

MAINE STATE LEGISLATURE

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2020-21

RESEARCH & MANAGEMENT REPORT

Game Species Conservation & Management



2020-21 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

Game Mammal Conservation & Management

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Game Bird Conservation & Management

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Cover photo by Chris Bennett



MAMMAL CONSERVATION & MANAGEMENT

The Mammal Group develops and oversees Maine’s mammal 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 also make regulatory recommendations on hunting and trapping of mammals to the Wildlife Division Director. We conduct all regulatory recommendations, planning, and research in close cooperation with regional wildlife biologists in the Wildlife Management section.

MEET THE GAME MAMMAL GROUP



Craig McLaughlin, Ph.D.
Wildlife Research and Assessment Section
Supervisor/Acting Mammal Group Leader

Craig supervises the Section and supports the Mammal Group’s conservation and management programs. As one of the Department’s primary liaisons with research programs at the University of Maine and other regional universities, he facilitates partnerships that strengthen the Department’s research programs. These programs provide science to inform management that conserves both common and uncommon species statewide.



Nathan Bieber
Wildlife Biologist
Deer

Nathan oversees deer management system implementation, working closely with a team of regional biologists to make recommendations for allocating Any-Deer Permits and analyze hunter harvest and biological data. He also organizes MDIFW’s chronic wasting disease monitoring efforts and serves as the departmental spokesperson on white-tailed deer issues. Nathan and the Cervid Working Group are updating the deer management system to address the priorities described in the Department’s new Big Game Management Plan. He is also currently collaborating with a team of biologists on a deer winter survival study in Maine and New Brunswick.



Lee Kantar
Wildlife Biologist
Moose

Lee oversees Maine’s Moose Management program. Lee’s work involves conducting aerial moose surveys, collecting and analyzing biological information from moose, making hunting permit recommendations, and serving as the departmental spokesperson on moose. Lee led research on Adult Cow and Calf Survival (2014-2020) with cooperators and counterparts in NH/VT. He is continuing research on moose and winter ticks thru the implementation of an Adaptive Hunt Unit in northwestern Maine as well as continued collaboration with northeastern wildlife agencies and universities to assess moose populations in Maine as well as the northeast. This work will continue to inform the moose management system to address priorities described in the Department’s Big Game Management Plan.



MEET THE GAME MAMMAL GROUP



Jennifer Vashon
Wildlife Biologist
Black Bear and Canada Lynx

Jennifer oversees the management of black bears and Canada lynx – a federally-threatened species. Jen designs and implements surveys and monitoring plans for bears and lynx and analyzes biological data for these species. She is the departmental spokesperson for lynx and bear, makes annual recommendations for harvesting black bears, and provides technical support on bear and lynx issues to stakeholders in Maine and other states. Jen also ensures that the Department meets its obligations under the federal Incidental Take Permit for Canada lynx.



Shevenell Webb
Wildlife Biologist
Furbearers

Shevenell oversees the management of furbearers, work that involves monitoring populations, developing a new Furbearer Management Plan, conducting research, recommending trapping regulations, and serving as the departmental spokesperson for furbearers. Shevenell is participating in several research projects, including a study to determine the most effective way to monitor Maine’s marten and fisher populations.

MAMMAL GROUP CONTRACT WORKERS AND VOLUNTEERS

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WHITE-TAILED DEER

Nathan Bieber

2020 Deer Harvest

SEASON DATES AND STRUCTURE

Maine offered five different structured hunting seasons:

- Expanded Archery
- Regular Archery
- General Firearms
- Two Muzzleloader Seasons

A total of 79 days to pursue white-tailed deer in 2020





Harvest Information & Biological Data

PERMIT ALLOCATION

There were 109,990 Any-Deer Permits (ADP) distributed among 26 Wildlife Management Districts (WMDs) and 2 deer management subunits to meet the doe harvest objective of 13,253 adult does. Because many hunters elect not to harvest a doe or not to hunt, MDIFW applies an expansion factor to each WMD to ensure enough ADPs are issued to meet doe removal goals for that district. This expansion factor results in more permits being issued than the number of does expected to be harvested. An expansion factor of 10, for example, indicates that MDIFW estimates it will need to issue 10 permits to harvest one adult doe. The average statewide expansion factor is usually between six and seven with higher expansion factors occurring in WMDs in central and southern Maine.

The 2020 ADP allocations ranged from zero permits in WMDs 1, 4, and 5, to 17,000 in WMD 23. The WMDs receiving the most ADPs per square mile of huntable habitat were WMD 24 (34 permits/mi²), WMD 22 (30 permits/mi²), WMD 21 (27 permits/mi²), WMD 25 (24 permits/mi²), and WMD 23 (22 permits/mi²).

Overall, 87,397 people applied for ADPs for the 2020 hunting seasons: 81,911 residents and 5,486 non-residents; 9,912 landowners; 3,371 Superpack permittees; 7,442 junior hunters.

As part of an effort to mitigate some of the impacts associated with locally overabundant deer, MDIFW issues bonus antlerless deer permits in parts of some WMDs, referred to as deer management subunits. These deer management subunits consist of groups of towns experiencing high levels of deer human conflicts, such as deer-vehicle collisions, nuisance deer reports, and cases of Lyme Disease. Subunits are impermanent but are intended to persist for at least 5 years, at which point MDIFW will reevaluate whether a subunit designation is still appropriate for each impacted area. Bonus permits allow hunters to harvest one additional antlerless deer (i.e.- a hunter may harvest a buck on their regular hunting license in addition to an antlerless deer on their bonus permit). Two deer management subunits were in place during the 2020 deer hunting seasons: subunit 25a consisting of the towns of Georgetown and Arrowsic in WMD 25 and subunit 26a consisting of portions of the towns of Brewer, Bucksport, Castine, Dedham, Holden, Orland, Orrington, Penobscot, and Verona in WMD 26. The need for additional subunits will be evaluated each year.



EXPANDED ARCHERY CHANGES

The expanded archery program was created to promote archery hunting in areas where hunting opportunities are limited, often by local firearms discharge ordinances, and where this additional hunting pressure will not disrupt other hunting opportunities or pose a public safety risk. Expanded archery areas include Wildlife Management District (WMD) 29, a large portion of WMD 24, and nine smaller areas near or around Augusta, Bangor, Bucksport, Camden, Castine, Eliot, Lewiston, Portland, and Waterville.

In 2020, existing expanded archery areas were reviewed, and additions to four of the expanded archery areas were recommended and adopted. These increased the sizes of the WMD 24, Augusta, Camden, and Lewiston areas.



Maine's deer hunters registered 33,159 deer during the 2020 hunting seasons.

HARVEST STATISTICS

Maine's deer hunters registered 33,159 deer during the 2020 hunting seasons (Tables 1, 2). Overall, 4,836 more deer were harvested in 2020 than in 2019, representing a 17.1% increase. Approximately 86% of the total deer harvest occurred during the regular firearms season (including Youth Day and Opening Saturday).



TABLE 1. STATEWIDE SEX AND AGE COMPOSITION OF THE 2020 DEER HARVEST IN MAINE BY SEASON AND WEEK.

SEASON	ADULT		FAWN		TOTAL DEER	TOTAL ANTLERLESS DEER	PERCENT BY SEASON AND WEEK		
	BUCK	DOE	BUCK	DOE			TOTAL	ADULT BUCK	ANTLERLESS
ARCHERY	1,136	1,372	290	344	3,142	2,006	9	6	14
Expanded	683	879	194	233	1,989	1,306	6	4	9
Oct	453	493	96	111	1,153	700	3	2	5
YOUTH DAY	330	446	130	126	1,032	702	3	2	5
REGULAR FIREARMS	17,101	6,710	2,042	1,690	27,543	10,442	84	89	75
Opening Sat	2,636	1,196	340	292	4,464	1,828	14	14	13
Nov 2 - 7	4,298	1,770	550	452	7,070	2,772	21	22	20
Nov 9 - 14	3,969	1,231	428	318	5,946	1,977	18	21	14
Nov 16 - 21	3,627	1,170	366	298	5,461	1,834	17	19	13
Nov 23 - 28	2,571	1,343	358	330	4,602	2,031	14	13	15
MUZZLELOADER	571	592	136	142	1,441	870	4	3	6
Nov 30 - Dec 5	228	157	41	42	468	240	1	1	2
Dec 7 - 12	343	435	95	100	973	630	3	2	4
UNKNOWN	1	0	0	0	1	0	0	0	0
TOTAL	19,139	9,120	2,598	2,302	33,159	14,020	100	100	100

Corrections applied for errors in sex-age. Estimated error rates are applied independently for each table, so estimates will vary. 1 record with no season recorded.



2020

TABLE 2. SEX AND AGE COMPOSITION AND HARVEST TOTALS FOR THE 2020 DEER HARVEST IN MAINE BY WILDLIFE MANAGEMENT DISTRICT.

WMD	ADULT		FAWN		TOTAL		HARVEST PER 100 ADULT BUCKS		HARVEST PER 100 SQ MILES HABITAT		
	BUCK	DOE	BUCK	DOE	ANTLERLESS DEER	ALL DEER	DOES	ANTLERLESS	ADULT BUCKS	ALL	ADULT DOES
1	72	1	0	0	1	73	1	1	5	5	0
2	50	17	4	3	24	74	34	48	4	6	1
3	69	10	5	4	19	88	14	28	8	10	1
4	55	0	0	0	0	55	0	0	3	3	0
5	31	0	0	0	0	31	0	0	2	2	0
6	190	80	26	20	126	316	42	66	13	22	6
7	244	20	11	4	35	279	8	14	18	20	1
8	209	6	7	1	14	223	3	7	11	11	0
9	67	6	4	1	11	78	9	16	7	9	1
10	62	7	3	2	12	74	11	19	7	8	1
11	211	28	15	8	51	262	13	24	13	16	2
12	538	55	30	11	96	634	10	18	59	69	6
13	383	49	19	13	81	464	13	21	68	82	9
14	171	15	8	3	26	197	9	15	23	27	2
15	1,420	549	141	119	809	2,229	39	57	152	239	59
16	1,466	742	226	193	1,161	2,627	51	79	190	340	96
17	2,004	1,276	324	306	1,906	3,910	64	95	150	292	95
18	389	65	24	16	105	494	17	27	32	40	5
19	170	23	12	8	43	213	14	25	15	18	2
20	1,333	525	152	120	797	2,130	39	60	230	367	90
21	1,320	805	245	209	1,259	2,579	61	95	274	536	167
22	1,429	960	306	278	1,544	2,973	67	108	330	686	222
23	1,925	1,227	332	318	1,877	3,802	64	98	246	487	157
24	740	648	167	172	987	1,727	88	133	338	788	296
25	1,795	1,249	295	303	1,847	3,642	70	103	256	519	178
26	1,461	312	108	79	499	1,960	21	34	162	218	35
27	643	105	39	25	169	812	16	26	88	111	14
28	352	29	17	5	51	403	8	14	33	37	3
29	347	307	74	82	463	810	88	133	239	558	211
STATEWIDE	19,146	9,116	2,594	2,303	14,013	33,159	48	73	67	115	32

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



The statewide antlered (adult) buck harvest totaled 19,146, a 4.7% increase from the 2019 hunting seasons (Table 2). Excluding WMD 29, the five WMDs producing the most bucks per square mile in 2020 were (in descending order) districts 24, 22, 21, 25, and 23. Overall, 14,013 antlerless deer were registered by hunters. The statewide total harvest of adult (yearling and older) does was 9,116, leaving the harvest below the Department’s doe harvest objective of 13,253. Adult doe harvests have been on average ~19.5% below objective over the last decade. The additional antlerless harvest was comprised of 2,594 male and 2,303 female fawns.

Maine residents harvested 31,063 deer in 2020, representing 94% of the total deer harvest (Tables 3-5). Percentage of resident harvest by season were: Youth Day (98.6%), Archery (97.0%), Muzzleloader (97.7%), and Firearms (92.5%, Table 3). The areas of the state that produced the most non-resident harvested deer were along the western Maine-Canada border (Tables 4, 5).

 2020

TABLE 3. 2020 MAINE DEER HARVEST BY SEASON AND RESIDENCY.

SEASON AND WEEK	RESIDENTS	NONRESIDENTS	TOTAL	PERCENT BY RESIDENTS
ARCHERY	3,044	98	3,142	96.9%
Expanded	1,934	55	1,989	97.2%
Oct	1,110	43	1,153	96.3%
YOUTH DAY	1,014	18	1,032	98.3%
REGULAR FIREARMS	25,607	1,936	27,543	93.0%
Opening Sat	4,429	35	4,464	99.2%
Nov 2 - 7	6,488	582	7,070	91.8%
Nov 9 - 14	5,390	556	5,946	90.6%
Nov 16 - 21	4,976	485	5,461	91.1%
Nov 23 - 28	4,324	278	4,602	94.0%
MUZZLELOADER	1,398	43	1,441	97.0%
Nov 30 - Dec 5	451	17	468	96.4%
Dec 7 - 12	947	26	973	97.3%
UNKNOWN	0	1	1	0.0%
TOTAL	31,063	2,096	33,159	93.7%



2020

TABLE 4. 2020 MAINE DEER HARVEST BY COUNTY AND RESIDENCY

COUNTY OF KILL	RESIDENTS	NONRESIDENTS	TOTAL	PERCENT BY RESIDENTS
ANDROSCOGGIN	2,022	51	2,073	97.5%
AROOSTOOK	674	67	741	91.0%
CUMBERLAND	2,777	86	2,863	97.0%
FRANKLIN	798	125	923	86.5%
HANCOCK	1,570	81	1,651	95.1%
KENNEBEC	3,528	138	3,666	96.2%
KNOX	1,745	76	1,821	95.8%
LINCOLN	1,598	42	1,640	97.4%
OXFORD	1,733	239	1,972	87.9%
PENOBSCOT	3,186	256	3,442	92.6%
PISCATAQUIS	589	107	696	84.6%
SAGADAHOC	1,504	36	1,540	97.7%
SOMERSET	2,357	297	2,654	88.8%
WALDO	2,437	228	2,665	91.4%
WASHINGTON	1,130	59	1,189	95.0%
YORK	3,415	208	3,623	94.3%
TOTAL	31,063	2,096	33,159	93.7%



2020

TABLE 5. 2020 MAINE DEER HARVEST BY WILDLIFE MANAGEMENT DISTRICT AND RESIDENCY.

WMD	RESIDENTS		NONRESIDENTS		TOTAL
	NUMBER	PERCENT	NUMBER	PERCENT	
1	52	71.2%	21	28.8%	73
2	65	87.8%	9	12.2%	74
3	82	93.2%	6	6.8%	88
4	29	52.7%	26	47.3%	55
5	25	80.6%	6	19.4%	31
6	310	98.1%	6	1.9%	316
7	174	62.4%	105	37.6%	279
8	135	60.5%	88	39.5%	223
9	65	83.3%	13	16.7%	78
10	65	87.8%	9	12.2%	74
11	220	84.0%	42	16.0%	262
12	574	90.5%	60	9.5%	634
13	392	84.5%	72	15.5%	464
14	162	82.2%	35	17.8%	197
15	2,023	90.8%	206	9.2%	2,229
16	2,493	94.9%	134	5.1%	2,627
17	3,579	91.5%	331	8.5%	3,910
18	444	89.9%	50	10.1%	494
19	188	88.3%	25	11.7%	213
20	1,974	92.7%	156	7.3%	2,130
21	2,537	98.4%	42	1.6%	2,579
22	2,902	97.6%	71	2.4%	2,973
23	3,547	93.3%	255	6.7%	3,802
24	1,697	98.3%	30	1.7%	1,727
25	3,506	96.3%	136	3.7%	3,642
26	1,895	96.7%	65	3.3%	1,960
27	784	96.6%	28	3.4%	812
28	381	94.5%	22	5.5%	403
29	763	94.2%	47	5.8%	810
TOTAL	31,063	93.7%	2,096	6.3%	33,159



CROSSBOW USAGE

Beginning in 2020 and lasting through at least 2022, Maine hunters are eligible to hunt deer with a crossbow while in possession of the correct permits.

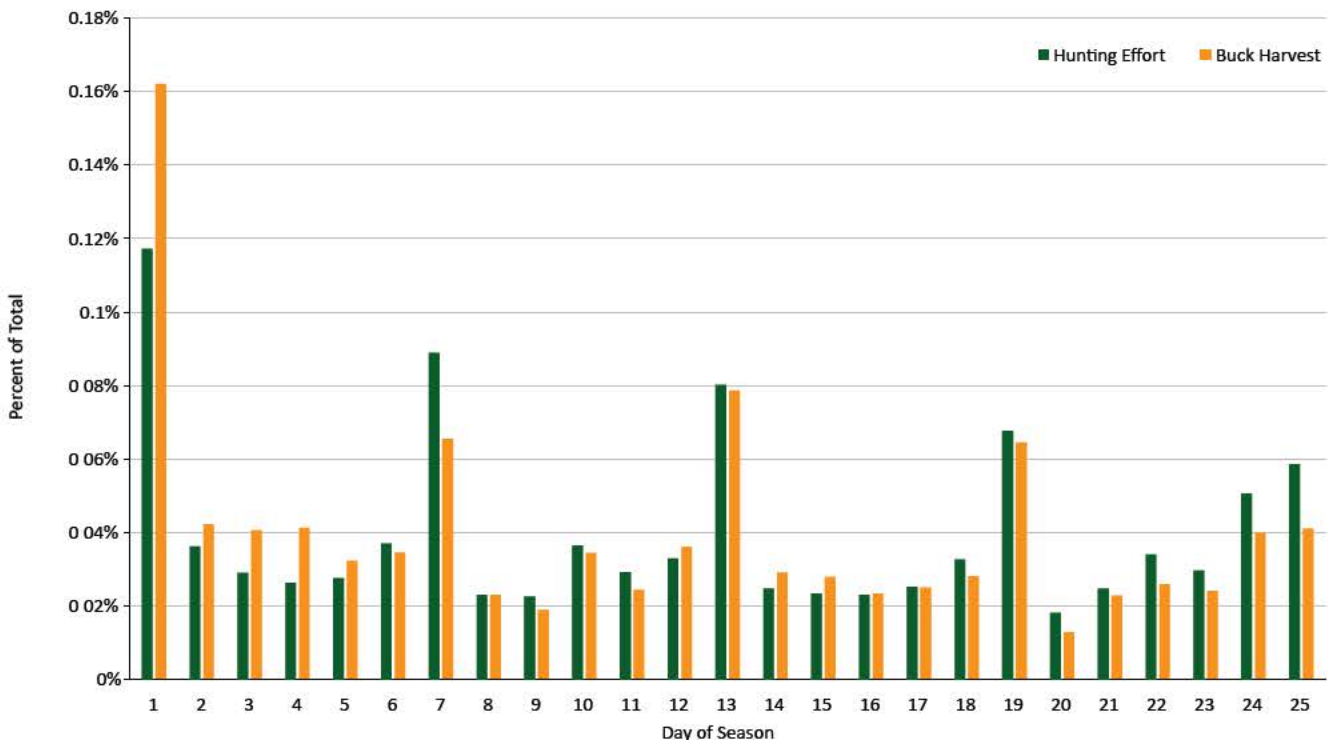
Use of crossbows and overall archery harvest will be monitored during this time, and afterwards the situation with respect to crossbow use will be reassessed. During the 2020 Regular Archery season, 719 kills were reported using upright bows and 434 using crossbows. The average age of a successful crossbow hunter during the Regular Archery season was 50 years old and the average successful hunter using an upright bow was 42. In 2019, prior to crossbows being widely allowed, the average age of a successful hunter with an upright bow was also 42 years old, which may suggest that many of the older crossbow hunters in 2020 were new archery hunters. Furthermore, while the overall harvest increased 17% from 2019 to 2020, the archery kill increased by 91%, which also suggests that there may have been a lot of new archery hunters, many using crossbows.

HUNTER PARTICIPATION

During the regular firearms season for deer, Maine deer hunters spent an average of 6.8 days and 5.0 hours per day pursuing deer. This means that the average hunter spent ~34 hours in the field pursuing deer during the firearms season, which was the same average hours spent as in 2019. Distribution of effort followed a typical pattern with high hunting effort resulting in high buck harvest (Figure 1). As in 2019, the Resident's Day opener was very productive in terms of buck harvest relative to time spent afield. Under 12% of hunting effort occurred on the opener, but this effort resulted in over 16% of the total buck harvest.

This year's hunter effort survey included an additional question about impacts of the COVID pandemic on hunters' plans. The question was asked, "Did your hunting plans change at all this year due to the pandemic?" There were 720 responses to this question: 77.92% of hunters indicated that their plans had not changed, 8.19% indicated that they spent more time hunting, 5.83% indicated that they spent less time hunting, 1.53% indicated that they hunted in a different area, 0.28% indicated that they hunted with different people, 3.33% indicated that they hunted alone whereas they usually hunt with other people, and 2.92% indicated an "other" response.

2020 **FIGURE 1. PERCENTAGE OF HUNTING EFFORT (HOURS) AND BUCK HARVEST BY DAY DURING MAINE'S 2020 REGULAR FIREARMS SEASON FOR DEER. DAYS 1, 7, 13, 19, AND 25 WERE SATURDAYS.**





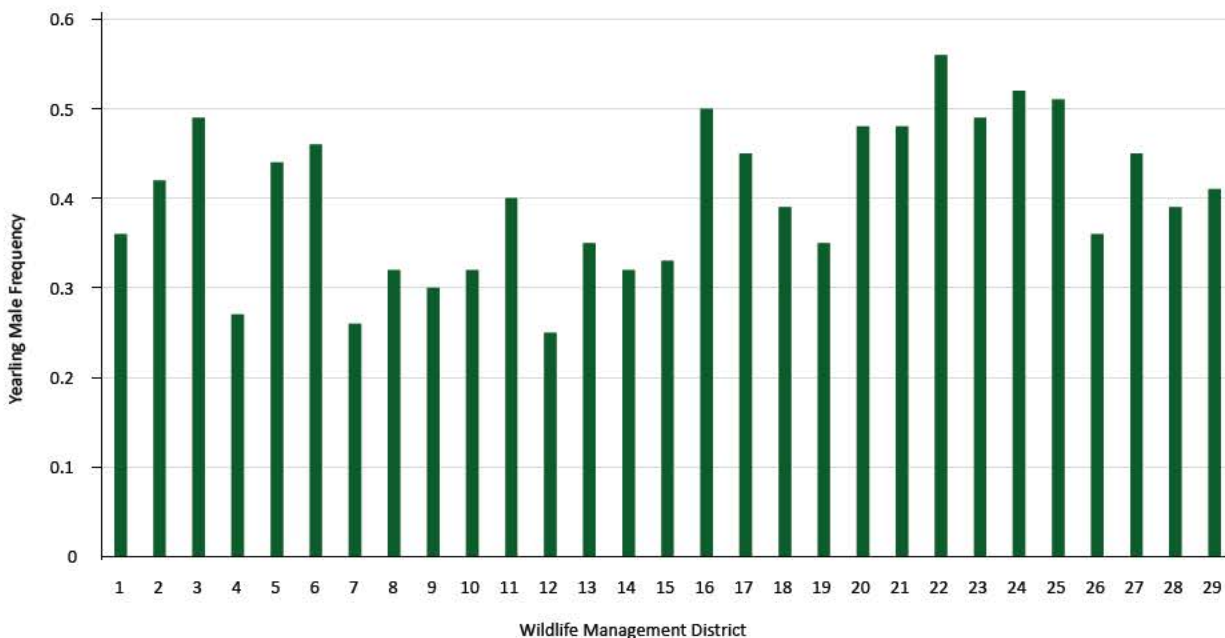
BIOLOGICAL DATA

MDIFW sampled from 6,634 white-tailed deer during the 2020 hunting season to assess the status and health of the state’s deer populations. Some of the characteristics we monitored included yearling antler beam diameters (YABD), yearling frequencies in the harvest, advanced age structure, estimated sex ratios, and mortality rates.

The antler diameter of yearling bucks in a WMD can help us identify when white-tailed deer have become overly abundant in that district. When there are too many deer in an area, the amount of forage available decreases, limiting availability of preferred foods and preventing deer from achieving optimum nutrition and peak antler growth. An average antler beam diameter between 15.5 to 16.8 mm indicates that a deer population is likely in balance with the availability of forage. If measurements are larger, there is enough forage available for the population to grow. If the measurements are smaller, the animals have become too abundant in the WMD and have reduced the availability of quality forage. In 2020, Maine’s yearling bucks expressed overall good health with a statewide average beam diameter of 17.3 mm and YABD ranging between 16.6 and 18.1 in WMDs with at least 20 samples.

Research has shown that the percentage of yearling bucks within the adult buck harvest can be used as an estimate of all-cause annual mortality for male white-tailed deer. Statewide in 2020, 37% of the male harvest was comprised of yearling bucks with yearling buck percent ranging from 25% in WMD 12 to 56% in WMD 22 (Figure 2). Because data are often limited, particularly in northern WMDs, pooled data may be used. Increased confidence in yearling frequencies and advanced age structure data is obtained by extracting incisor teeth from a sub-sample of deer throughout the state. Most of these teeth are analyzed to determine precise age in a laboratory, and these results typically take ~6 months to produce. Beginning in 2019, we included advanced deer age structure information for the state in the Deer Age Report, which may be viewed at maine.gov/ifw/hunting-trapping/harvest-information. Navigate to the end of the Age Report for age structure information by sex and MDIFW Region. Updates are provided as lab results become available.

 2020 **FIGURE 2. YEARLING MALE FREQUENCY IN THE 2020 DEER HARVEST IN MAINE.**





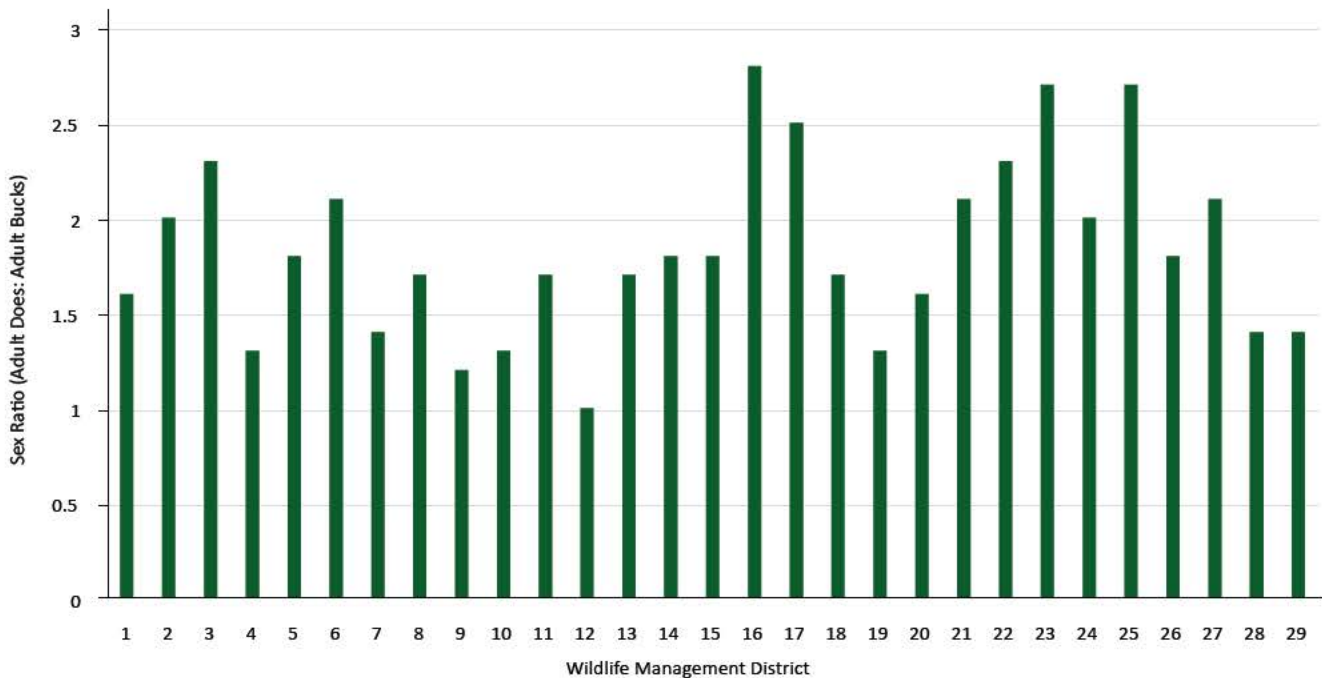
MDIFW monitors sex ratios (adult doe:adult buck) in all Maine WMDs. A sex ratio skewed towards does can be preferable in areas of desired population growth, but breeding success may begin to decline if the doe:buck ratio exceeds ~4:1. In 2020, estimated sex ratios in Maine's WMDs ranged from 1.0 to 2.8 (Figure 3). Weighted by proportion of buck harvest in each WMD, Maine's state-wide adult doe:adult buck ratio was ~2.1 to 1.

To better understand trends in recruitment, a citizen science project called "Deer Spy" was initiated, which sought to collect deer observation data from Mainers with a particular interest in doe-fawn group observations.

Data were collected from July 20th to September 10th, and 3,076 observations were collected from 605 different observers. Among lone does, which offered the highest confidence observations, 47.8% of observed does had fawns with them and 52.2% did not. Among does statewide with fawns, each doe had an average of 1.49 fawns alongside. These efforts will be continued in 2021, and we will continue to adapt data collection protocols, streamline data analysis, and assess data consistency to determine whether this method of data collection can support or replace current methods of estimating recruitment.

♀ 2020

FIGURE 3. ESTIMATED SEX RATIO OF DEER IN MAINE'S WILDLIFE MANAGEMENT DISTRICTS IN 2020.





Deer Winter Mortality Study

Background

Since 2015, MDIFW has been capturing and GPS-collaring white-tailed deer to monitor survival rates and impacts of winter severity, movements, and causes of mortality. The study has grown over the years and now includes four study sites: WMD 1 near Allagash, WMD 5 near the Scraggly Lake Maine Public Reserved Land, WMD 6 throughout and WMD 17 throughout. Achieving a better understanding of how environmental factors influence deer survival through winter will aid MDIFW in decision making and permit allocation processes each year.

Progress and Future

To date, 269 unique deer have been collared: 62 in WMD 1, 39 in WMD 5, 99 in WMD 6, and 69 in WMD 17. This winter 2020-2021 season was the seventh year for the project, and efforts were focused in WMD 5 with a couple of weeks spent in WMD 6 as well. We operated with a smaller crew of 4 individuals this year. Trapping conditions were very poor this year with relatively little accumulating snow on the ground in our study site until mid-February and little localized deer activity until early March. Trapping activities went through late March with nine new deer collared in WMD 5 and five new deer collared in WMD 6 by season's end. This was likely our final year of deer capture for this project. The batteries on our collars typically last for 2-2.5 years, so we expect data collection to be completed or near enough to completion for final data analysis by 2023.

Chronic Wasting Disease (CWD) Monitoring in Maine's Deer and Moose

BACKGROUND

Chronic wasting disease (CWD) is a fatal brain disease that impacts cervids, such as white-tailed deer, mule deer, caribou, moose, and elk. It is similar to mad cow disease, which occurs in cattle, and it has a 100% mortality rate in deer.

CWD has been found in wild deer populations in 25 U.S. states and two Canadian provinces, but it has not yet been found in Maine. CWD can persist in the environment outside of a host for many years, and recent research has shown that plants can uptake the disease agent and sub-

sequently become a potential disease vector. The nearest state or province where CWD is found in wild cervids is Pennsylvania.

There is currently no evidence that CWD can or has been transferred to humans, but similar diseases in humans do exist, and the disease has been transmitted to primates in a laboratory setting.

WHAT MDIFW IS DOING

MDIFW has monitored white-tailed deer for CWD since 1999, during which time we have screened over 12,000 wild deer. In 2020, 503 samples were collected for lab testing (497 from white-tailed deer and 6 from moose), and all samples tested negative. As a precaution, MDIFW does not translocate deer from other states into Maine, and we prohibit the transportation of unprocessed deer carcasses and/or parts into Maine from all states and provinces other than New Hampshire. MDIFW has drafted a response plan for CWD, which outlines steps and protocols to follow if CWD is detected in an adjacent jurisdiction or in Maine.

WHAT YOU CAN DO

Prevent the spread: If you are someone who feeds deer, keep your feeding sites small and spread out on the landscape, and rotate sites periodically. We recommend using synthetic deer lures rather than natural urine lures at this time, though this recommendation is subject to change as advancements in testing and standards in the deer scent industry and further research on prions in urine shed light on potential risk factors. Know and follow the state laws and rules around carcass processing and movement.

Report the signs: Contact your regional wildlife biologist or warden if an animal shows clinical signs of illness, such as loss of fear of humans, drooling, and/or excessive weight loss.

Protect yourself: When processing a harvested deer, take precautionary steps such as using latex gloves and sterilizing your equipment afterward. Also, avoid consuming the brain and spinal tissues. Even though CWD has not yet been identified in humans, these steps reduce the risk of transmitting any cervid-borne disease.

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



MOOSE

Lee Kantar

2020 Moose Harvest

Season Dates and Structure

The 2020 season framework allowed Maine moose hunters to hunt for six days either in September, October, and/or November.





Season Dates

2020

WMDs 1-6

Sep 28 - Oct 3

Oct 12-17

Oct 26-Oct 31

WMDs 15-16

Nov 2*-Nov 28

2019

WMDs 1-6

Sep 23-28

Oct 14-19

Oct 28-Nov 2

WMDs 15-16

Nov 2*-Nov 30

Statistics

2020

2,366

**moose were
registered**

2019

1,949

**moose were
registered**

Moose Permits and Applicants

TOTAL MOOSE PERMITS

The annual allocation of moose hunting permits is developed in relation to the Big Game Management Plan (BGMP) for moose. Permit levels changed in six WMDs from 2019 to 2020, resulting in an increase of 315 permits issued statewide (3,135 total). Permit changes are reflected by the implementation of the BGMP which includes increasing cow permits in the core range to promote a healthier moose population, additional WMDs open during the September season, and increase bull hunting opportunity in the northwest portion of the core range.

Moose hunting permits are allocated to qualified applicants in a random computerized lottery, and additional permits may be issued to prior-year permittees who deferred a year due to illness, armed service, or similar situations.

ANTLERLESS-ONLY PERMITS (AOPS)

In 2020, a total of 745 Antlerless Only Permits (AOPs) were allotted to six WMDs (1-6).

Moose health is directly tied to the productivity of cows. That is, a healthier moose population has heavier cows that reproduce at an earlier age, reproduce more frequently, and have a higher probability of calving twins. Over the last 30 years productivity in Maine moose have declined. Moose populations that exist at lower densities will tend to have higher rates of productivity.

ANY-MOOSE PERMITS (AMPS)

Any-moose Permits (AMPs; Bull, cow or calf) are allocated areas of southern Maine where moose densities are lower and allow for a small harvest. To honor Southern Maine landowners' recommendations, this season coincides with the November firearms season for deer.



Statewide Statistics for 2020

2,366 moose were registered in 2020 (Table 1).



2020

TABLE 1. 2020 MAINE MOOSE SEASON REGISTERED KILL BY WILDLIFE MANAGEMENT DISTRICT (WMD), SEASON, AND PERMIT TYPE. THE PERCENTAGE OF HUNTERS SUCCESSFULLY HARVESTING A MOOSE ARE GIVEN BY SEASON FOR EACH WMD.

2020 Maine moose season registered kill by WMD, season, permit type, and success rates.

WMD	SEASON	PERMIT TYPE	# OF PERMITS	2020 REGISTRATIONS	
				KILL	SUCCESS RATE
1	SEP	BOP	200	161	81%
	OCT	BOP	200	150	75%
	2nd OCT	AOP	150	124	83%
	*WMD Subtotals		550	435	79%
2	SEP	BOP	150	125	83%
	OCT	BOP	150	117	78%
	2nd OCT	AOP	150	122	81%
	*WMD Subtotals		450	364	81%
3	SEP	BOP	90	73	81%
	OCT	BOP	85	70	82%
	2nd OCT	AOP	110	96	87%
	*WMD Subtotals		285	239	84%
4	SEP	BOP	175	141	81%
	OCT	BOP	175	103	59%
	2nd OCT	AOP	175	114	65%
	*WMD Subtotals		525	358	68%
5	SEP	BOP	115	96	83%
	OCT	BOP	110	88	80%
	2nd OCT	AOP	110	77	70%
	*WMD Subtotals		335	261	78%
6	SEP	BOP	100	76	76%
	OCT	BOP	70	50	71%
	2nd OCT	AOP	50	40	80%
	*WMD Subtotals		220	166	75%
7	OCT	BOP	125	98	78%
	*WMD Subtotals		125	98	78%
8	OCT	BOP	175	146	83%
	*WMD Subtotals		175	146	83%
9	OCT	BOP	100	80	80%
	WMD Subtotals		100	80	80%

WMD	SEASON	PERMIT TYPE	# OF PERMITS	2020 REGISTRATIONS	
				KILL	SUCCESS RATE
10	SEP	BOP	30	23	77%
	OCT	BOP	30	19	63%
	*WMD Subtotals		60	42	70%
11	SEP	BOP	25	22	88%
	OCT	BOP	25	16	64%
	*WMD Subtotals		50	38	76%
12	OCT	BOP	25	16	64%
	*WMD Subtotals		25	16	64%
13	OCT	BOP	15	7	47%
	*WMD Subtotals		15	7	47%
14	OCT	BOP	30	19	63%
	WMD Subtotals		30	19	63%
15	NOV	AMP-B		1	NA
	NOV	AMP-C		2	NA
	WMD Subtotals		25	3	12%
16	NOV	AMP-B		1	NA
	NOV	AMP-C		0	NA
17	WMD Subtotals		15	1	7%
	OCT	BOP	10	4	40%
17	WMD Subtotals		10	4	40%
	SEP	BOP	20	12	60%
18	OCT	BOP	20	15	75%
	*WMD Subtotals		40	27	68%
19	SEP	BOP	30	20	67%
	OCT	BOP	30	19	63%
	*WMD Subtotals		60	39	65%
27/28	SEP	BOP	20	14	70%
	OCT	BOP	20	9	45%
	WMD Subtotals		40	23	58%
OVERALL WMD TOTALS			3,135	2,366	75%

BOP = Bull Only Permit – The holder may kill one male moose of any age.
 AOP = Antlerless Only Permit – The holder may kill a cow, a calf, or a bull w/antlers shorter than its ears.
 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.



2020 Bull Harvest

TOTAL HARVEST, AGE DISTRIBUTION

Among the 1,799 antlered bulls killed during the Sept/Oct 2020 season (a total of 208 more than the 2019 harvest of 1,519), biologists aged 1,462 of them by counting the cementum annuli on a tooth extracted from the animal.

Ages were distributed as follows:

- 1½ years old (yearlings sporting their first set of antlers): 6% (85)
- 2½ years old: 18% (257)
- 3½ years old: 21% (309)
- Mature bulls (aged at 4½ to 18½ years): 41% (811)

AVERAGE WEIGHT

On average, breeding bulls lose approximately 15% of their body mass during the rut (September to October). In 2020, this translated to an 9% decrease in average dressed weights from the September to October seasons (714 in Sept. vs. 648 in Oct.).

RECORD WEIGHT

The heaviest bull weighed in at 1,031 pounds field dressed (no digestive tract, heart, lungs, or liver). He was 7½ years old and was killed in WMD 3 during the September season.

RECORD ANTLER SPREAD

The largest antler spread was 61 inches with 16 legal points. He was 8½ years old.

ANTLER STATS

Nineteen percent of the antlered bulls sported cervicorn antlers (antlers without a defined palm), 24% were yearlings, and 6% were mature bulls (>4 years old). The oldest was 13½ years old.

Antlerless Harvest

TOTAL HARVEST

The 2020 statewide harvest of adult (yearling and older) cows was 565 (383 in 2019). In addition, 50 calves (25 males and 25 females) were harvested for a total harvest of 565 antlerless moose, including those taken as part of the AMPs issued within the southern zones.

MOOSE REPRODUCTIVE DATA

Antlerless permits during the second October season allow MDIFW to collect reproductive data critical to assessing and monitoring moose population health and growth. In 2020, hunters in WMDs 1-6 removed and brought in 141 sets of moose ovaries for examination by biological staff.

Typically, moose cows do not become pregnant until 2½ years old. The number of offspring she will produce depends upon her body weight and condition – factors influenced strongly by diseases and parasites, such as the winter tick. Of the cow moose examined this year, 77% of the cows older than 2½ years were pregnant.

MDIFW biologists can forecast a cow's reproduction rates by looking at corpora lutea, which are identifiable structures within the ovaries that indicate ovulation and potential pregnancy rates. Overall, there were 0.88 corpora lutea per cow for cows older than 3½ years (maturity). This is a significant decrease from 2019 and represents depressed reproductive rates (number of calves being born to a cow). We continue to evaluate the role of winter ticks and their impact on moose fitness including their role in depressed reproductive rates.



Hunter Participation, Residency, & Success Rate

In 2020, 2,828 residents, 250 nonresidents, and 57 lodge owners won permits to hunt moose. Most nonresidents were successful in their hunt (100% success rate). Out-of-state hunters came from 34 states (as far away as Alaska) and 1 Canadian Province. The majority (18%) of out-of-state hunters came up from Massachusetts.

Resident success rates were 66% and when combined with the outstanding success by out-of-staters equaled 69%. The higher success rate of out-of-state hunters, as compared to residents, may be attributed to the higher proportion of out-of-state hunters using registered Maine guides for their hunt. Success rates over the last 10 years have been around 80%.

Conditions for September and October were highly variable with September starting out extremely warm; unseasonable warm conditions typically lead to lower success rates.

In 2021, there will be four separate “traditional” moose hunting periods in Maine.

- The September season will run from Sep 27 – Oct 2 in WMDs 1-6, 10,11,18, 19, and 27/28.
- The October season will run from Oct 11-16 in WMDs 1-14, 17-19, and 27/28.
- In WMDs 15 and 16, the season will coincide with November’s deer season, which runs from Nov 1 through Nov 27. Opening day for Mainers will be on Saturday, Oct 30.
- WMDs 1-6 will have a cow moose hunt from Oct 25 through Oct 30.

Moose hunters who have a permit to hunt WMD 27 or WMD 28 can hunt in either WMD.

In addition, there will be 3 additional moose hunt weeks for the initiation of the Adaptive Moose Hunt Unit (see below), these weeks will run consecutively starting Oct 18-23, Oct 25-30, and Nov 1-6.



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Comprehensive Moose Management in Maine

The Department has conducted aerial surveys to estimate moose abundance and composition (bull, cow, and calf) across Maine’s core range of moose (roughly a line from Grafton Notch to Calais) since 2011. Aerial survey data combined with reproduction (ovaries-corpora lutea) and age data from moose teeth (from harvest) provides

biologists with a more complete picture of Maine’s moose population size and composition than ever before. Biologists and the Commissioner’s Advisory Council (rulemaking body), use these data to align moose permit levels with publicly derived management goals including moose viewing and hunting (both weighed equally).

Moose Adult Cow and Calf Survival Study

The size of Maine’s moose population is not static, and fluctuates in response to many factors, especially calf birth and overwintering calf survival rates. The winter of 2019-2020 signified the last aerial capture and GPS collaring of calves (~8 months old) in WMDs 2 and 8. This was the final round in our study of Adult Cow and Calf survival after seven years of intensive work. The study examined calf and adult survival rates and causes of mortality.

The study began in the winter of 2014 in WMD 8 and in 2016 a second study area in northern Maine (WMD 2) was added. Since 2014, we have captured over 675 moose and fitted them with GPS collars. These collars enable us to track moose locations and movements over time, and to be notified via text/email message if a moose dies.

During the course of our work in WMD 8 and 2 we observed adult cows each spring and summer to determine reproduction rates and survival of calves; for each collared moose, we collect detailed health information, including an assessment of blood parameters, parasite loads, body condition, and winter tick loads. This information is providing our researchers with a comprehensive look at moose health, including the impact of parasites on survival and reproduction.

Adaptive Management Unit

This past winter we fit an additional 70 calves (~8-month-old) with GPS collars in WMD 4 to compare calf survival with the work in WMD 2 and 8. This new unit will be monitored for the coming years to assess winter tick impacts on calves there first winter and cow reproductive rates. After public consultation the Department has begun implementing the Adaptive Unit Hunt in western half of WMD 4 to decrease the local moose population and determine if it can lessen the impacts of winter tick on overwintering calf mortality while improving reproductive success of cows.

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



BLACK BEAR

Jennifer Vashon

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.





Today, Maine’s expansive northern, eastern, and western forest supports one of the largest black bear populations in the lower-48 states (**Figure 1**). This population is valued by hunters and wildlife watchers alike. MDIFW strives to balance biological and social needs by basing management decisions on the bear monitoring, harvest, and conflict data we gather.

Monitoring

MDIFW’s black bear monitoring program is one of the most extensive and longest-running programs of its type in the U.S. For the last 45 years, Department biologists have captured and tracked over 3,000 bears to determine their health and condition, estimate how many cubs are born each year, and determine annual cause-specific mortality rates.

Population Management

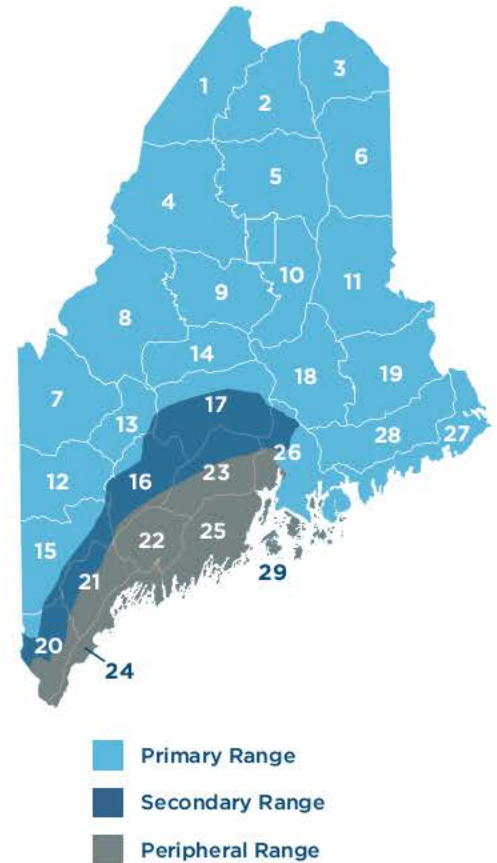
To maintain the bear population at a healthy and socially-acceptable level, the Department’s primary tool is hunting. Since 2005, Maine’s black bear population has steadily increased. The population grew from 23,000 in 2004 to ~36,000 in 2015, and annual harvest levels remain below what would be needed to stabilize it.

Maine offers a variety of traditional bear hunting methods, but the odds of taking a bear are low. Most (90%) bears 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 26% for hunters using bait or trained bear dogs, <20% for trappers, and <3% for those who still-hunt or stalk bear through Maine’s dense forests.

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. In order to achieve the goal and objectives outline in the plan, there are a series of management strategies designed to ensure continued enjoyment of black bears without too many conflicts in backyards and neighborhoods.

FIGURE 1. MAINE BLACK BEAR RANGE





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 conflicts between humans and black bears in Maine is lower than other northeastern states, averaging about 500 complaints each year. This relatively low conflict level is partially attributed to bears being more common where human densities are lowest. However, if Maine’s bear population continues to grow and bears move 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 a great concern.

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 continue 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 to a conflict with a bear, 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 when bears are trapped and transferred to new areas, you should remove or secure attractants to avoid future problems. Here is a checklist that you can run through every spring:

While hundreds of bear conflicts are reported each year, many can be prevented by simply **removing** or **securing** common bear attractants each spring.

1 REMOVE & STORE INSIDE
BETWEEN APRIL 1 AND NOVEMBER 1

2 SECURE & CLEAN

BIRD SEED 	<ul style="list-style-type: none"> • Take bird feeders down • Store seed and feeders indoors (you can still feed birds in the winter) 	<ul style="list-style-type: none"> • Rake up bird seed from the ground
GARBAGE 	<ul style="list-style-type: none"> • Store garbage cans in a building or enclosed by electric fence • Take to curb on morning of pickup 	<ul style="list-style-type: none"> • Keep outbuilding and garage doors closed at all times and repair broken window and doors • Dumpster lids and doors should be kept closed and latched • Use bear-resistant dumpsters or garbage cans
GRILLS 	<ul style="list-style-type: none"> • Store grill inside when not in use • If you are having bear conflicts, stop grilling until bear moves on 	<ul style="list-style-type: none"> • Burn off food residue • Dispose of food wrappers and grease cups
PETS AND LIVESTOCK 	<ul style="list-style-type: none"> • Feed pets inside • Store livestock and pet food inside • Keep livestock in buildings at night • Install and maintain effective fencing for livestock 	<p>If you feed your pets or livestock outside:</p> <ul style="list-style-type: none"> • Clean dishes daily • Remove leftover food daily

We have revised our website and other outreach materials to 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.



Black Bear Hunting and Trapping

SEASONS & PERMITS

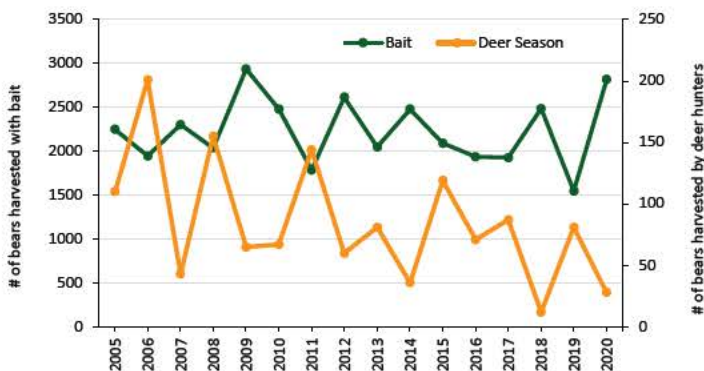
MDIFW’s management of Maine’s black bears includes setting the season length, bag limit, and legal methods of hunting. In addition to a hunting license, hunters (except for resident deer hunters during the firearm season) must purchase a bear permit to hunt black bears, and each successful hunter must register their bear. The Department uses bear registration data to monitor harvest levels and adjust regulations as needed to meet bear harvest objectives.

The black bear hunting season opens the last Monday in August and closes the last Saturday in November and is restricted to certain hunting methods during certain weeks.

In 2020, hunting over bait was permitted from August 29 through September 26. The hound (trained bear dogs) season overlaps with the last two weeks of the bait season, spanning September 14 to October 30. Annually, the trapping season opens on September 1 and closes October 31 and hunters can hunt bears near natural food sources or by still-hunting throughout the entire three-month season.

Starting in 2011, a properly licensed individual can harvest two bears annually if one is taken by hunting and the other by trapping. Although only a small proportion of hunters and trappers take advantage of this opportunity, the number of individuals harvesting two bears increased incrementally each year to 24 hunters by 2015 then stabilized. During the 2020 season, more hunters harvested two bears (41) than any year previously.

FIGURE 2. HARVEST ALTERNATES WITH NATURAL FOODS. IN POOR FOOD YEARS, HARVEST BY BEAR HUNTERS USING BAIT IS HIGH AND HARVEST OF BEARS BY DEER HUNTERS IS LOW. TYPICALLY, A GOOD FOOD YEAR IS FOLLOWED BY A POOR FOOD YEAR.



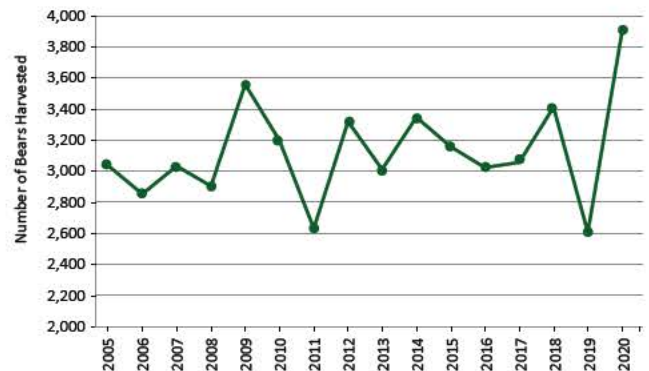
Starting in 2015, the Saturday prior to the opening day of the season is designated for youth hunters. Although the 2020 youth hunter harvest did not exceed the 2018 record of 64 bears, on average, more youth hunters (40) successfully harvested a bear on youth day in 2020.

ANNUAL HARVEST

Although many factors, including weather and hunter numbers, influence the black bear harvest, natural food levels play the largest 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 2 and Figure 3).

We expected 2020 to be a poor natural food year for bears, and the exceptionally dry spring and summer contributed to even lower fruit and nut crop than expected, contributing to the highest bear harvest on record since 2004. This year’s near record harvest of 3,883 bears (Table 1, Figure 3) was also influenced by increased interest in outdoor pursuits during the pandemic.

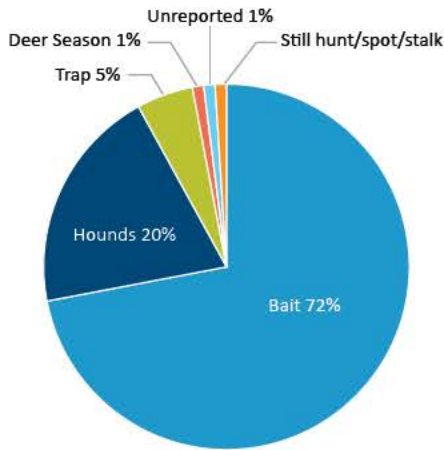
FIGURE 3. HARVEST GENERALLY ALTERNATES FROM YEAR TO YEAR IN RESPONSE TO NATURAL FOOD ABUNDANCE.





During the 2020 season, hunters harvested 2,815 bears over bait, with that method accounting for 72% of the total harvest, and they harvested 785 bears with trained bear dogs, accounting for 20% of the annual harvest (Table 1 and Figure 4). Although both harvest figures approached record highs, the harvest by trappers reached a record high of 183 bears. Later in the season, though, there was less opportunity. Due to a lack of natural foods, bears entered their winter dens early; and only 24 bears were harvested by deer hunters in November – a near record low.

FIGURE 4. MOST BEARS IN MAINE CONTINUE TO BE HARVESTED WITH BAIT AND HOUNDS (TRAINED BEAR DOGS). DUE TO THE LACK OF NATURAL FOODS DURING THE 2020 SEASON, FEWER BEARS WERE HARVESTED LATER IN THE SEASON BY DEER HUNTERS.

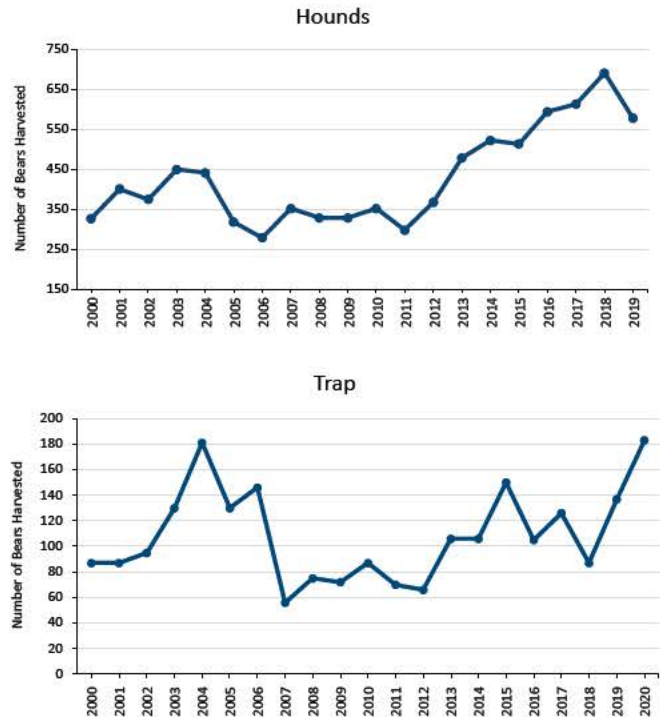


In Maine, most bears (90%) are harvested over bait or with trained bear dogs. Prior to 2012, approximately 80% of bears were harvested over bait and 10% by hunters using trained bear dogs. Since 2013, although bait remains the prominent method of harvest, a higher proportion (20%) have been harvested every year using trained bear dogs. This increase is likely in response to greater interest following a recent bear hunting referendum that, if passed, would have made hunting bears with bait, trained bear dogs, or traps illegal in Maine. We saw a similar increased interest in harvesting a bear with a trap following both the 2004 and 2014 bear referendums (Figure 5). It is important to note that the low number of trappers that harvested a black bear during the 2018 season was due to an emergency rule that limited the types of traps that could be set for bears during the 2018 season and not a change in interest.

Since 2005, Maine’s annual bear harvest has averaged around 3,000 animals, which is below the level needed to stabilize the bear population. As a result, Maine’s bear population has been increasing by 2% to 4% annually. The lower annual harvest in Maine is influenced by declining

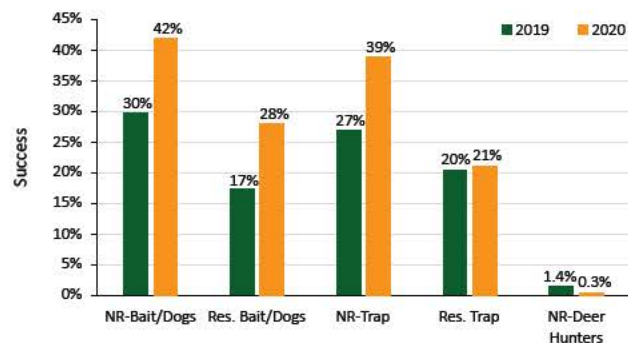
hunter numbers. Although the 2020 harvest approached objectives, to slow the growth and expansion of Maine’s bear population this harvest level needs to be sustained and if feasibly increased.

FIGURE 5. HARVEST BY HUNTING USING HOUNDS (TRAINED BEAR DOGS) HAS BEEN INCREASING IN RECENT YEARS, WHERE PERIODS OF HIGH HARVEST BY TRAPPERS OCCURRED FOLLOWING THE 2004 AND 2014 BEAR REFERENDUMS, THAT IF PASSED, WOULD HAVE MADE IT ILLEGAL TO HARVEST BEARS WITH BAIT, TRAINED BEAR DOGS, OR TRAPS.



In Maine, success rate is the highest among hunters that use bait or trained bear dogs, averaging 30% since 2008. Success is also higher among nonresidents, most of whom hire licensed professional Maine hunting guides to assist them (37% vs. 29%). Given the scarcity of natural foods, hunter success rates were higher in 2020 than 2019 when natural foods were more abundant. (Figure 6).

FIGURE 6. BEAR HUNTING SUCCESS RATES BASED ON PERMIT SALES BY RESIDENCE AND METHOD OF HARVEST.





2020

TABLE 1. NUMBER OF BEARS HARVESTED IN MAINE IN 2020 BY WILDLIFE MANAGEMENT DISTRICT (WMD).

WMD	METHOD OF TAKE						TOTAL HARVEST	ARCHERY ²	ASSISTED BY GUIDE	RESIDENT	NONRESIDENT
	HUNTING WITH BAIT	WHILE DEER HUNTING	HUNTING WITH DOGS	SPOT AND STALK	TRAPPING	UNKNOWN ¹					
1	100	0	24	0	4	0	128	12	117	14	114
2	131	0	26	1	2	0	160	10	145	18	142
3	198	1	13	4	6	0	222	31	163	76	147
4	207	0	23	1	2	0	233	28	167	88	147
5	122	0	65	0	4	0	191	18	147	43	148
6	250	1	14	9	7	0	281	40	152	111	171
7	138	2	47	0	21	0	208	14	137	80	132
8	250	0	66	0	21	0	337	23	214	174	167
9	107	0	24	2	2	0	135	11	88	52	91
10	111	0	11	1	8	0	131	15	94	51	80
11	189	0	57	2	11	0	259	17	189	83	177
12	139	6	91	7	16	0	259	32	108	145	116
13	42	2	25	0	8	0	77	4	44	37	40
14	83	0	25	1	4	0	113	5	77	54	59
15	44	4	55	3	11	0	117	7	25	99	19
16	6	1	2	0	4	0	13	0	0	12	2
17	52	2	6	1	9	0	70	5	20	52	18
18	176	2	53	1	12	0	244	19	138	120	124
19	134	0	83	0	8	0	225	28	196	26	199
20	12	4	0	4	2	0	22	3	0	21	2
21	3	0	0	0	0	0	3	0	0	3	0
22	0	0	0	0	0	0	0	0	0	0	0
23	0	1	1	0	0	0	2	0	1	2	1
24	1	0	0	0	0	0	1	0	0	1	0
25	2	0	0	1	0	0	3	0	0	3	0
26	59	0	2	3	11	0	75	11	7	66	9
27	56	2	20	2	6	0	86	15	30	59	27
28	202	0	52	0	4	0	258	18	161	104	156
29	1	0	0	0	0	0	1	0	0	1	0
UNREPORTED						29	29				
STATEWIDE	2,815	28	785	43	183	29	3,883	366	2,420	1,595	2,288

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

²This does not include 62 bears harvested with a crossbow.



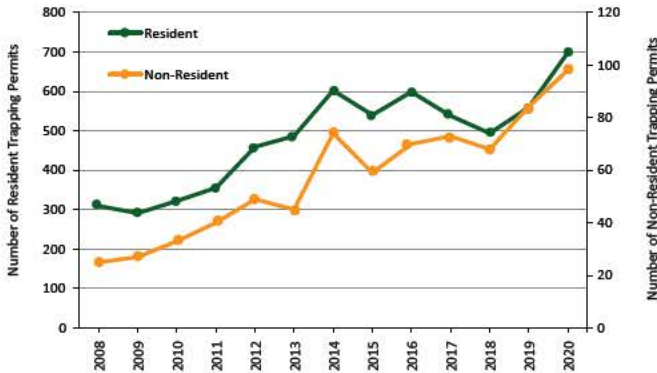
BEAR TRAPPING

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, especially among residents. In fact, trapping permit sales reached a record high in 2020 (796) likely in response to the pandemic and increased participation in outdoor activities (Figure 7). The prior record occurred in 2014 (676), with interest in trapping spiking in response to a ballot initiative that, if it had passed, would have eliminated traps, bait, and trained bear dogs as legal harvest methods.

The 2020 season harvest of 183 bears by 796 trappers eclipsed the previous five years, where an average of 538 trappers harvested anywhere between 87 and 150 bears.

Since 2011, individuals have been allowed to harvest two bears each year if one is taken by hunting and the other by trapping. Although only a small proportion of hunters and trappers take advantage of this opportunity, the number of individuals harvesting two bears increased incrementally each year until 2015 where it has stabilized. However, in 2020, the number of hunters/trappers harvested a second bear increased to 41. Although still a low number, it marked a new record. (Figure 8).

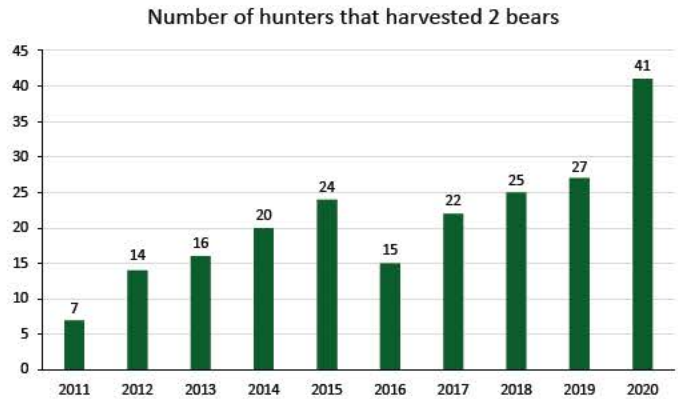
FIGURE 7. THE NUMBER OF RESIDENTS AND NONRESIDENTS PURCHASING A PERMIT TO TRAP BLACK BEARS IN MAINE HAS BEEN INCREASING.



RESIDENT VS. NONRESIDENT HARVEST NUMBERS

Although nonresidents continue to harvest most of the bears during the 2020 season (59%) and the majority taken with the use of trained bear dogs (68%) and over bait (60%), hunting over bait remains popular among resident hunters, with 72% of successful residents taking bears by this means. 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 (81%). While the percentage of the harvest by nonresident hunters using spot and stalk methods remains low, it accounted for 16% of the 2020 harvest by nonresidents.

FIGURE 8. THE NUMBER OF HUNTERS THAT HARVEST TWO BEARS IS LIKELY LIMITED BY THE FACT THAT ONE MUST BE TAKEN IN A TRAP. SINCE THE 2011 BAG LIMIT INCREASE, AN AVERAGE OF 19 HUNTERS HAVE HARVESTED TWO BEARS IN A YEAR.





THE INFLUENCE OF MAINE GUIDES

Every year, most bears harvested in Maine are taken by hunters employing a registered professional Maine hunting guide. During the 2020 season, 63% of the bears harvested were taken with the assistance of a guide accounting for more than 2,400 bears; most were harvested by non-residents (82%). Conversely, only 26% of residents harvested a bear in 2020 with a guide.

Since more nonresidents use a professional Maine hunting guide for their hunt, that could explain their overall higher success rates leading up to deer firearm season (42% compared to 28% for Maine residents). Hunters employing guides continue to account for the majority of bears harvested with trained bear dogs (83%) and taken over bait (62%), while contributing to 24% of the bears taken in traps. Guides appear to have boosted spot and stalk success, as the proportion of bears taken by spot and stalk methods with a Maine Guide also increased in the last 4 years, from 3% in 2016 to 18% in 2017, 21% in 2018, and 12% in 2019 and 2020.

GEOGRAPHIC DISTRIBUTION OF THE HARVEST

For the first time, bears were harvested in nearly every county and WMD including 14 of the state's 16 counties and 28 of 29 WMDs. Although most bears were harvested from Aroostook County (1,041 bears, 27% of total harvest), the density of harvest, expressed as the number of bears killed per 100 square miles of habitat (forested land), was greatest in WMD 28 at 36 bears/100mi², followed by WMDs 12, 3, and 6 (portions of Aroostook, Oxford, Washington and Hancock counties) at between 26 and 28 bears/100 mi². Fewer bears were taken in southern and central portions of the State (Androscoggin, Cumberland, Kennebec, Knox and Waldo counties). No bears were taken in Lincoln and Sagadahoc, counties or WMD 22 (Table 1). The statewide average of 11 bears/100 mi² was similar to the statewide average of 12 bears/100 mi² in 2018 (a poor food year) and below the statewide average of 9 bears/100mi² in 2019 (a good food year).

HUNTER PARTICIPATION

In 2003, permit fees were raised from \$5 to \$25 for residents and from \$25 to \$67 for nonresidents. Subsequently, bear hunting participation steeply dropped for residents and nonresidents alike. After a slight bump during the bear hunting referendum of 2004, numbers continued a steady decline before stabilizing at just under 11,000 in 2009 (Figure 9). In response to the pandemic, more than 12,000 bear permits were sold in 2020; the highest number in 17 years.





RESIDENTS

Resident participation fell sharply with the permit fee increase in 2003. Active bear hunters were more likely to pay the fee, while those who previously purchased permits for the chance to take a bear while hunting other game largely opted out. Although we saw a bump in both non-residents and residents permit sales in 2020, the increase was highest among residents (Figure 9).

NONRESIDENTS

Nonresidents became more interested in hunting Maine black bears following the closure of the Ontario spring bear hunt in 1999. However, some interest with the fee increase was also lost. While not as many nonresidents dropped off initially, the decline has continued, likely due to economics and increased opportunities to hunt bears in other states. This is particularly significant since nonresidents' higher success rates have a greater influence on the final harvest level (Figure 6). The increased sale of nonresident permits during the 2020 season likely contributed to the near record harvest of 3,883 bears (Figure 9). Interestingly, guides reported they booked more hunts to nonresidents hunters in 2020 after their spring hunts in Quebec and New Brunswick were canceled due to the pandemic's closure of the border.

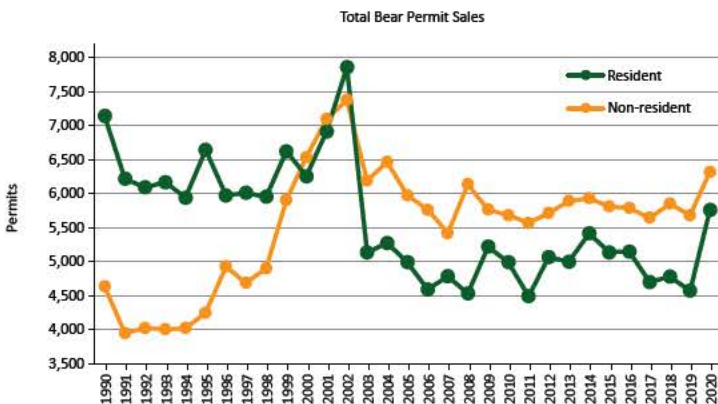
FIGURE 9. THE DEPARTMENT DOES NOT LIMIT THE NUMBER OF BEAR HUNTING OR TRAPPING PERMITS. IN RECENT YEARS, RESIDENT AND NONRESIDENT BEAR PERMIT SALES HAVE STABILIZED TO APPROXIMATELY 10,000 WITH A SIMILAR NUMBER OF RESIDENTS AND NONRESIDENTS PURCHASING PERMITS. PRIOR TO 2003, MORE RESIDENTS PURCHASED BEAR PERMITS, LIKELY DUE TO THE LOW COST OF THE PERMIT AT THE TIME.

NEW PERMITS FUNDING BLACK BEAR RESEARCH AND MANAGEMENT

Since 2008, all 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. Currently, we are using these funds to determine the age of harvested black bears from teeth turned in by the hunter, develop an integrated population model for bears, and evaluate the role of anthropogenic foods (including bait) on Maine's bear population. This research will allow us to improve our monitoring of trends in Maine's bear population, including its age structure and refine population estimates to better inform our management of bears.

Although the number of nonresident bear permit sales for deer hunting season has remained stable at 700 to 1,000 per year (901 in 2020), sales of resident and nonresident bear trapping permits have been increasing. The sale of these permits has contributed between \$40,000 and \$90,000 annually to bear research and management. In 2014, likely due to a ballot initiative that would have made it illegal to harvest bears with bait, trained dogs, or traps, the number of resident trapping permits more than doubled from 291 to 602, and nonresident trapping permits tripled from 25 to 75. In 2020, resident and nonresident trapping permit sales reached a new high of 698 and 98 respectively.

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





FURBEARERS

Shevenell Webb

Trapping and Furbearer Management

Furbearers are associated with a group of small and medium sized mammals that are primarily trapped and utilized for their fur and other products. These species play an important role in the environment as predator (coyote) or prey (muskrat), while some are seed dispersers (raccoon) or keystone species (beaver). Maine is fortunate to have 16 species of furbearers, semi-aquatic species (beaver, river otter, mink, and muskrat) and terrestrial species (bobcat, coyote, red and gray fox, fisher, marten, raccoon, opossum, skunk, short and long-tailed weasel, and red squirrel). Thanks to modern wildlife management principles, many of these species are more abundant now than they were 100 years ago, which allows for harvest and viewing opportunities. The harvest of these species is a regulated activity that is strictly enforced by game wardens. MDIFW continually reviews and develops science-based regulations, education programs, and capture methods to ensure the harvest is sustainable and that practices are humane.

Trapping is the primary tool used to manage and maintain healthy populations of furbearers in Maine. Regulated trapping provides many benefits to wildlife and people and is used in a variety of situations, such as research, protection and restoration of rare species, managing populations, and resolving human-wildlife conflicts.

EXAMPLES

Aiding wildlife biology - MDIFW often uses trap and release to track and study species populations. From 1999-2011, Department biologists studied Canada lynx in northern Maine to better understand their ecology (see lynx section for further description of this project). We captured 85 lynx using foothold traps, fitted them with radio-collars, and released them unharmed.

Managing predation - Trapping and removing the surplus of predators, like raccoon and skunk, is vital to the success of maintaining and restoring some sensitive species. We use trapping to manage predation of nesting colonies of coastal seabirds including the Atlantic Puffin, Roseate Tern, and the Common Eider; and the trapping of nest predators has helped to recover rare species including Piping Plover



and Least Tern, who were on the brink of being lost from Maine's sandy beaches. In another example, research has documented mink and river otter populations increasing on islands located close to shore and negatively impacting seabird nesting success and survival of seabird chicks and adults; but trapping has helped to protect and restore those islands' seabird populations.

Resolving human-wildlife conflicts - Furbearer harvest can also help mitigate human-wildlife conflicts.

Rabies is a disease that can be transmitted by all mammals but is most commonly found in raccoon, skunk, and fox. High populations of these species can result in disease outbreaks that can be a risk to humans, pets, and livestock. Trapping can help maintain healthy wildlife populations and remove individual animals if needed.

Beaver are nature's greatest engineers, but their activities can cause damage to roads, forests, and ornamental trees. Maine's abundant wetlands, rivers and lakes support a healthy beaver population, and trapping helps manage local beaver problems, balancing the maintenance of roads, properties, and beavers on the landscape.

MODERN-DAY TRAPPING

The Wildlife Society, American Association of Wildlife Veterinarians, and American Veterinary Medical Association support trapping as a valuable wildlife management tool. Maine law requires that new trappers complete a trapper education course, which covers the most up-to-date information on humane trapping tools and techniques. For over 20 years, state wildlife agencies have worked closely with the U.S. Department of Agriculture, state trapping associations, and veterinarians to develop best management practices (BMP's) for trapping. This program has established high quality standards for modern day trapping to be efficient, selective, practical, safe, and humane. Wildlife biologists and trappers support BMP's because they are passionate about the welfare of wildlife. To learn more about trapping regulations and furbearer management, please visit maine.gov/ifw or furbearermanagement.com.



Furbearer Planning

In 2019, the Department started a Furbearer Planning initiative. A Steering Committee made up of diverse wildlife stakeholder groups will be responsible for guiding this plan, and working groups with technical expertise will develop management goals, objectives, and strategies to address research and monitoring, policy and regulations, and outreach and communication needs. Given the wide scope and number of species, this will be a multi-year project. Learn more about the 2020 public survey results and progress to develop a new [Maine Furbearer Management Plan](#).

HARVEST UPDATE

In fall of 2019, we replaced hard copy fur cards with an online registration system for furbearers. The new online system is a much more efficient, accurate tool and results in fur registration data being available as soon as each fur is tagged.

The pelts of all furbearers, except weasels, raccoon, red squirrel, muskrat, skunk, and opossum, are required to be registered and tagged. Furbearers are primarily trapped, but fox, coyote, bobcat, raccoon, opossum, and skunk can also be hunted during a limited time of the year. Small game that can be hunted include snowshoe hare, red and gray squirrel, woodchuck, and porcupine. Tagging pelts gives the Department information on who harvested the animal, harvest method, town where it was taken, and month and year of harvest.

During the 2020 season, mild weather resulted in longer land and open water trapping opportunities. The bobcat harvest (59% taken by hunting) was the highest it's been since 2008 (Table 1). Along with an increase in bobcat roadkill and public observations in recent years, the bobcat population is doing well. Interest in coyote remains high

and harvests have been comparable in recent years. The number of successful marten and fisher trappers was up in 2020 and was similar to the 2018 season. Fisher trapping success was the highest it's been since 2006, which could be related to an increase in the fisher bag limit this year. Some species, like mink, are abundant but harvest is well below the 10-year average, due to low fur values and low trapper effort.

Fur harvest can be influenced by many factors including change in trapping regulations, pelt values, trapping licenses, trapper effort, wildlife populations, weather, and gas prices. Lynx exclusion devices, which became mandatory statewide in 2015 to protect Canada lynx, continue to affect trapping success and trapper effort, especially for marten and fisher. However, interest in trapping remains strong and there has been an increasing number of people taking trapper education courses in recent years.

TRAPPER EFFORT

In 2020, the number of trapping licenses (includes annual and lifetime trapping licenses) was 4,312, which was ~5% higher than the previous 5-year average of 4,096 trapping licenses. A new electronic survey was developed for trappers to complete their Fall and Spring Harvest Reports online. We had 1,161 fall and 821 winter/ spring trapper harvest reports returned for the 2020 season. 58% (Fall) and 80% (Spring) of reports indicated that a trapper did not trap for furbearers. Lack of time, trapping regulations (18%) and health issues (15%), were reported as reasons for not trapping furbearers. Coyote and beaver continue to be the most popular species to target. The average species catch per 100 trapnights reported on fall harvest reports (2018-2020) has been highest for muskrat (9) and beaver (5), followed by raccoon (3), otter (2), and coyote, fox, mink, fisher, marten, and bobcat (1).

TABLE 1. SUMMARY OF THE FURBEARER HARVESTS REGISTERED FROM THE 2011/12-2020/21 TRAPPING AND HUNTING SEASONS IN MAINE.

SPECIES	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	10-year Average
Beaver	15,812	9,327	4,295	3,541	5,666	3,448	5,411	4,187	6,173	5,988	6,385
Bobcat	267	239	136	126	228	207	221	281	352	396	245
Coyote	2,072	1,746	1,315	1,036	1,429	963	1,482	1,965	1,905	1,912	1,583
Fisher	978	1,346	656	688	295	341	352	659	365	741	642
Red Fox	1,010	901	541	304	618	437	582	726	457	739	632
Gray Fox	346	437	334	535	286	131	264	196	247	275	305
Marten	1,439	4,048	1,042	1,224	395	1,113	519	946	315	1,057	1,210
Mink	2,422	2,256	1,379	1,173	1,206	485	536	284	348	356	1,045
Otter	1,405	762	408	292	494	322	656	397	678	628	604

¹ Imports and roadkills were excluded from this summary.



Tooth Submissions

Since 2016, the Department has collected biological samples from bobcat, fisher, marten, and otter to improve management of these species (Figures 1-5). This allows biologists to closely monitor the demographics of the harvest and ensure that the trapping or hunting of these species is sustainable. These data are valuable when interpreting harvest trends and considering regulation changes.

FIGURE 1. AGE DISTRIBUTION OF THE SAMPLED BOBCAT, FISHER, MARTEN, AND RIVER OTTER HARVEST DURING THE 2019/20 HUNTING AND TRAPPING SEASON IN MAINE.

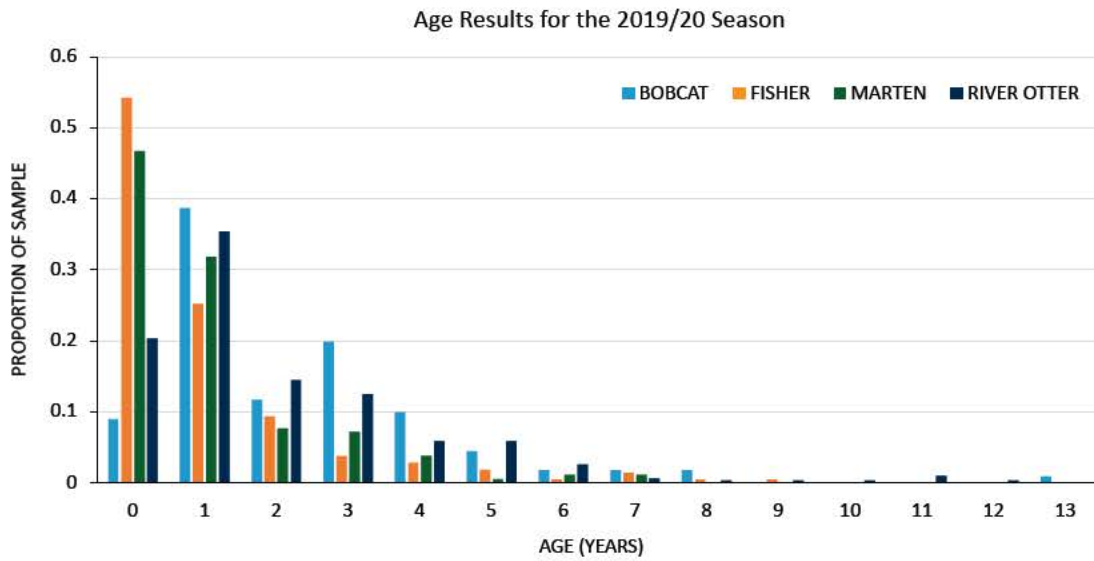


FIGURE 2. AGE AND SEX OF BOBCATS SAMPLED DURING THE 2016/17 - 2019/20 HUNTING AND TRAPPING SEASONS IN MAINE. NOTE THAT ASTERISKS* MARK RESULTS BASED ON VERY SMALL SAMPLE SIZE (I.E., LESS THAN 30 BOBCAT TISSUE SAMPLES).

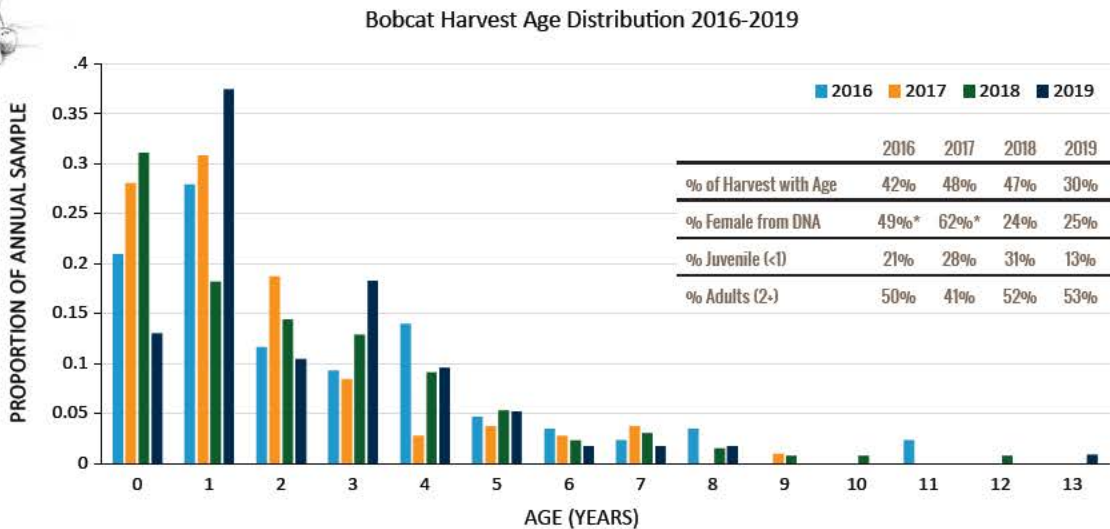




FIGURE 3. AGE AND SEX OF THE FISHER SAMPLED DURING THE 2016/17 - 2019/20 TRAPPING SEASON IN MAINE.

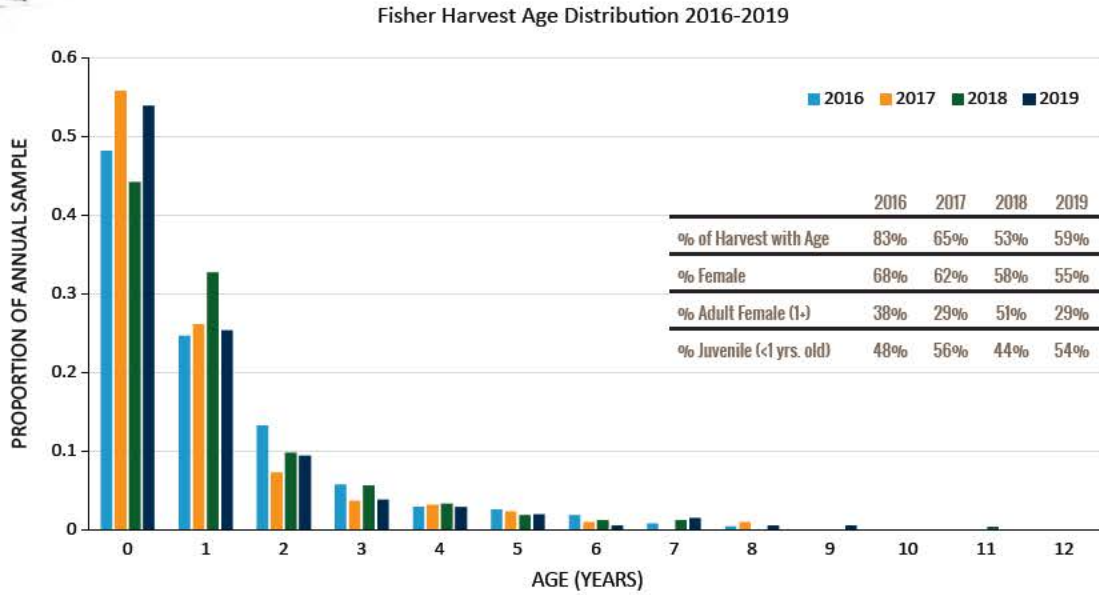


FIGURE 4. AGE AND SEX OF THE MARTEN SAMPLED DURING THE 2016/17 - 2019/20 TRAPPING SEASON IN MAINE.

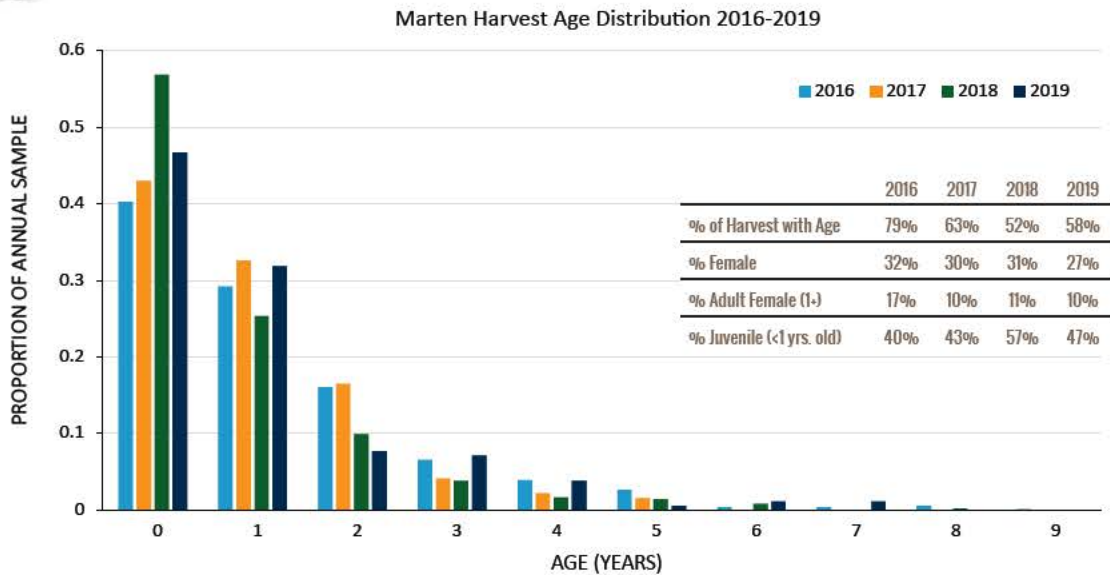
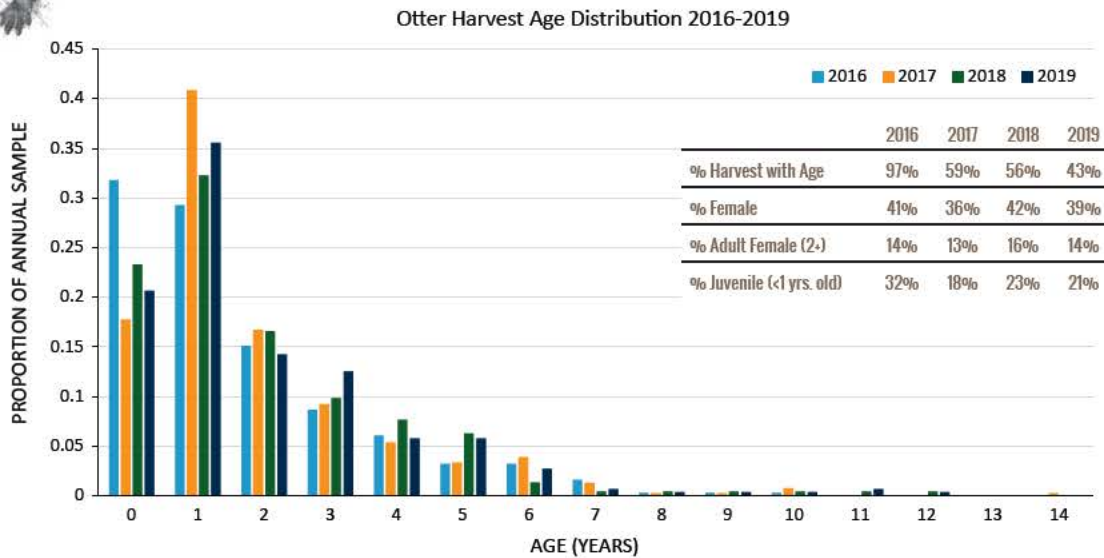




FIGURE 5. AGE AND SEX OF THE RIVER OTTER SAMPLED DURING THE 2016/17 - 2019/20 TRAPPING SEASON IN MAINE.



Rabies Update

Wildlife are tested for rabies when there has been potential exposure (typically a bite or direct contact) with humans or pets. Maine Department of Human Services reported 71 animals tested positive for rabies in 2020, which was slightly higher than the previous five-year average (average = 64, range = 28-89 animals from 2014-2018). Every year, raccoon and skunk consistently represent the vast majority of cases but we have seen an increase in rabid gray foxes in mid-coast areas of Maine in recent years.

USDA Wildlife Services continues its Oral Rabies Vaccine (ORV) Program in Maine, primarily focused on the Maine/New Brunswick border. The goal of the program is to prevent the further spread of wildlife rabies and eventually eliminate terrestrial rabies in the United States. In August 2020, the program distributed approximately 350,000 rabies vaccine baits around the town of Houlton by airplane and vehicle. Learn more about annual rabies trends at maine.gov/dhhs/mecdc/public-health-systems/health-and-environmental-testing/rabies/rabies.htm.



GAME BIRD CONSERVATION & MANAGEMENT

MEET THE GAME BIRD GROUP



**Brad Allen, Wildlife Biologist
and Bird Group Leader**

Brad oversees bird group activities and budgets and continues to investigate the lives and times of the common eider, focusing currently on a collaborative duckling survival study. Brad also coordinates Department interests in seabird research and management activities.



**Kelsey Sullivan
Wildlife Biologist**

Kelsey coordinates MDIFW's banding programs, surveys, and research to assess the status of game bird populations in Maine. Game bird species that Kelsey is responsible for include ruffed grouse, American woodcock, wild turkeys and waterfowl. He is Maine's representative on the Atlantic Flyway Council Technical Section.



RESIDENT GAME BIRDS

Kelsey Sullivan

Wild Turkey Fall 2020 Harvest Summary

The 2020 fall wild turkey season ran eight weeks, from September 14th to November 7th. Bag limits in all but one WMD remained unchanged from the 2019 limits. In WMD 6, a one bird bag limit was added after the Department considered the available data and public input through the rule making process.

The fall 2020 wild turkey harvest was the highest we've had in the State since the fall season began in 2002. The total harvest of 3,711 turkeys in 2020 was 1,015 more than the 5-year average of 2,696. The increase in harvest is partially attributed to the increase in wild turkey hunting participation in 2020, as measured by an increase in hunting licenses and wild turkey permit sales. In addition, a very good year for wild turkey reproduction in 2020 provided more wild turkeys on the landscape, and available for harvest.

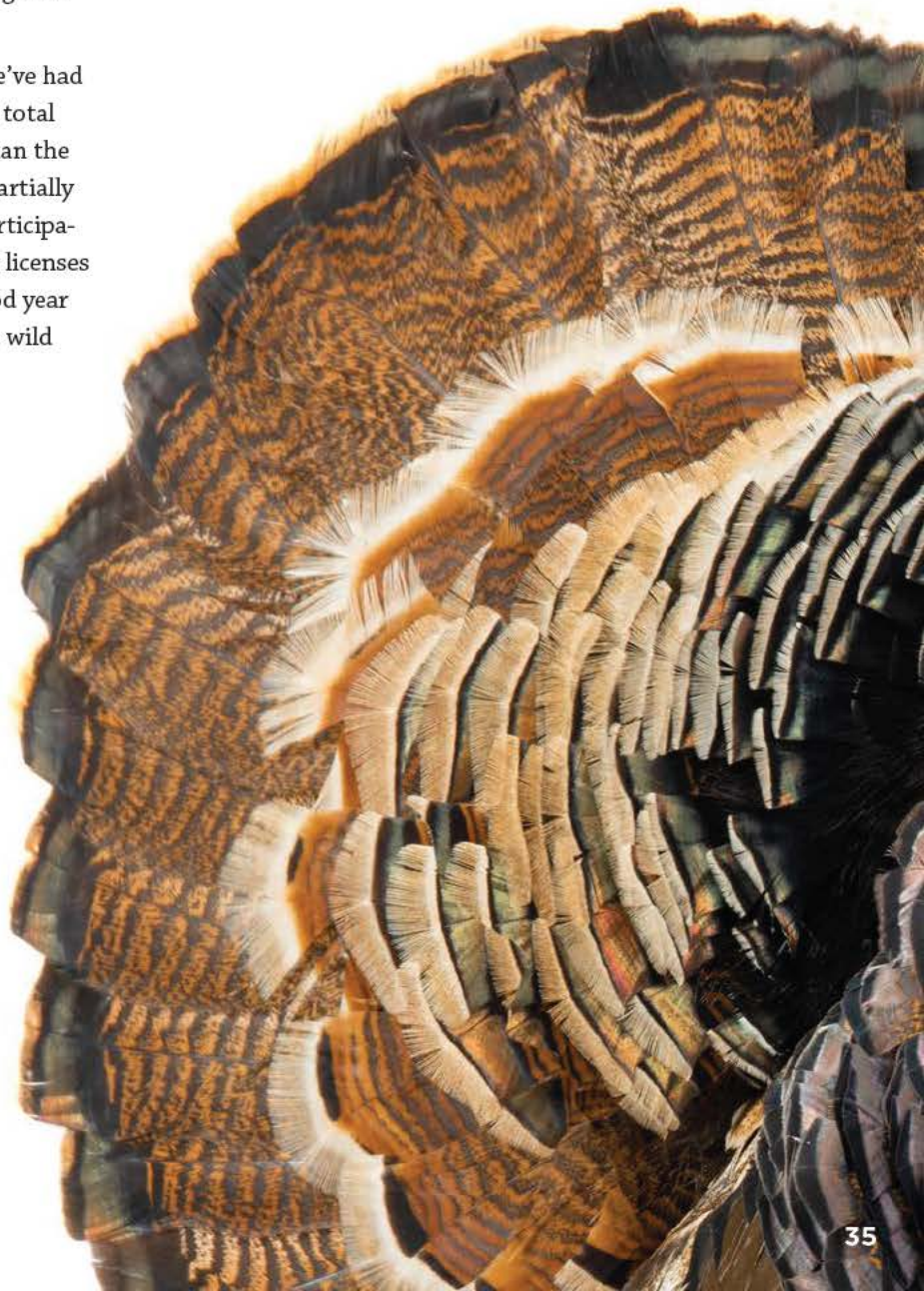




TABLE 1. WILD TURKEY FALL SEASON HARVEST TOTALS BY WILDLIFE MANAGEMENT DISTRICT FROM 2016 TO 2020.

WMD	2016 HARVEST	2017 HARVEST	2018 HARVEST	2019 HARVEST	2020 HARVEST	5 YEAR AVERAGE
6	CLOSED	CLOSED	CLOSED	CLOSED	66	66
10	2	8	7	8	19	9
11	46	32	61	30	71	48
12	57	29	107	29	80	60
13	67	10	59	7	30	35
15	307	155	418	196	400	295
16	242	97	371	140	332	236
17	362	146	345	272	363	298
18	62	42	80	48	86	64
19	39	16	35	21	37	30
20	307	212	350	191	384	289
21	194	127	244	154	236	191
22	214	112	301	130	257	203
23	235	154	407	260	369	285
24	99	58	64	57	102	76
25	232	123	340	185	408	258
26	169	81	149	156	292	169
27	CLOSED	42	54	41	57	49*
28	73	68	107	46	116	82
29	21	9	4	4	6	9
TOTAL	2,761	1,521	3,507	1,982	3,711	2,696

*4 year average



Wild Turkey Spring Harvest

Maine continues to have a quality wild turkey spring hunting season. The spring harvest has remained relatively stable over time. As with many ground-nesting upland game bird populations, the wild turkey population fluctuates annually based on factors such as weather conditions, predator numbers, and reproductive success. The table

below shows the spring wild turkey harvest from 2017 to 2021 by Wildlife Management District (WMD). The total harvest for the Spring 2021 hunting season was 4% below the most recent five-year, state scale average harvest of 6,110 turkeys.



TABLE 2. WILD TURKEY SPRING SEASON HARVEST TOTALS BY WILDLIFE MANAGEMENT DISTRICT.

WMD	2017 HARVEST	2018 HARVEST	2019 HARVEST	2020* HARVEST	2021 HARVEST	AVERAGE HARVEST
2	6	4	5	4	3	4
3	12	3	6	9	20	10
4	0	1	1	6	5	3
5	7	2	6	2	14	6
6	25	48	49	37	90	50
7	53	29	52	24	37	39
8	3	7	14	10	19	11
9	8	6	4	0	9	5
10	7	9	4	0	18	8
11	48	71	75	40	71	61
12	214	91	176	118	164	153
13	78	117	122	35	87	88
14	52	43	55	20	53	45
15	537	643	592	567	605	589
16	440	455	523	457	464	468
17	557	675	603	461	562	572
18	64	118	104	149	92	105
19	24	28	20	54	22	30
20	782	604	705	521	701	663
21	485	608	666	481	651	578
22	551	571	607	526	439	539
23	478	754	765	679	607	657
24	195	174	172	180	185	181
25	496	586	687	558	498	565
26	354	450	456	458	302	404
27	43	70	68	51	97	66
28	47	40	67	58	58	54
29	28	20	8	13	18	17
TOTAL	5599	6230	6612	6216	5891	6110

*Estimated from a post season harvest survey. In 2020, due to COVID, harvest registration was waived

Wild Turkey Research Project Update

The Maine Department of Inland Fisheries and Wildlife’s three-year research project (2018 – 2020), investigating various aspects of wild turkey biology and harvest, provided the Department contemporary data that will be incorporated into an adaptive harvest management system. This management system is intended to inform our harvest recommendations for the hunting seasons and provide us with the ability to adjust as we collect annual and periodic data on wild turkey survival, harvest rates, and reproduction. It will also incorporate perspectives of Maine citizens to assist the Department in balancing a successful wild turkey hunting season, and social values and perspectives on the level of wild turkeys in Maine.



Below are five key points from the research that we will incorporate into the adaptive management process.

1. Spring Harvest rates in 2019 and 2020 for adult males (toms) was around 25% and juvenile males (Jakes) was around 10%. These are in the moderate harvest range, considered sustainable in turkey management. Our relatively stable spring harvest and hunter success rates attest to this.
2. Spring male population estimates for the 3 years of the study were:

<u>2018</u>	<u>2019</u>	<u>2020</u>
31,677	32,512	33,500

Keep in mind, this is the spring population estimate and for males. The literature on proportion of male to female in turkey populations can vary by season, but in general a 1:1 ratio of male to female is widely used. With that we can estimate our Maine spring wild turkey population at around 70,000. This is a far smaller number from what we see in the fall directly after the nesting season. The fall population estimate would be much higher.

3. The date of nest initiation across the three years of monitoring GPS and VHF radio tagged females was around April 30th for first attempts, not varying much between the three years. This is key to supporting our current spring season start. By the end of April most female turkeys have mated and carry fertilized eggs. Removal of males from the population from harvest can occur without detriment to reproduction. Our season timing also minimizes disturbance on nesting females from turkey hunters and the potential to cause nest abandonment. The Department often receives requests to start the spring season earlier. Based on our study our spring season timing is correct.
4. Understanding disease prevalence in our wild turkey population is an important parameter in evaluating wild turkey population dynamics and needs to be considered in population management. Our study quantified the level of different diseases found in wild turkeys. We found that Lymphoproliferative Disease Virus (LPDV) infected ~57% of individuals and reduced clutch size and REV, or Reticuloendotheliosis Virus, which although found in 17% of the wild turkeys sampled, influenced wild turkey survival.
5. The average home range for GPS-marked females from winter capture to August 1 was near 7 square kilometers, with a range of 1.6 to 21.4 square kilometers. Movement from wintering home range to nesting home range was almost 5 km, ranging from 0.238 km to 23.216 (Monson to Kokadjo). This shows that female dispersal from winter flocks runs the gamut and there is a potential for movement between Wildlife Management Districts.



MIGRATORY GAME BIRDS

Kelsey Sullivan

MDIFW collaborates with the US Fish and Wildlife Service (USFWS) to monitor migratory game bird populations and assess their harvest. To monitor populations, we conduct several surveys throughout the year specific to migratory bird species groups, such as sea ducks and dabbling ducks, Canada geese, and American woodcock.



**WATERFOWL HARVEST**

The 2019-20 Maine waterfowl season selection continued with three zones: North, South, and Coastal. The federal framework offered states in the Atlantic Flyway a 60-day duck season with a six-bird daily bag limit and a 60-day Canada goose season with a two-bird daily bag limit. The season also allowed for additional hunting days to compensate for state-imposed Sunday hunting prohibitions. The special sea duck season in the Atlantic Flyway, including Maine was again limited to 60 days with a daily limit of five sea ducks per day with no more than four scoters, four eiders, or four long-tailed ducks per day. In addition to the regular Canada goose season, a special early Canada

goose season was open from September 2 to September 25. The early season daily bag limit was 10 in the South and Coastal zones and six in the North zone.

Table 4 below presents the waterfowl harvest results, as estimated from data collected through the Harvest Information Program (HIP), for the 2016-17, 2017-18, 2018-19 and 2019-20 hunting seasons. The HIP program is a federal, US Fish and Wildlife Service led survey of hunters each year to monitor annual waterfowl harvest. Each state requires waterfowl hunters to register for the survey when they purchase their license for the year.



TABLE 4. MAINE DUCK AND GOOSE HARVEST ESTIMATES BASED ON HARVEST INFORMATION PROGRAM, 2016/17-2019/20.

	2016-17	2017-18	2018-19	2019-20
Black Duck	2,700	2,900	5,600	2,700
Mallard	8,000	9,700	11,800	6,300
Mallard X Black Duck Hybrid	100	200	100	100
Green-Winged Teal	1,900	1,600	1,100	1,900
Blue-Winged Teal	200	0	0	200
Northern Shoveler	0	100	0	100
Northern Pintail	100	200	400	100
Wigeon	100	0	200	200
Wood Duck	5,500	6,500	3,700	4,600
Greater Scaup	0	0	100	0
Lesser Scaup	100	0	0	0
Ring-Necked Duck	800	200	800	900
Bufflehead	2,500	1,500	2,700	700
Common Goldeneye	600	600	700	400
Hooded Merganser	600	600	600	400
Other Mergansers	700	500	700	200
Total Dabbling/Diving Duck Harvest	27,000	32,200	39,400	22,900
Seasonal Duck Harvest Per Hunter	5.9	5.3	5.7	4.6
Canada Goose	11,400	15,200	11,400	7,200
Seasonal Goose Harvest Per Hunter	4	4.4	4.5	2.8
Common Eider	1,800	5,700	7,300	1,700
Long-Tailed Duck	800	1,700	2,600	1,300
Scoter Species	1,100	1,300	800	1,100
TOTAL SEA DUCK HARVEST	3,700	8,700	10,700	4,100