BIG GAME

MANAGEMENT

MAINE
DEPT. OF INLAND FISHERIES AND WILDLIFE
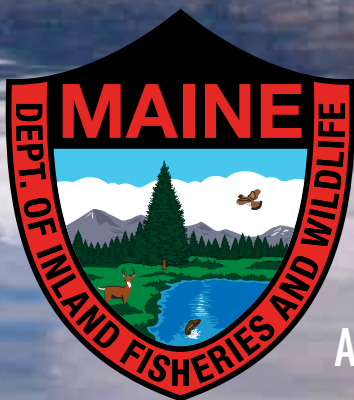
ALL IN FOR THE MAINE OUTDOORS

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.

BIG GAME MANAGEMENT
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Maine's Wildlife Management Districts

For a more detailed map and information on WMDs, please visit mefishwildlife.com

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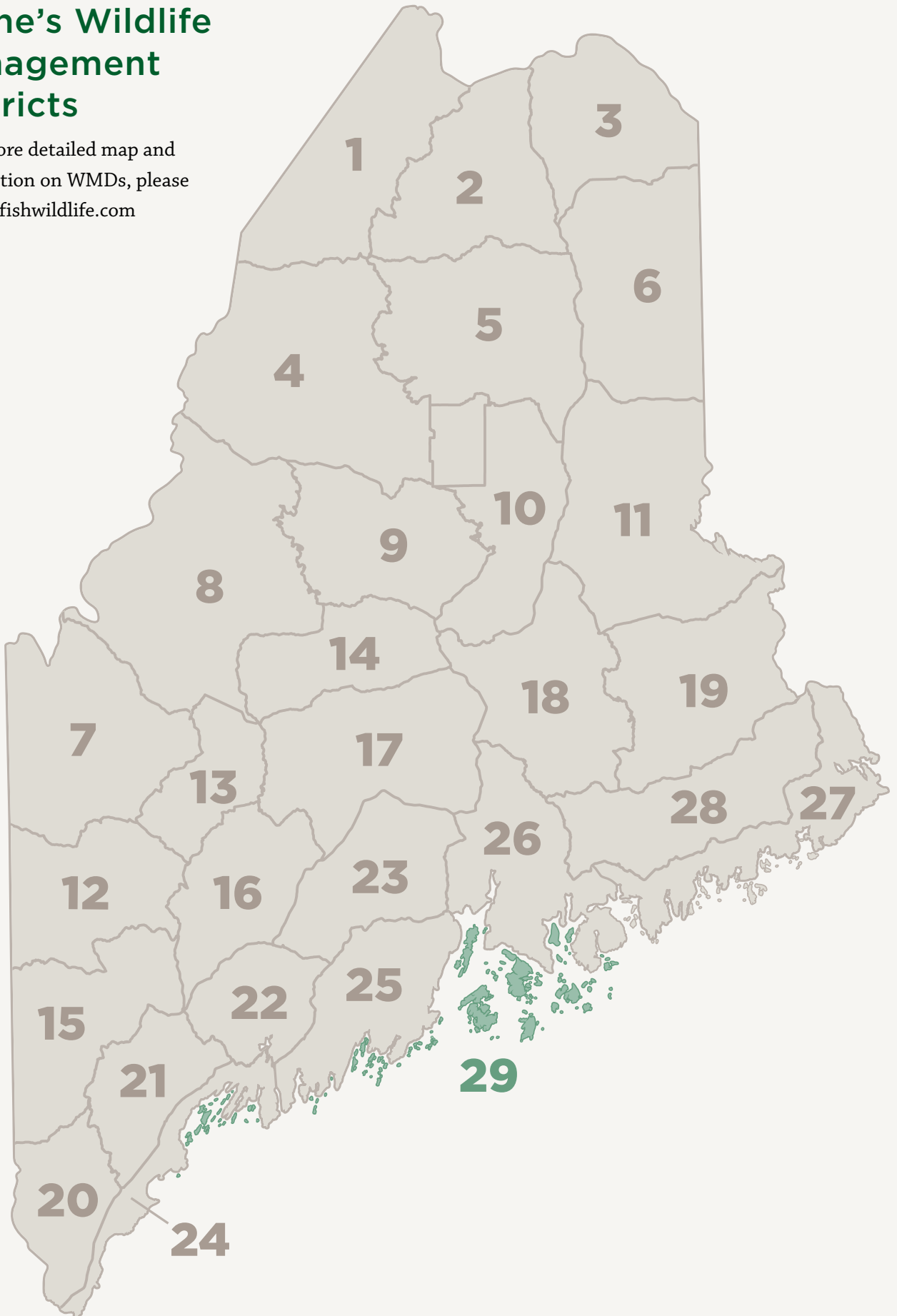
1.0 Introduction

Maine Department of Inland Fisheries and Wildlife *(hereafter 'MDIFW' or 'the Department')* was founded in 1880 to protect Maine's big game species; and while the scope of our work has grown since then, preserving these species—namely deer, moose, bear, and wild turkey—remains a core priority.

COORDINATED PLANNING

The Department initiated a comprehensive wildlife management planning process in 1968, and has continually refined and expanded it since then.

In 1989, MDIFW began using a formal public participation process to develop management goals and objectives for wildlife species of public interest (e.g., species that are hunted or have viewing interest).

This process included convening "Public Working Groups" to represent the public's desires for the management of each species. Public Working Groups were charged with developing wildlife management goals and objectives and discussing their feasibility with Department biologists. During the same time period, the Department implemented a new management system to document how it would meet the goals and objectives set by the Public Working Groups.

Over time, management plans were developed for many wildlife species within the State. Plans were originally updated every five years; but over time, this transitioned to a 15-year planning horizon. In 2014-15, MDIFW reviewed its planning process and determined that some adjustments would make the plans more responsive to public desires and more adaptable to emerging scientific information. In particular, recent advancements in human dimensions science (e.g., public attitude surveys and their analyses) uncovered new ways to broadly engage the public during species plan development.

Beginning in autumn of 2016, MDIFW collaborated with Maine citizens over an 18-month period to develop a new Big Game[1] Management Plan. This plan combines bear, moose, deer, and turkey management priorities in a single document. Rather than relying on members of a Public Working Group to be the sole representatives of public perspectives on the management of these species, MDIFW contracted with Responsive Management (Harrisburg, Virginia) to scientifically survey the general public, hunters, and landowners, and to gather additional information from regional public meetings, focus groups, and internet forums. A steering committee provided guidance and advice to MDIFW during the development of the plan. In addition, MDIFW convened a subcommittee for each species. Each subcommittee formulated draft goals, objectives, and management strategies based on the public survey information and the subcommittee members' professional expertise.

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WILDLIFE MANAGEMENT PLANNING INITIATED
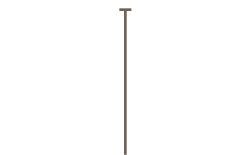
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PUBLIC WORKING GROUPS INCLUDED
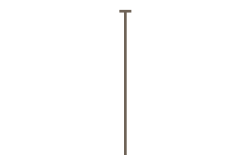
2014-15
MORE RESPONSIVE TO PUBLIC + ADAPTABLE TO EMERGING SCIENCE

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[1]*The term 'Big Game' refers to certain species of animals that can be hunted and is defined in Maine's statutes. It includes other species besides bear, moose, deer, and turkey (e.g., bobcat). The Department recognizes that these wildlife species are valued both as watchable wildlife and as hunted animals.*

1.1 MDIFW Species Planning – Past & Present

THE TRADITIONAL METHOD

Historically, MDIFW species management plans were developed through a multi-step collaboration between Department staff and a Public Working Group.

Step 1: Species assessment. First, a MDIFW wildlife biologist would develop a 'Species Assessment' summarizing the history and status of the species within the state. Each assessment included a thorough description of the species' ecology, management history, and use by the public. These assessments were often very detailed, and some exceeded 100 pages in length.

Step 2: Draft objectives & goals. Species Assessments were provided to a Public Working Group, which typically consisted of members of the general public and representatives from a wide range of stakeholder groups interested in, or impacted by, the management of the species. Using the Assessment as a guide, Public Working Group members recommended species management goals and objectives.

Step 3: Feasibility statements. Department staff then prepared 'feasibility statements' that described the desirability and feasibility of the draft goals and objectives.

Step 4: Revisions. Public Working Groups considered modifications to the goals and objectives based on the Department's feedback.

Step 5: Management systems. Finally, using the goals and objectives as a guide, Department staff developed 'Management Systems' that described the data inputs and rules of thumb used to manage the species over time.

A NEW, MORE EFFICIENT WAY

In 2015, MDIFW reviewed its species planning process and determined that several adjustments could make the process more efficient, more responsive to public desires, and more apt to produce reader-friendly management plans. These changes included modifications to the planning process and to the format of the plans:

1. **Public Consultation:** Advancements in human dimensions research and technology have made it possible to engage a wider diversity of constituents when assessing public attitudes towards wildlife management. Instead of relying solely on the discussions of a Public Working Group to represent the interests of Mainers, the Department used scientific public surveys to gather a representative summary of public attitudes on various issues. Researchers from Responsive Management determined the perspectives of different stakeholder groups on wildlife management issues by either surveying specific stakeholders (e.g., hunting license holders, landowners), or by using information collected during a survey (e.g., age, gender, town of residence for the survey participants) to categorize responses. In addition to conducting surveys, researchers also conducted focus groups to obtain more detailed information. To ensure all members of the public have the opportunity present their viewpoints on wildlife management in a setting that is comfortable for them, the Department holds public meetings and online forums, allowing the public to submit comments on draft management plans.

2. **Role of Working Groups:** Public Working Groups continue to form a key component of the Department's species planning process, although their role has changed slightly in both name and function. Now called 'Steering Committees', these groups provide input and advice throughout the planning process, including the public consultation efforts, identification of management issues, and development of plan content.

3. **Plan Content:** Historically, each MDIFW species plan has included a detailed Species Assessment, goals, and objectives to guide the management of the wildlife species over the life of the plan. Generally, the goals and objectives focused on the desired number or density of animals that the Working Groups felt would provide an appropriate balance of habitat protection, recreational opportunities, and conflict avoidance. Moving forward, goals and objectives will address the full range of management issues for each species, including habitat conservation, research priorities, disease, and public education. In addition, management strategies are developed to identify specific tasks that the Department and its partners should consider to achieve the goals and objectives for the species. Overall, species management plans will be streamlined, resulting in a more reader-friendly document that does not go into extensive detail on the species' ecology, which is generally available from other sources.

4. **Grouping Species:** Where appropriate, MDIFW species management plans will be developed for groups of species. This approach will improve efficiency and allow Department staff to focus more of their efforts on plan implementation rather than plan development. Combining several species into a single planning effort will also ensure that competing management issues are considered cohesively.

5. **Management Systems:** Species management systems outline the detailed data inputs, analyses, and rules of the thumb that MDIFW staff use to manage species. Historically, management systems were developed as an integral part of the planning process, and typically were not updated during the life of the plan. Moving forward, management systems will be developed separately from management plans, and will be updated on an as-needed basis throughout the life of the management plan. This will ensure management systems reflect the latest scientific information, and will allow the Department

to respond to emerging issues and challenges without altering the management plan. Management plans will continue to guide the Department, and will serve as the roadmap for species management.

1.2 Development of the 2017 Big Game Management Plan

Steering Committee and Species Subcommittees. MDIFW convened a Big Game Steering Committee in Fall 2015 to guide the development of this plan. Members were appointed by the Commissioner, and included a representative from the Department's Advisory Council, a representative from the Department's Legislative Committee, two Department staff, and representatives of several stakeholder groups with a long history of involvement in management of big game in Maine (for Steering Committee roster, see Appendix I). The Department also established a subcommittee for each species, chaired by a MDIFW species specialist from the Department's Research and Assessment Section. Subcommittees also included two MDIFW wildlife biologists from the Wildlife Management Section, a Maine Game Warden, and several members of the public involved with big game issues. The Steering Committee and subcommittees were provided with a 'project charter' (Appendix II) to guide their activities. In general, the steering committee was established to provide advice to the Department on plan content and format, and to make specific recommendations on difficult management issues. Subcommittees were tasked with identifying specific public input needs for each species, developing draft goals, objectives, and management strategies, and responding to steering committee feedback on draft content.

Public Consultation. MDIFW contracted with Responsive Management to conduct a scientific survey of Maine residents, landowners, and hunters, and to lead focus groups, facilitate public meetings, and develop an online 'town hall'. Species subcommittees developed a draft list of issues for public consultation, and worked closely with Responsive Management staff to develop survey questionnaires and discussion guides for the focus groups, with final review by the steering committee. The state was divided into three regions. Responsive Management summarized the public consultation into two reports: one describing the quantitative data (scientific survey), and one report summarizing the qualitative public input (focus groups, public meetings, and online town-hall comments). The steering committee and species subcommittees carefully reviewed the results, and repeatedly referred to them when developing species goals, objectives, and strategies. Detailed methodology and key results of the public consultation effort are provided in Section 2.0 and in the individual species chapters of this Plan.

Species Assessments. MDIFW species specialists developed the 'species assessment' portions of this plan, which are integrated into the document and include information on species' status, historic and current management practices, the current regulatory framework, and management issues and threats. The assessments were reviewed by the subcommittees and steering committee

Goals, Objectives, and Strategies. Species subcommittees identified management issues for each species by referring to the species assessments, public consultation results, and the professional expertise of Department staff and subcommittee members. To address these issues, each subcommittee developed draft goals, objectives and strategies. In many cases, the identified strategies were already underway as part of the Department's core management programs, while other strategies are new initiatives. The subcommittees discussed the feasibility and desirability of each strategy prior to inclusion in the plan. Subcommittees used a 'modified consensus' approach to develop plan content. Where consensus could not be achieved, the differing viewpoints were shared with the Technical Committee, which then made a final recommendation to the Commissioner.

1.3 Format of Plan

This Plan is organized into a summary section illustrating statewide issues and management strategies that are universal to all four big game species (bear, deer, moose and turkey), and then into separate chapters for each species. Species chapters include sections describing 'History and Population Status', 'Current Regulatory Authority', 'Current Management Issues and Threats', 'Goals, Objectives, and Strategies', and 'Expected Outcomes'

1.4 Process for Updating and Revising the Plan

This plan will be revised and updated as necessary throughout its life. The Department may make minor revisions in response to emerging scientific information or changes in wildlife populations or habitat. Prior to making major revisions (e.g., modifying goals or objectives), the Department will reconvene a Steering Committee and/or Species subcommittee(s) to provide advice and recommendations on proposed changes.

1.5 Species Management Systems

The Department will continue to use Species Management Systems to guide day-to-day wildlife management decisions. Following this Plan's publication, Department biologists (with help as needed from other wildlife professionals) will revisit the Management Systems for all four big game species and, when appropriate, update them to reflect new scientific information, biological data, and/or analytical techniques.

2.0 Public Survey Results – Methods & Key Findings

Before developing this plan, the Department scientifically surveyed Maine residents and non-resident hunters on their opinions and attitudes toward big game management. The survey was carefully designed by Responsive Management in collaboration with Department staff, the big game steering committee, and the subcommittees to ensure that results were accurate and representative of each stakeholder group. Large sample sizes (Table 1) were selected to give a high-level of reliability and confidence. Survey participants were contacted by postal mail, phone and email, and were given the option to complete the survey by phone or online. The survey questionnaire included a wide variety of questions, some focusing on wildlife and hunting in general, and others about population levels and management options for each of the four big game species.

Table 1. Sample sizes and sampling error (95% confidence interval) for the 2016 public survey that informed the Big Game Management Plan.

SAMPLE TYPE	SAMPLE SIZE	SAMPLING ERROR
RESIDENTS	933	4.07%
HUNTERS	956	6.81%
LANDOWNERS	304	3.26%

Respondents from all three survey groups indicated strong interest in wildlife (average rating of 8 or higher on a scale of 1 to 10), and support of legal hunting to manage wildlife (87% - 98% depending on the species and survey group). Most survey participants felt that the population size of each of the four big game species should remain similar to current levels, although about 30% felt that turkey populations should be reduced. The Department received high ratings for its management of big game, with less than 5% of residents rating the management of deer, bear, and moose as 'poor', and 11% rating turkey management as 'poor'. In general, respondents felt that the animals' health should be the department's most important management consideration.

The survey provided a wealth of information about hunters' motivations, limitations, and specific management preferences. Some key findings: the vast majority of hunters (77% - 96%, depending on species and region of the state) were satisfied with their big game hunting experiences in Maine. When asked why they chose not to pursue a particular big game species, most hunters indicated they either lacked time or simply weren't interested. Thirty-five percent of hunters agreed that the requirement to purchase separate permits for some species, such as turkey and bear, prevented them from hunting those species as much as they would like. Nonetheless, 74% of hunters felt that current hunting license fees were 'about right'. Support for mandatory antler-point restrictions for deer was mixed, with about half of hunters in favor and half opposed. Most moose hunters (60%) prefer to hunt in October, but appreciate the fact that permit holders are distributed over multiple seasons.

Several survey questions explored access to private land for hunting. Sixty-four percent of hunters rated access to hunting lands in Maine as 'excellent' or 'good, but 34% agreed that a lack of access caused them to not hunt as much as they would like. Interestingly, 28% of landowners responded that they provide open access to their land by hunters, 42% allow access by permission, 11% limit access to family and friends only, and 19% do not allow access at all. Of the 19% of landowners that do not allow access to their land, 36% responded that they didn't allow access because they are concerned about safety, disrespectful behavior by hunters, or property damage, and 20% because they disapprove of hunting in general.

Overall, the public survey provided a solid foundation upon which to develop big game management goals and objectives. When combined with the focus groups, public meetings, and online town hall, as well as other related public survey projects that the Department has recently undertaken, we now have the most comprehensive evaluation of Maine wildlife stakeholder opinions that has ever been available. This information was carefully considered during the plan's development, and provides a reference point from which to gauge future success.

77%

TO

96%

OF HUNTERS WERE SATISFIED WITH THEIR BIG GAME HUNTING EXPERIENCES IN MAINE

3.0 Statewide Big Game Management Issues & Strategies

3.1 Big Game Habitat Availability and Trends

Covering over 19 million acres, Maine is the largest northeastern state, in fact, the other five northeastern states' combined land mass could almost fit within its borders. Maine boasts a diversity of habitats, and has nearly 230 miles of coastline, the largest areas of grassland and agriculture in New England, and is the most heavily forested state in the U.S. Eighty-two percent of Maine's surface area is forested, with about 10% in either developed areas or agricultural lands, and the remainder in inland waterways. The state is fortunate to have one of the most intact forest environments in the country, including the largest undeveloped area east of the Mississippi River. Maine also has the lowest human population in the east at 43 people/mi2. These patterns have been relatively stable for the past 60 years (McCaskill et al. 2016).

Not only is Maine unique among eastern states for its heavily forested and relatively undeveloped landscape, but it also has an extremely diverse climate with significant implications for big game species. Although Maine spans only 4 degrees latitude, it includes three climate divisions with vastly different temperature and precipitation regimes. Northern hardwood and conifer forests are distributed statewide and comprise 40% of Maine's landscape, with significant areas of boreal upland forest in northern and Downeast Maine (NatureServe Ecological Systems GIS map 2012). As a result, vegetation and snowfall patterns in northern Maine are most conducive to wildlife adapted to areas with severe winters (including moose and bear), while southern and coastal portions of the state have much milder winters that are much more hospitable for deer and wild turkey.

Maine has a long and storied history of landscape changes that have shaped wildlife habitats over time. Historically, Maine was heavily forested with few natural clearings or early successional forest habitat. With European colonization, much of southern and central Maine was converted to farmland, and timber harvests occurred statewide. Beginning in the late 1880s, abandoned farmland began reverting back to forest. This created a diverse mosaic of forest, shrub, and old field habitats in southern and coastal Maine that was ideal for many wildlife species. Across much of northern Maine, a massive spruce budworm outbreak in the 1970s and 80s resulted in extensive salvage logging, creating extensive stands of even-aged forests. This continues to drive forest stand development across the northern tier of the state. Concurrently, a shift to mechanized harvesting, improved road networks, changing markets for forest products, and changes in silivicultural techniques have all contributed to an increase prevalence of 'young forests' in much of the State's industrial forest land base.

Maine's pattern of private land ownership also has significant implications for big game habitat in the State. Approximately 94% of the state is privately owned, with the majority held by corporations that manage the land for timber production, especially in northern and downeast Maine (McCaskill et al. 2016). Family landowners also own a significant portion of the state, especially in southern and central Maine, where parcel sizes are typically relatively small, averaging 64 acres and few exceed 1,000 acres. Most family landowners in Maine own land for a variety of reasons, including enjoyment of wildlife (McCaskill et al. 2016). In fact, 48% of landowners self-reported that they actively manage their land for wildlife (Responsive Management 2016). While, timber production is typically not a primary objective for these landowners, one quarter of family forest owners have had a commercial timber harvest in the past 5 years. Although timber harvesting occurs within

82%
FORESTED

MAINE IS THE MOST HEAVILY FORESTED STATE IN THE U.S.

the state's regulatory framework (including, the Maine Forest Practices Act and Natural Resources Protection Act), management of wildlife habitats within the state is generally at the landowner's discretion. Of the four big game species addressed by this Plan, white-tailed deer are the only that receive specialized habitat protection. In unorganized towns, zoned 'deer wintering areas' total ~200,000 acres, and forest harvest plans must be reviewed by a MDIFW biologist prior to initiation. Department staff also work closely with private landowners to develop Cooperative Agreements to manage deer wintering areas. These agreements currently cover over 300,000 acres (some of this acreage contains a zoned 'deer wintering area').

Currently, Maine's climate, forest management practices, and patterns of human settlement create excellent habitat conditions for deer and turkey across much of southern and central Maine, and for moose and bear across northern, western, and downeast portions of the state. The Department expects that habitat conditions for these big game species will remain relatively stable over the ten-year life of this plan. Maine's human population growth through the year 2034 is expected to be relatively stagnant, which will help minimize development and habitat conversion that could negatively impact some wildlife species.

3.2 Economic Impact of Big Game

Maine's big game species are an important natural resource in Maine, contributing to a ~$6 billion tourism industry that brings over 35 million visitors to the state each year (Maine Office of Tourism, unpublished data). According to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, wildlife watchers and hunters spend more than $1 billion per year in Maine, with about 1.1 million total participants spending greater than 12 million days/year hunting, fishing, and viewing wildlife (U.S. Department of Interior 2011). Deer, moose, and turkey are the three most commonly viewed species by wildlife watchers in Maine, and are also among the most sought-after species by hunters (Responsive Management 2016). Resident and non-resident hunting for big game also contributes significantly to the state's rural economy, with over $130 million/year in direct expenditures and nearly $200 million/year in total economic contributions by hunters pursuing these species (Southwick Associates 2014). With over 3,000 guides in the state licensed to assist big game hunters, as well as dozens of sporting lodges and hotels that cater to hunters, big game hunting provides a much-needed source of seasonal income, particularly in rural areas.

Although Maine's big game species provide significant economic benefit to the State, they can also present economic liabilities. Over 20,000 collisions between vehicles and deer, moose, bear, and turkey occurred on Maine roadways from 2011-2015, with nine human fatalities and an estimated $137 million economic impact (Maine Department of Transportation 2016). The average cost of a collision with a game animal is $6,746, and that's before considering the impact on insurance premiums and crash prevention/mitigation efforts. Similarly, all four big game can cause significant losses to agricultural crops and stored feed. Because many of these impacts are relatively small in scale, estimating the total value of crop damage is challenging.

3.3 Hunting Access

For hunting to be used as a management tool, hunters need land access. Lack of access for hunting is one of the primary challenges for maintaining appropriate deer densities in portions of southern and coastal Maine. With only 6% of Maine publicly owned, access ultimately depends on the willingness of private landowners to allow hunters to use their properties. Maine has a unique tradition of 'implied access', where unless posted otherwise, the public can legally access private land. With the exception of some large industrial landowners that charge road-use and/or camping fees, access to private land is generally free. This open-land tradition is a cornerstone of Maine's hunting heritage, but the tradition is slowly changing (Acheson 2006). While the data may not be directly comparable because methodologies differed, surveys of small landowners conducted in 1991 and 2016 demonstrated a dramatic increase in the amount of posted land, from 14.9% in 1991 to as much as 72% in 2016 (Acheson 2006, Responsive Management 2016). A number of factors may be at play, including increases in motorized recreation (ATVs), demographic shifts by landowners, and cultural attitudes towards hunting (Acheson 2006). These changes are not limited to small landowners, and changes in ownership of large parcels in northern Maine have also resulted in some loss in access for hunters.

Although Maine's open-land tradition may be changing, particularly on smaller parcels, there also several positive trends that have emerged in recent years. Conservation easements have increasingly been used to guarantee public access to private lands, often while prohibiting or limiting development. Land trusts have also acquired significant acreage in the state, particularly in central and coastal regions, and typically allow access for hunting. Use of 'Access by Permission Only' signage has also increased, which allows landowners to express their desire to control public access to their properties without necessarily prohibiting it altogether. Finally, MDIFW's landowner relations program provides targeted resources to address conflicts between landowners and land-users and encourage ongoing public access to private land. Continuation of efforts to maintain positive relationships between hunters and land owners, and where possible, to secure guaranteed access to land for hunting, will be critical to the effective management of big game in Maine.

3.4 Public support for hunting

Maine residents are generally highly supportive of legal, regulated hunting, particularly when used as a wildlife management tool (Responsive Management 2016). Nonetheless, with increasing urbanization, national declines in hunter participation rates, and public referenda on hunting methods, MDFIW will need to take proactive steps to ensure that support for hunting does not erode over time (American Sportfishing Association et al. 2013, U.S. Department of the Interior 2011). Successful management of all four big game species requires implementation of science-based hunting and/or trapping seasons, oftentimes in parts of the state with the highest human density. Therefore, it is essential that Maine residents not only support hunting, but also understand its role in maintaining healthy wildlife populations in both suburban and rural areas.

MDIFW has high credibility among Maine residents, and the public generally trusts the Department to make the best decisions for the state's wildlife (Responsive Management 2015). Although public referendums to limit bear hunting methods were rejected by voters in 2004 and 2014, they demonstrated that some aspects of the Department's big game management programs may be less palatable or not well understood. Similarly, the Department has faced public opposition to localized efforts to reduce deer densities, in communities where typical harvest framework is unavailable. While only 19% of landowners reported restricting assess to land, the lack of support for hunting is a primary reasons for prohibiting hunters from accessing their property (Responsive Management 2016). In order to maintain it's 'social license' to use hunting and trapping as tools to manage big game and other wildlife, MDIFW must continue, and where possible expand, its efforts to communicate with the non-hunting public. In particular, the Department must increase awareness by the general public on the ways that regulated hunting benefits local communities, such as maintaining healthy wildlife populations, limiting disease transmission, providing funding for wildlife conservation and public land acquisition, reducing human-wildlife conflicts, and providing a source of lean, nutritious protein.

SUCCESSFUL MANAGEMENT OF ALL 4 BIG GAME SPECIES REQUIRES IMPLEMENTATION OF SCIENCE-BASED HUNTING AND/OR TRAPPING SEASONS

3.5 Data Management

Management of Maine's big game species requires the ongoing collection of biological data to monitor populations, as well as information from harvested animals and hunters (surveys and licensing data). Mandatory registration of harvested animals provides critical information including the sex, age, location, method, timing of harvest, and other biological data. These data are used to calculate hunter success rates, and often inform additional biological data sets. MDIFW has long partnered with private businesses to register the majority of deer, moose, turkey, and bear. These registration agents attach a seal to each harvested animal and record pertinent information on paper forms for submission to the Department. At MDIFW headquarters, information from the forms is then manually entered into a database for biologists' use. Although this system has worked well for many years, technology has now made it possible to record this data more efficiently and accurately, and to get it to biologists faster.

Another key component of effective wildlife management is tracking conflicts with people. The number, severity, and geographic distribution of human-wildlife conflicts are important elements of 'social carrying capacity', or the willingness of people to coexist with wildlife. For some species, the Department believes social carrying capacity should be a trigger in the management system, potentially leading to regulatory changes to increase hunter harvests if conflicts become too severe. In the past, the Department tracked calls from the public regarding human-wildlife conflicts in the Warden Service Records Management System (RMS) database. Although the trend in conflict numbers at the regional level can be tracked, many details surrounding each incident must be recorded in a narrative form, which makes it difficult to efficiently summarize and categorize type and severity of conflicts. Recently, this system was improved when the State transitioned from RMS to Spillman software. As a pilot effort to track human-wildlife conflicts more thoroughly, and track changes in severity over time, the creation of standardized fields for data entry for black bear conflict is being tested. After this pilot effort, opportunities to incorporate other big game species should be considered.

3.6 Overarching Management Strategies

The big game steering committee and subcommittees identified several management strategies that apply universally to all four big game species. In most cases, these efforts are already underway or are part of the Department's core work program. They include:

• Implement electronic data entry at big game tagging stations to improve the availability and accuracy of harvest data

• Develop a comprehensive public outreach program about MDIFW, wildlife management, and hunting, focused on non-consumptive users

• Implement a hunter recruitment, retention, and reactivation (R3) program

• Identify options to simplify the hunting license and permit system to increase participation and maintain vital participation/effort data collection.

• Improve tracking and recording of human-wildlife conflicts

• Maintain the Landowner Relations Program to acknowledge the important contribution of landowners in maintaining wildlife habitat, and to help ensure hunting access.

INDIVIDUAL
SPECIES PLANS

4.0 BLACK BEAR

4.1 History and Population Status

Although Maine is home to the largest black bear population in the eastern United States, bears are relatively uncommon in the more densely-settled southern and coastal areas. Bears used to be found statewide, before the conversion of forest to farm land by early settlers, and increasing conflicts with agricultural activities, led to a bounty on bears. The first bounty payment was paid in 1770, with nearly 13,000 bears presented for payment between 1903 and 1952. By 1900, bears had been eradicated from much of southern and coastal Maine, but remained common in the northern half of the state, where farming had less of an influence.

Starting around 1950, the bear range began to slowly expand as public attitudes toward bears improved and agricultural land use declined. By 1985, 86% of the state was occupied by bears. Although nuisance and harvest records demonstrate a slow expansion into southern and coastal Maine since early 2000, bear densities remain low in these areas (Figure 1).

Primary Range

Secondary Range

Peripheral Range

Figure 1. Maine's Wildlife Management Districts in relation to the state's black bear primary, secondary, and peripheral ranges.
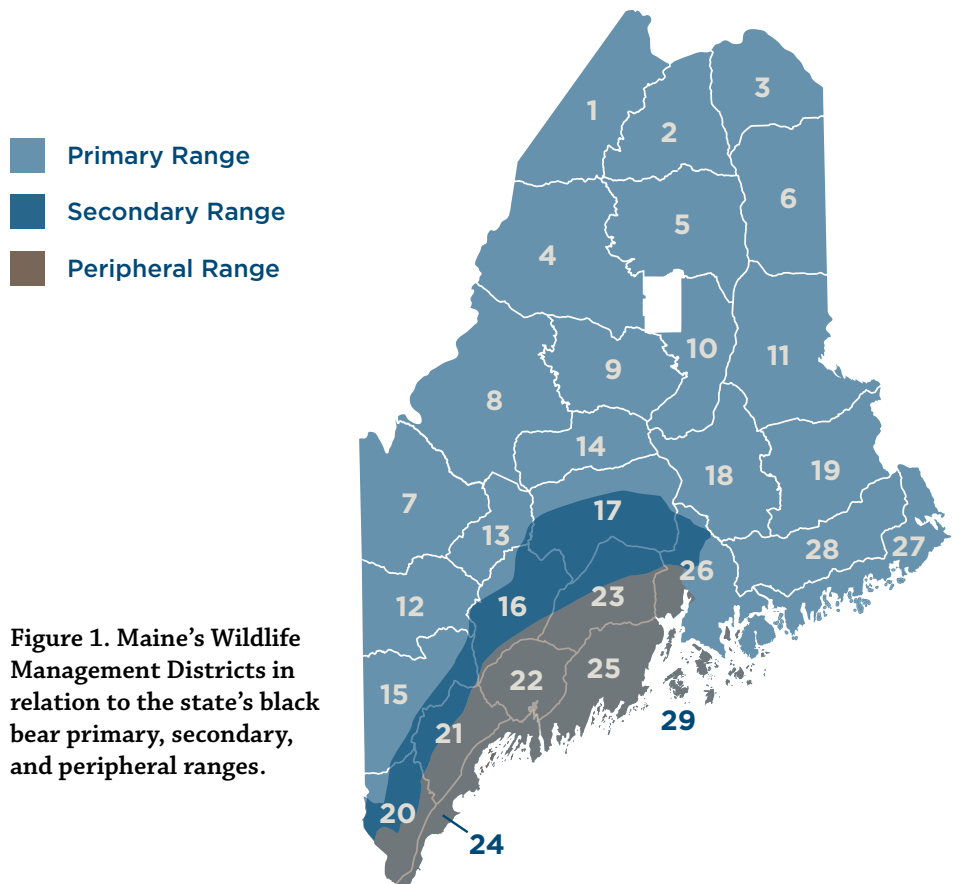
4.0 BLACK BEAR

A GROWING POPULATION

Bear population estimates have been updated periodically since the 1950s, and have been refined as knowledge and tools have improved. Early estimates of between 5,000 and 7,000 black bears in the 1950s were based on the age of bears presented for bounty and incidence of tracks, scat, and bear feeding activity on established transects. After bears were established as a game species with regulated hunting seasons and mandatory registration (1969), population estimates were derived from harvest statistics. Population estimates incorporated data from radiocollared black bears after MDIFW initiated telemetry studies in 1975. However, the initial assumption that bears were territorial resulted in generating what is now considered a low estimate of 6,000 to 9,000 bears in 1979. After more extensive telemetry data demonstrated bears were not territorial, but shared areas with other bears (McLaughlin 1999), a population estimate of 21,000 was generated in 1985. Since then, data from harvest, telemetry studies, and habitat inventories have been used to update population estimates. Except for a brief period, Maine's bear population remained between 21,000 and 23,000 black bears through the start of the 21st century. Since 2005, Maine's bear population has steadily increased in response to declining hunter participation and harvest. Over the last decade, the bear population has increased by 2% to 4% annually, and currently exceeds 35,000 animals.

Bar chart with bars labeled: 7,000 (1950), 9,000 (1980), 18,000 (1985), 23,000 (2000), >35,000 (2005-PRESENT)
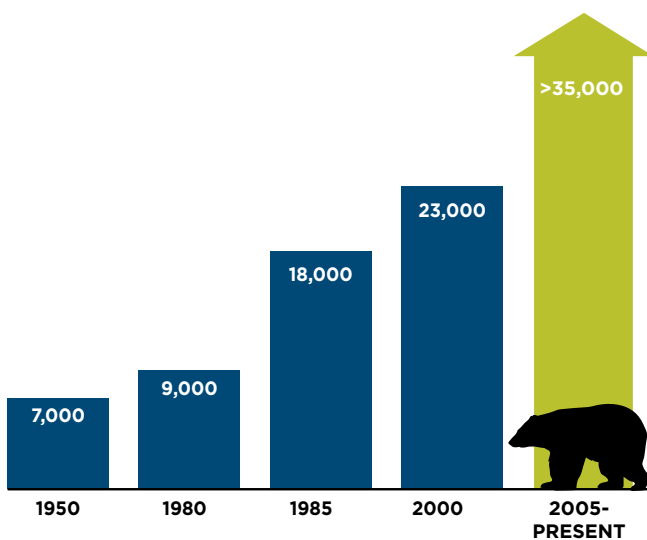
MAINE'S BEAR POPULATION HAS INCREASED IN RESPONSE TO DECLINING HUNTER PARTICIPATION

THE FOOD FACTOR

A variety of natural foods are important to bears, and availability of those foods has a strong influence on population growth rates (McLaughlin 1999). Although black bears are omnivores, primarily eating berries, nuts, grasses, and other forbs, they also eat animal protein (e.g., insects, insect larvae, carrion). Bears, particularly adult males, can be significant predators of deer fawns and moose calves.

The abundance of natural foods is affected by many factors, and often fluctuates from year to year. Historically, beech nuts were a very important food source for bears living in the northern forest of Maine (Jakubas et al. 2005). However, the number of mast producing beech trees has declined due to beech bark disease and subsequent timber harvest. This, coupled with an increase in the variety and availability of many alternative and important bear foods (e.g., beaked hazelnut, raspberries, mountain ash, pin and choke cherry, etc.), has reduced the importance of beechnuts for bears in Maine. In northern Maine, yearling bears have been heavier and exhibited higher growth rates during the last 10 years compared with decades when beech mast was more abundant. Although the presence of bear hunters' bait sites has been offered as a possible explanation for this increase in body weight, natural food availability is more likely, given the fact that we see year-to-year variation in yearling weights in an environment that has stable bait but variable natural food levels.

MANAGEMENT HISTORY

Since 1770, regulations governing the hunting of Maine's black bears have ranged from year-round bounties to hunting only during the fall (Table 1). Legal methods have included hunting with trained dogs, hunting over bait, trapping, and group hunting through organized drives. After 1969, a bag limit was established and registration of harvested bears became mandatory. Since 1971, the season has closed in November because most bears are hibernating in winter dens by the end of November. The spring season was closed in 1982, largely due to public concerns about protecting females with dependent cubs in the spring. However, the timing of a spring season and target identification requirements have been very effective in protecting females with cubs from harvest. Currently, two tribal nations in Maine allow a spring hunt on tribal lands with a harvest of about 100 bears annually. A variety of factors have influenced management decisions, including monitoring bear numbers, availability of new tools or technology, and political influences. These additional management actions are provided in Table 1.

Table 1. Summary of management actions from 1770 to 2014.

YEAR	MANAGEMENT ACTION
1770	First bounty payment
1931	Classified as game animal – bountied in some portions of the state
1931-1941	Season same as deer season
1942-1965	Year-round open season
1957	Bounty repealed
1963	Mandatory reporting of harvested bears
1966	Hunting season set: June 1-December 31
1967	Trapping season restricted to June 1-December 31
1969	Bag limit of 1 bear/hunter/yr. Hunters required to register their bear Cable traps legalized for bears (tool used by bear managers) Cubs protected from harvest
1971	Cubs legal to harvest Season May - November
1975	Telemetry study initiated
1980	Emergency closure - harvest projected to exceed goal
1981	Two separate seasons established by legislature (Spring and Fall)
1982	Fall-only season with bait, dogs, and traps permitted during the entire period
1981-1986	Mandatory tooth submission from harvested bears
1987	Restriction on timing and placement of bait (limited to first 9 weeks)
1990	Restriction on time and areas open to training dogs (limited to first 9 weeks) Bear hunting permit established (prior to deer firearm season) Bait and trapping seasons reduced from 9 weeks to 4 Hound season reduced (from 9 weeks to 6-7) Still-hunting season reduced (from 14 weeks to 4)
1994	Still-hunting season expanded to entire 3-month season Trapping season expanded to 5 weeks
1997	Trapping season expanded to 2 months (September and October)
2004	New bear study area opened in eastern Maine
2006	Passamaquoddy spring bear hunt initiated on tribal lands
2007	Legal trapping methods (cage style or cable foot trap) and number of traps limited
2008	Hunters asked to voluntarily submit a tooth from each harvested bear Require licensed trappers to purchase a bear trapping permit to take a bear Require non-resident deer hunters purchase a permit to take a bear while deer hunting
2009	Penobscot spring bear hunt initiated on tribal lands
2011	Bag limit increased to 2 bears/hunter/yr. (1 by trapping and 1 by hunting) Hunters required to submit a tooth from harvested bears

CURRENT MANAGEMENT

The Maine Legislature holds the authority to set opening and closing dates for bear hunting, legal methods of harvest, bag limits, and license fees. The Department and its Advisory Council have the authority to set the time when baiting is permitted within the current season structure, legal hunting hours and hunting implements, and can also shorten or terminate open seasons.

Since 1997, the general hunting season for black bear has opened the last Monday in August and closed the last Saturday in November. Throughout this 3-month period, hunters are allowed to hunt bears near natural food sources or by still-hunting. Hunting bears over bait is permitted for the first 4 weeks. The use of dogs is permitted for a 6-week period and overlaps the last 2 weeks of the bait season. Trappers can harvest a bear in September or October. Licensed trappers are limited to a cable foot restraint or cage-style trap, and are required to purchase a separate permit to trap a bear (Table 1). Although the Department has adopted a generic bear season framework to maintain consistent hunting, regulations can be modified as necessary based on population changes or other management concerns.

Beginning in 1990, in addition to a big game hunting license, hunters wanting to hunt a black bear prior to the deer firearm season have been required to purchase a bear permit ($5.00 for residents and $25.00 for non-residents). This permit allows bear managers to identify hunter participation and make better-informed management decisions (Figure 2).

Non-resident permit sales increased significantly after 1999, likely in response to the closure of the spring bear season in Ontario. In 2003, permit levels began to decline, likely in response to a significant increase in permit fees ($27.00 for residents and $67.00 for non-residents). Although permit levels declined, this did not necessarily affect participation rates proportionately. When permit fees are low, some hunters may purchase a permit for the potential opportunity to bear hunt. When fees are higher, hunters are more likely to purchase a permit if they seriously plan to hunt. Currently, participation among permit holders is very high, making permits sales a more accurate measure of hunting effort, which is valuable information for wildlife managers.

Other factors likely influence the continued decline in permit sales, most notably the cost to hunt black bears in a poor economy (e.g., in fall 2006 when gas prices spiked). Most hunters need to travel away from home to participate in the activity, since bears are uncommon in more human populated portions of the State. More recently, increased opportunity to hunt bears in neighboring states has likely influenced non-resident participation.

HUNTING OVER BAIT													
HUNTING WITH DOGS													
TRAPPING													
STILL HUNTING													
WEEK 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4
AUG	SEP				OCT				NOV			
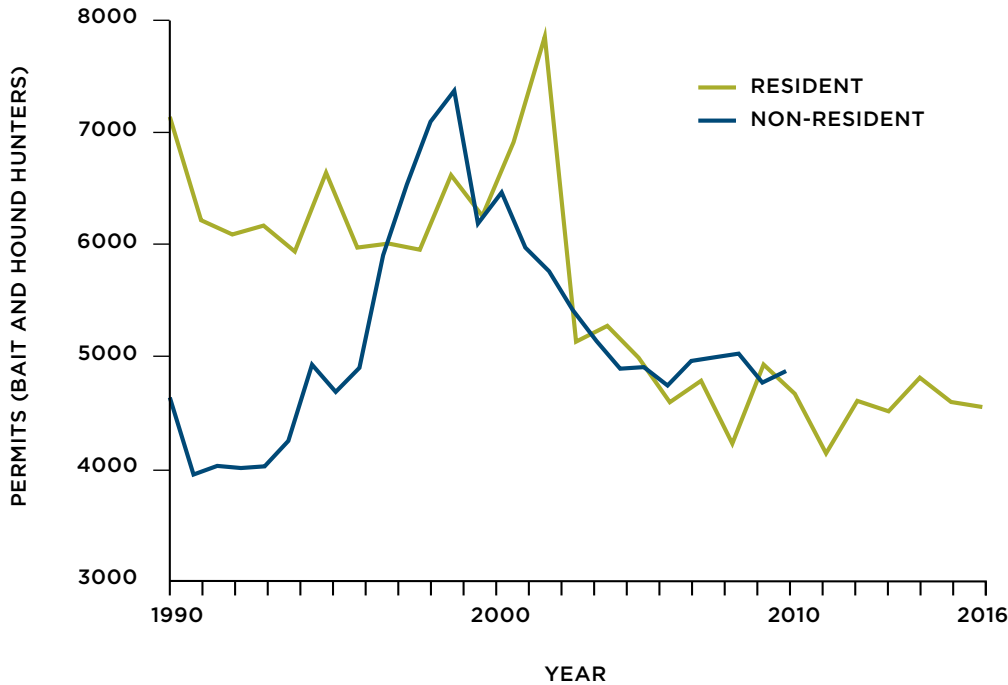
Figure 2. Trends in bear permit sales prior to the firearms season on deer (not including trapping permits) have changed due to a variety of factors, the most notable being the increase in permit fees in 2003.

The Maine Legislature established two new bear permits in 2008: one for trappers, and the other for non-resident deer hunters who want to hunt bears while hunting deer during the November firearm season. Fees from these new permits are dedicated to fund bear research in Maine and provide additional information on participation and success rates of trappers and deer hunters. Prior to these permits, we could not identify those that participated or their success rate. Since the establishment of a bear trapping permit, interest in trapping among both resident and non-residents has increased; doubling for residents from approximately 300 to 600 permits over the last 7 years and tripling from 25 to 75 permits for non-residents (Figure 3). In contrast, participation in bear hunting during the regular firearms season on deer by non-resident deer hunters has been variable, ranging from 700 to 1,000 permits.
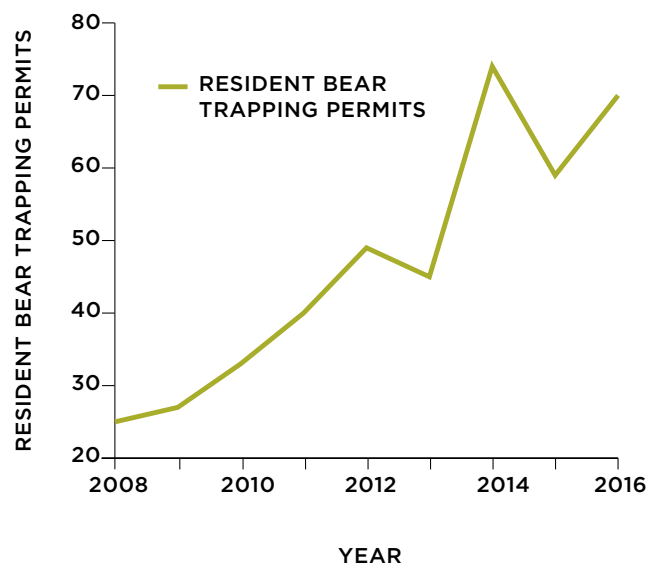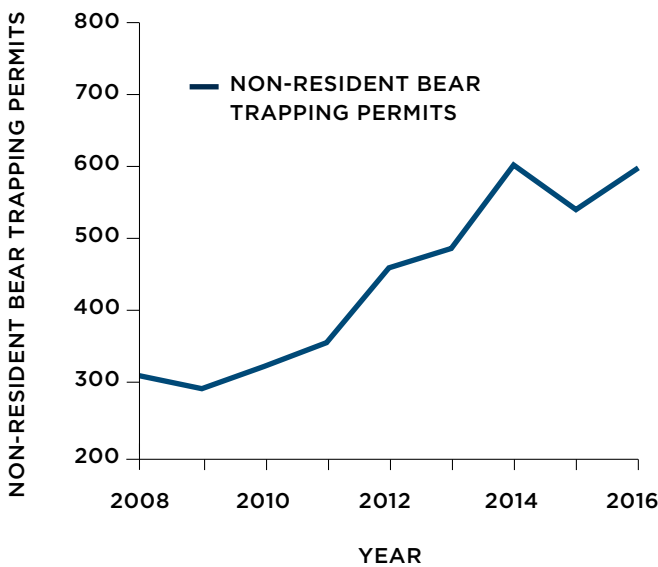
Figure 3. Bear trapping permits required since 2008 have shown a steady increase for both residents and nonresidents, with residents representing approximately 90% of participants.

Since 2005, success rates for hunters that purchased bear permits during the bait and dog seasons ranged from 25 to 35% (averaged 29%). Under the current permit structure, we cannot distinguish between hunters that pursue bears using bait and those using dogs. Thus, periodically, we survey permit holders to estimate hunter participation and success rates by different methods. Success was the highest among both residents and non-residents in 2009 (a year of low natural food availability) leading to the highest harvest over bait since 2004. We also saw the greatest success among non-resident trappers in 2009 with more than half of non-resident trappers successful. Since 2013, we have seen a higher harvest by hunters using dogs that may be attributed to availability of natural foods later in the season, as well as increasing hunter participation — perhaps in response to ballot initiatives to limit bear hunting methods (Figure 4). Interestingly, during both the 2004 and 2014 bear referendums, we saw an increase in bear permit sales (Figure 2 and Figure 3).

Figure 4. Summary of bear harvest by hunting/trapping method between 1982 and 2015 the influence of ballot initiatives (light blue) and regulatory changes (orange) are highlighted. The green lines are used as a visual reference to illustrate periods where harvest has changed.
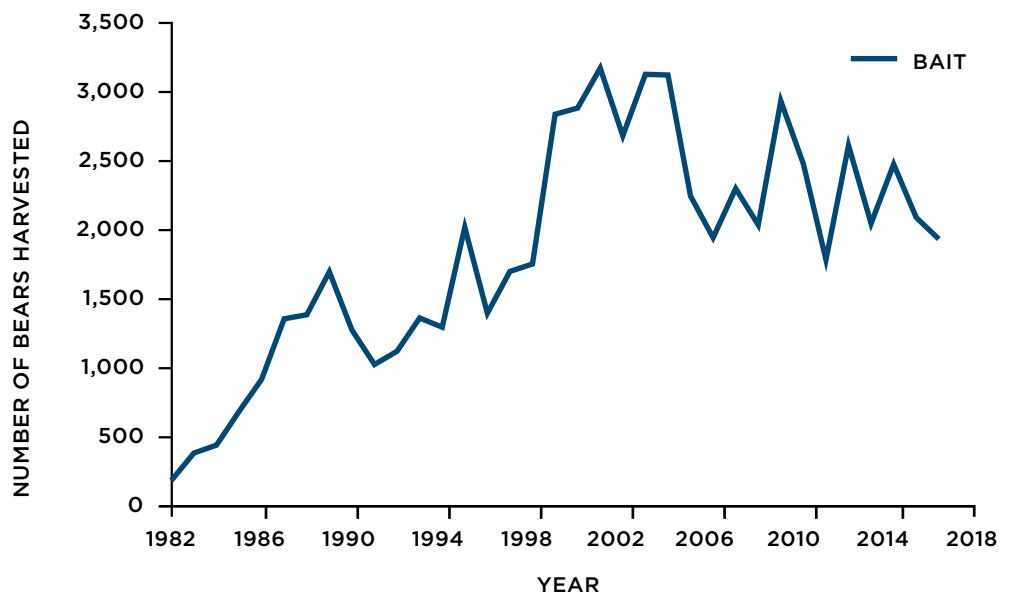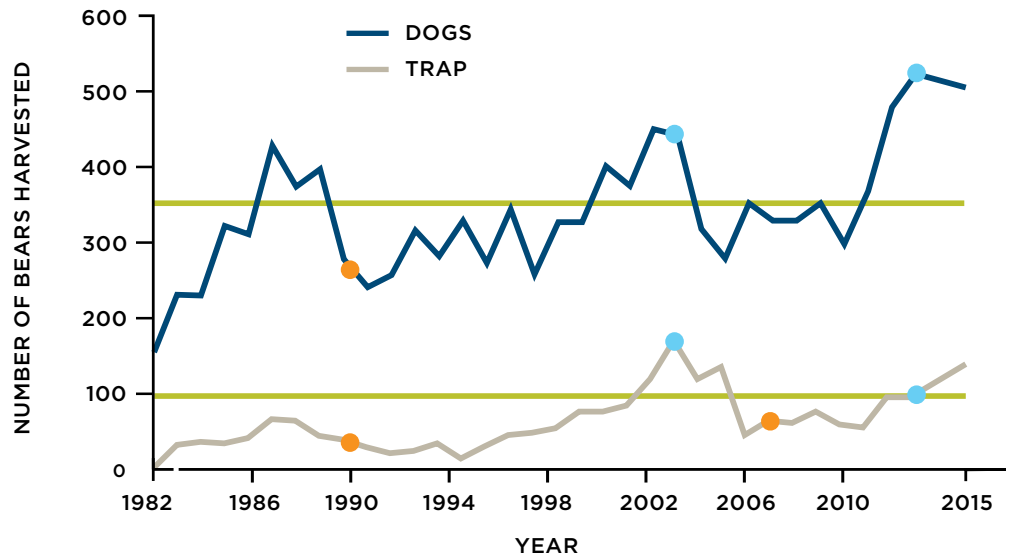
2000-2016 BEAR MANAGEMENT

In 2000, the Big Game Working Group established the goal to 'provide hunting, trapping, and viewing opportunity for bears'. This goal was supported by three objectives to guide bear management through 2015:

1. Stabilize the bear population by 2005 at no less than current (1999) levels, through annual hunting and trapping harvests.
2. Create information and education programs by 2002 that target specific audiences and promote traditional hunting and trapping methods as valid and preferred tools to manage black bear populations in Maine.
3. Create information and education programs by 2002 that target specific audiences and promote public tolerance of bears in Maine.

MDIFW made substantial progress in achieving these objectives. Between 1999 and 2005, Maine's bear population stabilized at around 23,000 bears (i.e., 1999 levels)[2]. Since then, Maine's annual bear harvest rate has remained below 15% (Figure 5), the rate that models indicate is needed to stabilize growth (McLaughlin 1998). Maine's bear population has been increasing by 2-4% annually and currently exceeds 35,000 animals. In 2008, responding to increasing bear numbers the Maine Legislature increased the bag limit (i.e., the number harvested per hunter) from 1 to 2 bears annually, one bear allowed by hunting and another by trapping, but few people have taken advantage of the increased limit. Other considerations have been proposed (e.g., reinstating a spring hunting season), but for now, Maine's bear season remains fall-only will no real opportunity to increase the season length, so the challenge remains to maintain a bear population at 1999 levels.

In 2004 and 2014, responding to increased public interest in how bears are hunted and managed, the Department provided a range of information to the public through a variety of media (Objectives 3 & 4, 2000 Black Bear Planning effort). Efforts included:

- Presentations to civic groups, towns, and other organizations about bears in Maine and the role of hunting and trapping in managing a robust bear population.
- Microsite on MDIFW web page about Maine's bear management program
- Fact sheet on bear management and role of hunting
- Frequently asked questions on bear hunting and trapping
- Interviews on local conservation television and radio stations
- Press releases, including: upcoming hunting seasons, harvest results, IFW's bear monitoring project, etc.
- Social media posts describing Maine's bear management program and the role of hunting and trapping
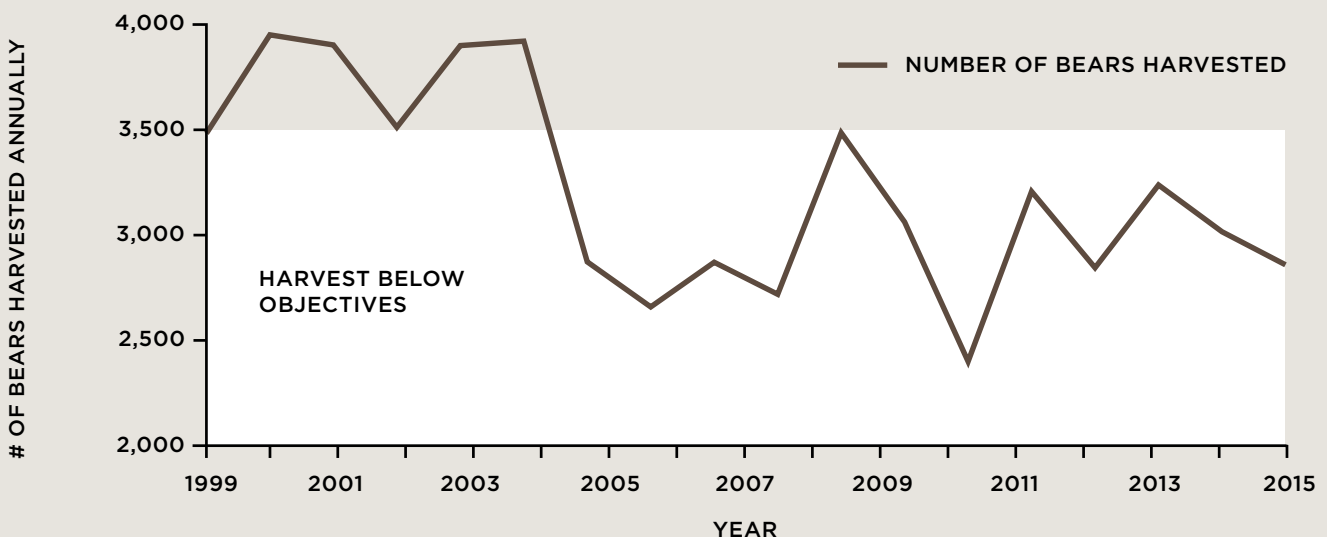

Figure 5. Harvest in Maine has been below objective since 2005; as a result, the population has been increasing.

[2]Methods used to monitor population are described in MDIFW's bear management system, available at www.maine.gov/ifw .

The Department has also created outreach programs to reduce potential conflicts between bears and people. Efforts have included:

- Issuing a press release each spring detailing how the public can secure common backyard attractants (bird feeders, garbage) and prevent problems with bears.
- Producing a brochure on how to avoid attracting bears to backyards, and periodically revising it to maximize attractiveness and reader-friendliness.
- In 2015, producing a brochure titled: "What to do if you encounter a bear," which included guidance on a variety of situations (e.g., while hiking, in your backyard, in a building).
- Revising our website, including the addition of a Living with Wildlife page
- Meeting with local municipalities to identify ways to address conflicts in urban settings.
- Providing assistance and information to landowners experiencing problems with black bears.

2016 Public Consultation – Key Findings

PUBLIC OPINION OF POPULATION MANAGEMENT

Of the four big game species, the general public, hunters, and landowners all indicated they knew the least about black bears. Nonetheless, when asked to rate bear management within the state, 57% of the general public, 57% of landowners, and 72% of hunters responded that management was 'good' or 'excellent'. Survey respondents were generally satisfied with the number of bears in the area where they lived, with only 5% of the general public indicating the bear population should be increased, and 4% feeling that the population should be decreased. Of those desiring an increase, less than a third still felt the population should be allowed to grow if it resulted in more damage to property, increased risks to public safety, or poorer health for the bear population. Interestingly, a majority of respondents in the general public sample expressed support for continued growth of the bear population in central and southern Maine where bears are less common, suggesting that some respondents may not be aware of the implications of living in close proximity to bears.

WHY SOME HUNTERS DON'T HUNT BEARS

Despite the relative abundance of bears in the state, only 33% of hunters responded that they had hunted bears in the past 15 years, perhaps due to bears being less abundant in more populated areas of the state where many hunters live. Of those that hunted bears, 90% were somewhat satisfied or very satisfied with their hunting experience. Of the 10% that expressed dissatisfaction, the majority indicated 'lack of success' or 'too few bears' as the primary reason. Of hunters that had not pursued bear during the preceding 15 years, most indicated they were not interested in bear hunting (41%), didn't like or need the meat (19%), or didn't have the time (18%). Only 1% indicated that permit fees or the regulatory framework prevented them from bear hunting. These patterns were generally consistent across the state, although more respondents in the southern region indicated they did not hunt bears because there were not enough bear (10%), bear hunting was too expensive (8%), or they had to travel too far to hunt (8%).

PUBLIC SUPPORT FOR BEAR HUNTING

Public support for legal, regulated bear hunting was high, with 84% of the general public expressing moderate or strong approval of bear hunting. Motivation of hunters was an important determinant of public support for bear hunting, with approval rates increasing when the primary reason for bear hunting was for meat or to manage the population. The greatest opposition was when hunting solely for recreation (51%), or for a trophy (30%). Forty nine percent of the general public sample strongly opposed bear trophy hunting, while only 6% strongly opposed hunting bears for meat, and 5% opposed hunting bears as a method to manage the population.

QUALITATIVE STUDY EXPLAINS QUANTITATIVE DATA

Findings from the qualitative public consultation efforts (focus groups, regional meetings, and online town hall) generally supported the survey results, although they did shed additional light on the reasons for opposition to specific bear hunting methods. Few participants expressed blanket opposition to bear hunting, but many Mainers objected to the use of some common hunting methods, especially dogs and traps. Interestingly, few participants seemed to be aware of the regulations governing these activities. Further study may be needed to determine if awareness would alter their opinions. Public meetings on bear management were dominated by comments related to the 2014 referendum and bear hunting methods, with little emphasis on other aspects of bear management. The timing of these meetings (shortly after a major public debate) was likely a factor.

4.4 Management issues and threats

Population Growth & Range Expansion

POPULATION GROWING IN URBAN AREAS

Over the last 50 years, the Department, through a strategic planning process, has sought public input on black bear population management goals and objectives. Although

population estimates have varied during each of these planning periods, the public's desire to maintain the population at current levels suggests a degree of tolerance for increasing bear numbers — if conflicts remain low. Today, Maine's bear population remains highest in areas with low human densities. However, it is slowly becoming established in areas of higher human density, increasing the potential for more conflicts.

TO SLOW GROWTH, CHANGES NEED TO HAPPEN

In order to maintain healthy bear populations in suitable habitats, and to minimize conflicts in more urban areas, the growth rate of Maine's bear population needs to slow down. From 2005 to 2016, the number of hunters and subsequent harvest of black bears declined below 4,000 annually; and during that time, Maine' s bear population grew by 2-4% each year (Linden 2016). To slow population growth and range expansion, harvests need to increase to 15% of the population (McLaughlin 1998), which would require hunter participation, success, or opportunity to expand above current levels. Rates of hunter participation are currently too low to slow bear population growth within the existing season framework. Adjustments to season timing, bag limits, and other aspects of bear hunting regulations and efforts are needed in order to increase participation and ensure that bears do not increase more rapidly than the public will tolerate, or reach numbers that are unhealthy for the bears.

PROPORTION OF HARVEST 2005-2016

- BAIT 77%
- DOGS 13%
- DEER HUNT 3%
- UNREPORTED 3%
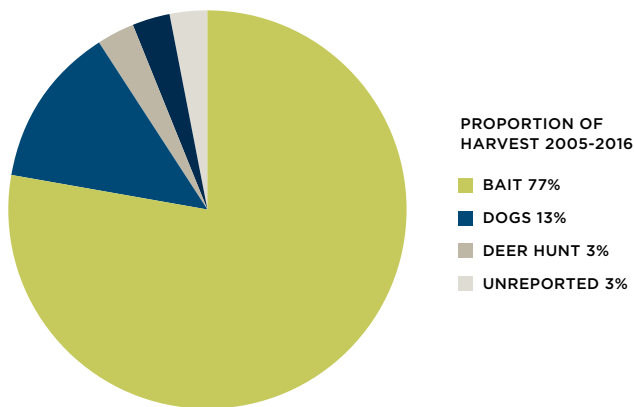
Figure 6. Hunters using bait and trained bear dogs account for 90% of Maine's annual bear harvest.

HUMAN-BEAR CONFLICTS: AMONG MAINERS, LOW AWARENESS OF HOW TO HANDLE

Despite their relative infrequency as compared with other northeastern states, human-bear conflicts can be high in some parts of Maine (e.g., northeastern Aroostook county, central Maine) where suitable bear habitat exists in closer

proximity to developed areas. As the bear population continues to grow and expand into the highly-populated southern and coastal areas of the state, conflict rates could increase dramatically. Most Maine residents are unaccustomed to living near black bears, and are not aware of the precautionary actions to take to prevent conflicts. A variety of measures (e.g., outreach, directed harvest, etc.) may be necessary to address current and future problem areas.

2016 AVERAGE SUCCESS RATES FOR BEAR HUNTERS
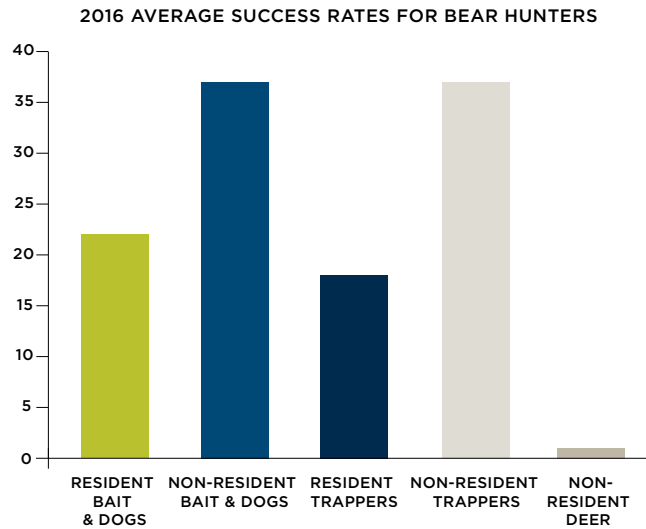
Figure 7. Success rates for bear hunters since 2008, when trappers and non-resident deer hunters were also required to purchase a separate permit to hunt black bears, are highest among non-resident hunters that use bait, dogs, or traps (most hire a professional hunting guide). Resident success rates are slightly lower, since most hunt without a professional hunting guide.

SHOW OF SUPPORT FOR TRADITIONAL HUNTING SUGGESTS REGIONAL KNOWLEDGE GAP

Twice in the past 10 years, Maine voters have been asked to eliminate certain bear hunting methods through the ballot process. Both proposals were defeated by similar margins, with the strongest support of hunting methods across northern Maine and the greatest opposition along the coast. Although both measures were defeated by Maine voters, they illuminated a knowledge gap among the general public about bear ecology, the role of hunting, and MDIFW's role in conserving Maine's wildlife while safeguarding against an overabundance of bears. As the state's bear population continues to grow, all established hunting methods will be required to slow range expansion and minimize human-bear conflicts. Outreach and education is clearly important to increase public knowledge, understanding, and support of bears and bear hunting in Maine.

Bear Management Goals, Objectives, and Strategies 2017-2027

Goal #1

Bear Management Goal #1:
Maintain a healthy, sustainable bear population overall, while minimizing population growth in areas of higher human density

Background

Maine's long history of intensive black bear monitoring indicates that the population is thriving and has experienced 10+ years of slow and steady growth.

Maine bears are healthy, with no evidence that habitat is currently limiting. Yearling weights have gradually increased over time, indicating improved habitat quality, likely due to changing forest practices that favor early successional bear foods.

As the population increases, bears are slowly colonizing new areas in southern and coastal Maine, and are appearing more frequently in some communities. Although public support for bear management is currently high, increased bear density in settled portions of the state may result in more frequent human-bear conflicts, and ultimately, reduced public support for bears.

Research indicates that reproductive rates may be higher in central Maine, likely due to the availability of a wider diversity of foods, more productive soils, and a slightly longer growing season. However, bears in this area experience higher mortality from vehicle collisions than other parts of the state. Lack of a strong bear hunting culture in southern and central Maine, and hunting restrictions in more populated areas (e.g., firearm discharge laws and limited access to private land), will make it challenging to control the bear population with hunting. For various reasons, hunters that currently pursue bears may continue to do so in more traditional bear range.

Outside of the southern and coastal areas, Maine's bear habitat is already densely occupied. If the bear population continues to grow, it will reach a level where the health of individual bears could decline. In this scenario, competition among bears could result in restricted food access, lower reproductive rates, higher cub predation levels, and increased adult bear mortality (e.g., vehicle collisions, protection of property). While the potential for human-bear conflict is low in much of the state due to lack of human settlement, controlling bear population growth in these areas should remain a Department priority for bear health.

Although Maine has traditionally managed bears using a statewide regulatory framework, bear population growth and new patterns of human settlement may now require a regional approach. Hunter participation rates are too low to slow the growth of the bear population within the existing season framework, requiring adjustments to season timing, bag limits, and other aspects of bear hunting regulations to ensure that bears do not increase more rapidly than the public will tolerate.

Ultimately, the Department and its partners must strive to increase interest and participation in bear hunting to keep the population at a level consistent with healthy, productive bears that experience few human conflicts. Failure to substantially increase bear harvests over the next 5-10 years, or to target harvests to meet regional population objectives, could result in significant, likely irreversible, consequences for Maine's people and bears.

Wildlife Management Districts

No Tolerance Zone

Low Tolerance Zone

Moderate Tolerance Zone

High Tolerance Zone
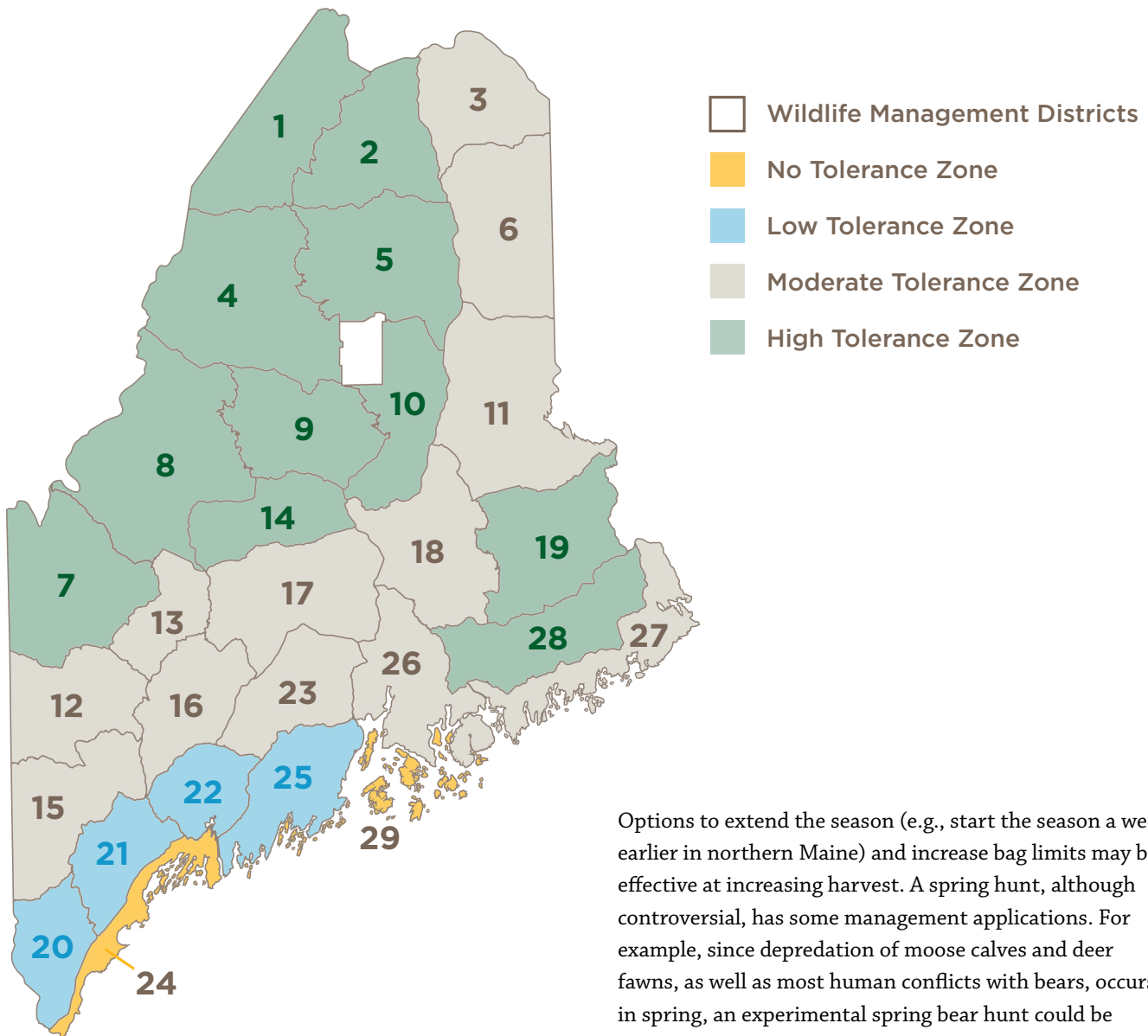
Maintaining, and as necessary expanding, Maine's bear research and monitoring program will be critical for evaluating the success of management efforts over time. The Department uses bear survival and reproduction measurements to inform population models, determine appropriate harvest levels, and monitor health indices, all of which help ensure that the population stays below the level where food resources would become limiting.

By continuing to collect data from harvested bears statewide, the Department will have more opportunities to monitor harvest sustainability. Although the Department currently records information on human-bear conflicts, several enhancements could improve the efficiency with which conflict severity is reported and chronic problem areas are identified.

Options to extend the season (e.g., start the season a week earlier in northern Maine) and increase bag limits may be effective at increasing harvest. A spring hunt, although controversial, has some management applications. For example, since depredation of moose calves and deer fawns, as well as most human conflicts with bears, occurs in spring, an experimental spring bear hunt could be implemented to assess whether it reduces these problems. Alternatively, the use of contraceptives has been suggested as a substitute to hunting. However, the cost and logistics of delivering contraceptives is challenging, and there have been no studies to determine if contraception is an effective tool for reducing population growth.

A recent survey indicated hunter satisfaction is high among bear hunters (Responsive Management 2016), and the Department's programs should strive to maintain or expand current levels of hunter satisfaction and participation.

An abundant bear population, coupled with long hunting seasons, an active guiding industry, abundant access to private land, and a wide variety of allowable hunting methods all contribute to a positive bear hunting experience in most of Maine. Even at current levels, Maine's active bear hunting community contributes significantly to rural economies.

Objectives

We'll know we achieved Bear Management Goal #1, to maintain a healthy, sustainable bear population overall, while minimizing population growth in areas of higher human density, if we:

1. Maintain a healthy bear population below biological carrying capacity (a level that natural food can support) in remote areas that are largely forested (high tolerance zone: e.g., WMDs 1, 2, 4, 5, 7-10, 14, 19, and 28), while reducing potential rates of dispersal to other WMDs

2. Maintain the bear population below social carrying capacity (a level the public will support) in rural areas (i.e., moderate tolerance zone; e.g. WMDs 3, 6, 11-13, 15-18, 23, and 26) with suitable forested habitat interspersed with human development

3. Maintain the bear population near current levels in urban and suburban areas with fragmented suitable forested habitat (low tolerance zone: e.g., WMD 20-22 and 25 and 27), to reduce the risk of further expansion into the no tolerance zone

4. Discourage establishment of resident, breeding bear populations in highly developed and fragmented forests with low suitability for bears (i.e. the no tolerance zone: WMDs 24 and 29).

5. Increase interest and participation in legal harvest methods

6. Maintain or increase current levels of bear hunting satisfaction

7. Continue to use the best available science and data as a guide

8. Minimize the number and severity of bear-human conflicts by managing bear populations at regional and local scales

Goal #1

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, policy, and outreach activities:

RESEARCH & MONITORING

1. Periodically survey the public to determine human-bear conflict and bear population size acceptance levels. (New; High Priority)

2. Continue to monitor bear health (e.g., survival, recruitment, yearling weights, mortality factors, and other metrics) using current research and monitoring program (Ongoing; High Priority)

3. Continue to monitor the effectiveness of the legal harvest at minimizing growth by requiring mandatory registrations of harvested black bears at tagging stations. (Ongoing; High Priority)

4. Improve monitoring of the number, type and severity of human-bear conflicts to assess whether population is above social carrying capacity (Ongoing; High Priority)

5. Conduct a follow-up survey to better understand why some hunters are not interested in hunting bears. Use this info to develop more effective strategies for increasing participation. (New; High Priority)

6. Compile existing information to determine the effectiveness of spring harvest in reducing human-bear conflicts and predation on ungulate neonates. If necessary, conduct or support additional research. (New; Low Priority)

7. Continue periodically conducting bear-hunter surveys to determine levels of satisfaction, hunter effort, hunting techniques, and hunter distribution, using a 3rd party contractor if appropriate. (Ongoing; Moderate Priority)

POLICY & REGULATIONS

1. Request an extension to the Commissioner's authority for setting hunting season frameworks and bag limits, including establishment of special hunts in areas of high human-bear conflict (New; High Priority)

2. Where appropriate to meet regional population objectives, adjust bear bag limits and hunting seasons to increase the bear harvest. (New; High Priority) Potential options include:

   • Extending the bait season (e.g., earlier in northern Maine or later in central or eastern Maine)

   • Expanding a multiple-bear bag limit (e.g., by any method of harvest)

   • Providing additional hunting opportunity (e.g., expanded archery) in areas experiencing high levels of human-bear conflict

   • Establishing an experimental spring bear hunting season in areas with high levels of human-bear conflict to assess its effectiveness at reducing conflicts

   • Adding a 'youth hound day' in increase hunting pressure in certain areas.

3. Promote semi-guided/apprenticeship hunting opportunities (New; Low Priority)

4. Reduce the cost of both resident bear permits, recognizing that permits are important for identifying participation and success rates, and reducing permit fees may increase participation. (New; Moderate Priority)

5. Eliminate the permit requirement to harvest a bear while moose hunting or for non-resident deer hunters to increase interest and participation by other hunters. (New; Low Priority)

6. Adjust harvest regulations to allow the use of regulated trapping in suburban areas experiencing high levels of human-bear conflict. (New; Moderate Priority) Potential options include:

7. Reducing the bait set-back distance for traps

8. Allowing use of culvert traps within 50 yards of a road

9. Allowing bears captured in culvert traps to be moved off-site prior to dispatch

10. Continue to provide diverse opportunities to sustainably harvest bears using established methods (e.g., bait, dogs, traps, spot and stalk/still hunting, while deer hunting). (Ongoing; High Priority)

OUTREACH & COMMUNICATION

1. Through the Department's landowner relations program, encourage landowners to allow bear hunting on their properties in order to help meet bear population objectives (Ongoing; High Priority)

2. Encourage bear harvest in areas of high human-bear conflict (e.g., when feasible connect hunters with landowners experiencing conflicts with bears). (Ongoing, Moderate Priority)

   • Encourage greater interest and participation in bear hunting and trapping (Ongoing; High Priority). For example,

   • Develop a bear hunting & trapping guide (including hunting tips, field dressing procedures, processing facilities, recipes) and distribute to hunters using a variety of methods (e.g., website, Department hunting safety programs, sportsman show)

   • Work with I&E Division and Hunter Safety Section to develop a promotional strategy for bear hunting:

     » Promote the whole bear hunting experience (family time) and wise use of the resource (meat, hide, skull, fat, etc.)

     » Promote bear meat as good table fare by developing YouTube videos for how to cook, dress, etc. for mass audience and promoting hunters for the hungry

     » Promote calling as a method to increase participation and success rate

     » Promote the use of still hunting/stalking as cost-effective bear hunting techniques, particularly for hunters with limited time to use other methods

     » Promote bear hunting as an opportunity to scout for other species

   • Promote awareness of bear hunting opportunities by:

     » Incorporate bear hunting into Becoming an Outdoor Woman (BOW) and similar programs

     » Promote youth bear hunting day

     » Reach out to other hunters, particularly nonresidents, that may not be aware of opportunities to hunt bears in Maine.

     » Encourage resident deer hunters to take advantage of opportunities to harvest bears incidental to deer.

Goal #2

Bear Management Goal #2:
Provide opportunities for the public to safely enjoy bears

Background

BEAR SIGHTINGS ARE RARE, BUT ON THE RISE

Of Maine's big game species, black bears are especially elusive and difficult to observe in the wild, due to their secretive nature and Maine's dense forest. Thus, black bears are not often considered when planning excursions to view wildlife. Opportunities to view bears increase during periods when they are foraging in open habitats. This typically occurs in the spring (April and early May) while feeding on forbs near road edges or fields, or in late summer when they are seeking berries (e.g., blueberries, raspberries, or blackberries). Even then, the opportunities to observe bears are often limited to long distances and in low light conditions early in the morning and late afternoon.

However brief and unexpected a bear sighting may be, it can be a thrill. The rarity of bear sightings increases their value as a special experience. For many visitors of the Maine woods, even a simple track in the mud is a notable discovery. As the bear population has increased and its range expanded, chance encounters have been on the rise, as have sightings in portions of the state where bears are rarely seen.

TECHNIQUES AND TECHNOLOGIES PROVIDE WINDOWS INTO BEAR LIFE

Providing the public with opportunities to directly enjoy the bear resource is challenging, and it is unlikely that a significant bear viewing industry could ever be established in the state. Although most members of the public are satisfied simply with the knowledge that bears exist, bear sign (tracks, evidence of feeding, tree markings) is readily observable to someone with a trained eye and provides a way for people to indirectly appreciate the presence of bears. While increasing opportunities to directly view bears in the wild will be difficult, certain techniques do exist to increase the likelihood, and the Department should devote effort to promoting them.

Technological advances may also provide new opportunities for the public to interact with bears remotely. Trail cameras are becoming an increasingly common way to view wildlife. In the past, den cameras have been used to broadcast live video footage of female bears with cubs, with wide international viewership. Although logistical difficulties prevented the continuation of this program, improvements to battery life, camera systems integrated with radio collars, and other technology may allow the Department or partners to share information about bears to new audiences. Public sentiment towards bears virtually guarantees high levels of interest in any effort to provide a glimpse into their lives.

Objectives

We'll know we achieved Bear Management Goal #2, to provide opportunities for the public to safely enjoy bears, if we:

1. Increase public awareness of opportunities to view bears and bear sign
2. Identify and create new opportunities for the public to safely enjoy bears
3. Provide tools and information on safely viewing bears

Management Strategies

Our plan for achieving this goal involves the following activities:

OUTREACH & COMMUNICATION

1. Develop wildlife viewing guides and a page on the MDIFW website to promote opportunities to safely view bears and bear sign, such as along roadsides during spring. (New; High Priority)
2. Work with partners to develop signage, brochures, kiosks and/or other media to promote bear viewing, including bear sign (e.g., NPS, Refuge, NMW, BSP, MSCA) (New; Moderate Priority)
3. Consider establishing bear den cameras combined with educational messaging on bear biology and management (New; Low Priority)
4. Promote legal use of trail cameras as an opportunity to observe bears in the wild (New; Low Priority)
5. Continue to work with mainstream media, and expand the use of social media (e.g. guest blogs, facebook live, youtube, etc) to distribute information on bears and their management (Ongoing; High Priority)

Goal #3

Bear Management Goal #3:
Increase public understanding of bear ecology, public support for bear management, and public tolerance for coexisting with bears

Background

PUBLIC SUPPORT FOR (AND OPPOSITION TO) BEAR HUNTING METHODS

Support for Maine's bear management program by the general public, hunters, and landowners is generally high. However, two citizen initiatives on bear hunting methods in 2004 and 2014 revealed notable opposition to the hunting methods most commonly used in Maine, although 53% of voters rejected the initiative to ban these methods. Qualitative public consultation suggests that among participants that were opposed to bear hunting, there was more widespread opposition for hunting bears with dogs and traps, with somewhat less opposition for baiting (Responsive Management 2016). Even though both referendums included extensive political campaigns, with approximately $8 million spent on advertising, it is apparent that many members of the public have a poor understanding of these hunting methods and the regulatory framework that governs them.

TO MEET MANAGEMENT GOALS, AN INCREASED HARVEST IS A MUST

Achieving the population goals and objectives outlined in this plan will require a significant increase in bear harvest over time. Therefore, the Department does not believe that eliminating or restricting current bear hunting methods is a reasonable course of action. During the development of this plan, a great deal of effort was directed towards understanding the root causes of public concern around the use of bait, dogs, and traps in bear hunting. It seems clear that among Maine residents, there is a segment that has concerns with some forms of bear hunting that cannot be resolved with outreach or adjustments to the methods. However, focus groups indicated that accurate information on the importance of the methods for Maine's bear management program, and the numerous regulations, along with hunters' self-imposed codes of practice that accompany each method, could result in improved public support.

BAIT MYTHS HAVE BEEN DEBUNKED

The Department's long-term bear monitoring program provides information on the population dynamics of Maine's bears over time. Data collected by this program shows that the presence of bait does not significantly impact the health or reproduction of bears at a population level or lead to increased human-bear conflicts. Formal analysis of existing information should help the Department evaluate if additional research is needed, as identified in previous goals in this plan. This may help alleviate concerns that bait used for hunting purposes is having negative consequences for bears.

TRAPPING IS ON THE RISE

Although a relatively small percentage of bears are harvested by traps in Maine each year, the number of bear trappers is increasing. If this trend continues, trapping may become a more significant component of the overall harvest, particularly in suburban areas where the use of other hunting methods is more challenging. Bear trapping is already highly regulated; however, a suite of additional recommendations, such as requiring bear trappers to take a specialized training course, may improve public support for bear trapping. Similarly, if MDIFW considers opening a spring bear hunting season in the future, it should consider several requirements that would help alleviate impacts to private roads and protect female bears with young.

EDUCATION AND OUTREACH ARE KEY

Ultimately, extensive public outreach on the importance of various harvest methods to Maine's bear management program, and the regulatory framework that ensures these methods are appropriately conducted, will likely be most successful for increasing support of bear hunting methods in Maine. MDIFW and its partners must embark on a long-term proactive education campaign, targeted at the general public, to ensure continued use of effective bear hunting methods.

Public knowledge of bears, and awareness of the Department's programs, will determine the success of bear management in Maine as much as bear population size and distribution. Improving the public's understanding of bears should be a top Department priority over the next 10 years.

FREQUENCY AND NATURE OF BEAR CONFLICTS IS LIGHT

Currently, conflicts with people remain relatively low. Between 1989 and 2003, MDIFW received an average of 300 calls each year regarding bear conflicts. Since 2008, the number has increased to an average of 500 annually (range= 311-827). This increase may be attributed to a new automated reporting mechanism for Maine wardens. The number of conflicts varies depending on natural food supplies, which often alternate from good to poor (Figure 8). The most common complaints are less serious and involve damage to bird feeders and bears getting into garbage. More severe conflicts, such as bears entering occupied homes or tents, and attacks on pets or livestock, are extremely rare in Maine. Damage to beehives established to pollinate blueberry fields is the most prevalent impact to agriculture in Maine. With an increased interest in backyard farming, damage to chicken coops and small livestock is becoming more common in some communities. As Maine's bear population expands, interactions with humans will likely increase. Public understanding of how to safely interact with bears and prevent conflicts will become increasingly important.

Goal #3
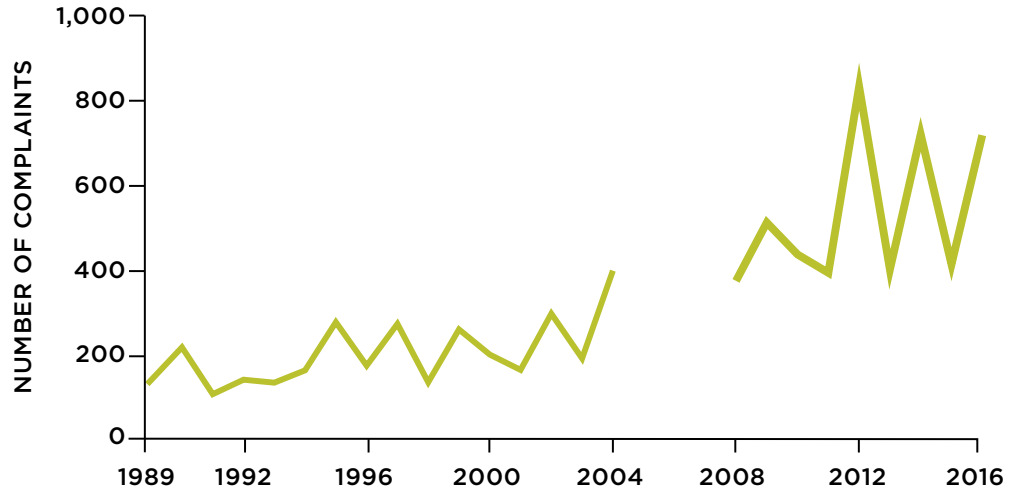
Figure 8. From 1989 to 2003, between 100 and 300 conflicts with bears and people were reported. Although it appears conflicts have increased in the last decade, a new automated reporting system introduced in 2008 may be a factor.

Local bear densities play a significant role in determining levels of human-bear conflict, but human behavior is equally important. In the near-term, as the bear population continues to grow and expand, maintaining, and ideally reducing, levels of human-bear conflict will be impossible without efforts to assist the public in coexisting with bears. Ultimately, securing attractants such as garbage, bird seed, and pet food from bears is the most effective way to reduce bear conflicts which can lead to property damage and public safety concerns.

Objectives

We'll know we achieved Bear Management Goal #3, to increase public understanding of bear ecology, public support for bear management, and public tolerance for coexisting with bears, if we:

1. Increase current levels of satisfaction and support for Maine's bear management program by the general public
2. Increase public understanding of appropriate agency responses to bear conflicts
3. Increase public knowledge, awareness, and appreciation of black bears and their ecology
4. Increase public awareness and use of effective methods to prevent and resolve conflicts with bears
5. Provide tools and information to minimize the number and severity of bear-human conflicts
6. Increase public understanding and acceptance of established bear hunting methods (bait, hounds, and traps).
7. If a spring bear hunting season is established in the future, assess, and if necessary increase, public acceptance

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, policy, and outreach activities:

RESEARCH & MONITORING

1. Periodically survey the public to determine levels of support for Maine's bear management program (New; High Priority)
2. Periodically survey bear trappers to determine their use of different trap types (e.g., culvert and cable restraint) and methods (Ongoing; Moderate Priority)
3. Publish existing data — and if necessary, conduct additional research — on the impacts of bait on bear health, behavior, and population dynamics (New; High Priority)
4. Compile existing information — and if necessary, conduct research — on the impacts of bait on non-target species (New; Low Priority)

POLICY & REGULATIONS

1. Implement the following adjustments to bear trapping regulations (New; High Priority):
- Bear traps to be checked at least once every 24 hours, rather than once each calendar day
- Add additional training, for example: a specific (online or classroom) bear trapping course
- Improve design & deployment standards for cable foot restraints (e.g. require swivels, a clear catch circle, fixed anchor points, minimum cable diameter/working load, and a minimum number of clamps)
- Improve design standards and set locations for culvert traps that reduce the potential for injury to bears and people, and reduce risk of hypothermia
2. Continue to enforce existing laws relating to animal trespass by hunters using dogs to pursue bears (Ongoing; High Priority)
3. Evaluate the duration of baiting and the amount and type of bait that is being used (New; Moderate Priority)
4. If a spring bear hunting season is established in order to meet bear population objectives (New; Moderate Priority):
   - Consider limiting road access in cooperation with landowners (e.g., temporary road closure, foot traffic or ATVs only) in areas or time periods of concern.
   - Consider allowing the use of culvert traps in spring because there is low risk of separating family groups
   - Consider requiring hunters to identify sex of bear before harvest (e.g., use of elevated baits)
   - Prohibit the harvest of cubs and females accompanied by cubs
   - Time the season in early spring when lactating females are less active
   - Survey the hunting and non-hunting public periodically to assess support/concerns.

Goal #3

COMMUNICATION & OUTREACH

1. Develop a strategic outreach plan for black bears and use the MDIFW Communication Program to disseminate key messages to the public (New; High Priority)

2. Create an interactive phone and/or web-based system to provide information to the public on methods to prevent and resolve human-bear conflicts (New; Moderate Priority)

3. Provide information to the public on the positive aspects of hunting bears with traps, dogs, and bait (e.g., allows selectivity, shot placement, management need), and the current regulations that are in place for each method. (Ongoing; High Priority)

4. Provide information to the public on the rationale for the use of GPS collars on dogs (New; Low Priority)

5. Provide information to the public on the rate of injury to dogs, treatment of dogs by their owners, and risk of contact between bears and dogs (New; Low Priority)

6. Conduct public education and outreach to increase awareness of laws that prevent public from interfering with lawful hunting and trapping activities. (New; Moderate Priority)

7. Increase focus on landowner relations during hunter education courses and through other department programs to reduce the likelihood of trespass by hunters or their trained bear dogs (Ongoing; Moderate Priority)

8. Continue working with landowners and hunters to reduce conflicts among hunters using bait or trained bear dogs (Ongoing; Moderate Priority)

9. Work with partners to increase public outreach on bear hunting methods (New; High Priority)

4.6 Expected Outcomes for Bear Management

The Maine Department of Inland Fisheries & Wildlife is responsible for protecting, conserving, and enhancing our wildlife resources. As such, the Department is primarily obligated to monitor and ensure the health of our bear population.

Past planning efforts have demonstrated public acceptance of a growing bear population (18,000 bears in the late 1980s to more than 35,000 bears today). This suggests that Maine's bear population has not yet reached a level where there are significant negative consequences to bears, the environment, or people. It also demonstrates that Maine's bear population can fluctuate (increase or decrease) and still remain healthy and in balance with the human and natural world. This public tolerance is largely explained by bears being more abundant where there are fewer people (northern, western and eastern Maine's forest).

Inevitably, if Maine's bear population continues to grow, bear health and public tolerance of bear conflicts will eventually diminish. Strategies in this plan to increase hunter participation (especially among residents) and success should curb population growth and expansion. Hunter satisfaction will remain high, bear population will remain healthy, and impacts to other populations of wildlife (e.g., deer or moose) will be minimized.

However, it will take a number of years and a direct effort to increase hunter participation and harvest, which in the short term will likely lead to a continued increase of the bear population. Eventually, bears may become more common in areas with higher human density. Outreach and education efforts will target these communities, as well as communities that have historically been living with black bears. This should facilitate greater understanding of how to prevent bear problems, greater desire and ability to implement preventative measures, and increase tolerance of black bears. In addition, requests to move black bears should decrease as the public becomes aware of alternative strategies to solve problems, and more importantly, prevent them in the first place.

Implementing strategies identified in this plan to increase outreach and education should allow people in Maine to become more knowledgeable and tolerant of black bears and the agency's role in insuring healthy populations of wildlife for future generations to enjoy. Additionally, the public's understanding of the role of hunters in preserving the health of wildlife populations and the Department's ability to gauge the public's attitudes about bears, how they are hunted, and how conflicts are prevented and resolved will improve. Increased outreach and education will insure that relevant facts are shared and that management decisions are based on informed opinions and the best available science.

Ensuring that black bears remain highly valued by the people of Maine requires that the bear population does not exceed the land's capacity to provide sufficient resources and the public's tolerance of living with bears.

Listed below are some metrics that will allow us to assess if we have met the plan goals.

• The percentage of the public rating the management of bear as 'excellent' or 'good' increases to 65% by 2022.
• Public support for legal bear hunting remains above 80%.
• Statewide bear hunter satisfaction remains above 90%.
• The percentage of public indicating that they knew a great deal or moderate amount about bears increases above 60% especially among residents in southern and central Maine.
• The majority of public (>56%), landowners (>71%), and hunters (>67%) feel the population of bears should remain the same where they live.
• The 4-year running average of yearling weights is maintained above 35 pounds, and 4-year running average of cub survival remains above 50%.
• The number of hunters pursuing bears increases by at least 25% by 2022, with success rates remaining stable or increasing.
• Opportunities to harvest bears increase, through extensions of season lengths, bag limits, allowable methods, or a combination.
• By accomplishing the above, the annual harvest approaches 15% of the bear population, discouraging range expansion into more densely (human) populated areas.

5.0 WHITE-TAILED DEER

5.1 History and Population Status

HOW MAINE'S DEER POPULATION DEVELOPED, AND HOW IT SPREAD

Maine's white-tailed deer population has been characterized by periods of boom and bust. Anecdotal information relates that the state's deer population probably did not exist in high abundance prior to the arrival of European colonists in the early 1600s (Banasiak 1964). A combination of harsh winters, an intact predator community, and perhaps, a lack of abundant young vegetative growth for forage may have restricted deer to the southern coast and isolated pockets inland (Banasiak 1964). With European colonization, however, settlers began clearing the landscape. Small-scale logging operations triggered an increase in the growth of underbrush and provided white-tailed deer with an optimum mix of forage and cover. Following logging operations, deer expanded their range and became more common in central and northern Maine. Then, in the 19th century, extirpation of wolves and cougars from Maine allowed deer to further expand and increase in number essentially unencumbered by predation. Still, despite their increased presence, deer population status continued to fluctuate with winter severity and large-scale events (e.g., spruce bud worm outbreaks, fires) that caused significant habitat changes.

EARLY DEER HUNTING LEGISLATION

Maine's legislature has been regulating deer hunting since 1830 (Table 1). Over the years, the legislature gradually increased the number and types of hunting restrictions by imposing bag limits (first in 1873), creating hunting zones with differing season length (first in 1893), and establishing hunting license requirements (first in 1906 for nonresidents) (Table 1). The public's concept of fair chase when hunting white-tailed deer was in large part based on these early hunting regulations. These included reductions and bans on the sale of venison and use of venison to provision logging camps, as well as the outlawing of deer hunting at night or with dogs. Other laws were enacted to promote safety, including bans on twilight hunting and "driving" of deer, as well as the requirement to wear blaze orange clothing during the firearms deer seasons (Table 1).

AGREEMENTS WITH LANDOWNERS

The Department considers the protection and enhancement of deer wintering areas (DWAs) to be an important role for our agency. In the 1950s and 60s, this role took the form of DWA identification and inventory, primarily in the northern 2/3 of the state. During this period, the Department entered into cooperative agreements with a number of industrial timberland owners. These agreements are not legally binding; but nevertheless, were an effort to accommodate deer wintering area protection and enhancement into corporate timber harvest planning. Cooperative agreements continue to be a key tool for DWA management on industrial timberland.

POPULATION ESTIMATES & ANY-DEER HUNTING

MDIFW began estimating deer populations in the mid-1950s. This enabled the state to better understand the status of their deer population and create a more informed management decision process. Between the mid-1950s and early-1960s, MDIFW estimated Maine's deer population at 250,000, and 35,000 to 40,000 deer were being harvested annually. Because overall hunting effort was minimal in relation to the abundance of deer, either sex hunting persisted for another 30 years as the most viable harvest strategy to regulate deer populations. Either sex hunting has been implicated as the main driver of the high harvests of this time period.

5.0 WHITE-TAILED DEER

Table 1. Maine deer management history: 1830-2016.

YEAR	STATUTES AND REGULATIONS
1830	First restrictions on deer hunting; season set at September 1 through December 31, no bag limit.
1840	Season extended to November 1 through June 30.
1848	Season changed to July 1 through February 28.
1853	Season reducedd to September 1 through January 15.
1870	Season reduced to October 1 through January 15.
1873	First bag limit, three deer per hunter per year.
1883	Sale of venison limited to three deer per hunter per year; exporting of venison outlawed.
1886	Hunting deer with dogs outlawed.
1893	Eight southern counties closed to deer hunting; other such closures between 1894 and 1902.
1895	Bag limit reduced to two deer per hunter per year.
1900	Season reduced to October 1 through December 15; special license required to sell venison.
1903	All Maine counties again open to deer hunting.
1906	Nonresidents required, for the first time, to purchase licenses for deer hunting annually.
1907	Hunters in York and Cumberland Counties restricted to one antlered buck a piece - the first "bucks only" law; in effect in 1907 and 1908.
1913	Southern Maine restricted to one deer per hunter, October 1 through November 30 season.
1914	Some counties restricted to October 15 opening, or to hunting only during November, between 1914 and 1922.
1916	Taking of deer for provisioning logging camps outlawed.
1919	Mandatory deer registration began; residents required to purchase "good for life" license; nonresidents still required to purchase annual license.
1921	Modified buck law (two deer per hunter, one must be antlered buck) in effect in northern and eastern Maine; in effect in 1921 and 1922.
1923	Most counties closed during first two weeks of October; season closings varied from November 30 to December 15 between 1923 and 1938, maximum was eight weeks.
1925	Bag limit set at one deer of either sex, statewide.
1929	Legislature authorized payments to farmers for crop damage by deer; law repealed in 1951.
1930	All hunters required to purchase annual hunting licenses, except landowners hunting on their own land.
1939	Basic two-zone (north and south) system established, allowing five to six weeks of hunting in the north, four weeks in November in the south. In effect through 1970, except for a three- zone system from 1960 through 1962 and a four-zone system from 1963 through 1966.
1951	First special archery season, October 1 through October 15, Franklin and Oxford Counties only.
1967	Deer hunters required to wear fluorescent orange clothing during regular firearm season in southern and central Maine. Later required statewide.

YEAR	STATUTES AND REGULATIONS
1971	Deer drives outlawed. Land Use Regulation Commission (LURC) established, biologists begin inventory of important wintering areas for LURC protection. Last week of season closed as an emergency measure, the only time this has been done. Also in 1971 (and through 1972), season was set at five weeks in the north, three weeks in the south.
1973	Northern zone season shortened to four weeks (still three weeks in southern zone). Commissioner given authority to set annual deer seasons within a framework - the fifth Monday preceding Thanksgiving through the Saturday following Thanksgiving (seasons previously set every two years by legislature).
1977	Legislature restricted the Saturday before regular firearm season be open for resident hunting only.
1980-82	Regular firearm season on deer shortened to two weeks in the "western mountain" portion of southern zone. Elsewhere in southern zone, season length remained three weeks and northern zone remained four weeks.
1981-82	Experimental muzzleloader season established by Legislature for three days following the end of regular firearm season. Law sunset in 1982.
1982	Legislature altered the deer season framework to include the fifth Saturday preceding Thanksgiving to November 30. Therefore, closing date of deer season no longer tied to Thanksgiving weekend.
1983-85	Legislature granted Department the authority to create hunting districts and to restrict the harvest of antlerless deer to increase deer populations. Authority sunset in 1985 and did not allow use of "doe permits".
1983	Southern zone divided into western, eastern, and central districts. Harvest restricted to deer with antlers 3" or larger in the former two districts while any deer was legal in the latter. Season length remained three weeks in all districts of southern zone. Any deer was legal during the four-week northern zone season.
1984	Uniform four-week season established statewide. Any deer was legal in the northern zone throughout the season. In the southern zone, only deer with antlers 3" or larger were legal throughout the season in the western and eastern districts while in the central district hunters were restricted to deer with antlers 3" or greater for first three weeks with any deer legal the last week.
1985	Season length unchanged from 1984. Harvest restrictions in all districts of southern zone unchanged from 1984. Northern zone restricted to deer with antlers 3" larger first 3 weeks with any deer legal last week. Legislature granted Department permanent authority (effective 1986) to create hunting districts and to regulate the harvest of antlerless deer including the use of "doe permits" Permanent muzzleloader season established by Legislature effective 1985 for 6 days following the end of regular firearm season on deer.
1986-95	Season length unchanged from 1984. Seventeen (18 after 1990) Deer Management Districts (DMDs) established to manage deer. Variable quota doe harvests within DMDs accomplished using Any-Deer permits valid for regular firearm and special muzzleloader seasons. Deer of either-sex legal for Any-Deer permittees and archers during special archery season.
1989	The Natural Resources Protection Act (NRPA) is passed. It mandates MDIFW to support MDEP in protecting and enhancing deer wintering habitat in Maine's organized townships.
1993	Legislature granted Department authority to implement controlled deer hunts after the close of muzzleloader season to January 31st annually, or as needed. Location of hunt area, weapon type, hunter selection, bag limits, quotas and composition of the kill to be determined by Commissioner as needed.
1997	Legislature granted Department authority to establish an early archery season (September 6 through the 30th in 1997). Either-sex season has separate limit from other deer season; targets parts of Maine where access to firearm deer hunter's limits deer harvest capability.
1995-96	Legislature granted Department authority to implement an additional 6 days (maximum of 12 days) of p rimitive firearm hunting during the special muzzleloader season which follows the regular firearm season. Commissioner may specify in which DMDs this season extension will be allowed.

YEAR	STATUTES AND REGULATIONS
1998	Department implements new zoning system for hunting regulations. Individual districts, termed Wildlife Management Districts (WMDs) total 30, statewide. WMDs would replace former 18 Deer Management Districts (DMDs) in use since 1986.
1999	Legislature expands early (limited areas) archery season to 79 days (early Sept. to early Dec.) and establishes a 2-deer limit. Legislature amends 1993 controlled hunt law to enable controlled hunts which are concurrent with other deer seasons, closing Jan. 31.
2000	Legislature grants authority to Department to open islands which have been closed by statute to deer hunting, using rulemaking authority, after gaining the support of island inhabitants.
2001	Department authorizes allocation of Bonus Any-Deer Permits in WMDs with insufficient applicants for available Any-Deer permits.
2002	Department establishes a one-day Youth only hunting day to precede the opening of resident firearms by one week. Youths are allowed to take deer of either sex.
2003	The Department, by rule, changed the limit on deer during the Expanded Archery season from 2 deer of either-sex to one buck and unlimited antlerless deer, by permit. Cost of the buck permit is $30; antlerless permits are $10 each.
2006	Department implements adjustment to Wildlife Management Districts in the coastal and Downeast Regions, including WMDs 25, 26, 27, 28 and 29, resulting in the reduction of WMDs from 30 to 29. This consolidation, to areas with similar habitat characteristics and deer densities was aimed at improving management for each WMD.
	Legislature provides by statute the allowance of crossbow use for deer hunting during the open firearm season and the authority through rulemaking to adopt rules regulating the use of crossbows for hunting.
2008	October (Special) Archery is limited to buck-only hunting in WMDs that are buck only due to winter severity and decrease in deer population in northern and eastern Maine.
2009	October (Special) Archery and Youth Hunters are limited to bucks only hunting in WMDs that are buck only due to winter severity and decrease in deer population in northern and eastern Maine.

CHANGES IN THE 60S AND 70S

The 1960s and 1970s were a turning point in Maine's land management practices. Logging underwent a transformation to a more mechanized process that enabled large tracts of land to be cut in a short time. In addition, a spruce budworm outbreak beginning in the 1970s impacted deer over-wintering habitat via landscape level die-offs of mature stands of softwood, and subsequent salvage harvests. As a result of the increased loss of mature softwood, deer summer habitat increased. However, the availability of deer wintering areas declined; particularly in the northern half of the state where they are the most critical. In addition, a ban on using the rivers to transport logs led to the creation of thousands of miles of logging roads across the state. This network of roads created greater access to stands of mature wood being impacted by the budworm outbreak, but also greatly increased access for Maine hunters. Colonization of Maine by eastern coyotes continued throughout this time period, which ended the several-decade span where adult deer were virtually free from predation. These factors may have worked together to cause a decline in deer populations in western, northern, and eastern Maine, and set the stage for contemporary population trends and management practices in those regions of the state.

During the 1960s, the state reached its lowest levels of deer abundance. Harsh winters, wintering habitat loss, coyote colonization, and increased hunting pressure resulted in the population declining to approximately 141,000. Following this die-off and continuing through the late-1980s, Maine's deer population expressed slow growth (Figure 1). Despite a slow rebound in the deer population, demand for the resource continued to grow (Figure 2). This precipitated a series of new management strategies and laws that attempted to expedite the growth of Maine's deer population.

MDIFW TASKED WITH WILDLIFE MANAGEMENT

In 1973, Maine's legislature began delegating regulatory authority for deer and other wildlife management to MDIFW (Table 1). The first step was to establish broad frameworks for hunting season lengths, with the provision that the Commissioner would shorten these seasons, as necessary, to protect deer. Much later, the legislature granted authority to regulate the harvest of antlerless deer. Beginning in 1986, the Department was granted long-term authority to establish deer management districts, and to regulate the harvest of does and fawns .

ANY-DEER PERMIT SYSTEM ESTABLISHED

Through different iterations of its deer management system, it became clear that the most efficient way to control the growth of Maine's deer population was to regulate the harvest of does. Since its inception in 1986, the Any-deer permit (ADP) system has provided MDIFW with a means of regulating doe harvests, while simultaneously maximizing hunting opportunity for Maine's hunters. Doe harvests consistently have been within 5%-10%, or less, of the Department's antlerless harvest goals since the ADP system was initiated.

Equipped with better knowledge of the resource and tools to manage it, MDIFW worked with representatives from Maine's public to identify new deer management goals for the state. During the 1985-1999 planning period, Maine sought to grow its deer population in all Wildlife Management Districts (WMD). Newly developed population objectives for the state were to manage the deer to 50%-60% of what Maine's deer wintering areas (DWAs) could support, aiming to grow the population at a rate that wouldn't outpace the availability of DWAs. In order to meet the public's population goals, the amount of winter habitat would need to be increased to approximately 8% to 10% of Maine's landscape.

POPULATION GROWTH IN THE 80S AND 90S

Maine's deer population grew prolifically through the late-80s and 90s, with the impetus for growth resulting from the regulatory system that limited doe harvest, plus a series of mild winters. During this time, Maine's deer population grew to an estimated all-time high of 331,000. However, much of the growth occurred within the southern tier of the state.
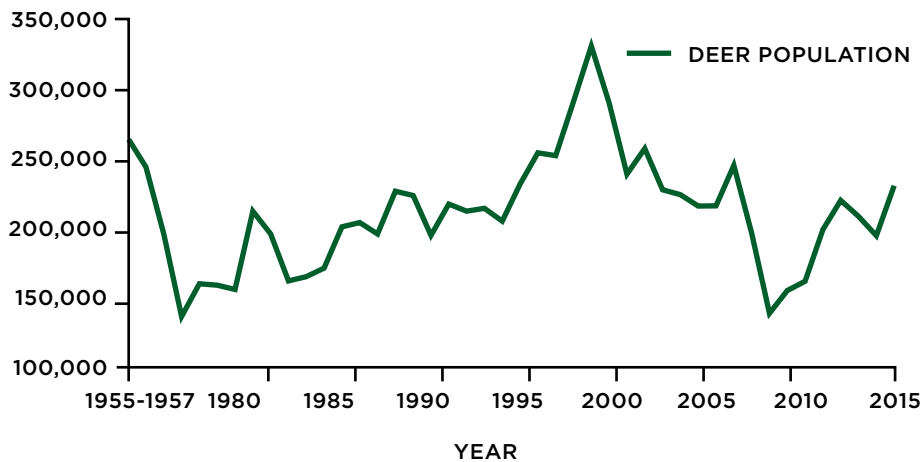
Figure 1. MDIFW began estimating population abundance of white-tailed deer in the 1950s. A better understanding of population status has helped the Department to better manage and conserve the animals across the state.
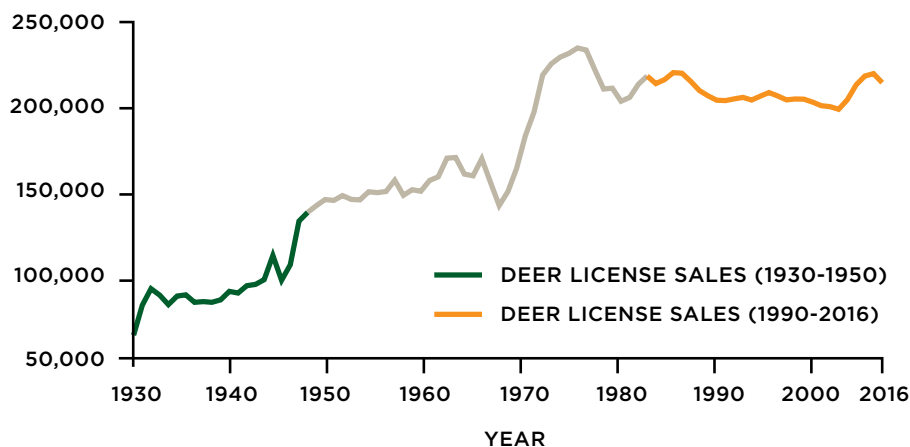

Figure 2. Despite large fluctuations in Maine's deer population, sales of hunting licenses in the state continued to climb, until recent years, demonstrating a growing desire to pursue white-tailed deer in the state.

2000-2016 DEER MANAGEMENT

As southern Maine's deer population grew, so too did the number of deer-car collisions, depredation issues, and cases of Lyme disease. In contrast, western, northern, and eastern, Maine's deer populations remained below objectives. As such, the current iteration of the deer management system reflects the disparity in Maine's regional deer populations (Lavigne 1999).

Wildlife Management Districts 1-11
- **Short-term Goal:** Provide hunting and viewing opportunity for white-tailed deer, while preventing over-browsing of deer wintering habitat.
- **Short-term Objective:** Bring the deer population to 50% to 60% of the carrying capacity of the wintering habitat by the year 2004, then maintain at that level.
- **Long-term Goal:** Increase hunting and viewing opportunity for white-tailed deer, while preventing over-browsing of deer wintering habitat.
- **Long-term Objective:** Increase deer wintering habitat to 8% of the land base to ensure sufficient wintering habitat to accommodate a post-hunt population of 10 deer/mi2 by the year 2030 (or sooner), and then maintain as for the short-term objective.

Wildlife Management Districts 12, 13, 14 and 18
- **Short-term Goal:** Provide hunting and viewing opportunity for white-tailed deer, while preventing over-browsing of deer wintering habitat.
- **Short-term Objective:** Bring the deer population to 50% to 60% of the carrying capacity of the wintering habitat by the year 2004, then maintain at that level.
- **Long-term Goal:** Increase hunting and viewing opportunity for white-tailed deer, while preventing over-browsing of deer wintering habitat.
- **Long-term Objective:** Increase deer wintering habitat to 9 to 10% of the land base to ensure sufficient wintering habitat and accommodate a post hunt population of 15 deer/mi2 (when on summer range) by the year 2030 (or sooner), and then maintain that level.
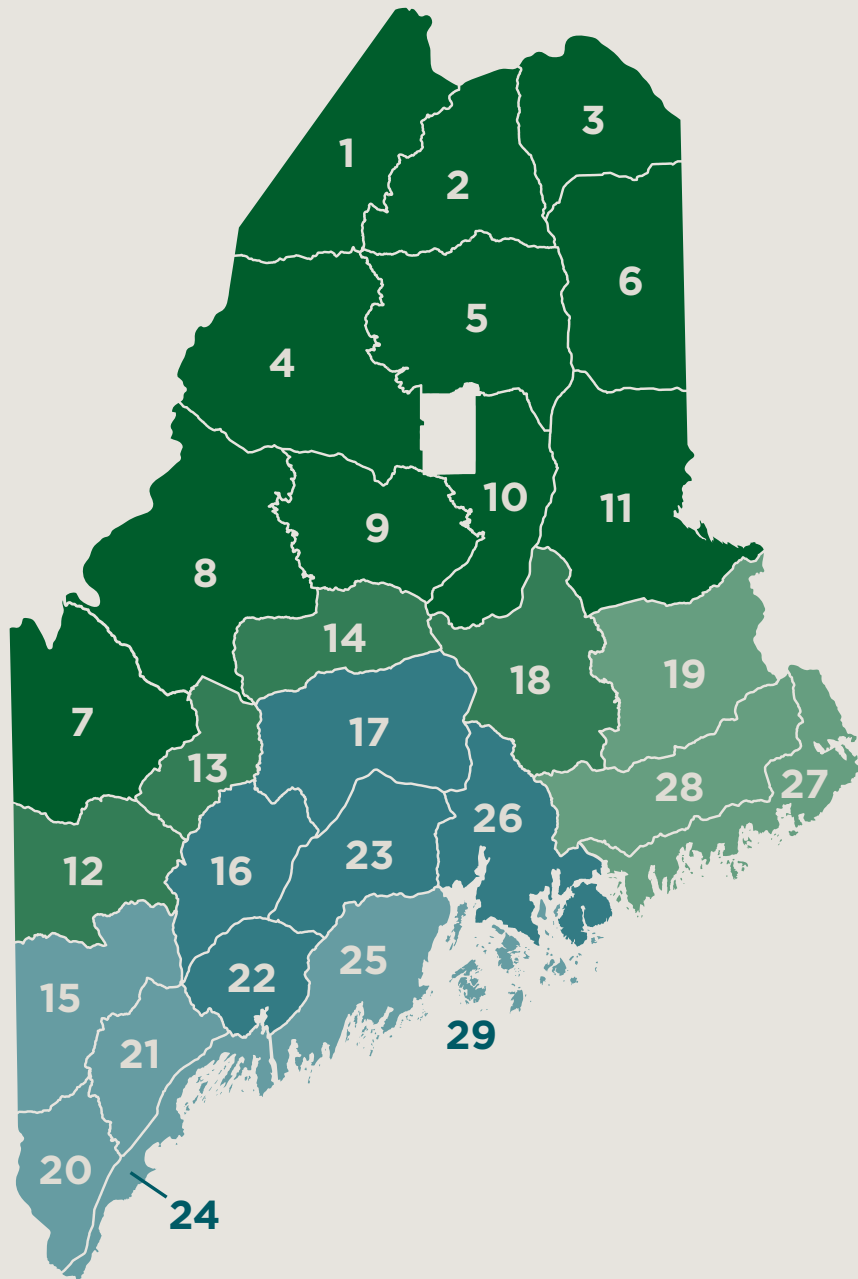
Wildlife Management Districts 19, 27, and 28
- **Short-term Goal:** Provide hunting and viewing opportunity for white-tailed deer, while preventing over-browsing of deer wintering habitat.
- **Short-term Objective:** Bring the deer population to 50 to 60% of the carrying capacity of the wintering habitat by the year 2004, then maintain at that level.
- **Long-term Goal:** Increase hunting and viewing opportunity for white-tailed deer, while preventing over-browsing of deer wintering habitat.
- **Long-term Objective:** Increase deer wintering habitat to 9 to10% of the land base to ensure sufficient wintering habitat to accommodate a post hunt population of 15 deer/mi2 (when on summer range) by the year 2030 (or sooner), and then maintain as for the short-term objective.

Wildlife Management Districts 16, 17, 22, 23, and 26

Goal: Balance the desire for deer hunting and viewing opportunity with the need to reduce negative impacts of deer from browsing damage, collisions with motor vehicles, and potential risk of Lyme disease.

Objective: Bring the post hunt deer population to 20 deer/mi2 (or no higher than 60% of Maximum Supportable Population) by 2004, then maintain.

Wildlife Management Districts 15, 20, 21, 24, 25, and 29

Goal: Balance the desire for deer hunting and viewing opportunity with the need to reduce negative impacts of deer (browsing damage, collisions with motor vehicles, and potential risk of Lyme disease).

Objective: Bring the post-hunt deer population to 15 deer/mi2 (or no higher than 60% of Maximum Supportable Population) by 2004, then maintain.
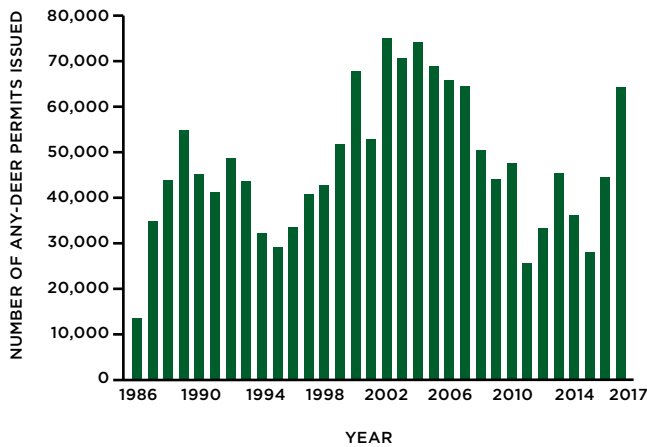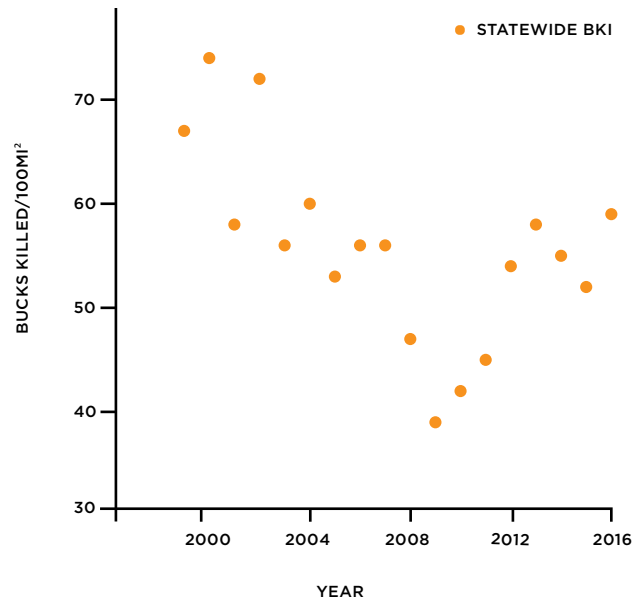
5.0 WHITE-TAILED DEER

Over the past 15 years, Maine's central and southern WMDs have been managed to balance deer hunting and viewing with the negative aspects often associated with overly abundant deer populations (i.e., depredation, deer-car collisions, and disease). A burgeoning deer population in southern Maine (where some localized populations exceeded 100 deer/mi² [Lavigne 1999]) during the early 2000s led MDIFW to significantly increase ADPs in southern Maine (greater than 70,000 deer permits were issued to Maine's hunters in some years; Figure 3). With the permitted increase in hunting pressure on females in, southern Maine, the number of ADPs issued generally declined starting in 2004, as population objectives were met and the Department began stabilizing population trends (Figure 4).

Figure 4. Maine utilizes the number of bucks harvested per/100mi to determine whether the state's deer population is declining, stable, or growing.

Figure 3. Maine's Any-deer permits system was created in 1986 to more closely regulate the harvest of white-tailed does. The permit system has helped MDIFW remain within 10% or less of its annual doe harvest objectives. At the outset of the new planning period in 2000, MDIFW began working to decrease Maine's deer population in the southern and south-central regions; thus the high numbers of permits issued early on.

Consequently, the instances of car/deer collisions decreased following the issuance of high numbers of ADPs during the early 2000s (Figure 5). However, Lyme disease cases continued to increase.

To control the spread of Lyme disease, MDIFW initiated increased deer harvests, aiming to reduce the population density of white-tailed deer to less than 20 per mi² and thereby decrease the numbers of breeding adult ticks. (Rand 2003). Despite this effort, tick abundance and Lyme disease both continued to increase (Figure 6).
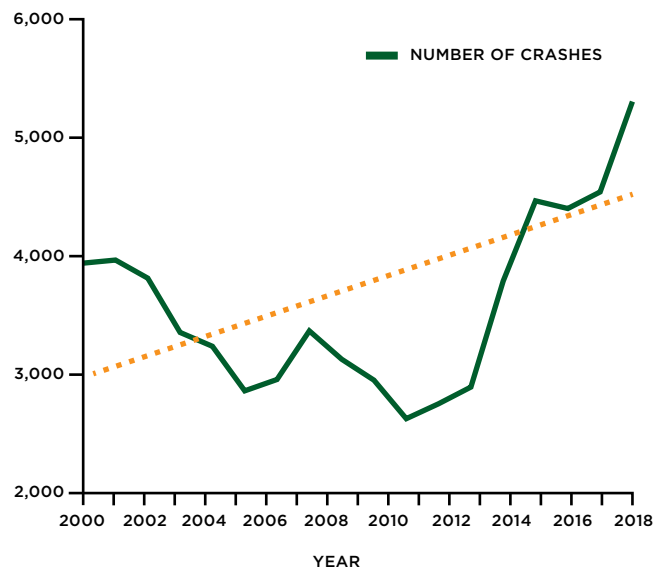
Figure 5. Car-deer collisions are used as an index to identify when Maine's white-tailed deer populations are becoming too abundant and thereby a nuisance to the public.
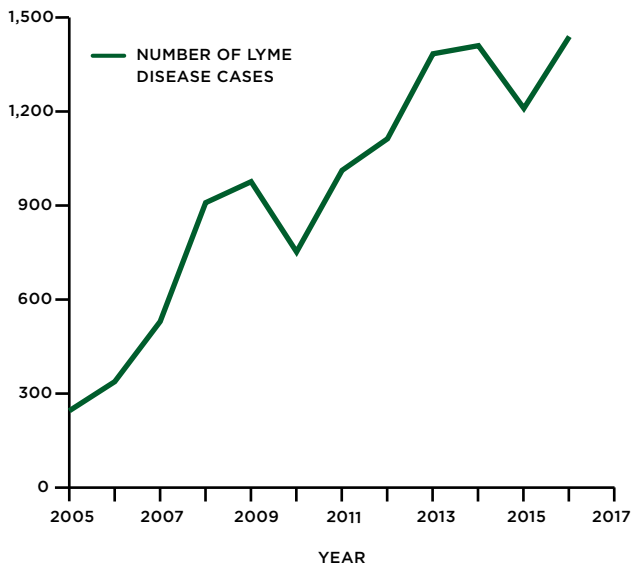
Figure 6. When a population of white-tailed deer reach social carrying capacity, they may become a detriment to human health due to zoonoses, such as Lyme disease. As such, Maine's current goals and objectives outline the need to minimize depredation related issues.

Note that this figure is populated with data provided by MECDC and is an altered reproduction of a graphic provided by MECDC (p.12): http://www.maine.gov/dhhs/mecdc/ infectious-disease/epi/vector-borne/lyme/documents/ Lyme-Legislative-Report-2015.pdf

Unlike their southern Maine counterparts, deer populations in western, northern, and eastern regions of the state remained chronically below both short-term and long-term management objectives throughout the life of the 2000-2015 Deer Management Plan. Following the 1985-1999 planning period, MDIFW and public working groups recognized that limited availability of deer wintering areas continued to preclude the state from growing its deer population in 2/3 of its Wildlife Management Districts (WMDs).

In response, the Department employed a two-tiered plan to promote population growth in proportion to winter habitat availability, while not allowing deer to become a detriment to themselves. The short-term goal (Tier 1) was to manage deer populations to 50-60% of what Maine's DWAs could sustain. Yearling antler beam diameter was used to assess this metric (Figure 7). As enough DWA habitat became available (Tier 2), management would then shift to growing the population to 10 deer/mi². This two-tiered approach was applied to WMDs 1-11, 12-14, 18, 19, 27, and 28. To date, most WMDs remain below the short-term objective of 50-60% of what current DWAs might be able to sustain.
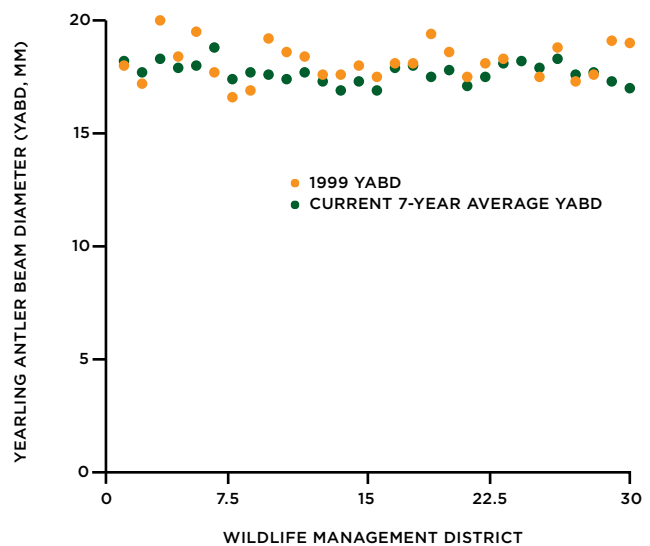
Figure 7. Yearling antler beam diameters provide MDIFW with a depiction of the nutritional state of Maine's deer, as well as an estimate of where the deer lie along the ecological carrying capacity continuum. Maine's white-tailed deer are generally healthy and reside below 50% of what Maine's habitat could support (biological carrying capacity).

5.2 Regulatory framework
DEER - A STATE-OWNED RESOURCE

Like all Maine wildlife, white-tailed deer are a publicly-owned resource that is held in trust, by the state, for the benefit of all Maine residents. The Department offers five different structured hunting seasons (i.e., Expanded Archery, Regular Archery, General Firearms, and two Muzzleloader seasons) for deer starting in early September and ending in mid-December. Unless a hunter holds a bonus any-deer permit, or they are harvesting deer within an Expanded Archery zone with the necessary permits, they may only harvest one deer per year.

NORMAL ANY-DEER PERMITTING

The state's deer management system uses an Any-deer permit system to achieve its population goals. The system operates under the premise that deer populations, in Maine, are most effectively controlled by regulating the doe harvest. Any-deer permits are allocated to WMDs based on the status of their deer population relative to their deer population objectives. Department biologists utilize harvest and biological data to annually assess population trajectories and make subsequent harvest prescriptions to maintain, or alter, a population's trajectory. Final harvest prescriptions are submitted to the Department's Commissioner and Advisory Council for approval prior to permit issuance.

SPECIAL EXCEPTIONS

In some localized cases, if regulated hunting cannot provide enough harvest to alleviate small-scale nuisance issues, MDIFW has legislative authority to also: 1) create special hunting seasons (e.g., Expanded Archery Season), 2) issue deer management permits that provide MDIFW-defined people to take deer, and/or 3) issue depredation permits to allow the taking of deer observed damaging personal property.

5.3 2016 Public Consultation – Key Findings

MOST MAINERS KNOW AND LIKE DEER

Not surprisingly, of the four big game species, Maine residents reported that they knew the most about deer, with only 3% indicating they knew nothing at all, and 75% responding that they knew a great deal or moderate amount. The public also rated deer management in the state favorably, with 67% rating it as 'excellent' or 'good', and only 5% it as 'poor'. Statewide, 65% of the general population felt that the deer population should remain the same in the area where they live, while 20% preferred an increase and 7% would prefer a decrease. However, 54% of hunters and 33% of the general public from northern and Downeast Maine felt the deer population should be increased.

These perspectives changed substantially given scenarios where the health of the deer population would decline, risk of Lyme disease would increase, or deer habitats would be negatively impacted. When asked about tradeoffs between moose and deer in northern Maine, the majority of respondents in all survey groups indicated a preference for moderate or low numbers of moose with more deer. This preference was strongest among hunters, with only 13% of hunters in the northern region indicating they would prefer abundant moose populations and very few deer.

REASONS HUNTERS MIGHT BE UNHAPPY OR NOT GO HUNTING

Ninety-one percent of hunters had hunted deer in the previous 5 years, and 82% were very satisfied or somewhat satisfied with their deer hunting experiences. The highest level of dissatisfaction was among those who most often hunt in northern or downeast Maine, with 21% of those hunters reporting that they were somewhat or very dissatisfied with their deer hunting experiences. Dissatisfaction was primarily (70% of respondents) related to 'lack of success' or 'too few deer'. A smaller percentage of dissatisfied hunters (7-8%) identified 'buck/doe imbalance', 'not enough permits', or 'lack of access' as reasons for their dissatisfaction. Of hunters that had not pursued deer within the past 5 years, the primary reasons were 'too far away' (33%), 'not enough time' (30%), and 'not enough deer/more elsewhere' (29%).

PUBLIC GENERALLY IN FAVOR OF LEGAL DEER HUNTING

Ninety-three percent of the general population expressed strong or moderate approval of legal deer hunting. Only 3% percent of the general population and 3% of landowners strongly disapproved of deer hunting. Among hunters, support for antler point restrictions (APRs) was mixed, with 46% expressing support and 50% voicing opposition. Responses varied slightly in different regions of the state, with a slight majority (53%) of hunters in northern Maine supporting APRs

Most participants in the focus groups, regional meetings, and online town hall were hunters, perhaps self-selected based on their passion for deer management. In the focus groups, many people commented that the deer population has appeared to rebound somewhat in recent years compared to levels in years immediately following particularly harsh winters. Most seemed to agree that it is fairly rare to see many large trophy-sized bucks. Participants also felt that deer populations varied considerably by region and district, especially as a result of the quality of habitat in the area. While opinions were not unanimous, there appeared to be a fairly widespread perception that recent years have seen increased, and possibly excessive, hunting pressure on yearling bucks in Maine. Simultaneously, there was notable support for the issuance of more doe permits in the downeast and coastal WMDs.

HUNTERS DIVIDED ON ANTLER POINT RESTRICTION IDEA

While there were fairly strong opinions both in support of, and in opposition to, an antler point restriction, most hunters seemed to agree with the basic need to improve the age structure and trophy class of bucks in Maine. Proponents of point restriction point to the perceived excessive harvest of yearling bucks in Maine and note that such measures have worked well to increase the size of bucks in other states. The most common reasons for opposition included the antler point restriction being hard to enforce and its potential to drastically limit hunters' success rates (in turn perhaps discouraging new hunter recruitment and/or youth participation).

5.4 Management Issues and Threats

HIGH DENSITIES & POTENTIAL HABITAT DAMAGE IN SOUTHERN MAINE

Healthy, self-sustaining forests are critical to many wildlife species, including white-tailed deer. Mature stands of softwood trees provide deer with winter cover, while the younger regenerating vegetation provides them with nutritious browse. Unfortunately, over-browsing by high densities of deer can alter forest ecosystem dynamics. Deer often feed selectively, which may result in suppression of some species of trees and shrubs. Heavy feeding by high numbers of deer has been linked to decreased growth of trees and shrubs, lowered abundances of saplings, increased mortality of vegetation, and subsequent release of invasive plant species (Hewitt 2011, Russell et al. 2017). Ultimately, maintaining too many deer can negatively impact multiple wildlife species. In localized areas within portions of southern and coastal Maine, deer densities may currently be at levels that negatively impacts regeneration of some species. Further research is required to determine whether this issue warrants management attention.

LOCALLY OVERABUNDANT DEER POPULATIONS

Overly abundant deer populations may also lead to public dissatisfaction due to, for example, high rates of deer-vehicle collisions, browsing of ornamental plants, and crop damage. Although MDIFW works to maintain socially acceptable deer densities, in some cases local deer populations can be difficult to regulate through the standard hunting framework. Reasons include town firearms ordinances, intense development that precludes hunting, and local land practices. Therefore, other methods, in addition to the regulated hunting seasons, may be necessary to accommodate extenuating circumstances. For example, the Department may need to consider issuing bonus deer permits for locales where deer populations have been identified as problematic to the public. Another option could be to work with town managers and residents to instate a special regulated hunting framework that would alleviate depredation issues. We'll need to think outside the box to identify new, effective, and employable methods of managing local populations of deer.

TICK-BORNE DISEASES

Lyme disease is a dynamic disease with a complex life cycle. The maintenance of the disease requires both a reservoir host for the bacteria (e.g., white-footed mouse), a vector (i.e., the black-legged tick), and a host for its reproductive stage (primarily the white-tailed deer). Although white-tailed deer are not competent hosts for the bacteria that causes Lyme disease (Telford 1988), tick abundance has been closely linked to the abundance of white-tailed deer (Rand et al. 2003) and therefore can indirectly influence disease prevalence. Although still not fully understood, limited research has expressed that maintaining deer at, or below, 11 deer/mi² may lower tick abundance and subsequently decrease risk of tick-borne pathogens (Mount et al. 1997, Rand 2003).

CHRONIC WASTING DISEASE

Chronic Wasting Disease (CWD) is an always-fatal disease that attacks the brain and nervous system of a number of species in the deer family, including white-tailed deer and moose. The disease was first discovered in the mid-1960s in a captive population of mule deer in Colorado. However, it was not identified in free ranging animals until 1981, when it was observed in a Colorado elk population. While, this disease has not been detected in Maine, it has been According to the U.S. Center for Disease Control, the disease has now been identified in 24 U.S. states and two Canadian provinces. Chronic Wasting Disease is persistent in the environment; and once it has established itself within an area, it can remain there indefinitely.

CWD is caused by infected prion proteins, which are normally found in the brain and other nervous tissues. Diseased prions can change the structure of healthy prions, causing them to function improperly, and subsequently affect more healthy prions. As the infected prions increase in number, so too do the disease's negative impacts.

Generally speaking, deer may be infected with the disease for a period of 5-36 months before any physical signs become apparent. The disease's long incubation period makes it difficult to identify the disease in its early stages. Clinical signs of the disease include: excessive drooling, excessive thirst, frequent urination, sluggish behavior, isolation from other deer, teeth grinding, droopy head and ears, and an emaciated appearance. To date, there is no known cure for the disease which is, as research has shown, spread by bodily fluids such as saliva, urine, and feces.

CWD has not been shown to be able to infect people. However, health officials advocate disposing of CWD infected meat rather than consuming it. For proper disposal methods please contact your local Regional Biologist and they will advise you on how to proceed with the disposal process.

THE IMPORTANCE OF DEER WINTERING AREAS

Historically, much of the growth of Maine's deer population was predicated on the quantity and quality of winter shelter. DWAs provide deer with refugia from deep snow and cold temperatures. It is believed that the state needs, on average, approximately 8% of the land base within each WMD to be available as DWAs to sustain 10 deer/mi². Current estimates of DWA availability continue to fall short of the 8% goal (Table 2).

In addition to limited availability of DWA acreage, much of MDIFW's hunting constituency has voiced concerns regarding the effects of predation on white-tailed deer. Current research on deer winter survival may give MDIFW new data on the impact of predators on Maine's deer population. This additional information will be used in the allocation of any-deer permits and to direct other deer management efforts.

Finally, research on deer winter survival may identify habitat characteristics associated with DWAs or the landscape surrounding DWAs that have higher deer winter survival rates. With this updated information, MDIFW may be able to work with landowners to improve habitat conditions for deer and identify landscape features that are discouraging deer from using historic DWAs.

HUNTER SATISFACTION

Hunter satisfaction is dynamic in that what influences it may change over time. Hunter satisfaction is often synonymous with hunting opportunities and/or the abundance of deer. To meet the needs of its hunting constituents, Maine offers five different hunting seasons (see Regulatory Framework page 47) that span from early September to mid-December. During that time, hunters have the option of pursuing deer in areas of high abundance, like southern and central Maine, to increase chances of success. Conversely, a hunter can travel to northern Maine where there are fewer deer, but where there is less competition with other hunters, access to private land is nearly unlimited, and one can pursue deer in the "Big Woods' tradition.

Table 2. Long-term deer population goals in western, northern, and eastern Maine are predicated on not only maintaining extant deer wintering areas, but also upon increasing the percentage of deer wintering area within Maine's Wildlife Management Districts.

WMD GROUP	NEEDED[1]	AREA 2000[2]	CURRENT AREA[3]	% GAIN	% OF NEEDED
1-11	780,000	258,600	501,100	48%	64%
12, 13, 14, AND 18	220,000	94,000	108,006	13%	49%
19, 27, AND 28	200,000	33,000	26,565	-24%	13%

[1]Total acres needed to sustain 10 deer/mi²
[2]Total acres at outset of 2000-2015 planning period
[3]Total current extant acres available as DW A

SATISFACTION WITH HUNTING IN GENERAL

According to the quantitative survey of Maine's hunting community, Maine meets most hunters' expectations – 82% were satisfied with their hunting experiences. Similarly, approximately 65% of respondents were happy with the current status of Maine's deer populations and felt they should not be changed. General satisfaction has also been expressed through increased license sales in recent years (Figure 8).
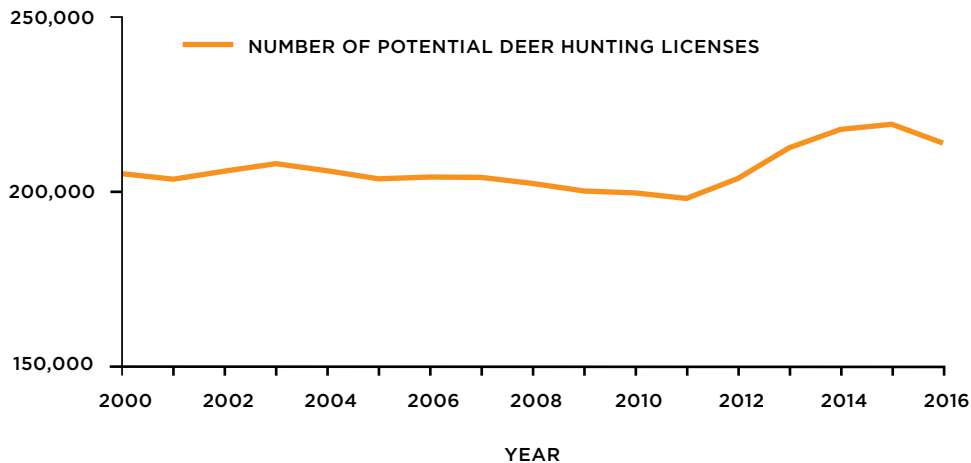

Figure 8. Maine's sales of hunting licenses, that permit deer hunting, experienced a drop concomitant with a decline in the state's deer population following two severe winters. However, according to recent license sales, Maine hunters are expressing a renewed interest in the time-honored tradition.

ANTLER POINT RESTRICTIONS: MIXED BENEFITS/SUPPORT

Many Maine hunters believe that implementing antler point restrictions (APR), will increase the number of trophy deer on the landscape. Antler point restrictions have been used by other eastern states, such as Pennsylvania, New York, and Vermont, to regulate their deer harvests. However, APRs were not designed to grow trophy deer, or increase deer abundance, but rather to increase recruitment of young bucks into the older age classes to offset high levels of adult buck mortality; as often occurs in heavily hunted populations of animals. With that in mind, an APR would likely not provide enough of a benefit to Maine's deer populations to offset the loss of opportunity for hunters. This concern was reflected in the public opinion survey. When asked if they would support the introduction of an APR, 50% of respondents expressed they would not, whereas 46% were in support of such a measure.

DEER FEEDING: PROS & CONS

Although impossible to quantify, anecdotal information suggests that the prevalence of deer feeding, and the proportion of deer that access feeding sites, has increased in Maine over time. In portions of northern Maine, informal aerial surveys indicate that during winter, a great number of deer are associated with feeding operations, some of which provide many tons of grain products each year. The Department discourages the public from feeding deer, and has the legal authority to prohibit feeding in cases where there is a safety hazard or the feeding is having a detrimental effect on the deer population. Feeding can lead to several unintended consequences for deer, including increases in vehicle collisions and predation, disruptions to normal movements and behavior, degradation of winter habitat, and increased susceptibility to disease. Some biologists believe that the presence of feeding operations may cause deer to abandon traditional wintering areas, leading to unoccupied habitat and lower overall deer populations on the landscape. It is also possible that when done properly, feeding may lead to improved survival for some deer during severe winters. Further research on the impacts of feeding on deer movements, habitat use, and population dynamics will be important to help determine the role that feeding operations play in maintaining deer across much of northern, western, and eastern Maine.

Goal #1

Deer Management Goals, Objectives, and Strategies 2017-2027

Deer Management Goal #1:
Maintain a healthy, sustainable deer population that provides opportunities for hunting and viewing with minimal negative impacts on natural ecosystems.

Background

DEER POPULATIONS, AND MANAGEMENT NEEDS, VASTLY DIFFER AROUND THE STATE

Maine's landscape presents an exceptionally diverse range of conditions for deer. In many areas of southern coastal Maine, factors including a mild climate with relatively low annual snowfall, high human densities, non-native browse, and challenging access for hunters have allowed populations to rise above management goals. In some of these areas, deer are experiencing the health consequences of poor nutrition; and incidences of human Lyme disease, correlated with deer density, have increased. Deer are also capable of impacting forest regeneration and simplifying vegetative communities, with negative impacts on overall biodiversity.

In stark contrast, severe winter conditions in much of northern, western, and eastern Maine have held deer at low densities except in small localized areas where winter feeding may allow higher survival rates. Ultimately, Maine's diverse climate, unique pattern of private land ownership, and market conditions for forest products interact to shape deer populations within the state.

ANY-DEER PERMIT SYSTEM HAS PROVEN TO BE AN EFFECTIVE MANAGEMENT TOOL

The Department has used the any-deer permit system as the primary tool for regulating deer populations since 1986, and has been successful at achieving healthy deer populations over much of the state while providing excellent hunting and viewing opportunities and managing conflicts with people. Any-deer permits will continue to play an integral role in deer management during the life of this Plan. This system requires the collection of detailed information on relative abundance of deer, population trends, health, reproductive performance, and hunter effort and success. These efforts should be continued and refined where appropriate, to take advantage of new scientific information and analytical techniques. In addition, measures of habitat condition should be incorporated into deer management decisions in southern and coastal Maine to ensure that populations do not reach levels where they are negatively impacting the environment.

LOCAL-LEVEL STRATEGIES

Although regular hunting seasons have proven relatively effective at managing deer at the WMD level, additional management strategies are needed to address high deer densities in local areas. Special hunts (including expanded archery), increased bag limits, or antlerless deer permits within portions of WMDs may be used to direct hunting pressure where it is needed. In situations where these approaches are ineffective, sharpshooters may be used as a last resort to reduce the risk of severe human-deer conflicts.

The efforts of MDIFW and landowners to increase deer densities in much of northern, western, and downeast Maine have not been successful, and deer remain under objective. Moving forward, the Department will continue efforts to increase the abundance and quality of winter shelter for deer, but must also re-evaluate the limiting factors for deer in this part of the state. Another spruce budworm outbreak, which is already occurring in Quebec, may further reduce the quantity and quality of winter shelter across northern Maine. Research on the factors impacting deer survival, including winter shelter, predation, winter severity, and feeding, is required to determine whether substantially increasing deer in this part of the state is a practical option.

Objectives

We'll know we achieved Dear Management Goal #1, to maintain a healthy, sustainable deer population that provides opportunities for hunting and viewing with minimal negative impacts on natural ecosystems, if we:

1. Monitor the relative abundance of Maine's deer population.
2. Monitor the health of Maine's deer.
3. Prevent the introduction and impact of infectious deer diseases to Maine, such as Chronic Wasting Disease (CWD) and Epizootic Hemorrhagic Disease (EHD).
4. In southern and central Maine (WMDs 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, and 29) use hunting as the primary tool to stabilize deer populations at levels where deer remain healthy and do not negatively impact Maine's natural ecosystems.
5. Increase deer abundance over the long term in Maine's Industrial Forest, Northern Agriculture, Western Mountains and Foothills, and Downeast Regions (WMDs 1-14, 18, 19, 27, and 28) while maintaining deer populations at levels that do not negatively impact over-wintering habitat.

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, policy, and outreach activities:

Goal #1

RESEARCH AND MONITORING

1. Continue to evaluate and implement the most appropriate indices for deer management (e.g. population trends) (Ongoing; High Priority).

2. Continue to participate in the Northeast Deer Research Partnership to (Ongoing; High Priority).:
   - Assess characteristics of survival and mortality for deer, including impacts of winter severity, predation, and poaching
   - Map the current amount of deer wintering habitat and determine its use by deer
   - Evaluate the impact of deer feeding on winter survival and use of DWAs

3. Implement sampling protocols to monitor diseases such as CWD and EHD (Ongoing; High Priority).

4. Explore options to identify habitat degradation due to over-abundance of white-tailed deer (New; Moderate Priority)

5. Evaluate early fawn mortality factors (New; Moderate Priority)

6. Evaluate the effectiveness of the coyote predation management program and identify options for improvement (New; High Priority)

POLICY AND REGULATIONS

1. Continue efforts to prevent introduction of CWD into Maine by (Ongoing; High Priority):
   - Collaborating with Maine's Department of Agriculture, Conservation, and Forestry to manage the importation and husbandry of farm-raised cervids
   - Preventing importation of cervid parts with a high risk of containing CWD material from states/provinces not adjacent to Maine.
   - Considering implementation of regulatory measures, such as a moratorium on the use of urine-based lures in hunting and a moratorium on the import of farmed cervids

2. Develop a CWD Response Plan that will allow MDIFW to respond to a CWD outbreak in a timely and efficient manner, should a positive CWD sample be collected (New; High Priority)

3. Continue to adjust deer densities using the following tools (Ongoing; High Priority):
   - Allocation of any-deer permits.
   - In areas where deer exceed social or ecological carrying capacity, allow the harvest of additional deer by increasing bag limits, implementing special seasons, or using other management tools

4. Develop adaptive processes and management triggers (e.g. vehicle collisions, nuisance complaints, prevalence of Lyme disease, local density estimates) for programs that would reduce locally overabundant deer populations (New; High Priority):

5. Monitor nuisance deer complaints to identify areas of high human-deer conflict and evaluate ongoing management efforts (Ongoing; Moderate Priority)

6. Increase efforts to conserve Deer Wintering Areas (DWAs) in northern, western, and eastern Maine by (Ongoing; High Priority):
   - Continue to use LUPC zoning to protect DWAs
   - Establish, or reestablish, cooperative agreements with Maine's large landowners to help manage and conserve the state's DWAs.
   - Continue to use the Land for Maine's Future program and other funding sources to acquire or establish conservation easements, or provide other incentives to conserve historically important deer wintering habitat and prioritize them for DWA management
   - Increase dialogue with landowners, land managers, land trusts, and wildlife consultants to facilitate conservation of DWAs.
   - Standardize methodology and messaging for MDIFW staff communication with landowners on managing DWAs
   - Explore opportunities to use existing Natural Resource Conservation Service programs to encourage DWA management
   - In the event of a spruce budworm outbreak, collaborate with landowners to identify alternate DWA management strategies in heavily impacted areas.

OUTREACH AND COMMUNICATION

1. Continue to facilitate communications between hunters and landowners and increase hunter access to lands to reduce locally abundant deer (Ongoing; Moderate Priority)

Goal #2

Deer Management Goal #2:
Ensure public satisfaction with Maine's deer population

Background

HUMAN-DEER RELATIONSHIP STATUS: IT'S COMPLICATED

White-tailed deer are perhaps the wildlife species most enjoyed by Maine residents. Many people enjoy watching deer, but they are also pursued by ~175,000 hunters every year, or about 91% of all hunting license holders in the state. However, deer are also responsible for significant property damage in the form of vehicle collisions and crop damage, and play a major role in the transmission of Lyme disease to people. Ensuring public satisfaction with the deer population will require striking a delicate balance between the positive and negative aspects of their interactions with people.

PUBLIC SATISFACTION

Providing opportunities for the public to view deer is relatively straightforward in southern and central Maine, where that state's highest human populations overlap with moderate to high deer densities. In this part of the state, maintaining public satisfaction with deer management hinges on limiting levels of human-deer conflicts, minimizing the risk of Lyme disease, and facilitating hunting opportunities on private land. In areas where traditional hunting seasons do not result in harvests high enough to achieve management objectives, special hunting opportunities will be required. Improving public satisfaction with deer management will be more challenging in northern, western, and eastern portions of the state.

HUNTER SATISFACTION

For hunters, maintaining and increasing levels of satisfaction will require maintaining relatively long seasons that provide the opportunity to use multiple hunting methods. Ensuring a healthy age and sex structure will be required to give hunters a reasonable opportunity to see and harvest bucks and maintain productivity in the deer population.

Objectives

We'll know we've achieved deer management goal #2, to ensure public satisfaction with Maine deer population, if we:

1. Maintain, or increase, 2016 levels of satisfaction and support for Maine's deer management program by the general public, hunters, and landowners.
2. Maintain a healthy age structure in Maine's deer herd.
3. Maintain deer densities below currently accepted thresholds for minimizing impacts to human health by tick-borne diseases.
4. Minimize the number of deer-vehicle collisions.
5. Manage deer human conflicts through hunting and conflict response programs.

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, policy, and outreach activities:

RESEARCH AND MONITORING

1. Periodically survey the public to determine levels of support for Maine's deer management program (Ongoing; High Priority)
2. Periodically survey deer hunters to determine levels of satisfaction (Ongoing; High Priority)
3. Evaluate the effectiveness of the Expanded Archery Program in managing deer-human conflicts (New; Moderate Priority)

POLICY AND REGULATIONS

1. Continue to provide a diversity of opportunities for hunters to pursue deer by allowing multiple hunting techniques over a long season framework (Ongoing; High Priority).
2. Develop a certification program for hunters (e.g. Marsh Island deer hunt) that would authorize participation in special urban deer hunts (New; Moderate Priority)
3. Adjust WMD boundaries in specific areas in order to improve the Department's ability to use hunting to manage deer-human conflicts (Ongoing; Low Priority)
4. Use the Department's Animal Damage and Depredation Control Program to manage deer-human conflicts (Ongoing; Moderate Priority)
5. Continue current efforts with the Maine Department of Transportation and the large animal crash group to reduce the rate of deer-vehicle collisions (Ongoing; High Priority)
6. Continue ongoing special opportunities provided to youth hunters, including the Youth Deer Hunting Day, special allocation of Any-Deer Permits to Youth Hunters, and ability to transfer Any-Deer Permits to Youth (Ongoing; Moderate Priority)

OUTREACH AND COMMUNICATION

1. Continue to provide information to hunters and landowners on the health of Maine's deer population (Ongoing; Moderate Priority)
2. Provide information to public on ways to increase deer viewing success (best time of day, habitats etc.) (Ongoing; Low Priority)
3. Encourage landowners to open land to hunting in areas experiencing high levels of human-deer conflicts and encourage towns to consider implementing Expanded Archery Seasons to manage deer-human conflicts (Ongoing; Moderate Priority)
4. Produce annual press releases, to be released during peak movements, warning motorists of increased potential of collisions with deer (Ongoing; High Priority)

Goal #3

Deer Management Goal# 3:
Increase public understanding of deer biology, ecology, and management.

Background

Ultimately, public support for deer management in Maine will depend on public understanding of deer biology, habitat use, interactions with other species, and management. Although Maine residents, landowners, and hunters all indicated they knew more about deer than any other big game species, MDIFW should continue and expand its efforts to provide information on deer biology and management. In particular, public outreach on the relationship between Lyme (other tick-borne diseases) and deer density would build support for deer reduction programs in areas with a high prevalence of these diseases.

MDIFW actively engages with the hunting community in a variety of formats, and these efforts should continue. Maintaining, and in some cases expanding, ongoing efforts to recruit, retain, and reactivate deer hunters will help build support for deer management in the state while ensuring that new hunters have the knowledge to conduct themselves safely and ethically. Increasing opportunities for interactions between MDIFW staff and hunters, possibly through annual open houses in various parts of the state, will ensure that the hunting community stays invested in deer management decisions and has the opportunity to provide input.

Objectives

We'll know we've achieved deer management goal #3, to increase public understanding of deer biology, ecology, and management, if we:

1. Increase awareness of public health issues related to deer.
2. Increase public understanding of supplemental feeding on deer habitats and populations.
3. Increase public understanding of deer biology and habitat needs to maintain healthy animals and reduce levels of conflict.
4. Increase public understanding and appreciation of hunting as a management tool for deer
5. Recruit, retain, and re-engage deer hunters and increase dialogue between Maine's hunters and MDIFW about Maine's deer management program.

Management Strategies

Our plan for achieving this goal involves the following outreach activities:

OUTREACH AND COMMUNICATION

Develop a strategic outreach plan for deer and use the MDIFW Communication Program to disseminate key messages to the public (New; Moderate Priority)

Develop outreach materials on the impacts of deer feeding and continue to actively communicate with members of the public that feed deer in situations that could negatively impact deer, deer habitat, or public safety (Ongoing; Moderate Priority)

Develop and distribute outreach materials on methods to reduce deer-human conflicts (Ongoing; Moderate Priority)

Work with partners to develop a mentoring program that encourages deer hunting. (New; Low Priority)

Conduct regular public meetings on deer management (New; High Priority)

5.6 Expected Outcomes for White-tailed Deer Management

Implementing the deer management strategies in this plan will require adequate staffing, funding, and public support. It may not be necessary or feasible to implement all strategies in order to achieve the goals and objectives. If MDIFW and its partners are successful managing deer over the next 10 years, the following outcomes are anticipated:

• The statewide over-wintering deer population averages 210,000 animals.
• The percentage of the public rating the management of deer as 'excellent' or 'good' increases to 75% by 2022.
• Public support for deer hunting to manage the population remains at or above 90%.
• Annual hunter participation of ≥ 150,000 hunters.
• Statewide hunter satisfaction with Maine's Deer Management Program increases to >85% by 2022.
    • Northeast Maine hunter satisfaction ≥80%
    • Central Maine hunter satisfaction ≥85%
    • Southern Maine hunter satisfaction ≥90%
• An average annual statewide buck harvest of at least 15,000 animals is maintained
• Seven year running average of the percentage of yearlings in the buck harvest remains below 50%
• Any-deer permits generally available in WMDs 15-17, 20-25, and 29, with permits issued in other WMDs during some years.

6.0 MOOSE

6.1 History and Population Status

Moose are a Maine icon, as demonstrated by our state flag and staunch public interest. They are valued for hunting, viewing, and the economic benefits of these activities. In past centuries, moose were valued as a source of meat, hides, and sport. They were important to both native people and settlers for subsistence and trade. In the 1700s and early 1800s, commercial moose hunting was unrestricted, and hunting to feed crews at logging camps was commonplace. By the late 1800s, with moose numbers declining, a moose season with bag limits was established. Continued decline led to closures and re-opening of the moose season until hunting was outlawed (Table 1) in 1936. As moose numbers increased, interest in hunting moose grew. In 1943, legislators introduced the first of many bills to reestablish a moose hunting season. Moose hunting was ultimately reestablished by the Maine State Legislature in 1980 but was restricted to a limited number of permittees selected by a lottery – a system still in place today.

FIELD VS. FOREST LANDSCAPE AND INTERACTIONS WITH DEER

Moose populations are inextricably tied to forage availability and quality. Thus, Maine's historical moose population trends are most directly tied to changes in the forest. Those changes include the forest succession and disturbances of the 1600s and today's large-scale forestry practices.

During colonization and well into the 1800s, Maine's landscape was transformed from forest to field and back again. Clearing and then subsequent reversion of farmlands promoted quality habitat for deer, but also increased the likelihood of meningeal worm (Parelaphostrongylus tenuis) transmission to moose (Lankester 2010). The increase in deer populations and subsequent colonization of western and northern Maine by deer in the late 1800s, then decline of deer in northern Maine in the late 1900s (Banasiak 1964) also played a significant role in the distribution and abundance of moose to the present day.

LOGGING AND LOGGING ROADS

Alongside changes in deer abundance/distribution and restrictions on hunting, the advent of commercialized forestry allowed moose populations to increase slightly throughout the 1900s. In their review of the status of moose in Maine, Banasiak et al (1980) estimated that moose numbers had declined to around 2,000 in the early 1900s. The most significant catalyst for increasing moose populations was the spruce budworm outbreak of the late 1970s and 1980s, which effectively set back forest succession in a large portion of western, northern and eastern Maine (Morris 1999). Consequent to the arrival of spruce budworm, salvage operations, construction of logging roads, and forestry mechanization greatly opened up the commercial forestlands, creating a burgeoning population of moose that has expanded as far south as Connecticut.

COMMERCIAL FOREST LANDS ARE IDEAL FOR MOOSE

Over the last 20 years spanning the 2000-2015 moose planning period, Maine's commercial forestlands have changed in the distribution and age of harvest blocks due to changes in land acquisition, forest product demand, and associated silvicultural techniques (MFS 2005). However, the extent to which this has impacted the amount of available forage for moose is unclear. Moose browse production was estimated across Maine's Wildlife Management Districts in 1997 using data from the US Forest Service 4th Forest Inventory (FIA) of Maine and updated a decade later (2007). Estimates of available browse within the moose core range (WMDs 1-11 and 19) have declined between 39% and 65% during this span of time. Given changes in land ownership, the Forest Practices Act of 1989 (which restricted the size of clear cuts) the relatively short window for optimum moose browse production (roughly 2-10 years post-harvest), and the coarse measurement scale of FIA plots, habitat quality and quantity within the commercial forestlands remains a shifting patchwork of early to mid-seral stage forest that is well suited for moose forage production.

MEASURING MOOSE ABUNDANCE

Prior to 2010, MDIFW was limited in its ability to directly measure moose abundance. While numerous techniques have been employed, direct estimates of moose abundance remained unreliable due to the geographical expanse of moose range, limited resources, and methodology. In the winter of 2010-2011, the department successfully implemented a survey for moose with reliable results (Kantar and Cumberland 2013) by adopting a statistical aerial survey method previously developed in Quebec for deer (Potvin Method). Building on the initial work, the department completed aerial surveys of the moose core range in 2012, which indicated that moose had reached a level of 76,064 +/- 6,059.

BIGGEST PROBLEMS WITH MOOSE

Nuisance complaints such as damage to maple sap tubing, gardens, and other crops do occur with moose. Moose in eastern Aroostook County have had significant impacts on high value agricultural crops including broccoli and cauliflower, resulting in the implementation of a state controlled moose hunt in 2009 (Kantar 2011). Moose prefer to browse on woody species with low commercial value which limits conflicts with forestry, but moderately preferred browse with high commercial value such as sugar maple may be impacted at high moose densities. Moose wandering into developed areas where people are not accustomed to them can cause problems with crowd control. Moose-vehicle accidents are the most serious problem involving moose. While many of these accidents are relatively minor, some cause serious human injury or death. Vehicle repair or replacement costs can be substantial.

MOOSE-WATCHING: A MANAGEMENT FACTOR

Moose management plans need to consider the public's non-consumptive appreciation of moose. In 1989, 6% of Maine residents reported that they took at least one trip where one of the primary reasons was to see moose (Boyle et al. 1991). Over time moose have continued to be one of the most sought-after animals for viewing, demonstrated by increases in moose safaris offered by licensed guides. The public's affinity for Maine moose is clearly demonstrated in the use of moose to market Maine products and tourism. The controversy over moose hunting in the 1980s was based in part on perceived conflicts between hunting and wildlife viewing. This appears to have abated in the area previously opened to hunting, but was an issue when the South Zone was opened. Although people still readily see moose, some feel that moose have become wary. There is no objective measure of whether hunting has affected people's ability to view moose for long periods of time or take close-up photographs; but clearly, both types of moose-oriented recreation contribute to the economy of northern Maine.

COLLISIONS DECREASING

Collisions between moose and motor vehicles increased until the 1990s (Figure 1). Contributing factors included moose densities, increased traffic, higher speed limits, and improved quality of rural roads. Collisions with moose have dropped by >50% since a high point of 858 reported collisions in 1998. Reasons for decreased moose-vehicle collisions include improved driver awareness through educational campaigns, signage, and roadside mitigation as well as changes in habitat and moose numbers.

PERMIT ODDS INCREASING

Applicants for moose hunting permits peaked in 1994 with 94,532 (74,424 residents, 20,108 non-resident) people entering the lottery. From 2006-2016 annual moose permit applicants have averaged around 56,389, a decline of 40%. Still, more people want to hunt moose than there are available permits. In 2015, the chances of being drawn in the permit lottery were 6.6% for residents and 1.8% for nonresidents. The upshot is that the odds of residents winning a permit have increased over time.

Table 7.1. History of moose hunting regulations in Maine.

YEAR	ESTIMATED HARVEST	HUNTING REGULATIONS BAG LIMIT	NUMBER SEX/ AGE RESTRICTED	SEASON LENGTH	NUMBER OF PERMITS	OPEN AREAS	NUMBER OF ZONES
PRIOR TO 1830	—	Unrestricted	Unrestricted	12 months	N/A	Statewide	1
1830 - 1839	—	Unrestricted	Unrestricted	4 months	N/A	Statewide	1
1840 - 1852	—	Unrestricted	Unrestricted	8 months	N/A	Statewide	1
1853 - 1854	—	Unrestricted	Unrestricted	6½ months	N/A	Statewide	1
1855 - 1869	—	Unrestricted	Unrestricted	5½ months	N/A	Statewide	1
1870 - 1872	—	Unrestricted	Unrestricted	4 months	N/A	Statewide	1
1873 - 1874	—	Unrestricted	Unrestricted	3 months	N/A	Statewide	1
1875 - 1879	No Open Season	—	—	—	—	—	—
1880 - 1888	—	Unrestricted	Unrestricted	3 months	N/A	Statewide	1
1889 - 1896	100-220	1	Bulls only	3 months	N/A	Statewide	1
1897 - 1912	160-410	1	Bulls only	1½ months	N/A	Statewide	1
1913 - 1914	90-100	1	Bulls only	1 month	N/A	Statewide	1
1915 - 1918	No Open Season	—	—	—	—	—	—
1919 - 1920	250	1	Bulls only	11 days	N/A	Statewide	1
1921 - 1926	No Open Season	—	—	—	—	—	—
1927	125	1	Bulls only	6 days	N/A	8 Counties	1
1928	No Open Season	—	—	—	—	—	—
1929	100	1	Bulls only	6 days	N/A	7 Counties	1
1930 - 1934	No Open Season	—	—	—	—	—	—
1935	45	1	Bulls only	3 days	N/A	3 Counties	1
1936 - 1979	No Open Season	—	—	—	—	—	—

Table 7.2. Moose management changes in Maine, 1980-2015.

| YEAR	MANAGEMENT ACTION
1830	First restriction placed on moose harvest – creation of 4-month season, but there were no bag limits
1830-1875	Restrictions on Moose hunting season fluctuated between 3-8 months, but still no bag limits
1875-1879	Moose hunting was banned – no open seasons
1880-1935	Fluctuated between open and closed season, and limited the bag limit to 1 moose
1936	Moose season closed indefinitely
1979	Moose hunting season once again re-established, a six- day season with permittee and sub-permittee system.
1980	1st Modern hunting season for Moose – 700 permits were allocated by the legislature – issued to resident hunters only. The success rate was extremely high and in a localize area which concerned citizens.
1981	No permits were issued. However, a law was passed to set the number of permits to 1,000 annually for 1 moose hunting-zone north of Canadian-Pacific Railroad.
1982	Moose zones expanded from 1 big zone to 6 smaller zones covering same area north of Canadian-Pacific Railroad.
1984-1989	The Department conducted aerial inventory of Moose populations in 5 of the 6 Moose management zones
1985	Moose Management plan focus on maintaining Moose numbers to 1985 levels for the next 15 years.
1994	Legislature increased maximum number of Moose permits to 1,200
1995	Legislature increased maximum number of Moose permits to 1,400
1996	Legislature increased maximum number of Moose permits to 1,500
1997	The number of Moose hunting zones expanded to 7 zones
1998	Legislature increased maximum number of Moose permits to 2,000
1999	Antlerless only permits (AOP) created; Legislature changed maximum number of moose permits to 3,000
2000	Big Game public working group was convened and create a new Moose management system with updated goals and objectives. This created 3 management strategies -- Recreation/Management, Road Safety, and Compromise zones to be applied to Moose management zones.
2001	The Department experimented with Forward Looking Infrared (FLIR) camera method to estimate Moose population
2001	The legislature transferred management authority to MDIFW for permit levels, season lengths/timing. Moose management zones changed from 7 to 18 Wildlife Management Districts (WMDS 1-14, 18, 19,28,29); A split two-week season framework; 6-day season in Sept. and a 6-day season in October.
2003	Any Moose Permit (AMP) was eliminated and a Bull-only Permit (BOP) was established; following New Hampshire's methodology, the Department once again experimented with FLIR cameras surveys to estimate Moose numbers.
2004	WMD 17 was opened for the October season.
2005	The Department collaborated with Unity College to design a method to count winter tick on hunter-harvest Moose at biological check stations during the October moose season.
2006	The Department began counting winter ticks on hunter-harvest Moose during the October season.
2008	Southern Maine WMDs 12,16,23,26 were opened to Moose hunting under a 3rd season that is concurrent with the November firearms season for Deer–
2009	The Legislature changed Moose management strategy for WMD 2 from Recreation zone to a Compromise zone; The Department established a Special Controlled Moose Hunt in portions of WMDs 3&6, open only to Disabled Veterans in response to Crop-depredation in high-value agricultural fields in eastern Aroostook County.
2010	The Department began conduction Potvin-type double count Aerial surveys to determine population status in select WMDs; The Department also began conducting Aerial flights to determine sex-age composition of select WMDs; The moose hunting season framework was changed to add a 4th 6-day season in November for AOP permits. The Department began collecting ovaries from moose to measure ovulation rates and estimate annual reproduction.
2014	The Department initiated a 5-year survival study to determine cause-specific mortality of Moose in WMD 8. This study is part of a collaborative effort with New Hampshire and Vermont to assess the impacts of winter tick, and potentially other issues for Moose in the Northeast.
2016	The Department expanded the project investigating Moose survival into WMD 2
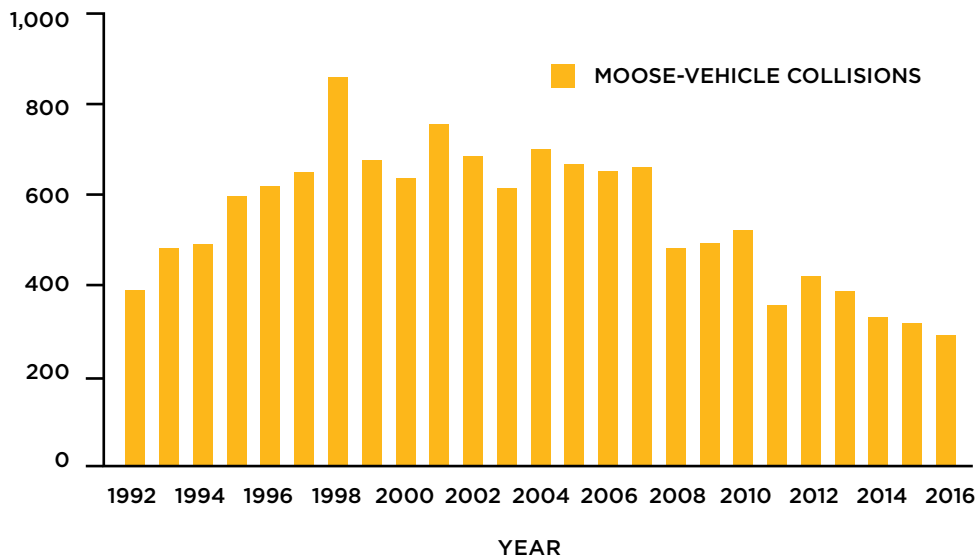
Figure 1. Moose-vehicle collisions in Maine, 1992-2016.
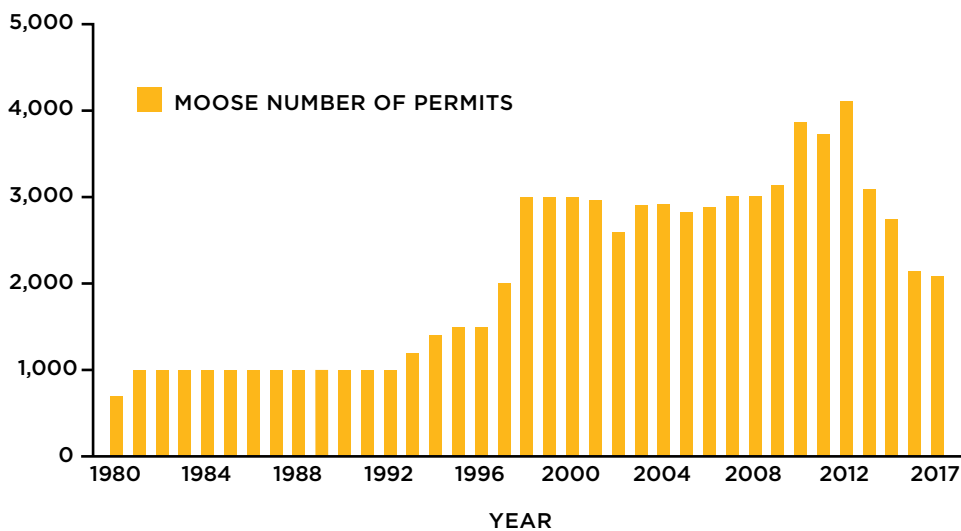

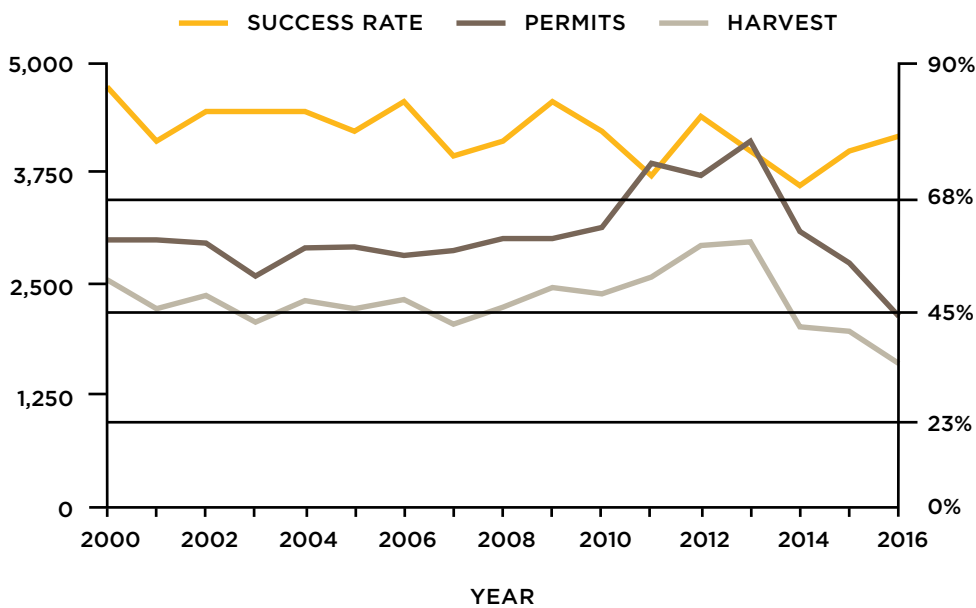Figure 2. Moose permit numbers in Maine, 1980 – 2016. No permits were issued in 1981.

Figure 3. Moose permits, harvest and success rates in Maine, 2000-2016.

2000-2016 MOOSE MANAGEMENT

In 1999, a public working group established goals and objectives to guide moose management for the next 15 years. Viewing and hunting were the primary considerations for moose management throughout much of the species core range in the state. In WMDs with abundant moose and significant human populations, minimizing vehicle collisions was also an important factor. In southern Maine, minimizing vehicle collisions was the primary consideration.

Recreation Management Area

WMDs 1:

Goal: Maximize hunting opportunity while maintaining the availability of mature (over 4 years of age) bulls.

Objective: By 2010, manage the moose population at 55%-65% biological carrying capacity (K) while maintaining 17% mature bulls.

WMDs 4, 5, 9 and 14

Goal: Maximize hunting and viewing opportunity while maintaining the availability of mature bulls.

Objective: By 2010, manage the moose population at 55%-65% K while maintaining 17% mature bulls.

WMDs 7, 8, 10, 12, 13, 18, 19, 27 and 28 (in 2006 WMD 29 was incorporated into 27/28)

Goal: Balance concerns over moose/vehicle collisions with the desire to provide excellent hunting and viewing opportunity.

Objective: By 2010, manage the moose population at 55%-65% K with 17% mature bulls.

Compromise Management Area

WMDs 2, 3 and 6

Goal: Balance the public's concern about moose/vehicle collisions with the public's desire to hunt moose.

Objective: By 2005, reduce the current (2000) moose population by 1/3 and maintain 17% mature bulls.

WMD 11

Goal: Balance the public's concern about moose/vehicle collisions with the public's desire to hunt moose.
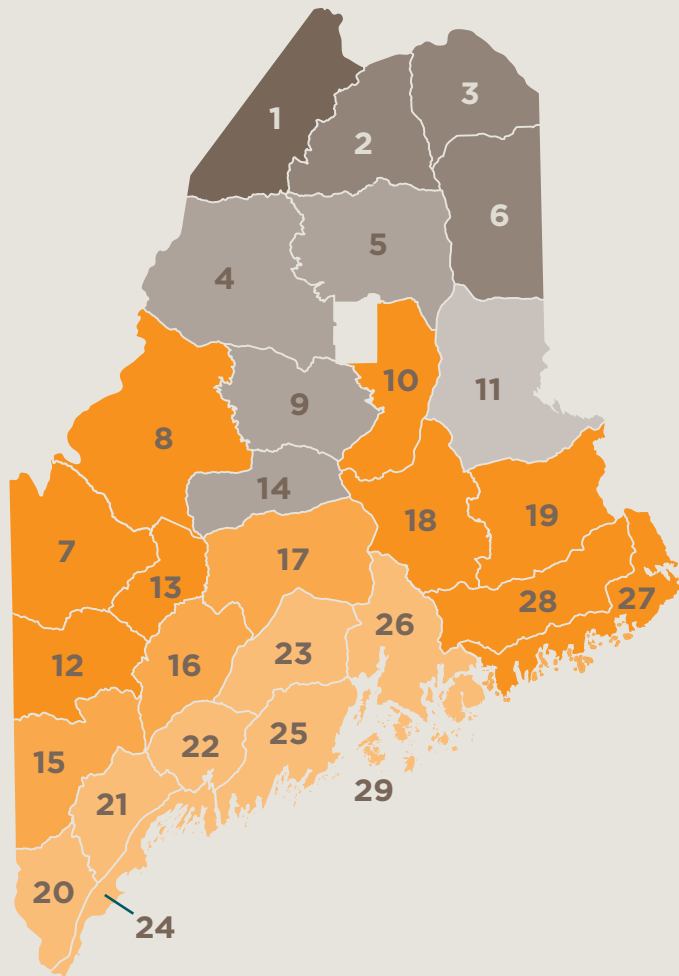
Objective: By 2005, reduce the current (2000) moose population by 1/3 while maintaining the sex ratio of at least 60:100 males to females.

WMDs 15, 16 and 17

Goal: Reduce moose/vehicle collisions.

Objective: By 2005, reduce the current (2000) moose population by 1/3.

Road Safety Management Area
WMDs 20 – 26 (in 2006 WMD 27 was partially incorporated in 26/28)

Goal: Reduce moose/vehicle collisions.

Objective: Reduce the moose population to the extent necessary to minimize the danger to motorists.

PROGRESS

Moose permits are allocated and adjusted annually to meet WMD goals and objectives. Over the last 15-year planning period, the season framework and permit structuring has changed, as have the metrics used to gauge population density, composition, and trends.

Recreational Management Area

Fourteen Wildlife Management Districts (WMD) comprise the recreational management area; including WMD 2 from 2000-2010. Five WMDs currently remain at population target, two are above population target, and seven are below target. The bull component remains adequate in nine units (1, 4, 5, 7, 9, 12, 13, 18 and 28), while three are low. We cannot measure bull characteristics statistically in two units.

Compromise Management Area

Seven WMDs comprise the compromise management area (WMD 2, 3, 6, 11, 15, 16, and 17). WMD 2 is at population target, while WMD 3, 6 and 11 have fallen slightly below target. WMD 15-17 do not have enough data to estimate parameters with. WMD 6 and 11 have an adequate bull component while WMD 2 and 3 are low. Again, three WMDs do not have data to estimate the bull component. A controlled moose hunt to reduce moose impacts on commercial broccoli and cauliflower crops was initiated in 2009 and has been successful in reducing crop damage (D. Hentosh, personal communication).

Road Safety Management Area

Moose harvest is very low in these WMDs. All management units within the Road Safety Management Area were opened within the 2000-2015 planning period. As stated previously moose-vehicle collisions have decreased during this planning period. Driver education, information disseminated throughout the Department of Transportation and Inland Fisheries and Wildlife as well as roadside mitigation activities have all likely contributed to decrease in moose vehicle collisions. Declines in moose numbers and distribution may also have contributed.

6.2 Regulatory Framework

Maine's current moose hunting framework divides the hunt into four timeframes, or seasons: a 6-day September hunt that typically occurs later in the month in 8 WMDs, a 6-day mid-October hunt that starts on Columbus Day in 19 WMDs, and a 6-day antlerless moose hunt that runs at the end of the month in 5 WMDs. In 2006, a month-long hunt in November that corresponds with the deer-firearms seasons was added in 6 WMDs, but has been scaled back over time and currently is open in 2 WMDs.

MOOSE PERMITS

Hunts are by permit only and are sex-specific, except for the November hunt, which is for any moose. Permits are allocated through an annual lottery, with 10% of permits for each WMD given to non-residents. The annual allocation of moose permits is related to the publicly-derived management goals for each WMD, and permit levels may change from year to year if significant changes occur in moose population trends, or population composition, or if management objectives are reached (Figure 2).

SPECIAL HUNTS

A controlled moose hunt to reduce the incidence of crop (commercial broccoli and cauliflower fields) depredation in selected towns was initiated in 2009. This has included nine towns in eastern Aroostook County from 2009 to 2016; additional towns have been added or removed over time due to crop field rotations and where crops are being grown in the current year. The hunt structure has been dynamic over time to provide improvements on the framework and program success. Since 2014, the controlled hunt has been restricted to Disabled Veterans, which has proven to be very successful at achieving harvest objectives while minimizing enforcement challenges.

6.3 Public Consultation – 2016 Key Findings

The public opinion survey conducted in 2016 indicated strong support for the Department's moose management program.

Sixty-three percent of the general public rated moose management as 'excellent' or 'good', with only 4% rating moose management as 'poor'. Respondents from the north/east region indicated the highest level of dissatisfaction, with 30% rating moose management as 'Fair' or 'Poor'. On a statewide basis, 49% of the general population felt that the moose population should remain the same, while 15% would prefer an increase and 4% would prefer a decrease. Of those that indicated they would like to see the population increase, 65% indicated they would reconsider if a population increase led to poorer overall health for the moose population. Ninety percent of the general population strongly or moderately approve of legal moose hunting. Thirty five percent of hunters of all types of game had pursued moose in the past 15 years, and 91% of those hunters were very satisfied or somewhat satisfied with their moose hunting experiences. Of those that were dissatisfied, 46% indicated there were too few moose, 17% indicated they could not get the appropriate permit, and 13% complained of hunter overcrowding or lack of access. Of hunters that did not pursue moose, 24% said they were not interested in hunting moose, 21% responded that they did not have enough time, 17% mentioned that moose hunting was too expensive, and 17% mentioned permits or restrictive regulations.

2016 MAINE SURVEY
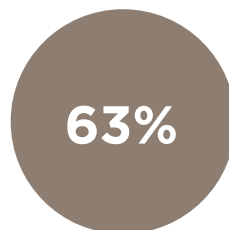
63%
OF MAINERS SEE MOOSE MANAGEMENT AS 'EXCELLENT' OR 'GOOD'
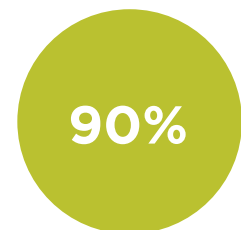
90%
OF MAINERS STRONGLY APPROVE OF LEGAL MOOSE HUNTING

PERCEPTIONS OF MOOSE POPULATION STATUS VARY BY REGION

When participants were asked to describe how Maine's moose population was doing, many felt that it had recently declined. Opinions on moose population trends varied among survey groups. In focus groups, it was common for people to perceive a decline in the moose population in most areas. Opinions were more wide-ranging in public meetings and forum comments. Similarly, opinions on whether more or fewer moose permits should be issued tended to vary substantially by district and region.

ANY MOOSE SIGHTING IS A GOOD ONE

There appeared to be little preference by moose viewers for one type of moose over another (e.g., big bulls or cows with calves). Survey results suggested that moose viewers would appreciate the opportunity to see moose of any kind. The potential economic impacts of tourism related to moose viewing appear to be widely recognized, as the topic was addressed throughout the survey groups, meetings, and forum comments. The availability of good habitat was also frequently mentioned as being necessary for viable moose viewing opportunities.

Perception that moose have been moving deeper into forests

The research suggests that the option to use ATVs may be one of the only ways to discourage moose hunting near roads—discussions on this topic in the focus groups underline how difficult moose carcasses are to move over any considerable distance. There is also some indication, based on comments in the focus groups and online forum, of a perception that moose are increasingly moving away from roads and deeper into forests.

LOTTERY SYSTEM CAN BE FRUSTRATING, BUT MOST HUNTERS STILL VIEW IT AS FAIR

While the moose permit application process was often described as frustrating for those who have applied numerous times and never been selected for a permit, few hunters appeared to favor changes to the current system. There appears to be more support for than opposition to the subpermittee system, and there is also appreciation for the current preference point system (note, however, that a few hunters in the focus groups communicated disbelief at having never been selected for a moose permit despite having an abundance of preference points). One idea for improving the current moose lottery system was to introduce a longer wait period for hunters who have previously been selected for a moose permit (i.e., requiring more time before they are eligible to apply again).

6.4 Management Issues and Threats

Moose remain one of the most sought-after species of Maine wildlife — for viewing and hunting. The moose is deeply appreciated by all for its imposing physical attributes, and moose remain ecologically, culturally, and economically important to Maine. The Department is responsible for the stewardship and management of this unique resource, and thus for collecting and analyzing information about moose population dynamics to ensure their conservation.

DATA FOR MOOSE MANAGEMENT

In the last 15 years metrics to assess moose abundance, composition, reproduction, and survival has improved with the increased availability of resources. Improved technologies and techniques to measure demographic attributes and assess ecological relationships allow for finer tuning of management decisions. For example, aerial surveys have allowed for a more precise understanding of moose numbers and population structure. With the re-establishment of moose hunting in 1980 and the continued demand for moose hunting permits that exceeds annual permit allocations, the importance of reliable data is as critical as ever.

Prior to 2008 the department depended heavily on deer hunter sightings of moose for assessing moose abundance and composition. These data were strongly correlated in New Hampshire (NH) with moose densities detected through FLIR (Forward Looking Infrared; Bontaites et al. 2000). However, deer hunting participation in western, northern and eastern areas of Maine have declined throughout this planning period negatively affecting the deer hunter survey and rendering it unreliable. In addition, other corollary data such as reproduction in moose had been scant since data on ovulation rates had not been collected since 1989 due to season timing.

In 2011, the department began aerial surveys to estimate moose abundance and composition. Moose seasons were pushed back to early October and additional seasons were added in September and October, this changed inhibited collection of reproductive data (ovary collection) until season framework changes occurred in 2010. These three sets of data provide information on abundance, composition, age/sex ratios and reproduction. Reproductive data provides an improved metric of moose population relative to biological carrying capacity (K). This is because reproduction in moose is tied directly to the body mass of adult cows. Adult cows must reach a minimum weight in order to begin ovulation. In areas of high moose densities and limited forage, reproduction in moose has been shown

to decline (Boer 1992a). Within the 2000-2015 moose management framework, yearling antler spread was determined to be the best predictor of moose abundance related to K after an evaluation of several biological characteristics measured at harvest (Adams and Pekins 1995). However, low sample sizes have precluded determining statistical significance for this metric during this time period. Andreozzi et al (2015) demonstrated that no statistically significant changes in bull physical characteristics have occurred in the last 30 years suggesting that changes in moose populations have not been influenced by lack of forage.

Since the start of moose hunting in New Hampshire (1988) and Vermont (VT, 1993) ovulation rates from corpora lutea counts have been used to examine annual productivity. These counts provide more biologically sound indications of a moose population related to K (Franzmann and Schwartz 2007). In relative terms ovulation rates alongside other readily collected reproductive parameters (i.e., cow weights), collected in NH, VT and ME provide an assessment of relative moose productivity among states. However, with current efforts underway to examine parasitism in moose, lowered productivity in moose appears to be obfuscated by the interplay of habitat quality and parasites.

WINTER TICKS AND CLIMATE CHANGE

Further complicating assessment of moose population dynamics has been the role of the winter tick and its impact on calf and adult survival. Information on the presence of winter tick on moose dates back to the 1930s; however, understanding how winter tick, internal parasites, environmental conditions, moose densities, and habitat interact and impact moose population dynamics continues to evolve regionally and across North America. The Department has collected various levels of data on moose disease dating back to the 1960s. Until the early 1990s, winter tick had not appeared to significantly impact moose. Increased reports of dead moose, especially overwintering calves, increased in frequency throughout the 1990s (1992, 1995, 1997, and 1999) as well as in 2001. However, it is not clear whether there was a real effect on specific sex and age classes, nor how widespread the distribution of this phenomenon was. In 2005, the Department and Unity College developed a technique to evaluate winter tick loads on hunter-harvested moose (Sine et al. 2009), recognizing the potential impact of winter ticks and the need to track annual changes in tick loads. At that time, it was recognized that parasite loads (i.e., winter tick and lungworm) might be a stronger limiting factor than available habitat (Morris update 2007). In

January of 2014, the Department, in collaboration with New Hampshire Department of Fish and Game and the University of New Hampshire, initiated a multi-year study to determine annual survival rates of adult female and calf moose. The project is closely examining causes of mortality, specifically the role of winter tick. This assessment hasn't been finalized, but preliminary (Year 3) results are showing significant differences in survival between calves and adults. Understanding how this will affect the dynamics and future conservation of moose will be critical to the next decade of planning and management.

MOOSE VIEWING

Few wildlife species in Maine are as iconic as moose; and considerable demand exists for viewing moose by Mainers and non-residents alike. Moose viewing is important to local economies as well as a common theme for business advertising in Maine. Moose viewing can serve as a stepping stone to the great outdoors by encouraging people to go outside and experience a part of nature that they may not ordinarily have the time or capability to pursue. There is evidence that the public wants more opportunity and means to view moose in many regions of the state.

To some extent, since moose health, abundance, and distribution are important to moose viewing, they also factor into to the public's impression of moose management in the state. It may seem intuitive that more moose translate into more viewing opportunity for the general public; however, other factors such as seasonal movements, habitat, and moose behavior also affect moose viewing success.

In addition, public moose viewing experience and knowledge is highly variable and affects viewing success. In regions of the state associated with moose viewing such as Rangeley, Greenville, Jackman, and Baxter State Park, concerns have been raised regarding moose abundance and population status. At times, this has appeared to conflict with moose hunting related to not only the timing of the hunt (e.g., during fall foliage season), but also in the perception of hunting as a cause of moose decline.

Current research on adult cow and calf survival is pointing to the detrimental effects of winter tick in western Maine on overwintering calves. This has decreased recruitment and ultimately moose numbers. However, moose densities themselves may be the biggest reason why winter tick has exerted such an influence on moose abundance; in other words, high moose densities have led to high rates of parasitism. Lower densities of moose are likely necessary

to reduce the rate and influence of winter ticks and other parasites and maintain a healthy moose population.

In the end, moose viewing success likely will be directly impacted by a reduction in moose numbers, but perceived changes in abundance may also may discourage pursuit of moose viewing opportunities.

VEHICLE COLLISIONS

Moose-vehicle collisions have decreased by approximately half since the late 1990s (Figure 2). Moose collisions can cause considerable damage to vehicles as well as bodily harm. The prior moose management system delineated Compromise and Road Safety Areas with the goal of reducing moose to some extent to minimize accidents. For more than two decades, MDIFW and MDOT have worked together to minimize and mitigate large animal collisions through education, signage, lighting and management of the road prism. These efforts have been aimed at increasing driver awareness, and where feasible, altering the physical environment to reduce moose-vehicle collisions (e.g., draining salt licks, altering roadside drainage, hardening drainage areas). MDIFW has altered moose permits in some areas to potentially reduce moose numbers and ensuing collisions. Information from radio collar studies shows that despite changes in moose abundance, animals can travel large distances and still become involved in an accident. There is no clear evidence that reduction of moose abundance affects the number of moose-vehicle collisions in a given area; however, statewide declines in moose-vehicle collisions imply that changes in moose abundance are a reasonable result of this dynamic. The moose planning subcommittee agreed that future harvest goals and objectives would not include altering permit numbers to

address road safety since the cause and effect relationship is nebulous. The subcommittee agreed that other methods currently being undertaken by MDIFW and MDOT are the most appropriate way to address moose-vehicle collisions.

HUNTER SATISFACTION

The majority of hunters are satisfied with moose hunting and the current moose hunting system (permit type, season length, season timing). Since the beginning of the modern moose hunt in 1980, hunter selection has been by lottery. Thus, hunters have been cognizant of moose hunting as being a limited commodity that is in high demand. Through the years, there have been many changes to moose hunting season timing, permits and structure as well as how the lottery is operated. Depending on changes in moose permit numbers over time, there will continue to be issues and problems surrounding the lottery system and who gets to hunt. While hunter satisfaction remains important to the department and implementation of the moose hunting framework, the department is limited in its ability to make changes. Much of this is due to legislative activism surrounding the moose lottery and who gets to hunt, as well as the administration of the lottery. Changes in moose abundance, distribution, and overall health, as well as hunters' perspectives on moose hunting – which tend to vary - will continue to provide administrative and hunter-satisfaction challenges and opportunities.

Moose Management Goals, Objectives 2017-2027

Moose Management Goal #1:
Maintain a healthy, sustainable moose population while providing hunting and viewing opportunities

Goal #1

Background

The Department has been largely successful in achieving the goals of the 2000-2015 moose management plan, which balanced viewing and hunting opportunity with vehicle collision prevention. Collection of detailed biological data on moose population abundance, health, and reproduction have guided the determination of hunting permit numbers for antlered and antlerless moose, helping to ensure healthy age structure and sex ratios. However, as Maine moves into a new horizon for moose management, impacts of winter tick, a warming climate, changing forest practices, and new information on moose health have resulted in some uncertainty for moose in the state. Anecdotal reports and rates of vehicle collisions suggest that moose populations have declined from highs in the early 2000s, yet aerial surveys indicate that moose densities are still relatively high in some WMDs. Over time, hunting permit numbers have not been high enough to significantly impact moose population trends, indicating that other factors are likely driving moose population dynamics.

Despite recent declines in moose numbers in some areas, ongoing (but preliminary), research suggests that moose densities may still be at a level that results in high tick numbers, leading to high over-winter calf mortality and depressed reproduction. Until the question of whether winter tick densities can be reduced by lowering Maine's moose densities is answered by the research, the most prudent management approach is to attempt to stabilize moose populations. This approach should include careful management of the age and sex structure of the population to meet social desires for viewing and hunting, including the issuance of antlerless permits in WMDs, where positive population growth occurs.

Objectives

We'll know we've achieved moose management goal #1, to maintain a healthy, sustainable moose population while providing hunting and viewing opportunities, if we:

1. Stabilize the moose population in the core of its range (i.e., WMDs 1-11 and 19).

2. Manage WMDs 1 and 4 for bull:cow ratios of 30-50 bulls:100 cows in order to increase opportunities for harvest while ensuring healthy reproductive rates

3. Manage all other WMDs in core moose range (2,3, 5-11 and 19) for an older bull age structure and bull:cow ratio of 50-70 bulls: 100 cows in order to provide opportunities to harvest and view mature bulls while ensuring at least 17% of the population consists of bulls older than 4 years of age.

4. Refine the moose management system to allow adjustments to moose population size based on measures of moose health or density.

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, and policy activities:

RESEARCH AND MONITORING

1. Continue to monitor moose abundance using aerial surveys, registration and biological data, and trend indicators such as the moose hunter survey and roadkill index (Ongoing; High Priority)

2. Continue to monitor moose reproductive rates and the age and sex structure of the population using the best available data, such as aerial surveys, corpora lutea counts, and cementum annuli (Ongoing; High Priority)

3. Continue annual winter tick counts at moose registration stations (Ongoing; High Priority)

4. Continue to identify and examine incidental reports of moose mortalities (Ongoing; Moderate Priority)

POLICY AND REGULATIONS

1. Continue to harvest female moose as needed to prevent population growth and provide hunting opportunities. (Ongoing; High Priority)

2. Discontinue issuing permits for the Southern Maine Moose Hunt (WMDs 22, 23, 25, and 26) while continuing to monitor vehicle collisions and other moose-human conflicts. (New; Moderate Priority)

3. Explore the possibility of implementing a calf-only hunting season in order to provide additional hunting opportunity while minimizing impacts on moose population growth (New; Moderate Priority)

4. Require the submission of ovaries for adult female moose, and canine teeth for all moose (Ongoing; High Priority)

Goal #2

Moose Management Goal#2:
Continue researching the relationships between moose, parasites, habitat condition, climate, and management.

Background

As the Department attempts to stabilize moose populations near current levels, it must continue to invest in state-of-the-art research to determine the impacts of parasites, climate, and habitat on moose population dynamics in order to inform management in the future. Although the majority of public survey respondents indicated they would prefer that moose populations stay near current levels, a strong majority also felt that moose health should be one of the primary drivers of management decisions. Compared to deer, very little information exists on the relationship of various moose health parameters and environmental factors. Because Maine moose live in an environment largely free of natural predators (with the rare exception of black bears), aspects of their population dynamics may be vastly different from the majority of moose range in North America, where predation by wolves provides a strong limiting influence. South of the St. Lawrence Seaway, winter ticks may play a more important role in limiting moose population growth.

Objectives

We'll know we've achieved moose management goal #2, to continue researching the relationships between moose, parasites, habitat condition, climate, and management, if we:

1. Develop an improved understanding of moose mortality and population dynamics
2. Develop an improved understanding of the effects of parasite loads on moose reproduction and calf survival, and how parasite loads may vary with moose densities and habitat conditions.
3. Develop an improved understanding of winter tick ecology, especially the relationship between winter tick population dynamics and environmental variables.
4. Develop an improved understanding of the impacts of moose browse on forest regeneration.

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, and outreach activities:

RESEARCH & MONITORING

1. Continue collaborative efforts with New Hampshire Fish and Game, the University of New Hampshire, and the Vermont Fish and Wildlife Department to investigate the impacts of parasites and other factors on moose population dynamics. (Ongoing; High Priority)

2. Establish an experimental management unit in which moose density would be reduced to determine whether impacts of winter tick can be reduced by lowering moose densities. Recommended location: WMD 4. (New; High Priority)

3. Continue work with the Cooperative Forestry Research Unit at the University of Maine to study the impacts of moose browsing on forest regeneration (Ongoing; Moderate Priority)

COMMUNICATION & OUTREACH

1. Provide information to hunters regarding the importance of moose biological data collection (Ongoing; High Priority).

2. Encourage moose hunters to target specific areas where moose browse pressure is high (Ongoing; Moderate Priority)

Moose Management Goal #3:
Ensure public satisfaction with Maine's moose population and increase the public's understanding of moose biology, ecology, and management

Goal #3

Background

Continued public support and understanding of moose biology, ecology, and interaction with humans is crucial to management in Maine. Since a strong majority of public survey respondents indicated that moose health should be a driving factor for moose management, it is important to continue to provide education and outreach to both the public and hunting community. These efforts should include, current Departmental management activities, results from on-going research, advancements in tools and techniques in moose management. Similarly, any changes in hunting opportunities, season framework, permit lottery system should be clarified and disseminated to the hunting community, in order to maintain high satisfaction of moose hunting in Maine. Some of these changes may be in conflict with moose viewing opportunities, so additional outreach for viewing options should be explored and executed.

Objectives

We'll know we've achieved moose management goal #3, to ensure public satisfaction with Maine's moose population and increase the public's understanding of moose biology, ecology, and management, if we:

1. Minimize agricultural conflicts with moose and the number and severity of moose-vehicle collisions.
2. Increase viewing opportunities for moose.
3. Maintain a world-class moose hunt in Maine's core moose range
4. Clarify and improve moose hunting regulations to ensure a legal and ethical moose hunt
5. Maintain or increase current levels of satisfaction by moose hunters in core moose range

Management Strategies

Our plan for achieving this goal involves the following policy and outreach activities:

POLICY & REGULATIONS

1. Maintain, and where appropriate expand, special hunt opportunities to manage moose involved with crop depredation (Ongoing; Moderate Priority)

2. Consider adjusting the current hunting season framework so there is always one week between the September season and first October season. (New; Moderate Priority)

3. Expand the September season to additional WMDs by splitting the annual permit allocation of antlered moose to increase ability to call bulls and minimize conflicts between hunters (New; High Priority):

   • Open a September hunting season in WMDs 10, 11, 18, 27, and 28

   • Engage stakeholders to gauge impact/feasibility of opening a Sept season in other WMDs (7-9, 12-14, 17)

4. Adjust the definition of bull and antlerless moose such that 'antlerless moose' means a moose without antlers, and 'antlered moose' means a moose with antlers (New; High Priority).

5. Resolve the discrepancy between statute and rule on legal hunting hours and provide consistent hunting hours (½ hour before sunrise to ½ hour after sunset) across seasons (New; High Priority)

6. Combine WMDs 27 and 28 when issuing permits to allow hunters to pursue moose in either WMD (New; Moderate Priority).

7. Convene a committee to review the structure of the moose lottery and identify opportunities for improvement, including timing of the lottery, mandatory wait time between permits, and indicating preferences for permit type and season (New; Moderate Priority).

Goal #3

COMMUNICATION & OUTREACH

1. Develop a strategic outreach plan for moose and use the MDIFW Communication Program to disseminate key messages to the public (New; High Priority)

2. Work with partners, including guides, outfitters, and organizations, to improve education and outreach (Ongoing; Moderate Priority)

3. Conduct annual stakeholder meetings with representatives from the moose hunting community, moose viewing communities, and landowners (New; Moderate Priority)

4. Produce annual press releases, to be released during peak movements, warning motorists of increased potential of moose collisions (Ongoing; Moderate Priority).

5. Continue current efforts with the Maine Department of Transportation and the large animal crash group to reduce the rate of moose-vehicle collisions (Ongoing; High Priority)

6. Develop a guide, dedicated web page, and social media products to encourage the public to view moose (New; High Priority).

7. Provide technical assistance to landowners and communities on habitat management strategies to enhance moose viewing (New; Moderate Priority)

8. Explore the development of cooperative land management areas, and moose viewing platforms or other infrastructure to facilitate moose viewing through a collaboration between landowners, Maine Tourism, and MDIFW (New; Moderate Priority)

9. Encourage hunting further from roads and provide information on how to extract moose from remote locations (New; Moderate Priority)

10. Update the moose hunter guide by streamlining content and improving readability (New; Moderate Priority)

11. Maintain satisfaction of landowners and hunters for current hunter densities (hunters/mi2), and if necessary, work to reduce conflicts (Ongoing; Moderate Priority)

6.6 Expected Outcomes for Moose Management

Implementing the moose management strategies outlined in this plan will require adequate staffing, funding, and public support. It may not be necessary or feasible to implement all strategies in order to achieve the goals and objectives outlined in the plan. If MDIFW and its partners are successful in managing moose over the next 10 years, the following outcomes are anticipated:

- The percentage of the public rating the management of moose as 'excellent' or 'good' increases to 70% by 2022
- Public support for legal moose hunting remains above 90%
- Public support for the harvest of female moose increases to greater than 75% by 2022
- Statewide moose hunter satisfaction remains above 90%
- Statewide moose-vehicle collisions are minimized
- Submission of moose hunter surveys and ovaries from antlerless moose increases 50% by 2022
- The percent of the public that feels they know a great deal or moderate amount about moose increases by 10% by 2022
- MDIFW improves its understanding of the role of winter ticks and moose density in annual adult cow and calf survival rates
- Management actions are implemented to stabilize or decrease winter tick effects on moose mortality
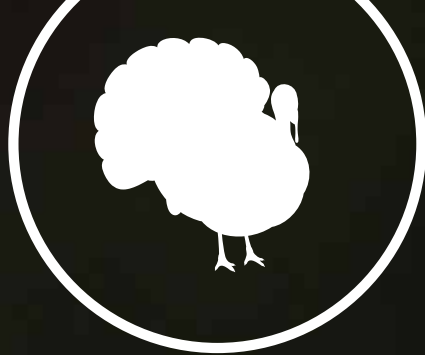
7.0 TURKEY

7.1 History and Population Status

Based on the writings of early naturalists, wild turkeys historically occupied the southern portion of Maine until the early 1800s. Records indicate that populations were concentrated in York, Cumberland, and Oxford counties, but were reported as far east as Mount Desert Island in Hancock County. It is not known how far inland the wild turkey population ranged. Reductions in the amount of forest land due to intensive clearing of the land for farming and unrestricted shooting were probably the two most important factors leading to extirpation of native wild turkeys in Maine. The reversion of thousands of acres of farmland back to wooded habitat, and present day agricultural practices, enhanced prospects for reestablishing wild turkeys into and beyond their former range.

Attempts to reintroduce wild turkeys to Maine began in 1942 when the Department released 24 captive-raised birds on Swan Island in Sagadahoc County. These birds were fed in the winter and the last bird from this population was reportedly seen in 1946. In the 1960s, fish and game clubs in Bangor and Windham made similar attempts to re-establish turkeys into their areas using imported birds raised from part wild and part game-farm stocks. Neither of these attempts resulted in sustainable populations of wild birds.

Responding to requests from fish and game clubs and individual Maine sportsmen, and encouraged by successful reintroduction programs in Vermont and New Hampshire, the Department began planning its own contemporary reintroduction program in the mid-1970s. The goal of the program was two-fold: to establish wild turkeys in the coastal portion of the state where they historically lived; and to establish another big game species for Maine hunters.

The first step was to locate a source of wild birds. Fortunately, biologists from Vermont were willing to supply Maine with birds from their wild stocks. York County was chosen as the initial release site because of its vast wooded habitat, good supply of mast-producing trees (beech and oak), and generally mild winters. In 1977 and 1978, Vermont Fish and Game staff trapped 41 wild turkeys. These birds were transferred to Maine biologists and were released in the towns of York and Eliot. By the early 1980s, the York County wild turkey population had become large enough to serve as a source of birds for new release sites in Maine. In the spring of 1982, 33 birds were captured in York County and released in Waldo County in an attempt to establish a wild turkey population in mid-coast Maine.

In 1985, the first Wild Turkey Assessment was written with well-defined goals and objectives for restoration. One key to the restoration program was the establishment of a trap and transfer program whereby turkeys were trapped and released within 10-15 miles of known populations. This eliminated the creation of island populations of birds that did not expand well. These in-state trap and transfer efforts were augmented by the release of 70 turkeys trapped in Connecticut in the winter of 1987/1988. Since that time, as interest in the program increased, the Department has committed significant time and money to this successful program. Wild turkeys continued to be trapped and transferred into the northern and eastern portions of Maine until 2012. In 2012, the Department ceased trap and transfer efforts in response to an avian pox virus outbreak where the risk of spreading virus was considered too great. Today, wild turkeys can be found in significant numbers in southern, central, and eastern Maine. Elsewhere, smaller concentrations of wild turkeys can be found as far north as Aroostook County.

POPULATION MONITORING

A number of wild turkey population monitoring techniques have been evaluated in the past. Unfortunately, many of these techniques were deemed unfeasible given personnel time and funding limitations. Current population data collection consists of mandatory registration of harvested wild turkeys during both the spring and the fall wild turkey hunting seasons. The Department uses harvest registration information as an index to the turkey population, and a population estimate is generated by simply multiplying the registered spring harvest by 10 (Healy and Powell 1999). This method is formulated from past population and harvest studies, and is recognized by the Northeast Upland Game Bird Technical Committee as a quick "rule of thumb" when accurate harvest data exist. Today, based on recent harvest data, the wild turkey population is estimated to be between 50,000 and 60,000.

In addition, the Department monitors annual wild turkey productivity by collecting observations of wild turkeys and wild turkeys with poults during the month of August. These data provide an index of annual productivity by calculating the ratio of poults per hen observed in brood flocks (Figure 1). This effort was initiated by the Northeast Upland Game Bird Committee in response to a charge given by the Northeast Association of Fish and Wildlife Agencies to investigate regional trends in wild turkey populations across the Northeast.

REGULATORY AUTHORITY AND HUNTING SEASON

In 1955, a statute was passed and approved which reads as follows, "there shall be no open season on wild turkeys except that beginning in 1960 there shall be an open season on wild turkeys beginning October 13 for a period of 15 days, Sundays not included. During the open season, no person shall take or kill more than one wild turkey, of either sex, in any one day or have more than one in possession at any one time (1955, C. 297)". The term "wild turkey" referred to game farm birds whose populations the Department and sportsmen hoped would increase in the wild. This section was repealed in 1959, and then there is no mention of wild turkeys in the Inland Fish and Game Laws until 1972 when Sec. 1960-A listed wild turkey as an upland game species over which the Commissioner was given regulatory authority. The regulation adopted at this time provided no open season for hunting or trapping of turkeys. Successful wild turkey restoration with associated population growth and establishment of a hunting season were not realized because the game farm birds did not increase in numbers in the wild.
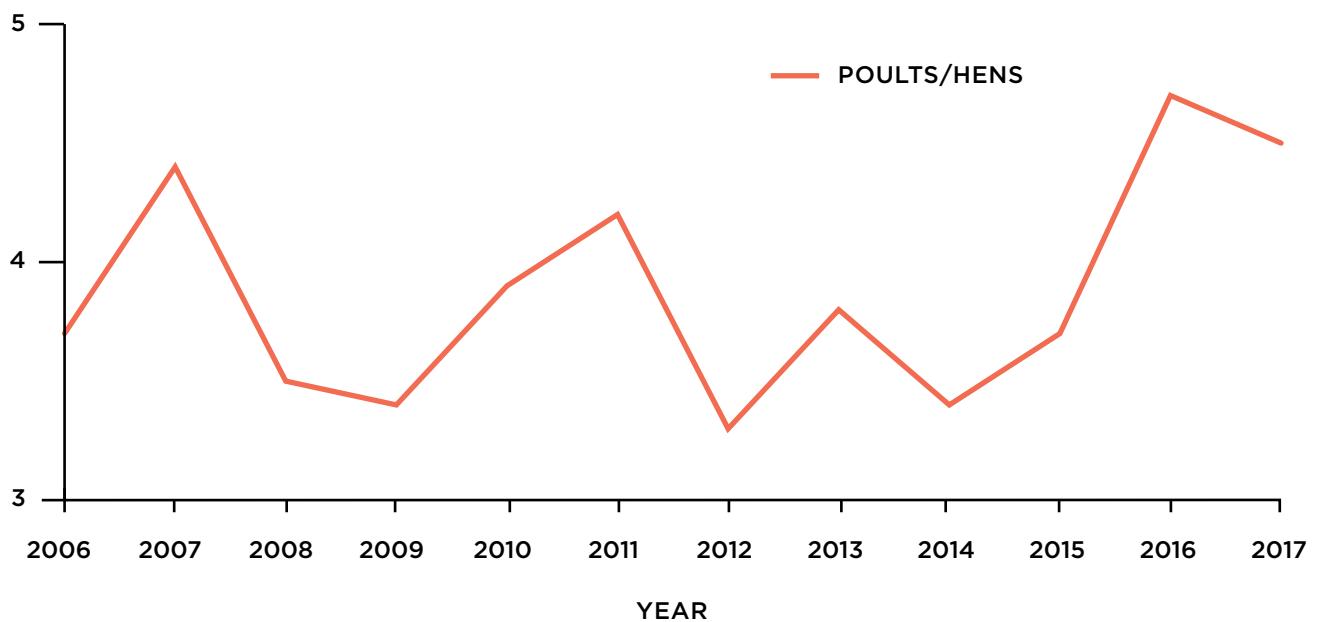

Figure 1. The average number of wild turkey poults seen per hen in August from 2006 to 2014.

Following the initial restoration efforts, the Department believed the turkey population had grown enough by 1986 to support a limited spring hunting season in York County. That year, 500 turkey hunting permits were issued and nine wild turkeys were taken. The conservative approach of limiting the number of turkey hunters each year was maintained into the late 2000s (Table 1). Using criteria in the 2002 Wild Turkey Management System related to established reproduction and an increasing population within a Wildlife Management District (WMD), additional WMDs were gradually opened to a spring hunting season. If the spring harvest in a particular WMD reached 0.5 turkeys taken per mi² of habitat, a fall season was initiated with a conservative two-week archery season. At 0.75 turkeys harvested per mi² of habitat, a one-week shotgun season was added. Lastly, if a spring harvest of 1.0 turkey harvested per mi² of habitat was achieved, the archery season was increased to four weeks.

Because Maine's wild turkey conservation and management program has been so successful, wild turkeys now thrive in much of Maine. Even in areas where wild turkeys were historically sparse or non-existent, wild turkey populations thrive today. We have learned that individuals who feed birds often place additional food for wild turkeys. Grain in the harvested silage of dairy farms remains an important food supplement during the winter and likely aids survival. With the robust wild turkey population, management of nuisance turkeys was incorporated into the Department's Nuisance Wildlife Policy. Beginning around 2010 and on a nearly annual basis, several legislative bills have been sponsored in response to abundant wild turkey populations. These efforts were designed to both reduce wild turkey conflicts and increase hunting opportunity. As a result of these legislative actions, wild turkey permit fees were reduced, bag limits were liberalized, and fall hunting seasons were extended.

2000-2016 GOALS AND OBJECTIVES

The first Wild Turkey Assessment was written in 1985 and an update was written in 2000 and approved by the Advisory Council that year. The 1985 - 2000 goal was to increase wild turkey populations in areas of suitable habitat and increase hunting opportunity. This was achieved by the time the Management System was updated in 2002 which modified the goal to increase the size and distribution of wild turkeys in all suitable habitat in Maine. Several objectives were established to accomplish this new goal. These included: (1) increasing the size and distribution of turkeys by 2010, (2) providing unlimited spring hunting without compromising hunt quality, (3) developing a component of the Department's Nuisance Wildlife Policy to address wild turkeys, (4) implementing a limited fall hunting season, and (5) developing a cooperative (ongoing) habitat improvement program between landowners, the Maine Chapter of the National Wild Turkey Federation (NWTF), and the Department.

At the time of the drafting of this new management plan, wild turkeys can be found in all Maine counties with viable, reproducing populations. In addition, each of the five objectives listed above are considered met. For objective 1, as stated, the wild turkey population has expanded to all Maine counties. For objective 2, an unlimited spring hunt was instituted in 2007. The success of the unlimited spring hunt has been good with harvest success rates of 30% and low interference rates among hunters. To address objective 3, the Department has incorporated addressing nuisance wild turkeys into its Animal Damage Control policy. For objective 4, a limited fall hunting season was opened in the fall of 2002 and has expanded conservatively since that time. For objective 5, the Department has worked with the NWTF on a number of habitat improvement projects both on public and private lands.

Table 1. Accomplishment time line for wild turkey conservation and management (1977 to present).

| YEAR	MANAGEMENT ACTION
1977	Reintroduction of 41 truly wild turkeys from Vermont
1982	In-state trap and transfer began. Birds moved to Waldo County.
1985	Wild Turkey Assessment written; goals and objectives established for 1985-2000
1985	In-state trap and transfer protocol established
1985-87	Wild Turkey reproductive ecology study conducted by Beatrix Treiterer
1986	First limited hunting season in 1986
1987	70 additional birds trapped and transported from Connecticut
1988	Memorandum of Understanding between IFW and NWTF signed
1989	UMO survey of Maine turkey hunters conducted
1991	Began rule making effort to eliminate allowing pen-raised wild turkeys in captivity
1992	Expanded hunting zone to include Cumberland County
1995	Number of hunting permits expanded
1996	Number of hunting permits expanded, north/south hunting zones established
1997	Number of hunting permits expanded
1998	Number of hunting permits expanded; hunting by WMD's, zone expanded
1999	Number of hunting permits expanded;
2000	Number of hunting permits expanded
2000	Wild Turkey Assessment updated
2001	Wild Turkey Management Goals and Objectives established for 2000-2015
2001	Number of hunting permits expanded; A/B seasons established
2002	Number of hunting permits expanded; 2-week fall archery season established
2002	IFW Nuisance Wildlife Policy adapted to specifically address Wild Turkeys
2003	Number of hunting permits expanded; Electronic calls legal, Landowner privilege
2004	Number of hunting permits expanded, 5-week season, zone expanded, Youth Day
2005	Number of hunting permits = number of hunters
2006	Unlimited hunt, zone expanded; 4-week archery season in some WMDs
2006	Southern Aroostook Wild Turkey Working Group established
2007	Fall 6-day shotgun season established
2008-09	Wild Turkey/blueberry depredation study conducted by UMO graduate student Janice Huebner
2009	A/B spring hunting season structure removed; archery zone expanded
2010	Bag limits changed; 1 bird spring & 1 bird fall; additional spring bird $20, youth no longer require a turkey permit
2013	Fall season extended to month of October
2014	Spring season open all day (changed from noon time), combined spring/fall turkey permit for $20 to include 2 bearded turkeys in the spring and 2 turkeys (either sex) in the fall

7.2 Regulatory Framework

CURRENT HUNTING SEASON DETAILS

As of March 2017, turkeys may be hunted throughout the state during a 5-week spring season, and in certain WMDs during a 37 day fall season. A 'Youth Day' precedes the opening day of the spring season, and allows junior hunters a special opportunity to pursue birds prior to the start of the regular season. The spring season is limited to turkeys with beards (typically males), while turkeys of any age and either sex may be harvested during fall. In northern Maine, the spring season is split into an 'A' and 'B' season in order to spread out hunting pressure on the relatively small turkey population in this part of the state. Up to two wild turkeys may be harvested during each season, but an individual WMD bag limit cannot be exceeded. A separate turkey hunting permit is required in addition to either a regular hunting license or a small game hunting license. Various groups are exempted from the turkey permit requirement including certain landowners, apprenticeship hunting license holders, junior hunting license holders, and lifetime license holders age 70 and older.

ALLOWABLE TECHNIQUES/METHODS AND BAG LIMITS

During spring, most hunters use a traditional 'sit and call' approach, where turkeys are located and then drawn to the hunter with the use of calls and decoys. Turkey hunters use a variety of techniques in the fall, and it is suspected that a significant portion of the harvest during this season is 'incidental' to the hunting of other species. The use of dogs to assist in the hunt is legal during the fall, but not the spring. It is illegal to shoot a turkey while it is in a tree. Shotguns are limited to certain gauges and types of ammunition; rifles are prohibited. Harvested turkeys must be presented to a registration station by the hunter who killed the bird. Fall and spring wild turkey harvests from 2005 to 2015 are shown in Figure 2. Included is the estimated number of spring wild turkey hunters during the same time period. Turkey bag limits vary by WMD and season, with most WMDs in southern and central Maine open to the harvest of two bearded turkeys in the spring, and two turkeys of either sex in the fall.

FALL HARVEST
SPRING HARVEST
NUMBER OF TURKEY HUNTERS
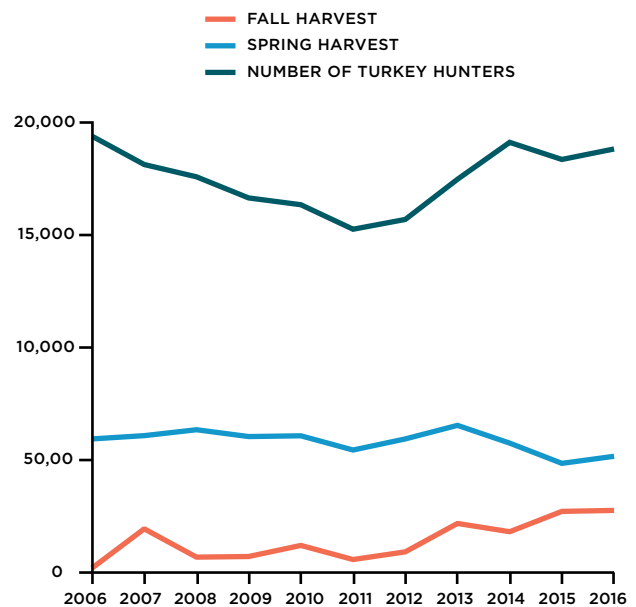
*From 2005 to 2009 spring wild turkey hunter numbers are from individual turkey hunter permits sold. 2010 – 2015 include adult permits sold plus an estimated 2,500 youth (under 16) wild turkey hunters.

EXCEPTIONS FOR CONFLICTS

Similar to most other wildlife species in Maine, a person may kill any wild turkey if the turkey is in the act of attacking, harassing, or wounding domestic animals or destroying property. In addition, the owner of an orchard or crop (except grass, clover, and grain), may kill wild turkeys within the orchard or crop when substantial damage is occurring. A person may also allow other individuals to kill wild turkeys that are causing substantial damage, subject to approval by a Game Warden. Anyone who kills a turkey under these provisions must notify a Game Warden within 12 hours, and must salvage the meat for consumption.

7.3 Public Consultation –2016 Key Findings

PUBLIC APPROVAL FOR TURKEY HUNTING IS HIGH

Public ratings on the effectiveness of MDIFW's turkey management program were moderate, with approximately 50% of the general public, landowners, and hunters responding that turkey management in Maine was 'excellent' or 'good'. Most respondents (>50% for all survey groups) indicated that turkey populations near their home should remain the same. 27% felt turkey populations should decrease and 8% felt the population should increase. Turkeys were tied with deer as the second most commonly reported species involved in conflicts, with 9% of landowners responding they had experienced problems with turkeys within the past two years. All survey groups indicated strong support for legal turkey hunting, with 93% of the general public expressing strong or moderate approval. Of those that had hunted turkeys in the past 5 years, 92% were somewhat satisfied or very satisfied with their experience, with no apparent differences among regions of the state. Hunters that had not pursued turkeys within the past 5 years were either not interested (29%), didn't have enough time (24%), or were held back by complex regulations and/or permit requirements (14%). In the northern/eastern region, 20% of hunters indicated that turkey hunting opportunities were too far away.

FOCUS GROUPS AND PUBLIC MEETINGS ADD MEANING TO THE DATA

Efforts to gauge public attitudes towards turkeys may help explain some of the patterns observed in the public survey. Most people in the focus groups and public meetings appeared to agree that Maine's turkey population has greatly increased in recent years, although the online forum saw a wider range of opinion on this (again, comments suggest that perceptions about the population vary considerably by area).

Similarly, while only a minority of people in the focus groups and public meetings expressed a need for more turkey hunting seasons, the online forum saw a fair number of comments addressing the need to expand turkey hunting opportunities (suggestions in the forum included moving up the opening date of the hunting season, lengthening the season, dropping the turkey permit fee, and increasing turkey bag limits). Regarding basic interest in turkey hunting, a number of people commented that it may be difficult to get more Mainers interested in hunting turkey due to the fact that turkey is not a traditional species of the state (one person described this as a "cultural gap" with the species).

Others, particularly some who left comments in the turkey management online forum, asserted that the permit fee is a disincentive to turkey hunting.

7.4 Management Issues and Threats

PUBLIC AWARENESS AND TOLERANCE FOR TURKEYS

Most Maine residents are satisfied with the current size of the turkey population, but unlike any of the other big game species addressed in this plan, a significant portion (~30%) feels that the wild turkey populations should be reduced. Issues such as property damage caused by wild turkeys and perceived negative interactions with other wildlife species contribute to this group's perspective. However, the difference between realized issues and perceived issues can be vast. Wild turkeys are one of the more conspicuous wildlife species in Maine. They are seen at all times of the day in many different environments, and people often form their opinions because they see them present, but not necessarily causing direct damage. A significant challenge going forward will be informing the public about the misconceptions of wild turkey impacts and behavior.

HUNTING PARTICIPATION

Wild turkey hunting is a somewhat popular activity with an average of 18,000 spring wild turkey hunters in Maine each year. The Department feels that the wild turkey population can support additional harvest in both the spring and fall in certain WMDs and would like to increase hunter participation in both seasons. The number of spring wild turkey hunters has remained relatively stable over the last 5 years, with some fluctuation, but does not show an increasing trend overall. Increasing hunter participation will be required before harvest can be used as a tool to effectively control or reduce the wild turkey population in WMDs where that may be desirable.

POPULATION MONITORING

As the wild turkey population increases, the Department needs to improve our ability to monitor it. For many years the Department has been using the spring harvest as an index to track statewide trends in wild turkey numbers. This method may not be as reliable in tracking the population at finer scales such as individual WMDs. Several factors have an influence on the wild turkey population, including harvest, weather, productivity, hunter effort, and disease. As we move forward in our efforts to stabilize the wild turkey population in southern and central Maine, we will need more rigorous methods to track population changes over time. This is a major component of the new management plan.

Wild Turkey Management Goals, Objectives, and Strategies - 2017-2027
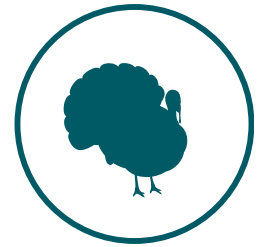
Turkey Management Goal #1:
Maintain a healthy, sustainable turkey population that provides opportunities for hunting and viewing, while also allowing turkeys to continue expanding into portions of northern, eastern, and western Maine.

Goal #1

Background

After several decades of population growth and expansion, Maine's wild turkey population is now distributed nearly statewide, and most suitable habitats in southern and central Maine are fully occupied. Although the Department's turkey management program has long reflected the species' evolving status within the state, over the next 10 years the Department will need to shift its focus from facilitating turkey population growth to managing an abundant, established resource. In southern and central Maine, turkey populations are now at levels where they may experience density-dependent impacts from competition or disease, requiring careful monitoring of health parameters to ensure the population remains healthy. Turkeys are also responsible for conflicts with landowners, and population management should include steps to substantially increase turkey harvest in WMDs that are experiencing significant public complaints, with the goal of reducing population size to socially acceptable levels. Opportunities for turkey hunting can likely be expanded in much of the state, however this will require new methods to estimate population trends and determine harvest sustainability at a regional level. Intensively managing turkeys to meet public expectations will require the continued collection of accurate and reliable harvest data, and may require additional data on population health and social tolerance. In some parts of northern, western, and eastern Maine, turkeys are still in the process of colonizing suitable habitats, and a conservative management framework should continue in these areas to allow population growth.

Objectives

We'll know we've achieved wild turkey management goal #1, to maintain a healthy, sustainable turkey population that provides opportunities for hunting and viewing, while also allowing turkeys to continue expanding into portions of northern, eastern, and western Maine, if we:

1. Develop and implement reliable methods to monitor wild turkey population trends.
2. Improve the quality and availability of wild turkey harvest data.
3. In WMDs 15-17, 20-26 and 28, stabilize wild turkey populations below biological carrying capacity and at socially acceptable levels.
4. Increase the size and distribution of turkey populations in WMDs 1-14, 18, 19, and 27.

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, policy, and outreach activities:

RESEARCH & MONITORING

1. Explore turkey population models (SAK, harvest removal, etc.) that incorporate variables such as weather, productivity, harvest, sex, age, natural mortality, disease and other factors (New; High Priority)

2. Identify novel approaches to track the turkey population and monitor the impacts of turkey harvest on population trends on a regional basis (New; High Priority)

3. Identify biological metrics to assess the relationship between turkey population levels and biological carrying capacity (Ongoing; High Priority)

POLICY & REGULATIONS

1. Refine the turkey management system to adjust harvest of female turkeys during fall by altering bag limits and season lengths in response to information on turkey population trends and weather conditions (Ongoing; High Priority)

2. Support legislation that would give the Department the ability to alter bag limits and season frameworks through rulemaking (Accomplished 2017)

3. Gather age information from a sample of harvested turkeys to correct age reporting by hunters (Ongoing; Moderate Priority)

4. Continue the current prohibition on long-distance trap and transfer to reduce the possibility of disease transmission among turkeys in different regions of the state (Ongoing; Moderate Priority)

5. Maintain a conservative fall hunting season framework in northern, eastern, and western Maine to allow turkey population growth (Ongoing; Moderate Priority)

6. Conduct regional, short-distance trap and transfer to address conflict situations and establish or bolster turkey populations in habitats within northern, eastern, and western Maine (Ongoing; Moderate Priority)

7. Identify locations with suitable unoccupied turkey habitat in northern, eastern, and western Maine where the public supports establishment of turkeys (Ongoing; Moderate Priority)

Turkey Management Goal #2:

Ensure public satisfaction with the turkey population

Background

Turkeys are highly visible; and for most Mainers, they are a relatively new occurrence on the landscape. When coupled with concerns related to perceived negative impacts on other wildlife and the occurrence of localized but occasionally severe conflicts with landowners, it's not surprising that a small but significant percentage of residents feel that turkey populations should be reduced. Although implementing more intensive population management may be effective at locally reducing turkey abundance in some situations, improving public satisfaction with turkeys will depend on effective, targeted conflict response programs, as well as public education programs implemented under Goal #4. Ongoing public surveys will also be required to assess public attitudes towards turkeys.

Goal #2

Objectives

We'll know we've achieved wild turkey management goal #2, to ensure public satisfaction with the turkey population, if we:

1. Improve the Department's ability to track wild turkey conflicts.
2. Provide information to landowners on methods to reduce wild turkey conflicts.
3. Increase hunter effort and opportunity in areas with high levels of landowner conflicts to reduce local populations.
4. Maintain the quality of the turkey spring hunt as measured by safety and levels of hunter interference.
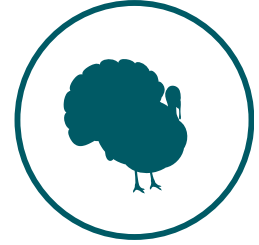
Management Strategies

Our plan for achieving this goal involves the following research, monitoring, policy, and outreach activities:

RESEARCH & MONITORING

1. Periodically survey the public to determine levels of acceptance for human-turkey conflicts and turkey population size (New; High Priority)

2. Periodically survey spring turkey hunters to measure levels of satisfaction and interference (New; High Priority)

3. Improve monitoring the number, type and severity of human-turkey conflicts (Ongoing; Moderate Priority)

POLICY & REGULATIONS

1. Request authorization for the commissioner to establish special wild turkey hunts in municipalities with hyperabundant turkey populations (Accomplished 2017).

2. Continue issuing depredation permits to allow designated hunters to harvest turkeys at conflict sites, including outside of the regular turkey season (Ongoing; Moderate Priority)

3. Continue to authorize landowners to implement lethal removal of turkeys in situations where other approaches are ineffective (Ongoing; Moderate Priority).

COMMUNICATION & OUTREACH

1. Develop and distribute BMPs to assist landowners with reducing wild turkey conflicts (New; High Priority) Expand the availability of information on the Department's website about ways to reduce wild turkey conflicts (New; Moderate Priority).

2. Strengthen the relationship with Maine Cooperative Extension, Maine Farm Bureau, the Maine Organic Farmer's and Gardener's Association, and other partners to provide information to farmers and landowners on methods to reduce conflicts with wild turkeys (Ongoing; High Priority).

3. Direct wild turkey hunters to problem areas with assistance from the Maine Chapter of the National Wild Turkey Federation or other sportsman groups (Ongoing; Moderate Priority)

4. With assistance from the Maine Chapter of the National Wild Turkey Federation or other organizations, develop and disseminate information for landowners who wish to enhance turkey habitat on their land (New; Moderate Priority).

Turkey Management Goal #3:

Increase the recreational value of the wild turkey resource by promoting participation in wild turkey hunting.
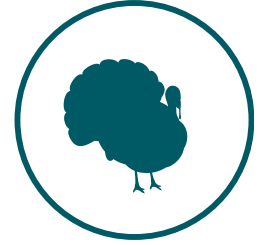
Goal #3

Background

Many hunters in Maine and across the northeast feel that Maine provides world-class turkey hunting opportunities. Low hunter density, abundant access to private land, and a relatively unpressured turkey population results in high satisfaction among hunters. However, relatively few hunters take advantage of opportunity to hunt turkeys in Maine, with only ~15,000 residents and ~1,000 non-residents purchasing turkey permits each year. Maine's turkey populations can likely sustain higher harvest levels than they have been experiencing; and in some cases, increased harvest will be required to meet population objectives in WMDS that are experiencing high conflict levels or density-dependent health effects. Therefore, the Department and its partners should embark on a focused effort to increase turkey hunting participation.

Objectives

We'll know we've achieved wild turkey management goal #3, to increase the recreational value of the wild turkey resource by promoting participation in wild turkey hunting, if we:

1. Promote wild turkey hunting to Maine residents and non-residents.
2. Develop tools to determine the current participation and interest of youth hunters.
3. Increase the public's awareness of the value of wild turkeys and the use of hunting as a population management tool.

Management Strategies

Our plan for achieving this goal involves the following outreach activities:

COMMUNICATION & OUTREACH

1. Increase public outreach to promote the value of turkey hunting as a management tool (Ongoing; Moderate Priority)
2. Provide a marketing effort for turkey hunting to increase participation (Ongoing; Moderate Priority)
3. Explore ways to encourage Canadian maritime hunters to hunt wild turkey in Maine (New; Low Priority)
4. Develop a wild turkey hunting video (New; Moderate Priority)
5. Update the spring wild turkey hunting guide. (New; Moderate Priority)
6. Continue to provide information to hunters on safe hunting practices (Ongoing; Moderate Priority)
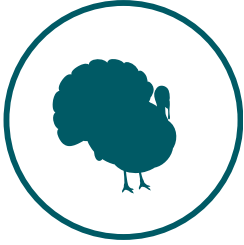
Turkey Management Goal #4:

Provide education to Maine residents (including hunters) on turkey biology, ecology, and management.

Goal #4

Background

During the public consultation efforts conducted by the Department and Responsive Management in 2016, it was clear that some members of the public hold a negative view of turkeys due to misconceptions about the species' biology and interactions with other species. More Maine residents indicated they knew little about turkeys than any of the other big game species, perhaps because most turkeys are a relatively recent phenomenon on much of the landscape.

Objectives

We'll know we've achieved wild turkey management goal #4, Provide education to Maine residents (including hunters) on turkey biology, ecology, and management, if we:

1. Increase the public's knowledge about wild turkey seasonal behavioral changes, impacts on forest regeneration, and interactions with other species.

2. Maintain or increase the 2016 levels of satisfaction and support for wild turkey management.

Management Strategies

Our plan for achieving this goal involves the following research, monitoring, and outreach activities:

RESEARCH & MONITORING

1. Periodically survey the public to determine levels of support for Maine's turkey management program and knowledge of turkey ecology (New; High Priority).

COMMUNICATION & OUTREACH

1. Develop a strategic outreach plan for turkeys and use the MDIFW Communication Program to disseminate key messages to the public (New; High Priority)

2. Compile and provide current information to the public on (Ongoing; Moderate Priority):
   - The impacts of turkeys on forest regeneration
   - Relationships between turkeys and other species
   - Relationships between turkeys and ticks

7.6 Expected Outcomes for Wild Turkey Management

Implementing the strategies for wild turkey management that are outlined in this plan will require adequate staffing, funding, and public support. It may not be necessary or feasible to implement all strategies in order to achieve the goals and objectives outlined in the plan. If MDIFW and its partners are successful in managing turkeys over the next 10 years, the following outcomes are anticipated:

- A new method of tracking wild turkey population trends to set hunting season frameworks is implemented by 2022.
- The percentage of the general public that feels turkey populations should remain the same in the area where they live increases to 70% by 2022.
- The percentage of the public rating the management of wild turkeys as 'excellent' or 'good' increases to 60% by 2022.
- The percentage of landowners that experience conflicts with turkeys within a 2-year period declines to less than 8% by 2022.
- Public support for legal turkey hunting remains above 90%.
- Annual hunter participation by adults increases to at least 20,000 by 2027.
- Annual youth hunter participation of a least 3,000 hunters by 2027.
- Statewide turkey hunter satisfaction remains above 90%.

8.0 Assumptions & Limitations

The goals, objectives, and management strategies in this Plan represent the Department's vision for Big Game Management for the next 10 years. Many components of the plan require collaboration with partners; and in some cases, depend on legislative or rule changes that involve a public review process. Ultimately, Maine's private landowners control most of the wildlife habitat in the state, and their cooperation is vital to achieving successful management programs for all four species. Therefore, although MDIFW will strive to implement all aspects of this Plan, many components will be possible only with support from other agencies, organizations, and Maine's public.

In total, this plan identifies 127 strategies to manage Maine's big game over the coming decade. Many strategies are complex, long-term research programs that will require substantial funding and expertise to implement. Others involve significant education programs that are beyond the scope of the Department's historic capacity for public outreach. However, the Department has a long history of implementing exemplary wildlife management programs, and the public consultation efforts in 2016 demonstrated a high level of public satisfaction with the Department's work. Even though unforeseen circumstances, time or budgetary constraints may preclude implementing all management strategies identified in this Plan, MDIFW will make every effort to maintain healthy, relatively abundant big game populations for all of Maine's citizens to enjoy into the future. As stewards of Maine's wildlife, we take our job very seriously, and look forward to the next 10 years of big game management.

9.0 Acknowledgments

This plan was prepared as a collaborative effort between members of MDIFW's Resource Assessment Section, Wildlife Management Section, Warden Service, and Augusta Headquarters Staff. Public members of the Big Game Steering Committee and Species Subcommittees (Appendix I) donated countless hours of their time to guide the public consultation process, develop much of the plan content and review early drafts of the document. Bob Wright (Panta Rei Consulting) facilitated the Steering Committee meetings, and MDIFW biologist Amanda Shearin facilitated bear subcommittee meetings. Mark Duda, Tom Beppler and other staff at Responsive Management coordinated the public consultation process and provided extensive guidance on the social aspects of wildlife management throughout the plan's development. Wally Jakubas and Michelle Philbrook edited the draft document, and Erica Johnson Design provided graphic design services. Finally, countless members of the public shared their views on big game management through the public survey, focus groups, regional meetings, and online town-hall. We hope this plan reflects their input and achieves the best possible outcome for Maine's bear, deer, moose, wild turkey, and public.

10.0 References

Adams, K. P., and P. J. Pekins. 1995. Growth patterns of New England moose: yearlings as indicators of population status. Alces 31:53-59.

Acheson, J. M. 2006. Public Access to Privately Owned Land in Maine. Maine Policy Review 15 (1):18 -30.

American Sportfishing Association, Responsive Management, Oregon Department of Fish and Wildlife, and Southwick Associates. 2013. Exploring Recent Increases in Hunting and Fishing Participation. Final Report. 168pp.

Andreozzi, H.A., P.J. Pekins., and L.E. Kantar. 2015. Analysis of age, body weight, and antler spread in bull moose harvested in Maine, 1980-2009. Alces. 51: 45-55.

Banasiak, C. F. 1964. Deer in Maine. Game Div. Bulletin No. 6. Dept. of Inland Fisheries and Game, Augusta, ME. 163pp.

Banasiak, C. F., F. Dunn., and K.I. Morris. 1980. Moose management plan. Pages 110-142 in Planning for Maine's Inland Fish and Wildlife, Vol. 1. Part 1. Maine Department of Inland Fisheries and Wildlife, Augusta, ME. 695 pp.

Boer, A. H. 1992. Fecundity of North American moose, Alces 27: 1-10.

Bontaites, K. M., K. A. Gustafson, and R. Makin. 2000. A Gasaway-type moose survey in New Hampshire using infrared thermal imagery: preliminary results. Alces 36:69-76.

Boyle, K. J., M. L. Phillips, and S. D. Reiling. 1991. Highlights from the 1989 Maine Wildlife Survey. University of Maine Department of Agriculture and Resource Economy. Staff paper series in Resource Economics. Orono, ME. ARE 425. 4pp.

Boyle, K. J. and A. G. Clark. 1993. Does getting a bull significantly increase value? The net economic value of moose hunting in Maine. Alces 29:201-212.

Department of Conservation, Maine Forest Service. 2005. The 2005 Biennial Report on the State of the Forest and Progress Report on Sustainability Standards. Report to the Joint Standing Committee of the 122nd Legislature on Agriculture, Conservation and Forestry. Maine Department of Conservation: Augusta. 124 pp.

Franzmann, A.W. and C.C. Schwartz, eds. 2007. Ecology and management of the North American moose. Smithsonian Institution Press, Washington, DC. 733 pp.

Healy, W. M., and S. M. Powell. 1999. Wild turkey harvest management: biology, strategies, and techniques. US Fish and Wildlife Service, Biological Technical Publication. BTP-R5001-1999, Washington DC, USA. 98pp.

Jakubas, W. J., C. R. McLaughlin, P. G. Jensen, and S. A. McNulty. 2005. Alternate year beechnut production and its influence on bear and marten populations. Pages 79-87 in C. A. Evans, J. A. Lucas, and M. J. Twery (eds.). Beech Bark Disease: Proceedings of the Beech Bark Disease Symposium. General Technical Report NE-331, US Department of Agriculture, Forest Service, Northern Research Station, Newtown Square PA. 149 pp.

Kantar, L.E. 2011. Broccoli and moose, not always served best together. Implementing a controlled moose hunt in Maine. ALCES Vol. 47: 83–90.

Kantar, L.E. and R.C. Cumberland. Using a Double Count Aerial Survey to Estimate Moose Abundance in Maine. 2013. Alces. Vol. 49: 17-28.

Lankester, M. W. 2010. Understanding the Impact of Meningeal Worm, Parelaphostronglus tenuis, on Moose Populations. Alces. Vol. 46: 53-70.

Lavigne, G. 1999. White-tailed Deer Assessment and Strategic Plan. Maine Department of Inland Fisheries and Wildlife, Bangor ME. 159pp.

Maine Department of Transportation. 2016. Collisions between wildlife species and motor vehicles in Maine 2011-2015. Maine Department of Transportation, Bureau of Maintenance and Operations, Traffic Engineering Division. 31 pp.

McCaskill, George L.; Albright, Thomas; Barnett, Charles J.; Butler, Brett J.; Crocker, Susan J.; Kurtz, Cassandra M.; McWilliams, William H.; Miles, Patrick D.; Morin, Randall S.; Nelson, Mark D.; Widmann, Richard H.; Woodall, Christopher W. 2016. Maine Forests 2013. Resoure. Bull. NRS-103. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 103 p.

McLaughlin, C. R. 1998. Modeling effects of food abundance and harvests on female black bear populations. Dissertation, Univ. Maine, Orono. 263pp.

McLaughlin, C. R. 1999. BLACK BEAR ASSESSMENT AND STRATEGIC PLAN. Maine Department of Inland Fisheries and Wildlife, Bangor ME. 136pp.

Morris, K. I. Moose Assessment 1999 (revised 2007). Maine Dept. of Inland Fisheries and Wildlife., Bangor, ME. 92pp.

Responsive Management. 2015. Maine residents' and outdoor recreationists' attitudes toward wildlife management and participation in wildlife-related recreation. Responsive Management Report, Harrisonburg, VA. 466pp.

Responsive Management. 2016. The opinions of Maine residents, landowners, and hunters regarding deer, moose, bear, and turkey. Responsive Management Report, Harrisonburg, VA. 543pp.

Sine, M., K.I. Morris, and D. Knupp. 2009. An assessment of a line transect method to determine winter tick abundance on Moose. Alces. Vol. 45: 143-146.

Southwick Associates. 2014. Hunting in Maine in 2013: a statewide and regional analysis of participation and economic contributions. Report Maine Office of Tourism and Maine Department of Inland Fisheries and Wildlife. 53pp.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

APPENDIX I
STEERING COMMITTEE & SPECIES SUBCOMMITTEES

STEERING COMMITTEE	
REPRESENTATIVE	**ORGANIZATION**
Gary Hilliard	Inland Fisheries and Wildlife Legislative Committee
Don Dudley	Inland Fisheries and Wildlife Advisory Council
Gerry Lavigne	Sportsman's Alliance of Maine
Tom Abello	The Nature Conservancy
Tom Doak	Maine Woodland Owners
Barry Burgason	Maine Forest Products Council
Deb Perkins	Maine Chapter of the Wildlife Society
Don Kleiner	Maine Professional Guide's Association
Jen Brophy	Maine Sporting Camp Association
Alicyn Smart	Maine Farm Bureau
Chris Cloutier	Maine Warden Service
Judy Camuso	MDIFW Wildlife Division
Nate Webb	MDIFW Wildlife Division
Wally Jakubas	MDIFW Wildlife Division
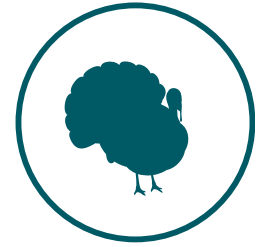
BEAR SUBCOMMITTEE	DEER SUBCOMMITTEE	MOOSE SUBCOMMITTEE	TURJEY SUBCOMMITTEE
Jen Vashon – Co-chair	**Kyle Ravana – Chair**	**Lee Kantar – Chair**	**Kelsey Sullivan – Chair**
Randy Cross – Co-chair	Mark Caron	Dave Hentosh	Mark Caron
Al Cowperthwaite	Bob Cordes	Doug Kane	Dave Chabot
Don Dudley	Gary Hilliard	Rob Kieffer	Bob Cordes
Jim Fahey	Gerry Lavigne	Roger Lambert	Jim Wescott
Doug Kane	Chuck Lubelczyk	Kendall Marden	
Kendall Marden	Fred Servello	Kevin Pelkey	
Erin Merrill	Henning Stabins	Nathan Kay	
Bob Parker	Dan Scott	Phil Savignano	
Katie Hansberry	Alicyn Smart	Tom Ward	

APPENDIX II
PROJECT CHARTER

Available online at:
http://www.maine.gov/ifw/docs/steering-committee/managementplan%20_operationalcharter.pdf