harvest. We are currently working on incorporating all the biological results into a sex-age-kill model to monitor population changes over time.

FIGURE 1. AGE AND SEX OF BOBCAT SAMPLED DURING THE 2016/17 – 2023/24 HUNTING AND TRAPPING SEASONS IN MAINE USED TO ASSESS DEMOGRAPHIC TRENDS OVER TIME. NOTE THAT ASTERISKS* MARK RESULTS BASED ON SMALL SAMPLE SIZE (I.E., LESS THAN 30 BOBCAT TISSUE SAMPLES DURING SOME SEASONS).

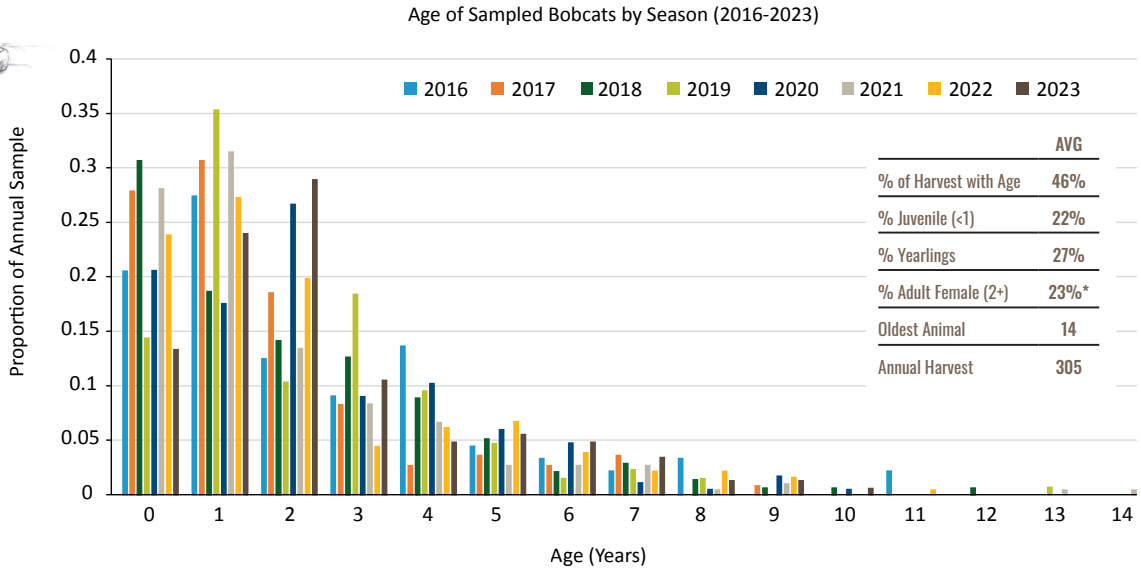


FIGURE 2. AGE AND SEX OF FISHER SAMPLED DURING THE 2016/17 – 2023/24 TRAPPING SEASON IN MAINE USED TO ASSESS DEMOGRAPHIC TRENDS OVER TIME.

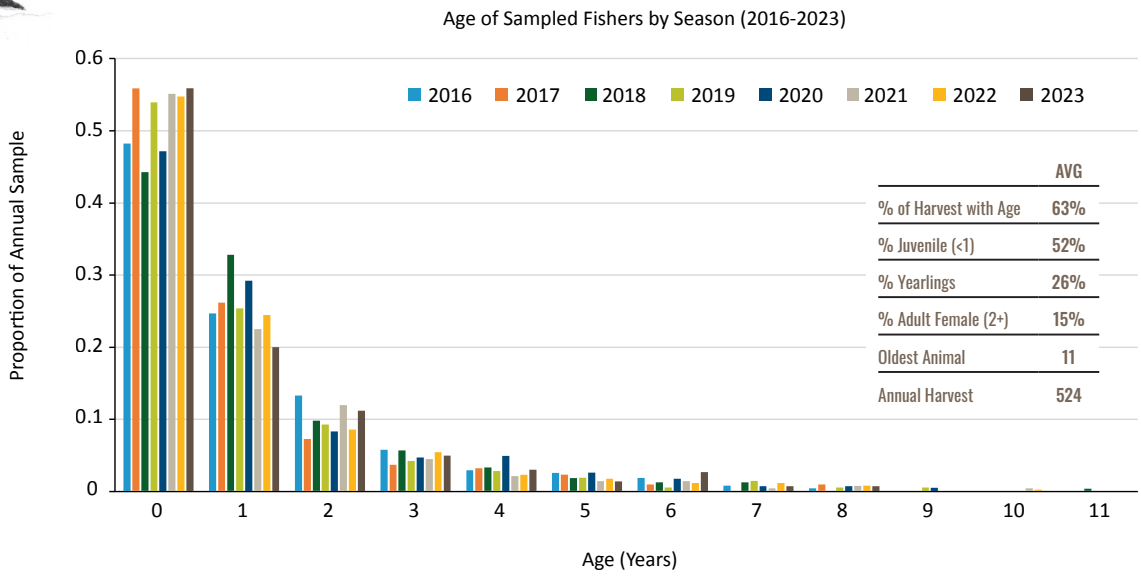


FIGURE 3. AGE AND SEX OF MARTEN SAMPLED DURING THE 2016/17 – 2023/24 TRAPPING SEASON IN MAINE USED TO ASSESS DEMOGRAPHIC TRENDS OVER TIME.

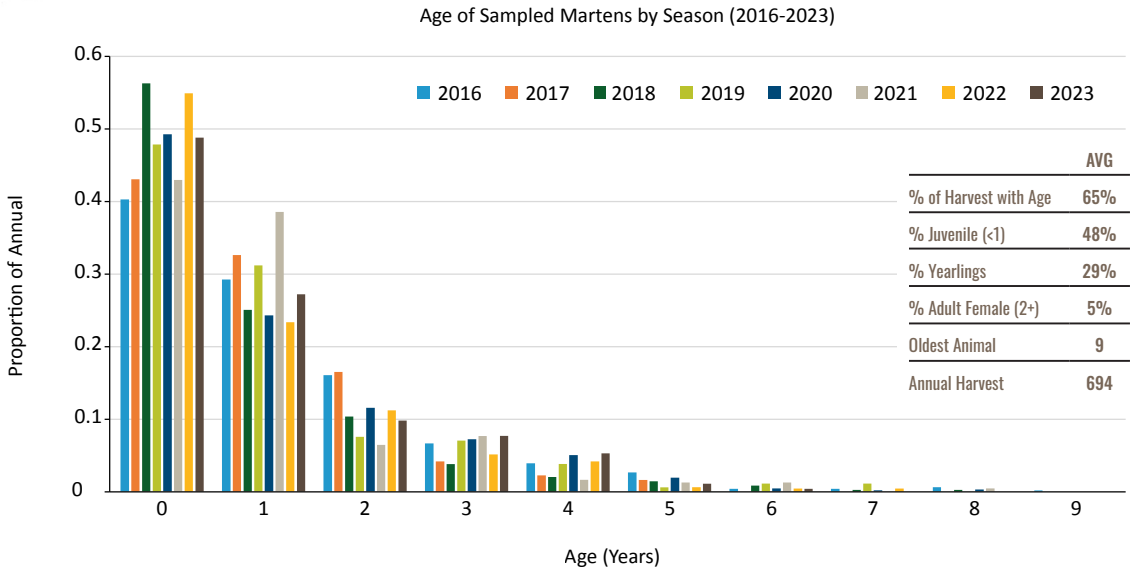
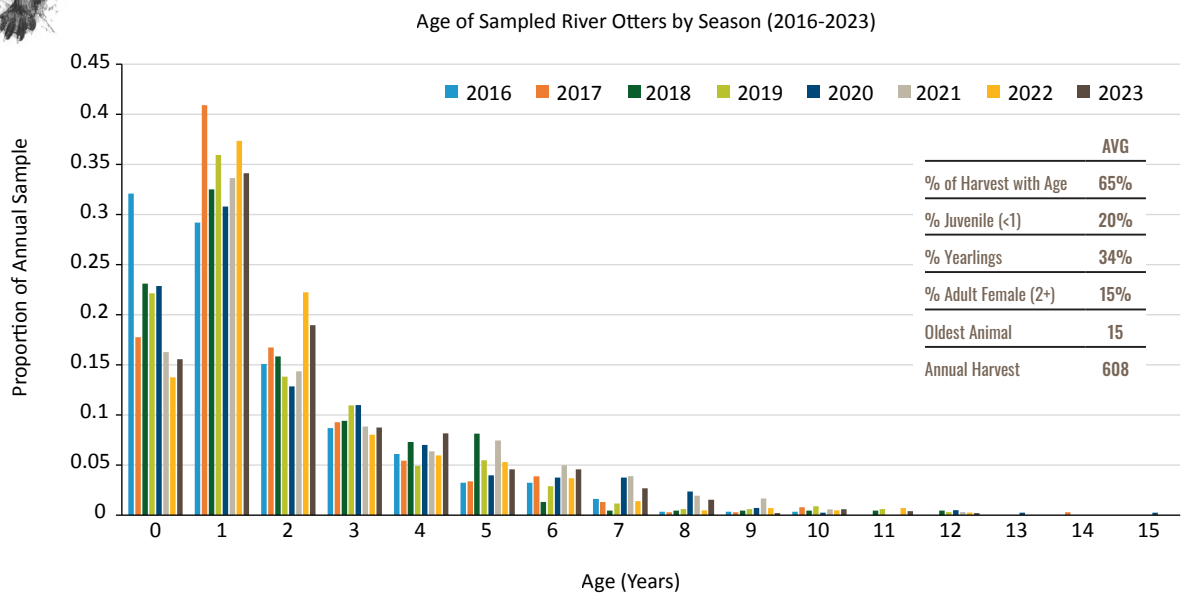


FIGURE 4. AGE AND SEX OF RIVER OTTER SAMPLED DURING THE 2016/17 – 2023/24 TRAPPING SEASON IN MAINE USED TO ASSESS DEMOGRAPHIC TRENDS OVER TIME.



Research and Monitoring

The Department works with partners on many wildlife research initiatives that expand our knowledge and improve management. Recent examples include studies on muskrat recruitment rates, effects of the fur trade on semi-aquatic species genetics, marten bioenergetics, genetic connectivity, and species health.

WILDLIFE CAMERA STUDY

One of our major long-term projects uses motion-activated cameras to survey forest carnivores across Maine each winter. Our goals in this study are to better understand marten and fisher occurrence in relation to forest conditions and to track population changes over time.

During the winters of 2022/23 and 2023/24, we surveyed 208 sites and collected more than 170,000 images over ~17,800 trapnights (1 camera set for 1 night = 1 trapnight). The initial effort documented more than 30 wildlife species, including many of Maine's mammals. The most commonly observed mammals were fisher (detected at 84% of sites), red squirrel (73%), marten (71%), and snowshoe hare (69%; **Table 3**).

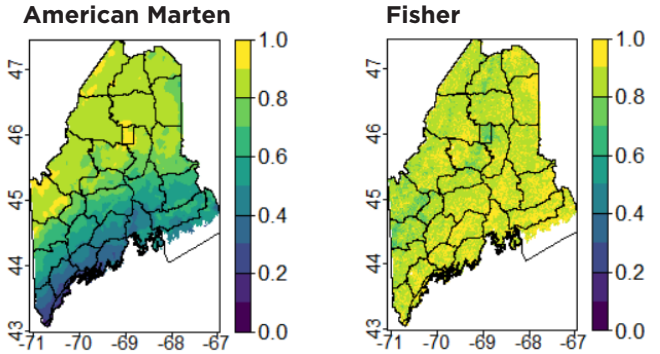
Preliminary results from the 2022-2024 period indicate that marten occupancy is positively associated with higher elevations and latitudes, more snow, and mature forests **(Figure 5).** Fisher occupancy is also positively associated with mature forests, but not with snow, and the species is found statewide **(Figure 5).** We are currently assessing whether marten and fisher distribution and occupancy patterns have shifted since the prior camera study (2017-2019).

This study would not be possible without the support of large landowners, private citizens, land trusts, tribes, and local, state, and federal partners. We appreciate the continued cooperation and assistance of over 20 landowners and managers who make this large study possible.

TABLE 3. PRELIMINARY NAIVE OCCUPANCY (PERCENT OF TOTAL SITES SPECIES WAS OBSERVED AT LEAST ONCE) OF MAMMAL SPECIES DURING WINTER 2022/23 AND 2023/24 CAMERA SURVEYS IN MAINE.

SPECIES	OCCUPANCY
FISHER	84%
RED SQUIRREL	73%
AMERICAN MARTEN	71%
SNOWSHOE HARE	69%
COYOTE	41%
WEASEL SP.	39%
MOOSE	37%
WHITE-TAILED DEER	35%
FLYING SQUIRREL SP.	34%
RACCOON	30%
RED FOX	26%
BOBCAT	13%
CANADA LYNX	12%
GRAY SQUIRREL	7%
GRAY FOX	5%
MINK	2%

FIGURE 5. PREDICTIVE SPECIES OCCUPANCY MAPS BY WILDLIFE MANAGEMENT AREA FROM TOP MODELS USING CAMERA SURVEY DATA COLLECTED DURING WINTERS 2022/23 AND 2023/24 IN MAINE. LIGHTER COLORS INDICATE A HIGHER PROBABILITY OF OCCURRENCE AND DARKER COLORS INDICATE A LOWER PROBABILITY OF OCCURRENCE BASED ON FOREST AND/OR SNOW COVER.



Health and Disease

FISHER AND GRAY FOX HEALTH ASSESSMENT

MDIFW is collaborating on a new multi-state study to assess the health of fisher and gray fox populations across the northeastern United States.

Recent research shows widespread exposure to anticoagulant rodenticides, and potentially other toxins like lead, among fishers in the region. The lowest levels of rodenticide exposure and compound diversity were found in central to northern Maine, while the highest were found in a region spanning southern Vermont and New Hampshire to southeastern New York.

Exposure in fishers was positively associated with areas where wildland and urban development intermix, defined as

areas with at least one building within 100 meters of vegetative cover (such as forest, shrubland, grassland, or wetland). Fishers near agricultural areas did not have significantly higher rodenticide levels than those in protected areas.

There is also concern that gray foxes may be declining in parts of their range, but there is a lack of data on this subject, including the potential role of pathogens and toxins. To address this, we are working with staff, hunters, and trappers to collect samples from the harvest and other mortality sources statewide, and will be analyzing necropsies and tissue samples as well as examining diets to see if there is any association between diet and toxin levels.

This study will help clarify the impact of disease-causing agents on fisher and gray fox populations and will guide future research, management, and outreach efforts.

FURBEARER TICK STUDY

We are partnering with the MaineHealth Institute for Research to better understand the suitability of furbearers as hosts for ticks, particularly the black-legged or deer tick (vector of Lyme disease), woodchuck tick (vector of Powassan encephalitis virus), and a third, recently identified tick found on mustelids like mink, fisher, and weasels.

To support this research, MDIFW worked with trappers in the southern half of the state to collect tick samples from coyote, bobcat, gray fox, red fox, fisher, and mink. We know that weather conditions influence tick activity, with mild winters allowing ticks to remain active into January in southern Maine.

A larger volume of black-legged ticks found on coyote, fisher, and bobcat warrants further research on how important a host these species may be for the reproductive stage of black-legged ticks. We are also interested in determining the prevalence of tick-borne pathogens, such as Lyme disease and anaplasmosis, in some of Maine's furbearer species.

Management

SPECIES PLANNING

In 2023, the Department finalized its most comprehensive furbearer planning effort to date. The process involved gathering extensive public input through scientific surveys and meetings, with 40+ stakeholder representatives providing their input on species status and related issues.

The resulting plan outlines management goals and strategies through 2030, including research and monitoring, policy and regulations, and communication and outreach needs for each of Maine's 16 furbearer species.

Scientific survey results — reinforced by other public input — revealed strong negative attitudes and/or fear towards some species, and a perceived lack of knowledge about others. Some species, such as coyotes, have become increasingly contentious, with divided public opinions on how they should be managed.

In response, the Department has focused outreach efforts on positive messages about furbearers and how to reduce human/wildlife conflicts. These efforts include staff presentations, news interviews, social media, blog posts, factsheets, and new signage at the Maine Wildlife Park.

Recognizing that all wildlife species, predator and prey, play valuable roles in a healthy, resilient ecosystem will help ensure the persistence of these species for generations.

Check out the Maine Furbearer Management Plan: **mefishwildlife.com/furbearerplan.**

MDIFW BLOG

Not to Fear, Predators are Here!

Maine's wild predator have an irreplaceable role in our ecosystem, regulating healthy and resilient wildlife populations, yet they still carry the negative connotation associated with their title. Taking a step back to look at the bigger picture reveals the positive power of our predators, their tremendous diversity, and simple ways we can improve our experience living alongside them in Maine. Our latest blog will help you do just that. **Take a look!**

LIVING WITH WILDLIFE

Maine has the largest undeveloped area east of the Mississippi River, the most forested land of any state, a low human population, and a variable climate. These factors support an abundance of wildlife and rich opportunities to engage and live responsibly alongside natural resources.

However, the Department receives thousands of wildlife-related service calls each year. These range from general sightings (including sick and injured wildlife) to property damage, pet and livestock issues, and human safety concerns. We collect data on each call (species, date, location, nature of conflict, and resolution) to measure social carrying capacity, or people's willingness to coexist with wildlife.

The Department helps resolve human-wildlife conflicts by providing information and recommending effective and humane practices that conserve wildlife whenever possible. We use a step-down approach that includes education and extension, prevention, use of regulated hunting and trapping, live capture/relocation, and lethal control.

In 2024, we recorded 5,841 service calls. Raccoon (13%) and red fox (9%) accounted for the most calls by species. Based on past trends, we have increased messages on how to identify normal versus sick or strange wildlife behavior and how simply removing attractants can prevent conflicts.

The Department strives for and values positive coexistence with wildlife and will continue to assess trends to inform future management and outreach.

This work is supported by the federal Pittman-Robertson program and state revenues from sales of hunting and trapping licenses.

WILD TURKEY

Kelsey Sullivan
State Game Bird Biologist

Maine's wild turkey population is considered stable overall. Wild turkeys are present in all 16 counties, though levels vary. In its core range — from Central to Southern Maine — the population is considered abundant. Outside of this area, turkeys are found in lower densities, often in small pockets. Recently, wild turkeys have been expanding into the northern part of the state, especially Wildlife Management Districts (WMDs) 3 and 6 in northeast Aroostook County.

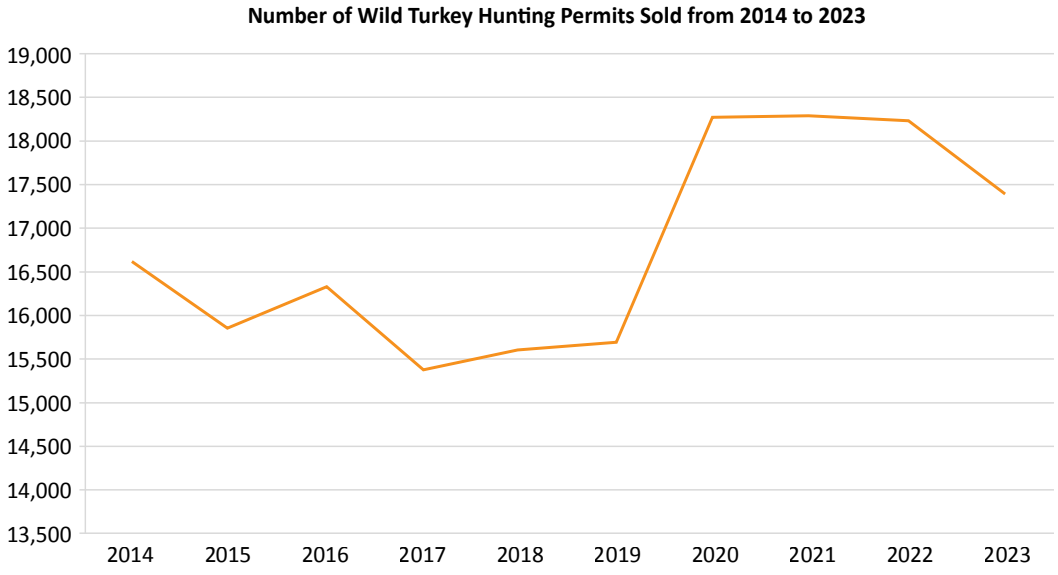
The Department's management focus is to maintain a quality spring wild turkey hunting season while maximizing social tolerance and appreciation of the species. Our goals are to stabilize the Central and Southern Maine populations and encourage growth outside of the core range.

Wild Turkey Hunting

PARTICIPATION

A $20 wild turkey hunting permit is required to hunt wild turkey in Maine and includes the spring and fall turkey seasons. We estimate turkey hunter participation using the number of permits sold each year. Permit sales declined by 5% from 2014 to 2019 before rising 16% from 2019 to 2020, likely due to increased interest in outdoor activities during the COVID-19 pandemic. In 2021 and 2022, sales stabilized at approximately 18,000 permits. In 2023, sales declined to 17,400 but remained above pre-pandemic levels (2014-2019) **(Figure 1).**

FIGURE 1.



Fall Hunting Season Structure and Dates

Maine has a seven-week fall wild turkey hunting season which opens on the Monday closest to September 17 and closes November 7. There is a youth (under 16) turkey hunting day on the Saturday before the Monday opener.

Legal hunting time is ½ hour before sunrise to ½ hour after sunset. Legal methods are bow and arrow, crossbow, and shotgun (gauges 10-20; shot sizes 4-6, or 4-7 in mixed loads). In addition, shotgun gauges 10-28, including .410, may be used with shot sizes 7-9 in Tungsten Super Shot (TSS).

The total bag limit for the fall season is five wild turkeys, with no more than two taken in a single day. Hunters can harvest male and female turkeys from any open WMD but must stay within each WMD's specific bag limit.

WMD BAG LIMITS BY ZONE:

- **Zone 1 (WMD 15–17, 20–25)**: 5 turkeys
- **Zone 2 (WMD 26):** 3 turkeys
- **Zone 3 (WMD 28):** 2 turkeys
- **Zone 4 (WMDs 6-8, 10-14, 18, 19, 27, 29):** 1 turkey
- **WMDs 1–5 and 9** are closed to fall turkey hunting

In 2023, the season opened on Monday, September 18 and closed November 7, with the youth day on September 16.

In 2024, the season opened on Monday, September 16 and closed on November 7, with the youth day on September 14.

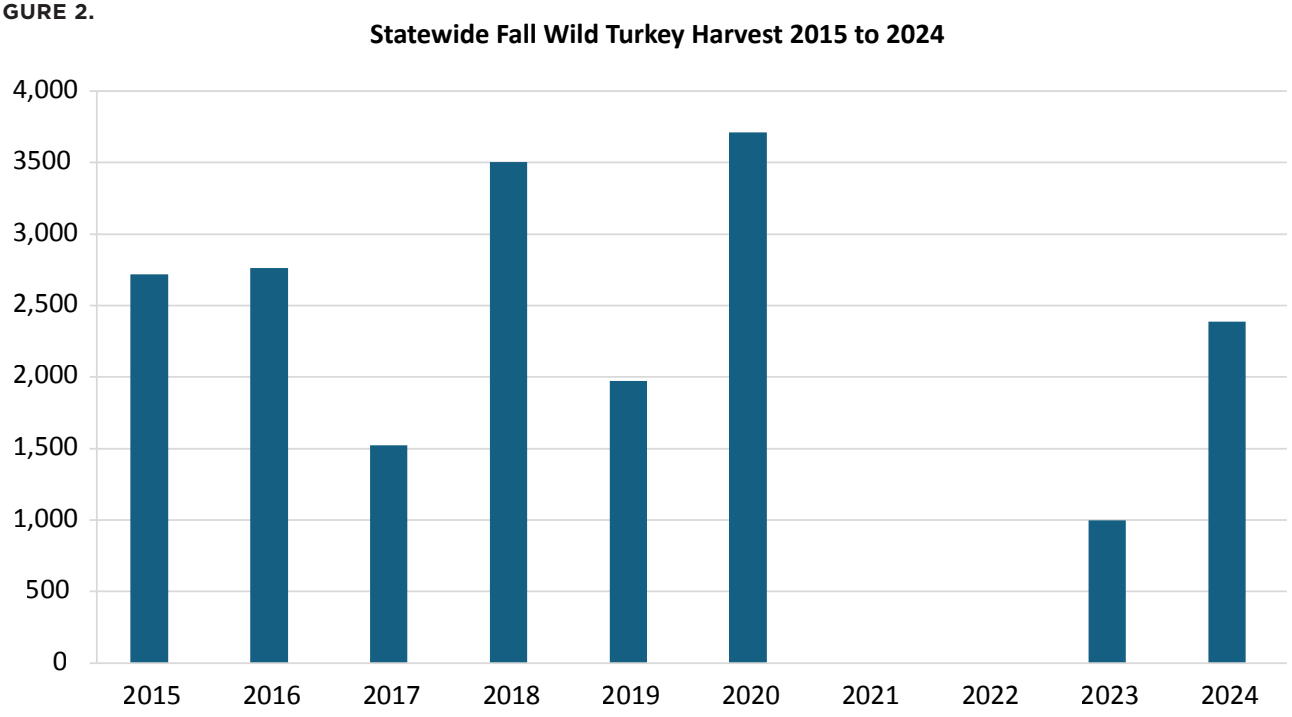
Fall Harvest

In 2021 and 2022, partly in response to the pandemic, hunters were not required to register their fall wild turkey harvests. In 2023, the Department reinstated the registration requirement, and hunters registered 999 wild turkeys. This total was 55% lower than the most recent 10-year average and 34% below the lowest harvest recorded during that time. We attribute this lower-than-expected harvest to hunters needing to relearn the reinstated registration requirement. Although the Department sent out reminders and conducted outreach, many hunters commented that they were unaware the requirement had was reinstated.

In 2024, fall season registrations increased to 2,388 wild turkeys, on par with the most recent 10-year average of 2,447. Fall harvest totals fluctuate based on weather during the hunting season and annual reproductive success. In good reproductive years, more juveniles are available for harvest.

Over the past decade, fall harvest registration fluctuated from a low of 1,521 in 2017 to a high of 3,711 in 2020 **(Figure 2).** This excludes 2021 and 2022 when harvest registration was not required, and 2023 when the registered harvest was well below expectations.

FIGURE 2.



Note 1: Registration was not required in 2021 or 2022
Note 2: Registration was low in 2023, likely due to the learning curve after reinstatement of the registration requirement

Fall harvest by WMD can also fluctuate each year. Since the 2023 fall total harvest registration fell far below expectations, as noted above, we have included 2020 in **Table 1** for comparison with a more typical season.

Most fall hunters use a shotgun to harvest wild turkeys. In both 2023 and 2024, 3% of hunters harvested a turkey with a bow and arrow, 4% used a crossbow, and 93% used a shotgun.

TABLE 1. WILD TURKEY REGISTRATIONS BY WMD FOR THE 2020, 2023, AND 2024 FALL HUNTING SEASONS

WMD	2020	2023	2024
6	66	57	66
7	NOT OPEN TO HUNTING	13	21
8	SEASON CLOSED	18	39
10	19	7	14
11	71	35	65
12	80	19	32
13	30	5	25
14	NOT OPEN TO HUNTING	6	15
15	400	79	215
16	332	57	180
17	363	124	287
18	86	19	45
19	37	11	31
20	384	100	213
21	236	68	196
22	257	46	157
23	369	81	247
24	102	31	84
25	408	104	177
26	292	64	154
27	57	24	47
28	116	29	77
29	6	2	1
TOTAL	3,711	999	2,388

Note: 2021 and 2022 data are not available due to suspended registration requirement during the pandemic.

Spring Hunting Season Structure and Dates

The spring hunting season opens on the Monday closest to May 1 and runs for five consecutive weeks. As in the fall, there is a youth (under 16) turkey hunting day on the Saturday before the Monday opener.

Legal hunting time is ½ hour before sunrise to ½ hour after sunset. Legal methods are bow and arrow, crossbow, and shotgun (gauges 10-20; shot sizes 4-6, or 4-7 in mixed loads). In addition, shotgun gauges 10-28, including .410, may be used with shot sizes 7-9 in Tungsten Super Shot (TSS).

The spring season bag limit is two bearded wild turkeys. Hunters can harvest turkeys from any open WMD but must stay within each WMD's specific bag limit.

WMD BAG LIMITS BY ZONE

- **Zone 1 (WMDs 7 and 9-29):** 2 bearded wild turkeys
- **Zone 2 (WMD 1-6 and 8):** 1 bearded wild turkey

The 2023 spring season ran from May 1 to June 3, with a youth day on April 29.

The 2024 spring season ran from April 29th to June 1st with a youth day hunt on April 27th.

Spring Harvest

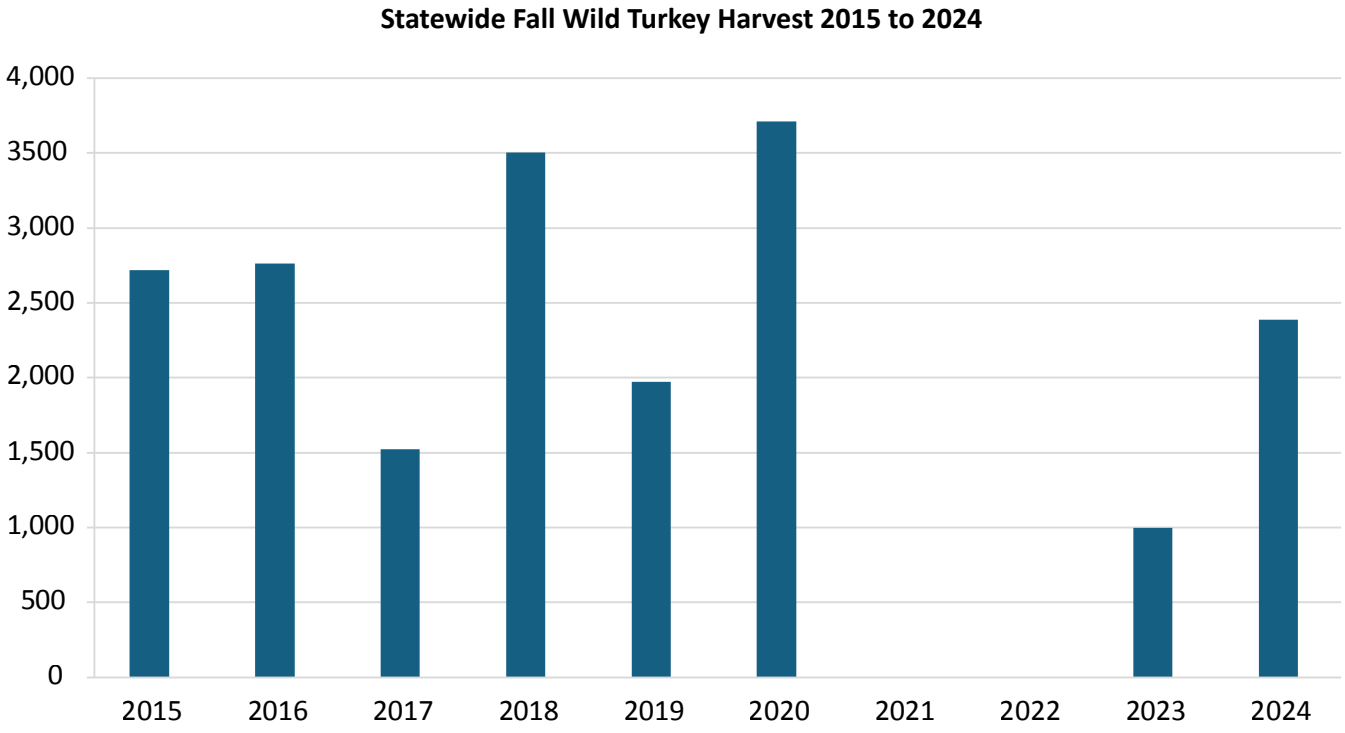
Every spring season, hunters are required to register their wild turkey harvest. In normal years, this is done in person at a registration/tagging station or, starting in 2023, online; however, in 2020, due to COVID-19 protocols, hunters reported their harvests to MDIFW via a post-hunt survey.

Maine continues to have a quality spring wild turkey season, with consistent harvest registration numbers and marked increases in 2022 and 2023 **(Figure 3)**. In both of those years, the spring registration total exceeded 7,000. Prior to 2023, the highest spring total was 6,612 in 2019. In 2024, registration declined slightly to 6,661 but remained above the 10-year average of 6,247.

Although the spring season bag limit is two bearded wild turkeys, most hunters register one. In 2023, 74% registered one turkey and 26% registered two. In 2024, 64% registered one and 36% registered two.

Non-resident participation has increased steadily, with non-residents accounting for 11% of spring registrations in 2019, 19% in 2023, and 22% in 2024.

FIGURE 3.



Spring harvest by WMD can also fluctuate by year **(Table 2)**. These fluctuations are often tied to reproductive success, with harsher winter conditions affecting survival and prolonged rainfall in May and June reducing hatching success and juvenile turkey survival rates. Colder temperatures and wet conditions not only impair thermoregulation; they also increase predation, as predators can more easily detect the scents of wet nests, hens, and juveniles.

TABLE 2. SPRING WILD TURKEY HUNTING SEASON REGISTERED HARVEST FROM 2015 TO 2024 AND 10-YEAR AVERAGES.

WMD	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	AVERAGE
1	0	0	5	3	0	19	0	0	3	0	3
2	6	7	6	4	5	4	3	4	7	6	5
3	7	21	12	3	6	9	20	22	34	56	19
4	0	0	0	1	1	6	5	0	2	4	2
5	13	9	7	2	6	2	14	9	18	27	11
6	39	29	25	48	49	37	90	120	130	153	72
7	57	64	53	29	52	24	37	57	57	63	49
8	3	16	3	7	14	10	19	35	19	21	15
9	3	9	8	6	4	0	9	13	8	10	7
10	6	8	7	9	4	0	18	22	20	17	11
11	54	54	48	71	75	40	71	125	144	140	82
12	142	122	214	91	176	118	164	201	209	210	165
13	112	78	78	117	122	35	87	172	134	146	108
14	33	40	52	43	55	20	53	66	53	40	46
15	473	562	537	643	592	567	605	720	735	661	610
16	310	339	440	455	523	457	464	551	601	522	466
17	500	538	557	675	603	461	562	681	743	676	600
18	67	85	64	118	104	149	92	97	93	62	93
19	23	13	24	28	20	54	22	37	31	16	27
20	628	620	782	604	705	521	701	719	747	686	671
21	535	574	485	608	666	481	651	720	707	654	608
22	350	435	551	571	607	526	439	525	537	443	498
23	458	472	478	754	765	679	607	749	716	658	634
24	207	212	195	174	172	180	185	195	185	193	190
25	401	400	496	586	687	558	498	631	540	624	542
26	295	338	354	450	456	458	302	406	372	372	380
27	41	31	43	70	68	51	97	118	104	115	74
28	39	35	47	40	67	58	58	66	83	69	56
29	39	48	28	20	8	13	18	20	18	17	23
TOTAL	**5,272**	**5,852**	**5,597**	**6,236**	**,612**	**6,216**	**5,891**	**7,081**	**7,050**	**6,661**	**TOTAL**

Youth Day Harvest

In 2023, 457 youth hunters registered 566 wild turkeys on Youth Day, with 76% registering one turkey and 24% registering two. In 2024, 373 youth hunters registered 459 turkeys, with 81% registering one turkey and 19% registering two. The 2023 Youth Day harvest was 10% above the 10-year average of 514 turkeys, while the 2024 Youth Day harvest was 11% below average. These annual fluctuations can be attributed partly to weather, with consistent rainfall on Youth Day tending to reduce participation.

HARVEST REGISTRATION

For the spring 2023 season, the Department launched a self-registration system for hunters to register their turkey harvest online. Hunters could choose to register at a traditional in-person station or use the mobile- and desktop-accessible online application. We kept this option open for the 2023 fall and 2024 spring seasons.

During the 2023 spring season, 67% of wild turkeys were registered online; and in 2024, this increased to 70%. Fall was similar, with 76% of turkeys registered using the system in 2023 and 77% in 2024.

Research and Monitoring

REWARD BANDING STUDY

To refine the wild turkey harvest rate estimates from past band reporting, we conducted a mark-recapture reward banding study. During winter 2023, we banded turkeys, then tracked how many were harvested during the spring 2023 season. We targeted adult males (toms) for capture and banded 267 of them from January to early April, giving every other captured tom a $100.00 reward band and the others a standard non-reward band. Hunters reported 86 banded toms (32%) during the spring season, with 5% more reward bands reported than non-reward bands. We will use this reporting rate difference as a correction factor in future population modeling and estimates.

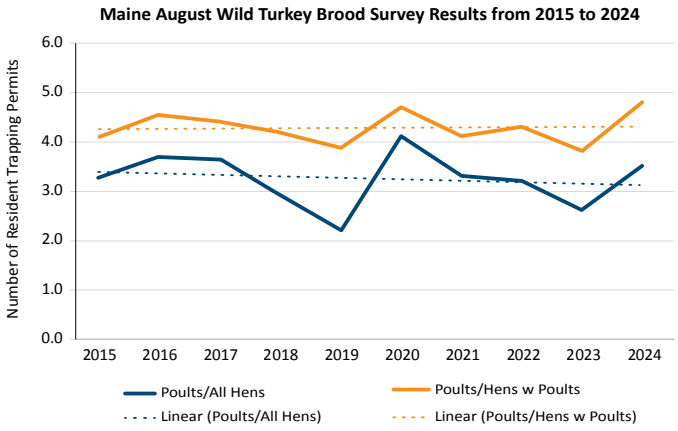
AUGUST WILD TURKEY BROOD SURVEY

The August Wild Turkey Brood Survey (Brood Index) monitors annual reproductive success. The survey results provide two different metrics: number of poults per all hens observed (measures overall reproductive rate of the population), and number of poults per hen with a brood (measures average individual reproduction rate).

Data from the 2024 brood survey aligned with biologists' field observations of more females with young than average during the summer of 2024. The average number of poults per all hens observed was 3.5, up from the last 10-year average of 3.2. The average number of poults per hen with a brood was 4.8, up from the last 10-year average of 4.3 **(Figure. 4)**.

The linear trend of poults per hen with a brood (individual reproductive rate) shows a slight increase in the most recent 10 years, while the linear trend of all poults to all hens observed (overall reproductive rate) shows a slight decline. This may be a result of higher wild turkey densities in their core range and higher numbers of juvenile hens, which are generally less successful nesters.

FIGURE 4.



POPULATION MODELING AND FUTURE MONITORING

In 2017, MDIFW, the University of Maine, and the National Wild Turkey Federation began a research project to collect information on various aspects of wild turkey ecology in Maine to inform conservation and harvest management. The field portion of the project was completed in the fall of 2020, and the Department is continuing to work with the University of Maine on population modeling and harvest management simulations. This work supports the development of an adaptive harvest management system and will inform future population monitoring efforts. Its objectives are summarized below:

1. Quantify uncertainty in wild turkey abundance estimates and identify the most efficient sampling framework to improve reliability. This includes evaluating how different hunter reporting methods affect estimate reliability.
2. Simulate the effects of different harvest management regulations on region-specific turkey abundance.
3. Develop a web-based tool for evaluating potential population outcomes under different harvest scenarios.

Health and Disease

The wild turkey population is strong, and most individuals have a high level of fitness. Like all wildlife, turkeys may be more susceptible to disease when certain conditions are present, such as high turkey density or weather that promotes higher populations of disease-transmitting insects like mosquitos and black flies. When both turkey and insect populations are high, disease incidence tends to increase.

AVIAN POX

From 2012 to 2014, Maine's wild turkey population was at its peak. During that same time, Avian Pox was detected at higher rates, with some hunters reporting lethargic-acting turkeys with lesions on the head. Most wild turkeys can develop an immunity to the virus, and very few cases have been documented since 2014. Avian Pox is not known to be transmissible to humans, but hunters who harvest turkeys with lesions on their head should report them to the Department before registering the turkey.

LYMPHOPROLIFERATIVE DISEASE VIRUS (LPDV)

A newly emerging disease called Lymphoproliferative Disease Virus (LPDV) has been found in wild turkey populations across their North American range. In Maine, LPDV infection fluctuates annually, and in some years, up to 78% of the wild turkeys we captured tested positive. This avian oncogenic tumor causing retrovirus was first identified as a disease agent that can cause tumors. Fortunately, most wild turkeys with LPDV are asymptomatic and survive the disease, but some do experience clinical symptoms. And when other diseases are present, LPDV can further compromise the immune system. LPDV is not known to be transmittable to humans.

HIGHLY PATHOGENIC AVIAN INFLUENZA

Highly Pathogenic Avian Influenza (HPAI), also known as Bird Flu, is a type A influenza virus that affects domestic and wild birds and can be transmitted to other animals, but it is rare in humans. Although widespread in wild aquatic birds and poultry, it rarely affects wild turkeys in Maine. During the North American outbreak from 2022-2025, which infected over 90 species of wild birds and millions of domestic poultry, including hundreds of individual birds in Maine, only one Maine wild turkey tested positive. Prior to 2022, we did not detect any cases of HPAI in our winter turkey sampling.

Management

SPECIES PLANNING

Wild turkey management and species planning has evolved from population recovery to long-term sustainability. With a reestablished, now abundant population strong enough to sustain annual spring and fall hunting seasons across the state, the Departments is now transitioning from growing the population to managing it for a quality hunting opportunities and maintaining social tolerance.

We are currently developing an adaptive harvest management and monitoring system using an Integrated Population Model. This system incorporates wild turkey productivity, survival, and harvest data to guide decisions and inform the next iteration of the Wild Turkey Management Plan.

LIVING WITH WILDLIFE/CONFLICT RESOLUTION

Maine's wild turkeys are managed both as a hunted species and a valued wildlife resource. When conflicts with wild turkeys arise, they're most often on dairy farms, orchards, and fruit-growing operations, where turkeys can damage crops or feed and defecate on exposed bunker-stored corn silage.

Early deterrence is key. Property owners can resolve or avoid most problems by wildlife-proofing buildings, property, animals, or crops with fencing, barriers, corrals, repellents, and/or improved sanitation. These deterrents can provide long-term relief by dissuading or preventing access by wild turkeys. For problems where physical barriers are not practical or have been unsuccessful, hazing can be an effective strategy if used early and frequently.

Foreground: Mark Caron, Region F and Tom Turkey; Allen Starr, Region F – retired; Background: Nathan Bieber, Deer Biologist. Bradford Capture Site, Winter 2019 – Wild Turkey Banding and Radio Telemetry Study.

This work is supported by the federal Pittman-Robertson program and state revenues from sales of hunting and trapping licenses.

RUFFED GROUSE

Kelsey Sullivan
State Game Bird Biologist

The ruffed grouse (*Bonasa umbellus*) is one of Maine's most popular and ubiquitous game species. They occur in every county at varying densities depending on the amount of quality habitat, which can include early successional and mixed growth upland and lowland hardwoods, old fields, and orchards. Young forests are a key habitat component, providing both food and dense cover for protection from predators. Management for ruffed grouse focuses on encouraging these younger forests on both public and private lands.

Ruffed Grouse Hunting Season Structure

Maine's three-month ruffed grouse season runs statewide from the last Saturday in September to the end of December. The daily bag limit is four grouse, and the possession limit is eight.

- The 2023 ruffed grouse season ran from September 30 to December 30.
- The 2024 ruffed grouse season ran from September 28 to December 31.

Research and Monitoring Introduction

To monitor the population, the Department conducts spring male drumming surveys and analyzes May-June rainfall and temperature data. In drumming surveys, we monitor the breeding grouse population by counting the number of males drumming along routes in different parts of the state. May and June rainfall and temperature records characterize grouse nesting and early brood rearing conditions and can help us to predict reproductive success and fall population levels.

In 2024, we initiated a Parts Collection Survey (PCS), which involved collecting wing and rump feathers from harvested grouse to determine age and sex. The PCS can help evaluate harvest levels and estimate juvenile recruitment into the fall population.

These annual monitoring efforts help the Department understand Maine's ruffed grouse population trends and inform our efforts to conserve and manage this important species to Maine's hunting community and economy.

RUFFED GROUSE DRUMMING SURVEY

In the spring of 2014, we conducted drumming surveys at three Maine sites: Frye Mountain Wildlife Management Area in Montville, the Studmill Road east of Milford, and routes in Aroostook County. Additional sites were added in 2015, including the Rangely area and Moosehorn National Wildlife Refuge. Subsequent routes have been added or removed along the way due to factors like route and road conditions and changing work priorities. On each route, we survey 15 stops spaced ½ mile apart for drumming activity. We conduct surveys in the morning, starting at ½ hour before sunrise, and repeat each route up to three times between late April and late May. At each stop, observers record the number of individual males heard drumming and the total number of drumming events heard in a five-minute period. The maximum number of individual grouse heard drumming on each route is one metric that we use to monitor annual population trends. **Figure 1** shows the 2024 grouse survey routes.

Survey data are presented as a maximum count (max count) of drumming males per route. In 2024, the average max count of individual male grouse heard drumming per route (15 stops per route) across all survey areas and routes was 7 per route. Max counts ranged from a low of 3 (Lincoln Pond Road route, Rangeley) to 20 (Burrill Woods Road route, Hartland). Overall, the average count across all routes (except the Burrill Woods Road, due to under sampling) was below the long-term average of 9 drumming males per route. This is consistent with the perceived lower reproductive success of grouse in the 2023 nesting season, likely due to persistent spring rainfall negatively affecting hatching success and chick survival. Grouse hunters also reported seeing fewer birds while afield, supporting the conclusion of lower recruitment into the 2024 breeding population.

FIG. 1. AREAS SURVEYED FOR DRUMMING RUFFED GROUSE IN THE SPRING OF 2024 IN MAINE.

TABLE 1. THE MAXIMUM NUMBER OF INDIVIDUAL RUFFED GROUSE DRUMMING ON ROUTES BETWEEN 2014 AND 2024.

YEAR	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AC2 - Reality Rd	18	12	4	1	9	4	7	6		9	5
AC3 - Beaver Brook Rd			3	2						5	4
CM1 - Burrill Woods Rd				21							20
FM1 - Frye Mountain	10	13	4	7	15	15	16		9		5
RA1 - Tim Pond Rd		9	4	5	7	4	4	8	2	5	5
RA2 - Linconln Pond Rd		16	10	5	9	9	6	5	5	4	3
SM1 - County Rd/St Regis Rd	7	7	8	14	14		19				5
SM2 - Studmill Rd/Titcomb Pond Rd	15	9	11	12	6	23					8

AC = Aroostook County, CM = Central Maine, FM = Frye Mountain WMA, RA = Rangeley Area, SM = Stud Mill Area

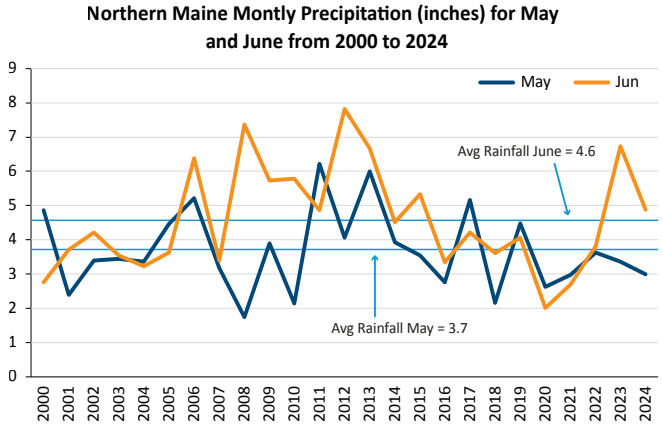
MAY AND JUNE RAINFALL DATA

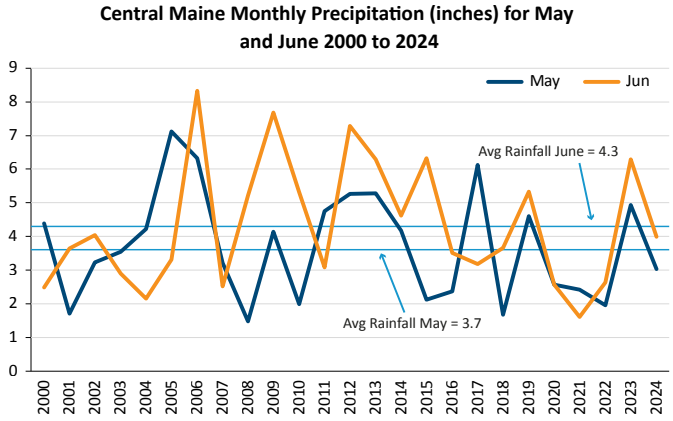
Precipitation during nesting and early brood rearing periods can significantly impact juvenile recruitment into the fall grouse population. Persistent cold and wet conditions impair thermoregulation and increase predation risk, as predators can more easily locate wet nests, hens, and juveniles by scent. The timing of this critical period in grouse reproductive chronology can vary by latitude: in southern Maine, grouse hens are typically on nests in May, with eggs hatching in early June, while in northern Maine, nesting extends into mid-May and hatching into mid-June.

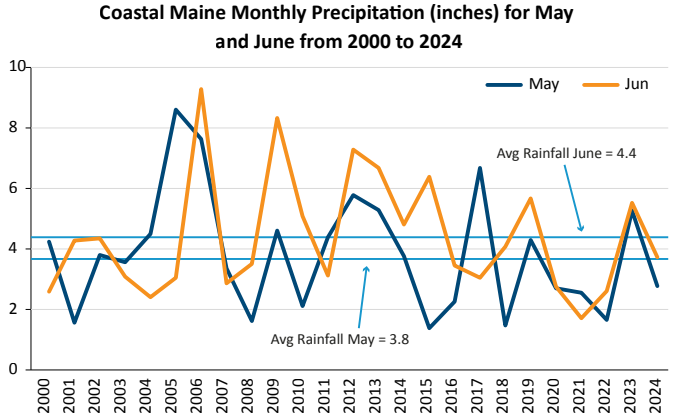
In 2023, June rainfall was well above average in northern, central, and coastal Maine. Rainfall in May was also above average in the central and coastal regions (Maine Climate Office). Although the PCS was not in place that year, biologists in summer and hunters in fall (October-November) made few observations of grouse, supporting the theory that greater rainfall in May and June can negatively affect juvenile ruffed grouse recruitment.

In 2024, May and June rainfall statewide was either below or near average **(Figure 2)**.

FIGURE 2. MAY AND JUNE MONTHLY PRECIPITATION (INCHES) FROM 2000 TO 2024 IN THE NORTHERN, CENTRAL, AND COASTAL REGIONS.





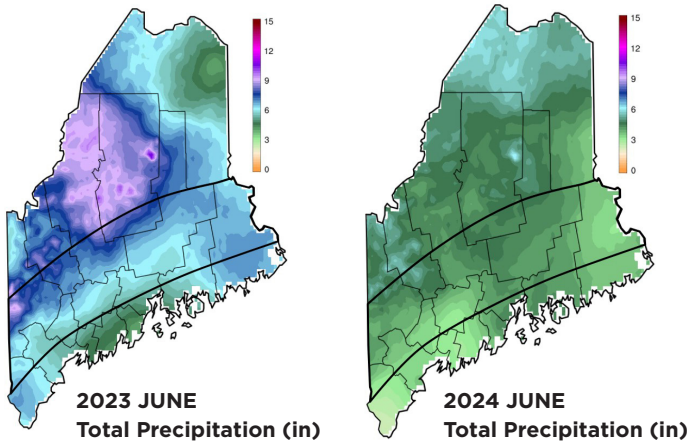


Weather data is from the Maine Climate Office

mco.umaine.edu/climate/me_monthly/

In June 2023, statewide precipitation was above average. In June 2024, it was below average **(Figure 3)**.

FIGURE 3. SHOWING THE HIGHER AMOUNT OF RAINFALL IN JUNE OF 2023 COMPARED TO JUNE OF 2024



PARTS COLLECTION SURVEY

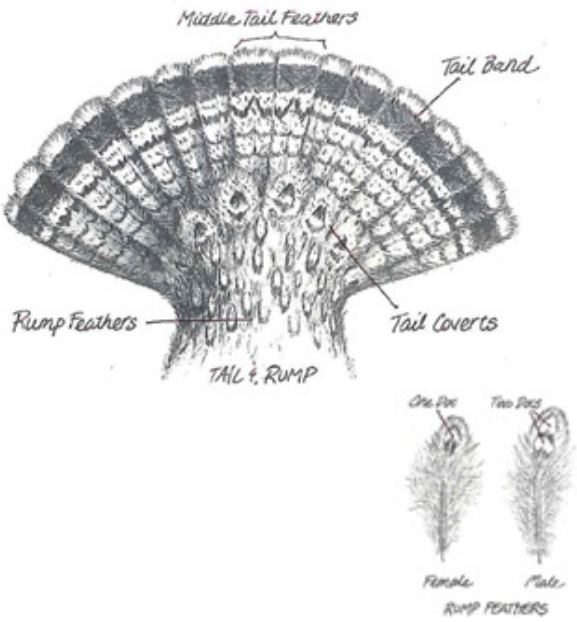
One measure of a wildlife population's reproductive success is the annual rate of juvenile recruitment into the population. For game bird species, a good period to focus on is the fall, during the open season on that species. By collecting samples from hunters' harvested birds, biologists can classify the age and sex of the harvested species and estimate recruitment.

In fall 2024, a pilot PCS study was initiated to explore using this method to monitor ruffed grouse reproductive success. Following the hunting season, cooperating grouse hunters submitted 82 wing samples. In addition to the wing, each sample also included rump feathers, which were used to determine the sampled bird's sex. Looking at the first few rows of rump feathers, which cover the base of the tail coverts, we can determine sex: one white dot at the tips of these feathers is characteristic of females, while two white dots indicate a male **(Figure 4)**.

A reliable method to classify a ruffed grouse's age is to examine the primary wing feathers, specifically the 9th and 10th primaries. Juvenile grouse generally have narrowed and pointed 9th and 10th primaries, often with wear and nicking on the outer margins. The outermost (10th) primary also resembles a sharp, narrow knife blade. By contrast, adult 9th and 10th primaries are generally rounded, with smooth and entire feather margins **(Figure 5)**.

In 2024, the ratio of juveniles to adult females harvested was similar across the range of samples collected statewide, averaging 4.1 juveniles per adult female.

FIGURE 4. USING RUMP FEATHERS TO DETERMINE SEX OF RUFFED GROUSE.

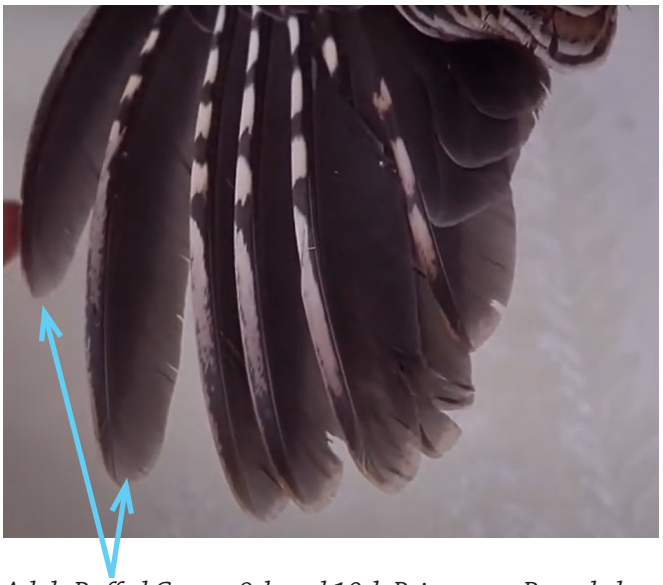


Since 2024 was the first year of the survey, these results are best understood in the context of similar efforts in other states. For example, in Minnesota, a ruffed grouse hunting weekend held yearly from 2017 to 2019 yielded juvenile-to-adult female ratios ranging from 2.7 (2018) to 7.7 (2019). In New Hampshire, the juvenile-to-adult female ratio was 2.93 in 2023 and 1.26 in 2022.

We will be continuing with this project, following a successful pilot year which established a baseline for monitoring ruffed grouse reproductive success.

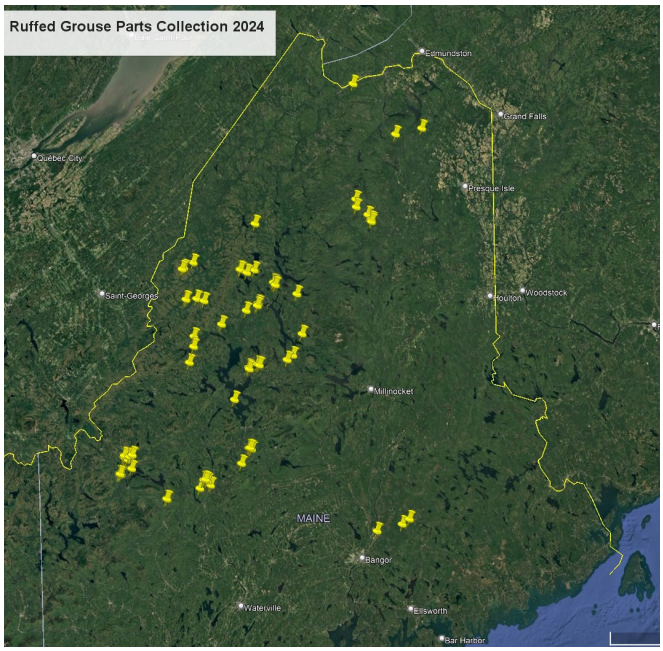
FIGURE 5. EXAMPLES OF A JUVENILE AND ADULT GROUSE WING.

Juvenille Ruffed Grouse 9th and 10th Primary—Pointed



Adult Ruffed Grouse 9th and 10th Primary— Rounded

FIGURE 6. LOCATIONS OF RUFFED GROUSE PARTS COLLECTIONS IN THE FALL OF 2024.



Health and Disease

WEST NILE VIRUS

West Nile Virus (WNV) is a mosquito-borne virus that affects birds and, to a lesser extent, other vertebrates. Recently, in Michigan, WNV was found to be the cause of death in a high number of ruffed grouse. And in Pennsylvania, WNV is a suspected cause of recent population declines. An analysis of Pennsylvania's historical Breeding Bird Survey data found a strong correlation between years with high WNV levels in sampled mosquitos and reduced ruffed grouse flushing rates (or lower grouse numbers) in the fall.

During the fall 2018, 2019, and 2020 hunting seasons, Maine grouse hunters submitted samples from their harvested birds to a multi-state WNV surveillance effort. Of the 101 samples they submitted in the fall of 2018, two (2%) were positive. Of the 32 samples submitted in 2019, 2 (6%) were positive, and of the 132 submitted in 2020, 19 (14%) were positive. We attribute the higher level of infection in 2020 to the Maine grouse population's exceptional reproductive success that summer — with more grouse on the landscape, more individuals were exposed to the virus.

As Pennsylvania continues to look at the relationship between WNV and their flushing rates, they are finding that areas of quality ruffed grouse habitat have lower WNV detection. If quality habitat can be promoted and managed for ruffed grouse, WNV may not have such a strong influence on future grouse population trends. Fortunately, in Maine, several million acres of forest in the North Maine Woods are managed for the forest products industry, resulting in quality ruffed grouse habitat that can buffer the effects of WNV.

HIGHLY PATHOGENIC AVIAN INFLUENZA

Highly Pathogenic Avian Influenza (HPAI), also known as Bird Flu, is a type A influenza virus that affects domestic and wild birds and can be transmitted to other animals, but is rare in humans. In 2022, North America experienced an outbreak of HPAI, infecting over 90 species of wild birds and millions of domestic poultry. In Maine, detection of HPAI in ruffed grouse is rare, and during the 2022 and 2025 outbreaks, we did not document any cases.

Management

The Department's grouse management is primarily focused on maintaining and promoting suitable habitat, both on WMAs and private lands. Our lands program actively manages timber sales and forest clearings on WMAs where conditions are suitable for young forest regeneration.

University of Maine Master's student Ellie Mangelinckx surveying a hen ruffed grouse with a VHF radio transmitter on a nest – Summer 2015. Photo – Kelsey Sullivan – MDIFW.

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